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Revision Summary

Date	Revision History	Revision Class	Comments
6/27/2008	1.0	New	First release
10/6/2008	1.02	Minor	Revised and edited the technical content
12/12/2008	1.03	Minor	Revised and edited the technical content
1/16/2009	1.04	Minor	Updated the Intellectual Property Rights Notice
7/13/2009	1.05	Major	Revised and edited the technical content
8/28/2009	1.06	Editorial	Revised and edited the technical content
11/6/2009	1.07	Editorial	Revised and edited the technical content
2/19/2010	2.0	Major	Updated and revised the technical content
3/31/2010	2.01	Editorial	Revised and edited the technical content
4/30/2010	2.02	Editorial	Revised and edited the technical content
6/7/2010	2.03	Editorial	Revised and edited the technical content
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1 Introduction

The Excel Binary File Format (.xlsb) Structure is a collection of records and structures that specify **workbook** content, which can include unstructured or semi-structured tables of numbers, text, or both numbers and text, formulas, external data connections, charts and images. Workbook content is typically organized in a grid based layout, and often includes numeric data, structured data, and formulas.

Sections 1.7 and 2 of this specification are normative. All other sections and examples in this specification are informative.

1.1 Glossary

This document uses the following terms:

A1: A reference style in which each **column (1)** is identified sequentially from left-to-right with a letter or series of letters in alphabetical order. Column headings are ordered A-Z, then AA-AZ, BA-BZ... ZA-ZZ, AAA-AAZ, and so forth. Each row is numbered sequentially from the top down.

absolute path: A string that identifies the location of a file and that begins with a drive identifier and root directory or network share and ends with the complete file name. Examples are C:\Documents\Work\example.txt and \\netshare\Documents\Work\example.txt.

absolute reference: A reference to a fixed location on a **sheet**. An absolute reference always refers to the same range, even if the formula that contains it is moved or copied to a new location.

absolute URL: The full Internet address of a page or other World Wide Web resource. The absolute URL includes a protocol, such as "http," a network location, and an optional path and file name — for example, http://www.treyresearch.net/.

active cell: The cell that is currently selected in a worksheet.

active sheet: The sheet that is currently selected.

ActiveX control: A reusable software control, such as a check box or button, that uses ActiveX technology and provides options to users or runs macros or scripts that automate a task. See also **ActiveX object**.

ActiveX Data Objects (ADO): A data access interface that connects to, retrieves, manipulates, and updates data in **Object Linking and Embedding (OLE)** database-compliant data sources.

ActiveX object: An object that is supplied by a component that supports automation.

add-in: Supplemental functionality that is provided by an external application or macro to extend the capabilities of an application.

add-in function: A worksheet function that is provided by an **add-in**, instead of being built-in.

aggregation function: A function, such as sum or average, that appears in the total row of a table and is used to summarize data.

ALL: See **OLAP All member**.

alternate startup directory: A secondary location that stores files to be opened by an application when the application starts.

American National Standards Institute (ANSI) character set: A **character set** defined by a **code page** approved by the American National Standards Institute (ANSI). The term "ANSI" as

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used to signify Windows code pages is a historical reference and a misnomer that persists in the Windows community. The source of this misnomer stems from the fact that the Windows code page 1252 was originally based on an ANSI draft, which became International Organization for Standardization (ISO) Standard 8859-1 [ISO/IEC-8859-1]. In Windows, the ANSI character set can be any of the following code pages: 1252, 1250, 1251, 1253, 1254, 1255, 1256, 1257, 1258, 874, 932, 936, 949, or 950. For example, "ANSI application" is usually a reference to a non-**Unicode** or code-page-based application. Therefore, "ANSI character set" is often misused to refer to one of the character sets defined by a Windows code page that can be used as an active system code page; for example, character sets defined by code page 1252 or character sets defined by code page 950. Windows is now based on **Unicode**, so the use of ANSI character sets is strongly discouraged unless they are used to interoperate with legacy applications or legacy data.

ARGB: A color space wherein each color is represented as a quad (A, R, G, B), where A represents the alpha (transparency) component, R represents the red component, G represents the green component, and B represents the blue component. The ARGB value is typically stored as a 32-bit integer, wherein the alpha channel is stored in the highest 8 bits and the blue value is stored in the lowest 8 bits.

ascending order: A sort order in which text strings are arranged in alphabetical order, numerical values are arranged from smallest to largest, and dates and times are arranged from oldest to newest.

ASCII: The American Standard Code for Information Interchange (ASCII) is an 8-bit character-encoding scheme based on the English alphabet. ASCII codes represent text in computers, communications equipment, and other devices that work with text. ASCII refers to a single 8-bit ASCII character or an array of 8-bit ASCII characters with the high bit of each character set to zero.

attribute: A characteristic of some **object** or entity, typically encoded as a name/value pair.

attribute drilldown: The process of examining the non-atomic constituent parts, such as properties or data elements, that make up an object.

attribute hierarchy: A single-level **hierarchy** that uses only an **attribute** or a column from a source, back-end relational database as its hierarchy. An attribute hierarchy typically has the same name as the attribute and is always associated with the attribute on which it is based. An all-level member can optionally be enabled for an attribute hierarchy. See also OLAP hierarchy.

Augmented Backus-Naur Form (ABNF): A modified version of Backus-Naur Form (BNF), commonly used by Internet specifications. ABNF notation balances compactness and simplicity with reasonable representational power. ABNF differs from standard BNF in its definitions and uses of naming rules, repetition, alternatives, order-independence, and value ranges. For more information, see [RFC5234].

AutoFilter: A mechanism that can be used to filter tabular data based on user-defined criteria such as values, strings, and formatting.

AutoFormat: A built-in set of complementary formatting options that can be applied to ranges of cells and other objects in a document.

automatic calculation mode: A **calculation mode** in which formulas in a worksheet are recalculated automatically whenever the data changes. See also **manual calculation mode**.

AutoRecover: A feature that recovers document and application states in the event of a hardware or software failure.

AutoShow: A filter option that enables users to display a specified number of the top- or bottom-most items within a PivotTable field.

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background color: A color against which characters, patterns, and graphics are displayed. See also **foreground color**.

Binary Interchange File Format (BIFF): The binary file formats that are used to save Excel workbooks.

Boolean: An operation or expression that can be evaluated only as either true or false.

border: A line that can be applied to the outer edge of a cell, shape, object, or chart element. A border can be variously formatted for style, color, and thickness.

border formatting: A set of properties that, as a whole, specify the appearance of a border, such as color, line style, and thickness.

border style: See **border formatting**.

build number: A part of a sequential numbering system that is used to differentiate one version of a software product from another.

built-in name: A member of the group of defined names that are reserved for specific functionality.

calculated column: A **column (1)** in a table that contains a formula that is copied automatically to each record in the column.

calculation mode: A setting that determines whether the formulas in a worksheet are recalculated automatically or manually. See also **automatic calculation mode** and **manual calculation mode**.

caption: One or more characters that can be used as a label for display purposes or as an identifier.

cascading style sheet (CSS): An extension to **HTML** that enables authors and users of HTML documents to attach style sheets to those documents, as described in [CSS-LEVEL1] and [CSS-LEVEL2]. A style sheet includes typographical information about the appearance of a page, including the font for text on the page.

cell: A box that is formed by the intersection of a **row** and a **column (1)** in a worksheet or a table. A cell can contain numbers, strings, and formulas, and various formats can be applied to that data.

cell reference: A set of coordinates that a cell occupies on a worksheet. For example, "B3" is the reference of a cell that appears at the intersection of column "B" and row "3".

cell value: The text or numeric content of a cell, or the results of a formula. A cell value does not include a formula expression, cell formatting, or other metadata.

center-across-selection alignment: A formatting setting that centers cell content horizontally within a selected range of cells.

character set: A mapping between the characters of a written language and the values that are used to represent those characters to a computer.

chart sheet: A single logical container that is used to create and store charts in a workbook.

chart sheet view: A set of display settings, such as zoom level, for a chart sheet window.

child element: In an XML document, an element that is subordinate to and is contained by another element, which is referred to as the parent element.

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class identifier (CLSID): A **GUID** that identifies a software component; for instance, a DCOM object class or a COM class.

code page: An ordered set of characters of a specific script in which a numerical index (code-point value) is associated with each character. Code pages are a means of providing support for **character sets** and keyboard layouts used in different countries. Devices such as the display and keyboard can be configured to use a specific code page and to switch from one code page (such as the United States) to another (such as Portugal) at the user's request.

collapsed outline state: A state in which the content that is nested within an outline is not displayed.

color scale: A specific range of colors that is used to give additional meaning to data by assigning certain values to colors in the spectrum.

column: (1) A single set of data that is displayed vertically in a worksheet or a table.

(2) See column chart.

comment: An annotation that is associated with a cell, text, or other object to provide context-specific information or reviewer feedback.

compact axis: A state in which PivotTable members from different levels in a hierarchy are displayed in a single **column (1)**.

Component Object Model (COM): An object-oriented programming model that defines how objects interact within a single process or between processes. In **COM**, clients have access to an object through interfaces implemented on the object. For more information, see [MS-DCOM].

conditional formatting: A mechanism that changes the appearance of a user interface element based on the evaluation of a rule or expression.

connection string: A series of arguments, delimited by a semicolon, that defines the location of a database and how to connect to it.

credential: Previously established, authentication data that is used by a security principal to establish its own identity. When used in reference to the Netlogon Protocol, it is the data that is stored in the NETLOGON_CREDENTIAL structure.

cube: A set of data that is organized and summarized into a multidimensional structure that is defined by a set of **dimensions** and **measures**.

cube function: A function that is used to extract and display Online Analytical Processing (OLAP) data sets and values.

custom list: A user-defined list or enumeration that can be used to sort data in a worksheet.

custom view: A collection of display and print settings that users can name and save. Users can switch between custom views to change settings quickly.

Data Access Objects (DAO): A programming interface that can be used to access and manipulate database objects.

data bar: A graphical representation of cell content as a bar graph.

data consolidation: The process of combining tabular data from various worksheets into a single list.

data marker: A customizable symbol or shape that identifies a data point on a line, scatter, or radar chart. A data marker can be formatted with various sizes and colors.

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data point: A representation of a PivotTable item in a PivotTable data field contained in a PivotChart report.

data provider: A known data source that is specific to a target type and that provides data to a collector type.

data recovery: A process in which files are repaired through error correction or restored from backup media.

data region: A region of a table that encompasses the range of cells that contains the table records. A data region does not include the **header row**, insert row, or total row of a table.

data source: A database, web service, disk, file, or other collection of information from which data is queried or submitted. Supported data sources vary based on application and data provider.

data table: A range of cells that is designated to perform what-if analysis for formulas, based on various input values.

data validation: The process of testing the accuracy of data; a set of rules that specify the type and range of data that users can enter.

date system: A method of calculating calendar dates and times.

DDE server: An application that responds to a **Dynamic Data Exchange (DDE)** request from a DDE client application.

DDE topic: A general classification of information about a **Dynamic Data Exchange (DDE)** server within which multiple, specific data items related to the topic can be exchanged.

defined name: A word or string of characters in a formula that represents a cell, range of cells, formula, or constant value.

diagonal-down: A cell **border formatting** that displays a line diagonally from the top left corner of a cell to the bottom right corner.

diagonal-up: A cell **border formatting** that displays a line diagonally from the bottom left corner of a cell to the top right corner.

dialog sheet: A single logical container that is used to create a custom dialog box.

dimension: A structural attribute of a cube, which is an organized hierarchy of categories (levels) that describe data in a fact table. These categories typically describe a similar set of members upon which the user bases an analysis.

display folder: A folder into which attributes, measures, calculated members, and key performance indicators can be organized to facilitate browsing.

distributed alignment: A formatting setting that spreads text evenly, both vertically and horizontally, between the edges of a cell, object, or page. Distributed alignment is used primarily with East Asian languages. See also **justify distributed**.

double accounting: An underline style that places two lines beneath the formatted text. Double accounting is frequently used to indicate totals.

drawing object: A shape, curve, line, WordArt, or other type of graphical object that can be inserted into a document.

drillthrough: A query that is used to retrieve individual records that were used to calculate an aggregate value.

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drop zone: An area of a PivotTable report where fields can be positioned to affect the layout of the report. Each PivotTable report has four drop zones.

dynamic array: An array resulting from a formula whose dimensions may change when the formula is evaluated.

Dynamic Data Exchange (DDE): An inter-process communication method that is featured in Windows. DDE allows two or more applications that are running simultaneously to exchange data and commands.

embedded object: An object that is created by using one application and is hosted in a document that was created by using another application. Embedding an object, rather than inserting or pasting it, ensures that the object retains its original format. Users can double-click an embedded object and edit it with the toolbars and menus from the application that was used to create it. See also **Object Linking and Embedding (OLE)**.

English Metric Unit (EMU): A measurement in computer typography. There are 635 EMUs per twip, 6,350 EMUs per half-point, 12,700 EMUs per point, and 914,400 EMUs per inch. These units are used to translate on-screen layouts to printed layouts for specified printer hardware.

Excel Linked Library (XLL): A Dynamic Link Library (DLL) that is authored to function as an **add-in** for Microsoft Excel.

Excel macro (XLM): A programming language that provides development capability in Microsoft Excel. XLM was superseded by Microsoft Visual Basic for Applications (VBA).

expand/collapse button: A user interface control that is used to determine which hierarchical level is displayed in an outline, or in row and column groupings.

expression: A combination of operators, symbols, constants, literal values, functions, names of fields or **columns**, controls, and properties that evaluates to a single value.

external data: Data that is stored in a repository outside a workbook.

external link: A reference to a cell, range, defined name, or other object in another worksheet or workbook.

external workbook: A workbook, other than the active workbook, that is on disk or in memory and to which a dependency is implied or intended.

file extension: The sequence of characters in a file's name between the end of the file's name and the last "." character. Vendors of applications choose such sequences for the applications to uniquely identify files that were created by those applications. This allows file management software to determine which application are to be used to open a file.

file format compatibility checker: A tool that identifies whether a workbook has compatibility issues that can cause a significant loss of functionality or a minor loss of fidelity in a different version of Microsoft Excel. The compatibility checker finds any potential compatibility issues and generates a report so that they can be resolved.

fill: A color, pattern, or other attribute that is used to format the background of a cell, shape, or chart element. See also **fill color** and **fill pattern**.

fill alignment: A setting that repeats a cell value to fill the horizontal space of a cell. If the cell value exceeds the horizontal width of the cell, the value is truncated.

fill color: A color that is used to fill the background of a cell, shape, or chart element.

fill pattern: A repetitive design that users can add to the background of a cell, shape, or chart element.

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filter: A mechanism by which a set of data is scoped to display only those entries that meet specified logical criteria.

fit to page: A printing option that scales a document to print on a specified number of pages.

floating-point number: A number that is represented by a mantissa and an exponent according to a given base. The mantissa is typically a value between "0" and "1". To find the value of a floating-point number, the base is raised to the power of the exponent, and the mantissa is multiplied by the result.

folder: A file system construct. File systems organize a volume's data by providing a hierarchy of objects, which are referred to as folders or directories, that contain files and can also contain other folders.

font: An object that defines the graphic design, or formatting, of a collection of numbers, symbols, and letters. A font specifies the style (such as bold and strikeout), size, family (a typeface such as Times New Roman), and other qualities to describe how the collection is drawn.

font face color: A property of a cell that specifies the color that is used to render a font.

font face weight: A value that specifies the thickness of a font.

font family: A set of fonts that all have common stroke width and serif characteristics. For example, Times Roman and Times Roman Italic are members of the same font family.

font scheme: A combination of complementary fonts in a **theme**.

foreground color: A color that is used to display text, patterns, and other objects that appear in front of or on top of the **background color**.

format string: A string that contains the number formatting information to apply to data, such as decimal position, percentage indicator, or currency symbol.

formula: A logical equation or function that produces a result in a spreadsheet application.

formula bar: A user interface element that appears at the top of a worksheet and is used to display and edit cell content.

fragment identifier: A portion of a URI that specifies the destination of a hyperlink within a document.

friendly name: A name for a user or object that can be read and understood easily by a human.

frozen panes: Portions of a worksheet that remain static and do not scroll when the worksheet is displayed in split pane view. See also **split pane**.

function: A code module that takes a value as input, performs an operation, and returns the results to a worksheet.

function category: A group of worksheet functions that are part of the same broad usage area, such as Finance or Statistical. A function category can be built-in or user-defined.

future function: A function that can be written to but is not implemented in a file.

general alignment: A default formatting setting for the horizontal alignment of cell content in a worksheet. Text is positioned to the left and numbers are positioned to the right.

globally unique identifier (GUID): A term used interchangeably with universally unique identifier (UUID) in Microsoft protocol technical documents (TDs). Interchanging the usage of these terms does not imply or require a specific algorithm or mechanism to generate the value. Specifically, the use of this term does not imply or require that the algorithms described in

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[RFC4122] or [C706] must be used for generating the **GUID**. See also universally unique identifier (UUID).

gradient fill: A type of fill that applies gradient formatting to the background of a cell or an object.

gradient stop: A marker on a gradient spectrum that denotes where a specific color is introduced in gradient formatting.

gradient vector: A vector that indicates the direction of a gradient fill. The gradient vector is perpendicular to the bands of color.

grand total: An aggregation of all of the field subtotals in a PivotTable report.

gridline: A line that is drawn on a worksheet or table for use as a visual aid to distinguish between cells.

hash: A fixed-size result that is obtained by applying a one-way mathematical function, which is sometimes referred to as a hash algorithm, to an arbitrary amount of data. If the input data changes, the hash also changes. The hash can be used in many operations, including authentication and digital signing.

header: A line, or lines, of content in the top margin area of a page in a document or a slide in a presentation. A header typically contains elements such as the title of the chapter, the title of the document, a page number, or the name of the author.

header row: A row in a table, typically the first row, that contains labels for **columns (1)** in the table.

hidden: A condition of an object that prevents it from being displayed in rendered output.

hidden column: A **column (1)** that does not appear in a worksheet view because its width is set to 0 (zero). A column can be hidden if an outline is collapsed.

hidden protection: A cell protection property that prevents formulas, but not values, from appearing in a cell when a worksheet is **protected**.

hidden row: A row that does not appear in a worksheet view because its height is set to "0" (zero). A row can be hidden if the data is filtered or an outline is collapsed.

hierarchy: A logical tree structure that organizes the members of a dimension such that each member has one parent member and zero or more child members.

horizontal alignment: A formatting setting that specifies how content is positioned within the horizontal space of a cell, object, or page. Content can be aligned along the left or right edge, or distributed evenly across the horizontal space.

hyperlink: A relationship between two anchors, as described in [RFC1866].

Hypertext Markup Language (HTML): An application of the Standard Generalized Markup Language (SGML) that uses tags to mark elements in a document, as described in [HTML].

icon: A graphical image used to supplement alphanumeric text in the visual identification of an object on a computer monitor. **Icons** are typically small, relative to the size of the area on which they are displayed.

icon set: A collection of icons that can be used to comment and classify data into categories.

indentation level: A measure of the distance between the position of content that is in a cell and the logical left side of the cell. An indentation level is equal to three spaces.

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Information Rights Management (IRM): A technology that provides persistent protection to digital data by using encryption, certificates, and authentication. Authorized recipients or users acquire a license to gain access to the protected files according to the rights or business rules that are set by the content owner.

ink: A process of entering text in handwritten form. Instead of converting handwritten text to typed text, ink is converted to an object and displayed exactly as it was written.

inner rectangle: In a cell that is formatted with a rectangular gradient, a rectangle that is formed by the leftmost, rightmost, topmost, and bottommost lines of pixels in which the initial color of the gradient is completely dissipated. See also **rectangular gradient**.

input cell: A cell in which each input value from a data table is substituted.

Input Method Editor (IME): An application that is used to enter characters in written Asian languages by using a standard 101-key keyboard. An IME consists of both an engine that converts keystrokes into phonetic and ideographic characters and a dictionary of commonly used ideographic words.

insert row: A placeholder row at the bottom of a table. It is used to enter new records.

iterative calculation: A **calculation mode** in which calculations are performed until a specific numeric condition is met or a maximum number of iterations is reached.

justify alignment: A formatting setting that spreads text evenly, both vertically and horizontally, between the edges of a cell, object, or page. Also referred to as distributed alignment.

justify distributed: A special, distributed-alignment setting that evenly distributes the last line of text in a cell. The setting is primarily used for East Asian languages. See also **distributed alignment**.

key performance indicator (KPI): A predefined measure that is used to track performance against a strategic goal, objective, plan, initiative, or business process. A visual cue is frequently used to communicate performance against the measure.

language code identifier (LCID): A 32-bit number that identifies the user interface human language dialect or variation that is supported by an application or a client computer.

left-to-right: A reading order in which characters in words are read from left to right, and words are read from left to right in sentences.

level: A relative position in a hierarchy of data. A level is frequently used when describing how to navigate a hierarchy in an Online Analytical Processing (OLAP) database or a PivotTable report.

library directory: A directory in which Microsoft Excel **add-ins** are installed.

line style: A style, including width and dash type, that is applied to and alters the appearance of a line or **border**.

linear gradient: A type of gradient fill in which the color of a cell or other object gradually changes horizontally, vertically, or diagonally from one edge of the object to the other.

linked object: An object that is inserted into a document and continues to exist in a separate source file. If the object in the source file changes, the object in the document is updated automatically to reflect those changes.

little-endian: Multiple-byte values that are byte-ordered with the least significant byte stored in the memory location with the lowest address.

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locale: A collection of rules and data that are specific to a language and a geographical area. A locale can include information about sorting rules, date and time formatting, numeric and monetary conventions, and character classification.

locked: The condition of a cell, worksheet, or other object that restricts edits or modifications to it by users.

locked protection: A cell-protection property that restricts the editing of cell content when a worksheet is **protected**.

logical left: A position that is relative to the language orientation of a document. Logical left means left, except in a right-to-left language where it means right. Also referred to as leading edge.

logical right: A position that is relative to the language orientation of a document. Logical right means right, except in a right-to-left language where it means left. Also referred to as trailing edge.

logical top-left: A position that is relative to the language orientation of a document. Logical top-left is the upper-left corner of a range or object when in left-to-right mode. It is the upper-right corner when in right-to-left mode.

logical top-right: A position that is relative to the language orientation of a document. Logical top-right is the upper-right corner of a range or object when in left-to-right mode. It is the upper-left corner when in right-to-left mode.

long file name: A folder or file name that is longer than the 8.3 file name standard, which permits as many as eight characters followed by a period and a file name extension of three characters.

macro: A set of instructions that are recorded or written, and then typically saved to a file. When a macro is run, all of the instructions are performed automatically.

macro sheet: A single, logical container that is used to store and run Microsoft Excel 4.0 for Windows macro formulas.

major scheme: A font scheme that is used for primary text elements, such as headings and titles, in a **theme**.

Mandarin phonetic symbols: A phonetic system for transcribing Chinese through the use of an alphabet that includes characters for all possible sounds in the spoken Mandarin language.

manifest: A file that stores metadata about an expansion pack, such as the name of the expansion pack, the files and resources that are included in the expansion pack, and the dependencies that it has on other files and components.

manual calculation mode: A **calculation mode** in which the formulas in a workbook are calculated only when specified by a user. See also **automatic calculation mode**.

MDX query: A query that uses the multidimensional expression (MDX) syntax.

MDX unique name: A unique identifier for a multidimensional expression (MDX) member or value in a given Online Analytical Processing (OLAP) cube, for example "[Customer].[Customer Geography].[Country].&[Australia]".

measure: In a cube, a set of values that are typically numeric and are based on a column in the fact table of the cube. Measures are the central values that are aggregated and analyzed.

measure group: A collection of related **measures** in a **cube** that derive from a single fact table, typically in a data source view.

member: See **OLAP member**.

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member property: An **attribute** on a data item within a specific dimension in an Online Analytical Processing (OLAP) database.

merged cell: A single cell that is created by combining two or more adjacent cells.

MIME Encapsulation of Aggregate HTML Documents (MHTML): A MIME-encapsulated HTML document, as described in [RFC2557].

minimal save: A process that saves only critical workbook data to disk when errors are detected during a file save operation.

minor scheme: A font scheme that is used for secondary text elements, such as body text, in a **theme**.

module: A collection of routines and data structures that performs a specific task or implements a specific abstract data type. Modules usually consist of two parts, a module header and a module body. A module header is a set of name/value attribute pairs that specify the linguistic characteristics of the module. A module body is the VBA source code, a set of declarations followed by procedures. VBA supports two types of modules, procedural modules and class modules.

module sheet: A sheet type that contains VBA code and was created by using Microsoft Excel 5.0 for Windows or Microsoft Excel for Windows 95.

Multidimensional Expressions (MDX): A syntax that is used for defining multidimensional objects, and for querying and manipulating multidimensional data.

named range: See **defined name**.

ninched: A condition in which a group of selected cells or objects do not share a specific property. For example, if a selection has three cells and only two of the cells share the same color formatting, the color formatting of the selection is in a ninched state.

non-contiguous range: A selected **range** that includes non-adjacent cells.

Normal view: A document view that displays text formatting and a simplified page layout of a document. The Normal view hides some layout elements such as the header and footer. Referred to as Draft view in Microsoft Office Word 2007 and Microsoft Word 2010.

number format: A property of a cell or other type of object that determines how numerical data is displayed or interpreted. For example, a currency number format affixes the proper currency symbol to the number.

object: In **COM**, a software entity that implements the IUnknown interface and zero or more additional interfaces that may be obtained from each other using the IUnknown interface. A **COM object** can be exposed to remote clients via the DCOM protocol, in which case it is also a DCOM object.

Object Linking and Embedding (OLE): A technology for transferring and sharing information between applications by inserting a file or part of a file into a compound document. The inserted file can be either embedded or linked. See also **embedded object** and **linked object**.

object model: A collection of object-oriented APIs that represent data structures and are designed to promote software interoperability.

OLAP All level: An optional level at the top of a hierarchy. It typically contains an **OLAP All member** that represents an aggregation of all of the lower-level members of that hierarchy.

OLAP All member: A multidimensional expression (MDX) that evaluates a hierarchy and returns a set that contains all of the members of the specified hierarchy.

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OLAP allocation: An operation in which the values for members at lower levels in an **OLAP hierarchy** are changed based on changes to values for members at higher levels in that hierarchy.

OLAP calculated member: An **OLAP member** whose value is calculated at run time.

OLAP cube: A data structure that aggregates **Online Analytical Processing (OLAP)** measures by **OLAP levels** and **OLAP hierarchies**. An OLAP cube combines several OLAP hierarchies, such as time, geography, and product lines, with OLAP measures, such as sales or inventory figures.

OLAP hierarchy: An **attribute hierarchy** or a user-defined hierarchy in a data structure. By default, each dimension **attribute** has an attribute hierarchy. A user-defined hierarchy is a set of related attribute hierarchies that is used to facilitate browsing an **OLAP cube**.

OLAP KPI: See **key performance indicator (KPI)**.

OLAP level: Within an **OLAP hierarchy**, a set of data that is organized into a lower or higher level of detail, such as Year, Quarter, Month, and Day levels in a Time hierarchy.

OLAP measure: A set of numeric values in an **OLAP cube** that is used in aggregation and analysis.

OLAP member: An item that is in an **OLAP level**. For example, a Canada member in a Country level of a Geography hierarchy.

OLAP member property: A relationship between two **OLAP hierarchies**, such as a Population member property of a Country member.

OLAP named set: A collection of **OLAP tuples** that have the same dimensionality. Also referred to as OLAP set.

OLAP subselect: The ability to execute multiple SELECT commands in a FROM clause that is inside a multidimensional expression (MDX) statement.

OLAP tuple: An ordered collection of members that are from different dimensions of an **OLAP cube**. A single member is a special case of a tuple.

OLAP weight expression: A multidimensional expression (MDX) that is used to apply and allocate modified values to an **Online Analytical Processing (OLAP)** provider. It typically returns a decimal value between "0" and "1".

OLE DB: A set of interfaces that are based on the Component Object Model (COM) programming model and expose data from a variety of sources. These interfaces support the amount of Database Management System (DBMS) functionality that is appropriate for a data store and they enable a data store to share data.

OLE object: An object that supports the **Object Linking and Embedding (OLE)** protocol.

OLE1: See **Object Linking and Embedding (OLE)**.

OLE2: See **Object Linking and Embedding (OLE)**.

one-variable data table: A data table that consists of only one input cell, which is either a row input cell or a column input cell.

Online Analytical Processing (OLAP): A technology that uses multidimensional structures to provide access to data for analysis. The source data for OLAP is stored in data warehouses in a relational database. See also **cube**.

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Open Data Protocol (OData): A web protocol for querying and updating data specified in the OData protocol.

Open Database Connectivity (ODBC): A standard software API method for accessing data that is stored in a variety of proprietary personal computer, minicomputer, and mainframe databases. It is an implementation of [ISO/IEC9075-3:2008] and provides extensions to that standard.

outline: A nested grouping of rows or **columns (1)** that are in a worksheet.

outline level: The number of levels that a task is indented from the top level of an outline; the order associated with an outline.

outline state: A setting that specifies whether an outline is currently outline expanded or outline collapsed.

outline symbol: A user interface control that is used to display or hide subordinate levels in an outline.

page break: A divider that breaks a worksheet into separate pages for printing. Page breaks are inserted automatically based on the paper size, margin settings, scaling options, and the positions of any page breaks that are inserted manually.

Page Break Preview view: A worksheet view that displays the areas to be printed and the locations of page breaks.

Page Layout view: A sheet view that displays a sheet as it would appear on a printed page, including margins, header and footer elements, and pagination.

page margin: The white space at the top, bottom, and sides of a document when a document is printed.

palette color: A specific color among those that are available on the active color palette.

pane: A portion of a software window that has a distinct function and is bounded by and separated from other portions of the window by vertical or horizontal bars.

phonetic guide: A set of supplemental phonetic symbols that appears above text in Japanese and other East Asian languages. A phonetic guide is displayed automatically and can be edited by the user.

phonetic information: A series of characters that appear above text in a cell and provide information that helps users pronounce the text.

phonetic string: A series of characters that appear above a string and provide information that helps users pronounce the string. Phonetic strings are typically used in East Asian languages.

phonetic text run: A series of characters that are within a **phonetic string**.

PivotChart filter pane: A user interface element that displays a list of active fields in a PivotChart view and is used to apply filters to those fields.

PivotTable: An interactive table that summarizes large amounts of data from various sources by using format and calculation methods. Row and column headings can be rotated to view different summaries of the source data, filter the data, or display detail data for specific areas.

PivotTable field list: A user interface element that displays a list of all of the fields in a PivotTable report. It can be used to populate a PivotTable report and to manipulate the fields.

pixel: A discrete unit of display on a computer display device.

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placeholder: A character or symbol that is used in place of an actual value, text, or object. The actual value that the placeholder represents is unknown or unavailable at the current time, or is not displayed for security reasons.

plot area: A portion of a chart area that contains the plotted data and axes.

precision as displayed: A calculation setting that permanently changes stored values in cells from full precision (15 digits) to the currently displayed format, including the number of decimal places.

print area: A collection of one or more ranges of cells that are designated to be printed. If a worksheet includes a print area, only the content inside the print area is printed.

print scale: The size of the output that is printed on a page. It is expressed as a percentage of the size of the original page content.

print settings: The settings that specify how a file is printed in a specific print job, such as duplex or landscape orientation. Printer settings are settings that can differ from printer to printer but apply to every print job of a given printer. Print settings are values that typically vary between print jobs.

print titles: The rows or **columns (1)** that appear on each page when a page is printed. Print titles are typically used to print column headers above tabular data that spans several printed pages.

ProgID: An identifier that is used by the Windows registry to uniquely identify an object and is in the form OLEServerName.ObjectName, for example, "Excel.Sheet" or "PowerPoint.Slide."

protected: A property that is applied manually to a file or a portion of a file, with or without a password, and that helps prevent users from accidentally or deliberately changing, moving, or deleting data.

protection: A mechanism that helps restrict users from making unwanted changes to the data or structure of a workbook.

publish to server: A process that facilitates saving a document or portions of a document to a web server.

published: A condition of portions of a workbook that are marked as being available to the user when that workbook is processed by a protocol server.

query: A formalized instruction to a data source to either extract data or perform a specified action. A query can be in the form of a query expression, a method-based query, or a combination of the two. The data source can be in different forms, such as a relational database, XML document, or in-memory object. See also search query.

query table: A two-dimensional table that presents data from an external data source.

R1C1: A reference style in which each row and each **column (1)** has a numeric heading that is numbered sequentially from top to bottom and left to right, respectively. "R" stands for row and "C" stands for column.

range: An addressable region that is in a workbook. A range typically consists of zero or more cells and represents a single, contiguous rectangle of cells on a single sheet.

reading order: The positioning of characters in words and the positioning of words in sentences. This can be left-to-right or right-to-left.

read-only recommended: A file sharing property that displays an alert when a file is being opened. The text of the alert recommends that the user open the file with read-only permission.

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real-time data (RTD): Data that is pushed into a worksheet from an **RTD server** and is updated continually. Real-time data is frequently used to track stock prices or inventory levels in real time.

rectangular gradient: A type of gradient fill in which the color of a cell or other object gradually changes with each successive inner rectangle of pixels.

red-green-blue (RGB): A color model that describes color information in terms of the red (R), green (G), and blue (B) intensities in a color.

red-green-blue-alpha (RGBA): A color model that describes color information in terms of the red (R), green (G), blue (B), and alpha (A) intensities that comprise a color.

refresh: A process that retrieves values from a data source and populates a workbook with those values.

relative reference: A reference to a location on a sheet that is relative to the cell that contains the reference. A relative reference can be stored as a cell reference or as an offset.

relative security descriptor: A security descriptor that contains all associated security information in a contiguous block of memory.

revision: A change in a document, file, or other object.

revision history: A list of data that describes document updates, such as when and by whom a document was modified.

rich value: A complex representation of data that contains a rich value type, a rich value fallback, and a collection of key value pairs (KVP). A rich value can exist as the value of a cell or nested as the value in a key value pair.

rich value key: The name of the key in the key value pair (KVP).

right-to-left: A reading and display order that is optimized for right-to-left languages.

root element: The top-level element in an XML document. It contains all other elements and is not contained by any other element, as described in [XML].

row: A single set of data that is displayed horizontally in a worksheet or a table.

RTD server: A Component Object Model (COM) Automation server that is used by the real-time data (RTD) function to retrieve data in real time. The RTD server can exist as an ActiveX DLL or as an executable (.exe) file that runs on the same local computer or on a remote server.

RTD topic: A discrete combination of parameters that is used to request data from a real-time data (RTD) server.

ruler: A user interface element that enables users to adjust page margins and to measure and align objects in a document.

safe load: A process of loading a file in which additional error checking is performed and various corruption patterns in the file are detected and repaired.

salt: An additional random quantity, specified as input to an encryption function that is used to increase the strength of the encryption.

scenario: A named set of input values (changing cells) that can be substituted in a worksheet model.

Scenario Manager: A process for creating and managing different sets of input values for calculation models in a worksheet.

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security descriptor: A data structure containing the security information associated with a securable **object**. A **security descriptor** identifies an **object's** owner by its security identifier (SID). If access control is configured for the **object**, its **security descriptor** contains a discretionary access control list (DACL) with SIDs for the security principals who are allowed or denied access. Applications use this structure to set and query an **object's** security status. The **security descriptor** is used to guard access to an **object** as well as to control which type of auditing takes place when the **object** is accessed. The **security descriptor** format is specified in [MS-DTYP] section 2.4.6; a string representation of **security descriptors**, called SDDL, is specified in [MS-DTYP] section 2.5.1.

selected: The condition of a set of items that has focus in a workbook.

selection: An item or set of items, such as cells, shapes, objects, and chart elements, that has focus in a document.

server name: The name of a server, as specified in the operating system settings for that server.

session: A representation of application data in system memory. It is used to maintain state for application data that is being manipulated or monitored on a protocol server by a user.

shade: A color that is mixed with black. A 10-percent shade is one part of the original color and nine parts black.

shape: A collection of qualifiers, such as names, and quantifiers, such as coordinates, that is used to represent a geometric object. A shape can be contained in a document, file structure, run-time structure, or other medium.

shared workbook: A workbook that is configured to enable multiple users on a network to view and make changes to it at the same time. Each user who saves the workbook sees the changes that are made by other users.

sheet: A part of an Excel workbook. There are four types of sheets: **worksheet**, **macro sheet**, **dialog sheet**, and **chart sheet**. Multiple sheets are stored together within a workbook.

sheet tab: A control that is used to select a sheet.

sheet view: A collection of display settings, such as which cells are shown, and the zoom level for a sheet window.

shrink to fit: The process of adjusting the font size of text in a cell to fit the current height and width of the cell.

single accounting: An underline style that places one line beneath the text. Single accounting can be used to indicate subtotals.

single sign-on (SSO): A process that enables users who have a domain user account to log on to a network and gain access to any computer or resource in the domain without entering their **credentials** multiple times.

smart document: A file that is programmed to assist the user as the user creates or updates the document. Several types of files, such as forms and templates, can also function as smart documents.

smart tag: A feature that adds the ability to recognize and label specific data types, such as people's names, within a document and displays an action button that enables users to perform common tasks for that data type.

smart tag actions button: A user interface control that displays a menu of actions that are associated with a specific smart tag.

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smart tag indicator: A triangular symbol that appears in the bottom right corner of a cell and indicates that the cell contains a smart tag.

smart tag recognizer: An **add-in** that can interpret a specific type of smart tag, such as an address or a financial symbol, in a document and display an action button that enables users to perform common tasks for that data type.

sort: A process that arranges cells in ascending or descending order, based on cell content.

sort condition: A condition that determines how to sort cells in a range.

sort order: (1) A set of rules in a search query that defines the ordering of rows in the search result. Each rule consists of a managed property, such as modified date or size, and a direction for order, such as ascending or descending. Multiple rules are applied sequentially.

(2) A specific arrangement of cells that is based on cell content. The order can be ascending or descending.

source data: The data that is used as the basis for charts, PivotTable reports, and other data visualization features.

sparkline: A miniature chart that can be inserted into text or embedded in a cell on a worksheet to illustrate highs, lows, and trends in data.

split pane: A pane that consists of two or more discrete areas of a window. Each area displays content and scrolls independently from other areas of the window. See also **frozen panes**.

spreadsheet data model: A local **Online Analytical Processing (OLAP)** storage of data used by a spreadsheet application.

startup directory: The directory from which an application opens data files when the application starts.

strikethrough formatting: A formatting option in which characters are crossed out by horizontal line.

stripe band: One or more adjacent **columns (1)** or **rows** that are in a table and have the same **stripe formatting**.

stripe formatting: A table formatting option that applies **background colors** to alternating **rows** or **columns (1)** to increase legibility.

stroke order: A sort order that arranges items in a sort range according to the number of strokes that is used to write each glyph. Stroke order is used when sorting text that is written in some East Asian languages.

Structured Query Language (SQL): A database query and programming language that is widely used for accessing, querying, updating, and managing data in relational database systems.

style: A set of formatting options that is applied to text, tables, charts, and other objects in a document.

summary: The orientation of outline expand and outline collapse symbols in relation to the data that is outlined.

table: A list that is defined in a workbook.

table header: The top row of a table, where the column names are displayed.

target: An actor to which a task is assigned.

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text importation: A process that incorporates textual data into a workbook, either by opening a text file or through an external link.

text run: A string of characters that represents a discrete span of text with the same formatting properties.

theme: A set of unified design elements, such as colors, fonts, graphics, and styles, that define the appearance of a website, document, or data visualization.

time hierarchy: A specialized Online Analytical Processing (OLAP) hierarchy that can be organized into lower and higher levels of detail, such as Year, Quarter, Month, and Day.

tooltip: A window displaying text that is created when the mouse is moved over a window or notification icon.

top N filter: A filter that matches the top or bottom N items or N% of items in a specified **column (1)**.

total row: A row in a list or table that provides a selection of aggregate functions that are useful for working with numerical data.

transfer protocol: A protocol that governs the transfer of files, Internet messages, and webpages between networked computers. On the Open Systems Interconnection (OSI) Basic Reference Model, these are application layer protocols. Examples of transfer protocols are Hypertext Transfer Protocol (HTTP), Simple Mail Transfer Protocol (SMTP), and File Transfer Protocol (FTP).

transition formula entry: A worksheet option that enables users to enter formulas that use IBM Lotus 1-2-3 syntax.

transition formula evaluation: A setting that enables formulas in a worksheet to be calculated in a manner that is consistent with IBM Lotus 1-2-3.

tuple: An ordered grouping of members from different dimensions or hierarchies. A single member is a special case of a tuple and can be used as an expression. Every hierarchy does not have to be represented in a tuple.

twip: A unit of measurement that is used in typesetting and desktop publishing. It equals one-twentieth of a printer's point, or 1/1440 of an inch.

two-variable data table: A data table that consists of two input cells, a row input cell and a column input cell.

type library: A binary file that describes the methods, properties, and data structure of a component.

UNC volume: A storage device that is accessible by network protocols and addressed in the standard Universal Naming Convention format, for example, "\\Server Name\Share Name".

Unicode: A character encoding standard developed by the Unicode Consortium that represents almost all of the written languages of the world. The **Unicode** standard [UNICODE5.0.0/2007] provides three forms (UTF-8, UTF-16, and UTF-32) and seven schemes (UTF-8, UTF-16, UTF-16 BE, UTF-16 LE, UTF-32, UTF-32 LE, and UTF-32 BE).

Uniform Resource Identifier (URI): A string that identifies a resource. The URI is an addressing mechanism defined in Internet Engineering Task Force (IETF) Uniform Resource Identifier (URI): Generic Syntax [RFC3986].

Uniform Resource Locator (URL): A string of characters in a standardized format that identifies a document or resource on the World Wide Web. The format is as specified in [RFC1738].

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user-defined function (UDF): A function that is coded in a VBA module, macro sheet, **add-in**, or **Excel Linked Library (XLL)**. A UDF can be used in formulas to return values to a worksheet, similar to built-in functions.

VBA project: A collection of the modules, class modules, and user forms that are needed to create an application. Modules, class modules, and user forms can be imported into and exported from a project.

Vector Markup Language (VML): A system of marking up or tagging two-dimensional vector graphics for publication on the World Wide Web. VML graphics are scalable and editable, and typically require less disk space and less time to download.

vertical alignment: A formatting setting that specifies how content is positioned within the vertical space of a cell, object, or page. Content can be aligned along the top or bottom edge, or distributed evenly across the vertical space.

visible: A condition of an object that allows it to be displayed in rendered output.

Visual Basic for Applications (VBA): A macro-based programming language that derives from Microsoft Visual Basic and can be used to customize and extend an application. Unlike Visual Basic, VBA code and macros can be run only from within a host application that supports VBA.

volatile: A condition of a formula in which the formula is calculated every time the workbook is calculated. This is unlike a non-volatile formula, which is calculated only when dependent values are changed.

watched cell: A cell whose value is monitored in a separate window while formulas that are associated with the cell are calculated.

web query: An external data connection that retrieves a table from a website and inserts table data into a workbook.

window protection: A workbook protection option that prevents users from changing the position and size of a window.

workbook: A container for a collection of **sheets**.

workbook view: A set of display settings, such as the height and width, for the windows in a workbook.

worksheet: A single logical container for a set of tabular data and other objects in a workbook.

write reservation: A field or condition that is set on a document, workbook, or presentation to help prevent users from modifying it.

write-reservation password: A sequence of characters that need to be entered to modify a document.

XML: The Extensible Markup Language, as described in [XML1.0].

XML map: A feature that is used to import data from databases and applications and to map XML elements and **attributes** from the associated **XML schema** to cells in a worksheet. The revised **XML** data can then be exported for interaction with other databases and applications.

XML namespace: A collection of names that is used to identify elements, types, and attributes in XML documents identified in a URI reference [RFC3986]. A combination of XML namespace and local name allows XML documents to use elements, types, and attributes that have the same names but come from different sources. For more information, see [XMLNS-2ED].

XML node: The smallest unit of a valid, complete structure in an XML document. For example, a node can represent an element, an **attribute**, or a text string.

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XML Path Language (XPath): A language used to create expressions that can address parts of an XML document, manipulate strings, numbers, and Booleans, and can match a set of nodes in the document, as specified in [XPATH]. XPath models an XML document as a tree of nodes of different types, including element, attribute, and text. XPath expressions can identify the nodes in an XML document based on their type, name, and values, as well as the relationship of a node to other nodes in the document.

XML schema: A description of a type of XML document that is typically expressed in terms of constraints on the structure and content of documents of that type, in addition to the basic syntax constraints that are imposed by **XML** itself. An XML schema provides a view of a document type at a relatively high level of abstraction.

XML schema definition (XSD): The World Wide Web Consortium (W3C) standard language that is used in defining XML schemas. Schemas are useful for enforcing structure and constraining the types of data that can be used validly within other XML documents. XML schema definition refers to the fully specified and currently recommended standard for use in authoring **XML schemas**.

XOR obfuscation: A type of file encryption that helps protect private data by using an exclusive or bitwise operation. This is done by adding a mathematical expression that prevents a simple reverse-engineering process.

XPath expression: An expression that searches an71 XML document and can extract and manipulate data in elements or **attributes** within that document.

zoom level: The degree to which a portion of an image, document, or other screen object is made to appear closer or farther away relative to its default appearance. This value is usually expressed as a percentage of the default appearance.

MAY, SHOULD, MUST, SHOULD NOT, MUST NOT: These terms (in all caps) are used as defined in [RFC2119]. All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

1.2 References

Links to a document in the Microsoft Open Specifications library point to the correct section in the most recently published version of the referenced document. However, because individual documents in the library are not updated at the same time, the section numbers in the documents may not match. You can confirm the correct section numbering by checking the Errata.

1.2.1 Normative References

We conduct frequent surveys of the normative references to assure their continued availability. If you have any issue with finding a normative reference, please contact dochelp@microsoft.com. We will assist you in finding the relevant information.

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[MS-DTYP] Microsoft Corporation, "Windows Data Types".

[MS-ODRAWXML] Microsoft Corporation, "Office Drawing Extensions to Office Open XML Structure".

[MS-OFFCRYPTO] Microsoft Corporation, "Office Document Cryptography Structure".

[MS-OFORMS] Microsoft Corporation, "Office Forms Binary File Formats".

[MS-OSHARED] Microsoft Corporation, "Office Common Data Types and Objects Structures".

[MS-OVBA] Microsoft Corporation, "Office VBA File Format Structure".

[MS-OWEXML] Microsoft Corporation, "Office Web Extensibility Extensions to Office Open XML Structure Specification".

[MS-XLDM] Microsoft Corporation, "Spreadsheet Data Model File Format".

[MS-XLSX] Microsoft Corporation, "Excel (.xlsx) Extensions to the Office Open XML SpreadsheetML File Format".

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1.3 Structure Overview (Synopsis)

This document specifies **workbook** data contained in a **ZIP package** (section 2.1.1) conforming to the Open Packaging Conventions as described in [ISO/IEC29500-1:2016]. Individual files stored in the ZIP package, called parts (section 2.1.2), contain information about the content of a workbook including workbook data such as **worksheet** definitions. Some parts store information by using **XML**, some parts store information by using binary records (section 2.1.4), and other parts contain information stored as a binary stream of bytes. The binary record structure and content are specified in this document. Each binary record contains its record type, information about the record size, and zero or more type-specific fields depending on its record type, which is specified in Record Enumeration (section 2.3). Type-specific fields contain information further specifying the workbook data. Specifications of the fields for a given record type can be found in Records (section 2.4).

Unless otherwise specified, all data in files of the type specified by this document are stored in **little-endian** format.

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See File Structure (section 2.1) for a more detailed overview of specific file architecture and content.

1.4 Relationship to Protocols and Other Structures

The Excel Binary File Format is a package as described in [ISO/IEC29500-1:2016] containing a set of related parts (section 2.1.2). It is dependent on the structures defined in the following references:

- [MS-ODRAW] for the persistence format for **shapes**.
- [MS-OFFCRYPTO] for the persistence format for document signing, information rights management, document encryption and obfuscation.
- [MS-OSHARED] for the persistence format for additional common structures.
- [MS-OVBA] for the persistence format for a **VBA project**.
- [MS-XLS] for command bar information and number formatting.
- [MS-XLSX] for storing custom data, custom data properties, and drawing and control properties.
- [MS-ODRAWXML] for images stored in the **workbook**.
- [MS-DTYP] for specifying a **relative security descriptor**.

1.5 Applicability Statement

This document specifies a persistence format for **workbook** content and templates, which can include unstructured or semi-structured tables of numbers, text, or both numbers and text, formulas, external data connections, charts, and images. This persistence format is applicable for persistence of documents with a grid based layout, including those with numeric data, structured data, and formulas.

This persistence format is applicable for use as a stand-alone document, and for containment within other documents as an embedded object, as described in [MS-OLEDS].

This persistence format provides interoperability with applications that create or read documents conforming to this structure.

1.6 Versioning and Localization

This document covers versioning issues in the following areas:

Structure Versions: There is only one version of this file format.

Localization: The following records and structures contain fields that specify locale-dependent meaning:

- **BrtBeginHeaderFooter** (section 2.4.89)
- **BrtFmt** (section 2.4.675)
- **CodeName** (section 2.5.21)
- **BrtFont** (section 2.4.677)

The Security Considerations (section 4), Password Verifier Algorithm (section 2.2.9), Encryption (section 2.2.11), and International Macro Sheet (section 2.1.7.31) also specify processes and data that are locale-dependent. See each record, structure, and section description for more information.

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1.7 Vendor-Extensible Fields

This persistence format can be extended by storing information in parts not specified in section 2.1.2. Implementations are not required to preserve or remove additional parts when modifying an existing document. See File Structure (section 2.1) for more information. Implementations can extend a part specified in Section 2 by storing future records and alternate content blocks as specified in Future Record (section 2.1.6). Implementations can extend the **XML** as described in [ISO/IEC29500-3:2015]: Markup Compatibility and Extensibility.

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2 Structures

2.1 File Structure

This section specifies the overall structure of a file that conforms to this specification.

A file of the type specified by this document is a package (section 2.1.1) that contains a collection of related parts (section 2.1.2). Parts contain information about the contents of a **workbook**, including workbook data and the structure of the package. Some parts contain information stored using binary records (section 2.1.4), some parts contain information stored using **XML**, and other parts contain information stored as a binary stream of bytes. Each binary record contains zero or more structured fields that contain the workbook data.

2.1.1 Package

A file of the type specified by this document is a package that is a ZIP archive that conforms to the Open Packaging Conventions as specified in [ISO/IEC29500-2:2012]: Open Packaging Conventions, the further packaging restrictions as specified in [ISO/IEC29500-1:2016]: Fundamentals, section 9, and this specification.

A file of the type specified by this document MUST contain exactly one **workbook** (section 2.1.7.61) part, and that part (section 2.1.2) MUST be the target of a relationship (section 2.1.3) in the package relationship part. The **workbook** (section 2.1.7.61) part is the main or starting part in a file of the type specified by this document.

2.1.2 Part

A part is a stream of bytes as specified in [ISO/IEC29500-2:2012]: Open Packaging Conventions, section 8.2. Each part has an associated content type that specifies the nature and type of content stored in the part. Some parts store information using binary records (section 2.1.4). Some parts store information using **XML**.

The valid parts, content types, and required and optional relationships (section 2.1.3) between all parts in a package (section 2.1.1) are specified in **Part Enumeration** (section 2.1.7). Each part that contains binary records (section 2.1.4) MUST be written as a series of binary records as specified in **Part Enumeration**.

This document uses **Augmented Backus-Naur Form (ABNF)** as specified in [RFC5234] to specify the record (section 2.1.4) sequence for parts that contain binary records.

2.1.3 Relationship

A relationship specifies a connection between a source and a target resource as specified in [ISO/IEC29500-2:2012]: Open Packaging Conventions, section 8.3. Relationship identifiers are used in binary and **XML** part (section 2.1.2) content to reference unique relationship elements in relationship parts that in turn target other resources. There are several different types of relationships:

- A package relationship is a relationship where the target is a part and the source is the package (section 2.1.1) as a whole.
- A part-to-part relationship is a relationship where the target is a part (section 2.1.2) and the source is a part in the package.
- An explicit relationship is a relationship where a resource is referenced from the contents of a source part by referencing the ID attribute value of a relationship element.
- An implicit relationship is a relationship that is not explicit.
- An internal relationship is a relationship where the target is a part in the package.

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- An external relationship is a relationship where the target is an external resource not in the package.

2.1.4 Record

A record is the basic building block used to store information about features in a **workbook**. Each binary record is a variable-length sequence of bytes. A binary record consists of three components: a record type, a record size, and the record data that is specific to that record type.

The record type is an integer that specifies what type of information is specified by the record and how the structure of the record data specific to this record is ordered and structured. Each valid record type is listed in Record Enumeration (section 2.3). The record type MUST be either one or two bytes. The record type MUST be two bytes if and only if the high bit in the low byte is equal to 1; otherwise, the record type MUST be one byte. If the record type is two bytes, the value consists of seven low bits of the high byte combined with the seven low bits of the low byte. This value MUST be greater than or equal to 128 and less than 16384. For performance reasons, one-byte record types are reserved for commonly used records. Record type values MUST be a value from Record Enumeration (section 2.3) or the record MUST make use of the future record (section 2.1.6) architecture.

The record size specifies the count of bytes that specifies the total size of the record data. This value MUST be one to four bytes. This value MUST be one byte if the high bit in the low byte is equal to 0; otherwise, this value MUST be greater than one byte. If the count of bytes is greater than one byte, the high bit in each successive byte specifies whether an additional byte is used. If the high bit of the second byte is equal to 1, then this value MUST use an additional third byte. If the high bit of the third byte is equal to 1, then this value MUST use an additional fourth byte. The high bit of the fourth byte MUST be ignored. The value consists of the seven low bits of each byte combined. The low, least significant bits are contained within the first byte, and each successive byte contains higher order bits than the previous byte.

The record data component contains fields that correspond to a particular record type and comprise the remainder of the record. The order and structure of the fields for a given record type listed in Record Enumeration (section 2.3) are specified in the corresponding section for that record type in Records (section 2.4). The total size of the record data component MUST be equal to the record size. Fields in the record data component can contain simple values, arrays of values, structures of several fields, arrays of fields, and arrays of structures.

For example, the following record type and record size specify a **BrtCommentText** (section 2.4.336) record with a size of 200 bytes:

```
11111101 00000100 11001000 00000001 [Record Fields]
```

The first byte is 11111101, specifying a low value of 125 and that the record type requires a second byte. The second byte is 00000100, specifying a high value of 4 * 128, which equals 512. The record type value is 125 + 512, or 637, which corresponds to a **BrtCommentText** (section 2.4.336) record type. The next byte is 11001000, specifying a low value of 72 and that the record size requires a second byte. The second byte is 00000001, specifying a higher value of 1 * 128 and that the record size does not require an additional byte. The record size is 72 + 128, or 200, which specifies the total size, in bytes, of the record data component. The fields in the record data component are specified by **BrtCommentText** (section 2.4.336).

2.1.5 Collection of Records

A collection of records (section 2.1.4) is a series of related records that are treated as a single set. Records in a collection do not have to share the same record type. A collection of records can further contain other collections of records. The beginning of a collection of records is sometimes indicated by a different type of record, as specified in the record sequence **ABNF** where the rule that contains that record is specified. Similarly the end of a collection of records is sometimes indicated by a different

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type of record, as specified by the record sequence ABNF where the rule that contains that record is specified. Each record or collection within the collection can be referred to by index, and the index count starts over for each collection.

In this document, record A precedes record B when record A is the last record of that type to appear before record B, in the part (section 2.1.2) that contains those records.

In this document, record B follows record A when record A is the last record of that type to appear before record B, in the part that contains those records.

2.1.6 Future Record

The future record (section 2.1.6) architecture enables the file format to be extended with new or alternate content while maintaining compatibility with applications that do not support the new content. The future record architecture consists of a future record mechanism and an alternate content mechanism. The future record mechanism enables an application that does not support certain future records to open and save the file while ignoring but preserving those future records in the file, and correctly modifying **cell references** and formulas associated with the records. The alternate content mechanism enables an application to introduce extensions that target particular implementations.

2.1.6.1 Future Record Mechanism

Future records are specified as a collection of records (section 2.1.4) that exists between a set of **BrtFRTBegin** (section 2.4.678) and **BrtFRTEnd** (section 2.4.679) record pairs. An application uses the **productVersion.product** and **productVersion.version** fields of the **BrtFRTBegin** record to determine whether that application supports the collection of future records following that **BrtFRTEnd** record.

An application supports the collection of future records following a given **BrtFRTBegin** record if the **productVersion.product** field matches the application's product value, and the **productVersion.version** field is less than or equal to the application's version value. Otherwise the application does not support the collection of future records following this **BrtFRTBegin** record, and can ignore but preserve those future records in the file, including the **BrtFRTBegin** and **BrtFRTEnd** records.

Every record in the collection of future records between a set of **BrtFRTBegin** and **BrtFRTEnd** records—except **BrtFRTBegin**, **BrtFRTEnd**, **BrtACBegin** (section 2.4.2), and **BrtACEnd** (section 2.4.3) records—is a future record and MUST start with an **FRTHeader** (section 2.5.60) structure that specifies future record attributes unless the record is less than 4 bytes, in which case an **FRTBlank** (section 2.5.54) is inferred as the **FRTHeader** structure for that future record, and the bytes in the future record specify record data. Future record data that occurs after the **FRTHeader** is application specific.

For example, consider an application that implements the basic concepts of a spreadsheet as specified by the structures and records in this document and that implements other features and concepts not specified in this document. That application can use the future record mechanism to persist data associated with those other features and concepts as extensions to the structures and records specified in this document.

2.1.6.2 Alternate Content Mechanism

Alternate content is specified as a collection of records (section 2.1.4) that exists between a set of **BrtACBegin** (section 2.4.2) and **BrtACEnd** (section 2.4.3) record pairs. The **RgACVer** field of a **BrtACBegin** record specifies an array of **ACProductVersion** (section 2.5.1) structures that specify a list of application product and version values and whether a version value is extended for all future versions. An application uses the **RgACVer.ACProductVersion.fileProduct**,

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RgACVer.ACProductVersion.fileVersion and **RgACVer.ACProductVersion.fileExtension** fields of the **BrtACBegin** record to determine whether the application is the intended target of the collection of records following that **BrtACBegin** record.

An application is the target of the collection of records following a given **BrtACBegin** if for at least one element of the **RgACVer** array the **ACProductVersion.fileProduct** field matches the application's product value, and the **ACProductVersion.fileVersion** field is equal to the application's version value and the **ACProductVersion.fileExtension** field is 0, or the **ACProductVersion.fileVersion** field is less than or equal to the application's version value and the **ACProductVersion.fileExtension** field is 1. Otherwise the application is not the target of the collection of records following this **BrtACBegin** record, and MUST ignore on load and discard these records when saving the file, including the associated **BrtACBegin** and **BrtACEnd** records.

Multiple blocks of alternate content for different implementations can be specified with consecutive **BrtACBegin** and **BrtACEnd** record pairs and their collections of records. Alternate content records are permitted in any record sequence within any part that contains **Binary Interchange File Format (BIFF)** records.

For example, consider an application that implements the basic concepts of a spreadsheet as specified by the structures and records in this document and enhances some of those concepts with additional features and concepts that one or more other applications support. That application can persist the basic concepts using records and structures specified by this document, and can persist the enhanced set of properties associated with those concepts and features as alternate content blocks, where each content block targets an application that supports those records. Instead of being required to maintain and preserve each of the alternate content blocks, in this case the application only loads the records it supports and discards all alternate content blocks it does not support. On save the application might or might not write an entirely new or different set of alternate content blocks.

2.1.7 Part Enumeration

This section specifies the parts (section 2.1.2) of the Excel Binary File Format (.xlsb) package. Refer to File Structure (section 2.1) and Relationship (section 2.1.3) for information about packages, parts, implicit relationships, explicit relationships, and the package relationship part.

If a part is in **Binary Interchange File Format (BIFF)** format, the record sequence is specified using **ABNF** grammar. The first rule in each rule list comprises the entire record sequence for that part. Subsequent rules are fragments of the first rule.

Parts and their relationships are summarized in the following table:

Part	Relationship Target of
ActiveX	Worksheet
ActiveX Binary	Worksheet
Attached Toolbars	Workbook
Calculation Chain	Workbook
Chart	Drawings
Chart Drawing	Chart
Chart Sheet	Workbook
Comments	Macro Sheet, Worksheet
Control Properties	SpreadsheetML control

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Part	Relationship Target of
Custom Data	Custom Data Properties
Custom Data Properties	Workbook
Custom Property	Macro Sheet, Worksheet
Custom XML Data Storage	Workbook
Custom XML Data Storage Properties	Custom XML Data Storage
Custom XML Maps	Workbook
Diagram Colors	Drawings
Diagram Data	Drawings
Diagram Layout Definition	Drawings
Diagram Styles	Drawings
Dialog Sheet	Workbook
Digital Signature Origin	Package
Digital Signature XML Signature	Digital Signature Origin
Drawings	Chart Sheet, Worksheet, Macro Sheet
External Data Connections	Workbook
External Link	Workbook
File Properties, Core	Package
File Properties, Custom	Package
File Properties, Extended	Package
File Properties, Thumbnail	Package
Images	Chart Sheet, Macro Sheet, Theme, VML Drawings, Worksheet
International Macro Sheet	Workbook
Macro Sheet	Workbook
Macro Sheet Binary Index	Macro Sheet
Metadata	Workbook
Model	Workbook
OLE Object	Dialog Sheet, External Link, Macro Sheet, Worksheet
OLE Package	Dialog Sheet, Macro Sheet, Worksheet
PivotCache Definition	PivotTable, Workbook
PivotCache Records	PivotCache Definition
PivotTable	Worksheet

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Part	Relationship Target of
Printer Settings	Chart Sheet, Dialog Sheet, Macro Sheet, Worksheet
Query Table	Table, Worksheet
Revision Headers	Workbook
Revision Log	Revision Headers
Shared Strings	Workbook
Single Cell Tables	Worksheet
Slicer Cache	Workbook
Slicers	Worksheet
Sort Map	Macro Sheet, Worksheet
Styles	Workbook
Table	Worksheet
Theme	Workbook
Timeline Cache	Workbook
Timelines	Worksheet
User Names	Workbook
VBA Project	Workbook
VBA Project Signature	VBA Project
VML Drawings	Worksheet, Chart Sheet, Dialog Sheet, Macro Sheet
Volatile Dependencies	Workbook
Workbook	Package
Worksheet	Workbook
Worksheet Binary Index	Worksheet

2.1.7.1 ActiveX

An instance of the **ActiveX** part specifies an **ActiveX control**.

Content type**:** application/vnd.ms-office.activeX+xml

Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/control

An **ActiveX** part MUST be the target of an explicit relationship from the **worksheet** (section 2.1.7.62) part.

An **ActiveX** part is permitted to have explicit relationships to the **ActiveX Binary** (section 2.1.7.2) part.

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An **ActiveX** part MUST NOT have implicit or explicit relationships to any other part (section 2.1.2) specified by this document.

The syntax of the structures contained in this part uses **XML schema definition (XSD)**, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various **XML namespaces** using the mechanisms specified in [XMLNS].

The content of the **ActiveX** part is **XML** as specified by the following XSD.

```
<?xml version="1.0" encoding="utf-8"?>
<xsd:schema
   targetNamespace="http://schemas.microsoft.com/office/2006/activeX"
   xmlns:xsd="http://www.w3.org/2001/XMLSchema"
   xmlns="http://schemas.microsoft.com/office/2006/activeX"
   xmlns:r="http://schemas.openxmlformats.org/officeDocument/2006/relationships"
   elementFormDefault="qualified"
   attributeFormDefault="qualified"
   blockDefault="#all">
<xsd:import id="r"
  namespace="http://schemas.openxmlformats.org/officeDocument/2006/
  relationships" />
<xsd:element name="ocx" type="CT_Ocx" maxOccurs="1" minOccurs="1"/>
   <xsd:complexType name="CT_Ocx">
      <xsd:sequence>
      <xsd:element name="ocxPr" type="CT_OcxPr" minOccurs="0"
            maxOccurs="unbounded"/>
      </xsd:sequence>
      <xsd:attribute name="classid" type="ST_String" use="required"/>
      <xsd:attribute name="license" type="ST_String" use="optional" />
      <xsd:attribute ref="r:id" use="optional" />
      <xsd:attribute name="persistence" type="ST_Persistence" use="required" />
   </xsd:complexType>

   <xsd:simpleType name="ST_String">
      <xsd:restriction base="xsd:string" />
   </xsd:simpleType>

   <xsd:simpleType name="ST Persistence">
      <xsd:restriction base="ST_String">
         <xsd:enumeration value="persistPropertyBag"/>
         <xsd:enumeration value="persistStream"/>
         <xsd:enumeration value="persistStreamInit"/>
         <xsd:enumeration value="persistStorage"/>
      </xsd:restriction>
   </xsd:simpleType>

   <xsd:complexType name="CT OcxPr">
      <xsd:sequence>
         <xsd:choice>
            <xsd:element name="font" type="CT_Font" maxOccurs="1" minOccurs="0" />
            <xsd:element name="picture" type="CT_Picture" maxOccurs="1"
              minOccurs="0"/>
         </xsd:choice>
      </xsd:sequence>
      <xsd:attribute name="name" type="ST String" use="required" />
      <xsd:attribute name="value" type="ST_String" use="optional" />
   </xsd:complexType>

   <xsd:complexType name="CT Font">
      <xsd:sequence>
         <xsd:element name="ocxPr" type="CT OcxPr" minOccurs="0"
           maxOccurs="unbounded" />
      </xsd:sequence>
      <xsd:attribute name="persistence" type="ST Persistence" use="optional"/>
      <xsd:attribute ref="r:id" use="optional"/>
   </xsd:complexType>
```


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```
   <xsd:complexType name="CT_Picture">
      <xsd:attribute ref="r:id" use="optional"/>
   </xsd:complexType>
</xsd:schema>
```

The **XML schema** associated with the imported namespace, "http://schemas.openxmlformats.org/officeDocument/2006/relationships", is specified in [ISO/IEC29500-1:2016], section 22.8.

2.1.7.1.1 Elements

This section specifies the **font** (section 2.1.7.1.1.1), **ocx** (section 2.1.7.1.1.2), **ocxPr** (section 2.1.7.1.1.3), and **picture** (section 2.1.7.1.1.4) elements that are **XSD** elements used for persisting **ActiveX controls**.

2.1.7.1.1.1 font

The **font** element specifies the persistence of a standard font object (StdFont), as specified in [MS-OFORMS] section 2.4.9.

The following **XSD** fragment specifies the contents of this element:

```
<xsd:complexType name="CT_Font">
   <xsd:sequence>
      <xsd:element name="ocxPr" type="CT OcxPr" minOccurs="0"
        maxOccurs="unbounded"/>
   </xsd:sequence>
   <xsd:attribute name="persistence" type="ST_Persistence" use="optional"/>
   <xsd:attribute ref="r:id" use="optional"/>
</xsd:complexType>
```

The following table specifies the attributes for this element:

Attributes	Description
persistence	Specifies the method used to store properties of the font object.
r:id	An **ST_RelationshipID**, as specified in [ISO/IEC29500-1:2016], section 22.8, that specifies the relationship identifier to the **ActiveX Binary** (section 2.1.7.2) part that contains the persisted font object. The target of the relationship MUST be an **ActiveX Binary** (section 2.1.7.2) part. **id** MUST exist if and only if **persistence** is equal to either **persistStorage**, **persistStream**, or **persistStreamInit**.

2.1.7.1.1.2 ocx

The **ocx** element specifies the persistence of an **ActiveX control**.

The following **XSD** fragment specifies the contents of this element:

```
<xsd:complexType name="CT_Ocx">
   <xsd:sequence>
      <xsd:element name="ocxPr" type="CT_OcxPr" minOccurs="0"
            maxOccurs="unbounded"/>
```


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```
    </xsd:sequence>
    <xsd:attribute name="classid" type="ST_String" use="required"/>
    <xsd:attribute name="license" type="ST_String" use="optional"/>
    <xsd:attribute ref="r:id" use="optional"/>
    <xsd:attribute name="persistence" type="ST_Persistence" use="required"/>
</complexType>
```

Attributes	Description
classid	Specifies the **class identifier (CLSID)** of the ActiveX control.
license	Specifies the license string for the ActiveX control.
persistence	Specifies the method used to store properties of the ActiveX control.
r:id	An **ST_RelationshipID**, as specified in [ISO/IEC29500-1:2016], section 22.8, that specifies the relationship identifier to the **ActiveX Binary** (section 2.1.7.2) part that contains the persisted ActiveX control. The target of the relationship MUST be an **ActiveX Binary** part. **id** MUST exist if and only if **persistence** is equal to either **persistStorage**, **persistStream**, or **persistStreamInit**.

2.1.7.1.1.3 ocxPr

The **ocxPr** element specifies a single name and value pair used to persist a property of an **ActiveX control** that uses the **persistPropertyBag** method as specified by **ST_Persistence** (section 2.1.7.1.2.1).

The following **XSD** fragment specifies the contents of this element:

```
<xsd:complexType name="CT_OcxPr">
   <xsd:sequence>
      <xsd:choice>
         <xsd:element name="font" type="CT_Font" maxOccurs="1" minOccurs="0"/>
         <xsd:element name="picture" type="CT_Picture" maxOccurs="1"
           minOccurs="0"/>
      </xsd:choice>
   </xsd:sequence>
   <xsd:attribute name="name" type="ST_String" use="required"/>
   <xsd:attribute name="value" type="ST_String" use="optional"/>
</complexType>
```

Attributes	Description
name	Specifies the name of the property. **name** MUST be unique in its collection.
value	Specifies the value of the property. **value** MUST NOT exist if the **font** or **picture** child elements exist.

2.1.7.1.1.4 picture

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The **picture** element specifies the persistence of a standard picture object (StdPicture), as specified in [MS-OFORMS] section 2.4.5.

The following **XSD** fragment specifies the contents of this element:

```
<xsd:complexType name="CT_Picture">
   <xsd:attribute ref="r:id" use="optional" />
</xsd:complexType>
```

Attributes	Description
r:id	An **ST_RelationshipID**, as specified in [ISO/IEC29500-1:2016], section 22.8, that specifies the relationship identifier to the **ActiveX Binary** (section 2.1.7.2) part that contains the persisted picture object. The target of the relationship MUST be an **ActiveX Binary** part.

2.1.7.1.2 Simple Types

This section specifies the **ST_Persistence** (section 2.1.7.1.2.1) and **ST_String** (section 2.1.7.1.2.2) **XSD** simple types used for persisting **ActiveX controls**.

2.1.7.1.2.1 ST_Persistence

The **ST_Persistence** simple type specifies the persistence method used to persist an **ActiveX control**.

The following **XSD** fragment specifies the contents of this simple type:

```
<xsd:simpleType name="ST_Persistence">
   <xsd:restriction base="ST_String">
      <xsd:enumeration value="persistPropertyBag"/>
      <xsd:enumeration value="persistStream"/>
      <xsd:enumeration value="persistStreamInit"/>
      <xsd:enumeration value="persistStorage"/>
   </xsd:restriction>
</xsd:simpleType>
```

The following are possible enumeration values for this type:

Enumeration Value	Description
persistPropertyBag	Specifies that the ActiveX control is persisted using property-bag-based persistence. Property-bag-based persistence stores an ActiveX control by means of a collection of name and value pairs which specify the data persisted by the ActiveX control. A child **ocxPr** (section 2.1.7.1.1.3) element MUST appear within the element that contains this simple type if and only if **persistPropertyBag** is used.
persistStorage	Specifies that the ActiveX control is persisted using storage-based persistence. The **id** attribute of the element that contains this simple type MUST specify a relationship to an **ActiveX Binary** (section 2.1.7.2) part if **persistStorage** is used.

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Enumeration Value	Description
persistStream	Specifies that the ActiveX control is persisted using a stream-based persistence that does not support initialization of the ActiveX control to a default state. The **id** attribute of the element that contains this simple type MUST specify a relationship to an **ActiveX Binary** (section 2.1.7.2) part if **persistStream** is used.
persistStreamInit	Specifies that the ActiveX control is persisted using a stream-based persistence that supports initialization of the ActiveX control to a default state. The **id** attribute of the element that contains this simple type MUST specify a relationship to an **ActiveX Binary** (section 2.1.7.2) part if **persistStreamInit** is used.

2.1.7.1.2.2 ST_String

The **ST_String** simple type specifies a string.

The following **XSD** fragment specifies the contents of this simple type:

```
<xsd:simpleType name="ST String">
   <xsd:restriction base="xsd:string"/>
</xsd:simpleType>
```

2.1.7.2 ActiveX Binary

An instance of the **ActiveX Binary** part specifies the persistence of an **ActiveX control** when the method used to persist is either **persistStream**, **persistStreamInit**, or **persistStorage**, as specified in section 2.1.7.1.

Content type**:** application/vnd.ms-office.activeX
Source relationship: http://schemas.microsoft.com/office/2006/relationships/activeXControlBinary

An **ActiveX Binary** (section 2.1.7.2) part MUST be the target of an explicit relationship from the **ActiveX** (section 2.1.7.1) part.

An **ActiveX Binary** part MUST NOT have implicit or explicit relationships to any part specified by this document.

The contents of this part consist of an individual ActiveX control. The internal structure of the ActiveX control is not specified in this document. See section 2.1.7.1 for more information about general ActiveX control persistence.

2.1.7.3 Attached Toolbars

An instance of the **Attached Toolbars** part type specifies the custom toolbars attached to the file.

Content type: application/vnd.ms-excel.attachedToolbars

Source relationship: http://schemas.microsoft.com/office/2006/relationships/attachedToolbars

The internal structure of this part is the same as the structure of the XCB binary stream specified in [MS-XLS] section 2.1.7.10.

An **Attached Toolbars** part MUST be the target of an implicit relationship from the **workbook** (section 2.1.7.61) part.

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An **Attached Toolbars** part MUST NOT have implicit or explicit relationships to any part specified in this document.

2.1.7.4 Calculation Chain

The **Calculation Chain** part consists of an application-specific cache of information.

Content type**:** application/vnd.ms-excel.calcChain
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/calcChain

This cache exists for performance reasons only, and can be rebuilt based on information stored elsewhere in the file without affecting calculation results. A package SHOULD NOT<1> contain this part.

A package MUST contain no more than one **Calculation Chain** part. If it exists, that part MUST be the target of an implicit relationship from the **workbook** (section 2.1.7.61) part.

A **Calculation Chain** part MUST NOT have implicit or explicit relationships to any part.

2.1.7.5 Chart

The **Chart** part (section 2.2.3.1) is specified in [ISO/IEC29500-1:2016], section 14.2.1. The content associated with this part is specified in [ISO/IEC29500-1:2016], section 21.2.

2.1.7.6 Chart Drawing

The **Chart Drawing** part is specified in [ISO/IEC29500-1:2016], section 14.2.2. The content associated with this part is specified in [ISO/IEC29500-1:2016], section 21.3.

2.1.7.7 Chart Sheet

An instance of the **Chart Sheet** part type specifies a **chart sheet**.

Content type**:** application/vnd.ms-excel.chartsheet
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/chartsheet

A Chart Sheet part MUST be the target of an explicit relationship from the **workbook** (section 2.1.7.61) part.

A Chart Sheet part is permitted to have explicit relationships to the following parts specified by this document:

- **Drawings** (section 2.1.7.23)
- **Images** (section 2.1.7.30)
- **Printer Settings** (section 2.1.7.41)
- **VML Drawings** (section 2.1.7.59)

A Chart Sheet part MUST NOT have implicit or explicit relationships to any other part specified by this document.

Record sequence **ABNF**:

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```
CHARTSHEET = BrtBeginSheet [BrtCsProp] CSVIEWS [[BrtCsProtectionIso] BrtCsProtection]
        [USERCSVIEWS] [BrtMargins] [BrtCsPageSetup] [HEADERFOOTER] BrtDrawing [BrtLegacyDrawing]
        [BrtLegacyDrawingHF] [BrtBkHim] [WEBPUBITEMS] *FRT [ACUID] BrtEndSheet

CSVIEWS = BrtBeginCsViews 1*CSVIEW *FRT BrtEndCsViews

CSVIEW = [ACUID] BrtBeginCsView *FRT BrtEndCsView

USERCSVIEWS = BrtBeginUserCsViews *USERCSVIEW BrtEndUserCsViews

USERCSVIEW = BrtBeginUserCsView [BrtMargins] [BrtCsPageSetup] [HEADERFOOTER] BrtEndUserCsView
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.8 Comments

An instance of the **Comments** part type specifies the **comments** for a given **sheet**, as well as the names of the authors of those comments.

Content type**:** application/vnd.ms-excel.comments
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/comments

A package MUST contain at most one **Comments** part per **worksheet** (section 2.1.7.62) or **macro sheet** (section 2.1.7.32) part, and each such part MUST be the target of an implicit relationship from a **worksheet** or **macro sheet** part.

A **Comments** part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence **ABNF**:

```
COMMENTS = BrtBeginComments COMMENTAUTHORS COMMENTLIST *FRT BrtEndComments

COMMENTAUTHORS = BrtBeginCommentAuthors *BrtCommentAuthor BrtEndCommentAuthors

COMMENTLIST = BrtBeginCommentList *COMMENT BrtEndCommentList

COMMENT = [ACUID] BrtBeginComment [BrtCommentText] BrtEndComment
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.9 Control Properties

The **Control Properties** part is specified in [MS-XLSX] section 2.1.1.

2.1.7.10 Custom Data

The **Custom Data** part is specified in [MS-XLSX] section 2.1.2.

2.1.7.11 Custom Data Properties

The **Custom Data Properties** part is specified in [MS-XLSX] section 2.1.3. The content associated with this part is specified in [MS-XLSX] section 2.4.35.

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2.1.7.12 Custom Property

The **Custom Property** part is specified in [ISO/IEC29500-1:2016], section 12.3.5.

In addition to the explicit relationships specified in [ISO/IEC29500-1:2016], section 12.3.5, a **Custom** Property part is permitted to be the target of an explicit relationship from the following parts specified by this document:

- **Macro Sheet** (section 2.1.7.32)

2.1.7.13 Custom XML Data Storage

The **Custom XML Data Storage** part is specified in [ISO/IEC29500-1:2016], section 15.2.5.

Additional **XML namespaces** are specified in [MS-OSHARED] section 2.3.6.1.

2.1.7.14 Custom XML Data Storage Properties

The **Custom XML Data Storage Properties** part is specified in [ISO/IEC29500-1:2016], section 15.2.6. The content associated with this part is specified in [ISO/IEC29500-1:2016], section 22.5.

2.1.7.15 Custom XML Maps

The **Custom XML Maps** part is specified in [ISO/IEC29500-1:2016], section 12.3.6. The content associated with this part is specified in [ISO/IEC29500-1:2016], section 18.6.

2.1.7.16 Diagram Colors

The **Diagram Colors** part is specified in [ISO/IEC29500-1:2016], section 14.2.3. The content associated with this part is specified in [ISO/IEC29500-1:2016], section 21.4.4.

2.1.7.17 Diagram Data

The **Diagram Data** part is specified in [ISO/IEC29500-1:2016], section 14.2.4. The content associated with this part is specified in [ISO/IEC29500-1:2016], section 21.4.3.

2.1.7.18 Diagram Layout Definition

The **Diagram Layout Definition** part is specified in [ISO/IEC29500-1:2016], section 14.2.5. The content associated with this part is specified in [ISO/IEC29500-1:2016], section 21.4.6.

2.1.7.19 Diagram Styles

The **Diagram Styles** part is specified in [ISO/IEC29500-1:2016], section 14.2.6. The content associated with this part is specified in [ISO/IEC29500-1:2016], section 21.4.5.

2.1.7.20 Dialog Sheet

An instance of the **Dialog Sheet** part type contains information about a custom dialog box.

Content type**:** application/vnd.ms-excel.dialogsheet
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/dialogsheet

A Dialog Sheet part MUST be the target of an explicit relationship from the **workbook** (section 2.1.7.61) part.

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A Dialog Sheet part is permitted to have explicit relationships to the following parts specified by this document:

- **OLE Object** (section 2.1.7.36)
- **OLE Package** (section 2.1.7.37)
- **Printer Settings** (section 2.1.7.41)
- **VML Drawings** (section 2.1.7.59)

A Dialog Sheet part MUST NOT have implicit or explicit relationships to any other part specified by this document.

Record sequence **ABNF**:

```
DIALOGSHEET = BrtBeginSheet [BrtWsProp] [WSVIEWS] [WSFMTINFO] [[BrtSheetProtectionIso]
        BrtSheetProtection] [USERSHVIEWS] [BrtPrintOptions] [BrtMargins] [BrtPageSetup]
        [HEADERFOOTER] [BrtDrawing] [BrtLegacyDrawing] [BrtLegacyDrawingHF] [OLEOBJECTS] *FRT
        [ACUID] BrtEndSheet
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.21 Digital Signature Origin

The Digital Signature Origin part is specified in [ISO/IEC29500-1:2016], section 15.2.7. Further information about digital signatures is specified in [ISO/IEC29500-2:2012], section 13.

2.1.7.22 Digital Signature XML Signature

The **Digital Signature XML Signature** part is specified in [ISO/IEC29500-1:2016], section 15.2.8. The content associated with this part is specified in [ISO/IEC29500-2:2012], section 13.

2.1.7.23 Drawings

The **Drawings** part is specified in [ISO/IEC29500-1:2016], section 12.3.8. The content associated with this part is specified in [ISO/IEC29500-1:2016], section 20.5.

In addition to the explicit relationships specified in [ISO/IEC29500-1:2016], section 12.3.8, a **Drawings** part is permitted to be the target of an explicit relationship from the following parts specified by this document:

- **Macro Sheet** (section 2.1.7.32)

Sections 2.1.7.23.1 and 2.1.7.23.2 specify additional extensions to this part.

2.1.7.23.1 compatSp

The **compatSp** element is a **CT_CompatShape** that specifies a legacy drawing object. The legacy drawing object MUST be a form control, an **OLE object** or a legacy **ActiveX object**.

Target namespace: http://schemas.microsoft.com/office/drawing/2010/compatibility

```
<xsd:element name="compatSp" type="CT_CompatShape"/>
```

The **graphicData** ([ISO/IEC29500-1:2016] section 20.1.2.2.17) element, with parent **graphic** ([ISO/IEC29500-1:2016] section 20.1.2.2.16) element, with parent **graphicFrame** ([ISO/IEC29500-

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1:2016] section 20.5.2.16) element, with ancestor **twoCellAnchor** ([ISO/IEC29500-1:2016] section 20.5.2.33), **oneCellAnchor** ([ISO/IEC29500-1:2016] section 20.5.2.24), or **absoluteAnchor** ([ISO/IEC29500-1:2016] section 20.5.2.1) element, with parent **wsDr** ([ISO/IEC29500-1:2016] section 20.5.2.35) element, is extended by the addition of an **AlternateContent** ([ISO/IEC29500-3:2015] section 7.5) child element, whose structure is specified in the following table:

AlternateContent components	Structure of child elements
Choice: http://schemas.microsoft.com/office/drawing/2010/compatibility	**wsDr** **twoCellAnchor** or **oneCellAnchor** or **absoluteAnchor** **grpSp** (if inside a group) **graphicFrame** **graphic** **graphicData** **compatSp**
Fallback	Empty

Where the **grpSp** element is specified in [ISO/IEC29500-1:2016] section 20.5.2.17.

2.1.7.23.2 CT_CompatShape

CT_CompatShape is a complex type that specifies a legacy drawing object.

Target namespace: http://schemas.microsoft.com/office/drawing/2010/compatibility

Referenced by: compatSp (section 2.1.7.23.1)

CT_CompatShape has the following attributes:

spid : An **ST_ShapeID** ([ISO/IEC29500-1:2016] section 20.1.10.55) attribute that specifies the shape identifier of a legacy drawing object.

```
<xsd:complexType name="CT_CompatShape" oxsd:cname="CompatShapeStg"
oxsd:cwrap="CompatShapeStgMethods">
  <xsd:attribute name="spid" oxsd:cname="ShapeId" type="a:ST ShapeID" user="required"/>
</xsd:complexType>
```

2.1.7.24 External Data Connections

An instance of the **External Data Connections** part type specifies external connections (section 2.2.8) for the **workbook**.

Content type**:** application/vnd.ms-excel.connections
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/connections

A package MUST contain at most one External Data **Connections** part, which MUST be the target of an implicit relationship from the **workbook** (section 2.1.7.61) part.

An External Data **Connections** part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence **ABNF**:

```
EXTCONNECTIONS = BrtBeginExtConnections 1*EXTCONNECTION BrtEndExtConnections

EXTCONNECTION = BrtBeginExtConnection [ACUID] [(ECDBPROPS [ECOLAPPROPS / ECPARAMS]) / (ECWEBPROPS
        [ECPARAMS]) / ECTXTWIZ] FRTEXTCONNECTIONS BrtEndExtConnection
```


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```
ECDBPROPS = BrtBeginECDbProps BrtEndECDbProps

ECOLAPPROPS = BrtBeginECOlapProps BrtEndECOlapProps

ECWEBPROPS = BrtBeginECWebProps [ECWPTABLES] BrtEndECWebProps

ECWPTABLES = BrtBeginEcWpTables *PCDI BrtEndECWPTables

PCDI = BrtPCDIMissing / BrtPCDIIndex / BrtPCDIString

ECTXTWIZ = BrtBeginECTxtWiz ECTWFLDINFOLST BrtEndECTxtWiz

ECTWFLDINFOLST = BrtBeginECTWFldInfoLst 1*BrtBeginECTwFldInfo BrtEndECTWFldInfoLst

ECPARAMS = BrtBeginECParams 1*ECPARAM BrtEndECParams

ECPARAM = BrtBeginECParam BrtEndECParam

FRTEXTCONNECTIONS = [BrtFRTBegin [EXTCONN14] [EXTCONN15] BrtFRTEnd] *FRT

EXTCONN14 = BrtBeginExtConn14 [PCDCALCMEMSEXT] BrtEndExtConn14

EXTCONN15 = BrtBeginExtConn15 [OLEDBPR15 / DATAFEEDPR15 / TEXTPR15 / BrtRangePr15]
       BrtEndExtConn15

OLEDBPR15 = BrtBeginOledbPr15 (DBTABLES15 / BrtDbCommand15) BrtEndOledbPr15

DBTABLES15 = BrtBeginDbTables15 1*BrtDbTable15 BrtEndDbTables15

DATAFEEDPR15 = BrtBeginDataFeedPr15 DBTABLES15 BrtEndDataFeedPr15

TEXTPR15 = ECTXTWIZ15 [BrtTextPr15]

ECTXTWIZ15 = BrtBeginECTxtWiz15 ECTWFLDINFOLST15 BrtEndECTxtWiz15

ECTWFLDINFOLST15 = BrtBeginECTWFldInfoLst15 1*BrtBeginECTwFldInfo15 BrtEndECTWFldInfoLst15
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.25 External Link

An instance of the **External Link** (section 2.1.7.25) part **ABNF** specifies an **external link** (section 2.2.7.4).

Content type**:** application/vnd.ms-excel.externalLink
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/externalLink

An **External Link** (section 2.1.7.25) part ABNF MUST be the target of an explicit relationship in the **workbook** (section 2.1.7.61) part.

If the External Link part specifies an **external link** (section 2.2.7.4) that is of type **external workbook** (section 2.1.10), the part MUST specify an explicit external relationship to an external workbook. If the External Link part specifies an **external link** (section 2.2.7.4) that is of type **OLE data source** (section 2.2.7.4.3), the part MUST specify an explicit external relationship to an **OLE object** (section 2.1.7.36). If the External Link part specifies an **external link** (section 2.2.7.4) that is of type **DDE data source** (section 2.2.7.4.2), the part MUST NOT specify any relationship.

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An External Link part MUST NOT have any implicit or explicit relationships to any other parts specified by this document.

Record sequence ABNF:

```
EXTERNALLINK = BrtBeginSupBook (EXTERNALBOOK / DDEOLELINK) *FRT BrtEndSupBook

EXTERNALBOOK = BrtSupTabs *EXTERNNAME *EXTERNTABLE

DDEOLELINK = *DDEOLEITEM

EXTERNNAME = BrtSupNameStart BrtSupNameFmla BrtSupNameBits BrtSupNameEnd

DDEOLEITEM = BrtSupNameStart BrtSupNameBits [DDEOLEITEMVALUES] BrtSupNameEnd

DDEOLEITEMVALUES = BrtSupNameValueStart *DDEOLEITEMVALUE BrtSupNameValueEnd

DDEOLEITEMVALUE = BrtSupNameNum / BrtSupNameBool / BrtSupNameErr / BrtSupNameSt / BrtSupNameNil

EXTERNTABLE = BrtExternTableStart *EXTERNROW BrtExternTableEnd

EXTERNROW = BrtExternRowHdr 1*EXTERNVALUE

EXTERNVALUE = [BrtExternValueMeta] EXTERNVALUEDATA

EXTERNVALUEDATA = BrtExternCellBlank / BrtExternCellReal / BrtExternCellBool / BrtExternCellError
       / BrtExternCellString
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.26 File Properties, Core

***The* File Properties, Core** part is specified in [ISO/IEC29500-1:2016] section 15.2.12.1. The content associated with this part is specified in [ISO/IEC29500-2:2012] section 11.

2.1.7.27 File Properties, Custom

The **File Properties, Custom** part is specified in [ISO/IEC29500-1:2016] section 15.2.12.2. The content associated with this part is specified in [ISO/IEC29500-1:2016] section 22.3.

In addition, the custom properties, used by the version of the **workbook** that is **published** to or rendered on a Web or application server, are specified in the following table:

Name attribute	Meaning
PROP_*ParameterName*	Specifies a parameter, where *ParameterName* is a name specified by the user. The parameter corresponds to the **named range** specified by the **BrtName** (section 2.4.705) element that has a **name** field equal to *ParameterName*. The contents are an empty **lpwstr** element. The **lpwstr** element is specified in [ISO/IEC29500-1:2016] section 22.4.2.18.
PROP_MULTVAL_*ParameterName*	Specifies a **filter** parameter, where *ParameterName* is a name specified by the user. The parameter corresponds to the named range specified by the **BrtName** (section 2.4.705) element that has a **name** field equal to *ParameterName*. The contents are an empty **lpwstr** element. The **lpwstr** element is specified in [ISO/IEC29500-1:2016] section 22.4.2.18.

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2.1.7.28 File Properties, Extended

The **File Properties, Extended** part is defined in [ISO/IEC29500-1:2016] section 15.2.12.3. The content associated with this part is specified in [ISO/IEC29500-1:2016] section 22.2.

In addition, this document specifies the following name value pairs for the **HeadingPairs** element specified in [ISO/IEC29500-1:2016] section 22.2.2.8:

Name Value Pair	Meaning
SheetType, *n*	There are *n* of these type of **sheets** in the **workbook**. SheetType MUST be one of the following: "Worksheets", "Excel 4.0 Macros", "Charts", or "Dialogs".
Named Ranges, *n*	There are *n* **named ranges** in the workbook.

2.1.7.29 File Properties, Thumbnail

The **File Properties, Thumbnail** part is specified in [ISO/IEC29500-1:2016] section 15.2.16. The content associated with this part is specified in [ISO/IEC29500-2:2012] section 12.

2.1.7.30 Images

The **Images** part is specified in [ISO/IEC29500-1:2016] section 15.2.14.

In addition to the explicit relationships specified in [ISO/IEC29500-1:2016] section 22.4.2.18, an **Image** part is permitted to be the target of an explicit relationship from the following parts specified in this document:

- **Chart Sheet** (section 2.1.7.7)
- **Macro Sheet** (section 2.1.7.32)
- **Theme** (section 2.1.7.52)
- **Worksheet** (section 2.1.7.62)

2.1.7.31 International Macro Sheet

An instance of the **International Macro Sheet** part type specifies the same information as a **macro sheet** (section 2.1.7.32) part type.

Content type**:** application/vnd.ms-excel.intlmacrosheet
Source relationship: http://schemas.microsoft.com/office/2006/relationships/xlIntlMacrosheet

When this part type is present, the associated **macro sheet** will display and operate with US English **locale**, regardless of what the product locale, user locale, or system locale is. This will maximize compatibility when running under various locales.

International Macrosheet records and record sequence **ABNF** are identical to **macro sheet** (section 2.1.7.32).

2.1.7.32 Macro Sheet

An instance of the **Macro Sheet** part type specifies a **macro sheet**.

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Content type**:** application/vnd.ms-excel.macrosheet
Source relationship: http://schemas.microsoft.com/office/2006/relationships/xlMacrosheet

References to the Macro Sheet part in this document include **International Macro Sheet** (section 2.1.7.31).

A Macro Sheet part MUST be the target of an explicit relationship in the **workbook** (section 2.1.7.61) part.

A Macro Sheet part is permitted to have implicit relationships to the following parts specified in this document:

- **Comments** (section 2.1.7.8)
- **Macro Sheet Binary Index** (section 2.1.7.33)
- **Sort Map** (section 2.1.7.49)

A Macro Sheet part is permitted to have explicit relationships to the following parts specified in this document:

- **Custom Property** (section 2.1.7.12)
- **Drawings** (section 2.1.7.23)
- **OLE Object** (section 2.1.7.36)
- **OLE Package** (section 2.1.7.37)
- **Images** (section 2.1.7.30)
- **Printer Settings** (section 2.1.7.41)
- **VML Drawings** (section 2.1.7.59)

A Macro Sheet part MUST NOT have implicit or explicit relationships to any other part specified in this document.

Record sequence **ABNF**:

```
MACROSHEET = BrtBeginSheet [BrtWsProp] [BrtWsDim] [WSVIEWS] [WSFMTINFO] *COLINFOS CELLTABLE
        [BrtSheetCalcProp] [[BrtSheetProtectionIso] BrtSheetProtection] [AUTOFILTER] [SORTSTATE]
        [DCON] [USERSHVIEWS] [BrtPhoneticInfo] [BrtPrintOptions] [BrtMargins] [BrtPageSetup]
        [HEADERFOOTER] [RWBRK] [COLBRK] *BrtBigName [BrtDrawing] [BrtLegacyDrawing]
        [BrtLegacyDrawingHF] [BrtBkHim] [OLEOBJECTS] *FRT [ACUID] BrtEndSheet
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.33 Macro Sheet Binary Index

An instance of the **Macro Sheet Binary Index** part type specifies a binary index (section 2.2.1.1) for a **macro sheet**, as specified by the **Macro Sheet** (section 2.1.7.32) part.

Content type**:** application/vnd.ms-excel.binIndexMs
Source relationship: http://schemas.microsoft.com/office/2006/relationships/xlBinaryIndex

This part is identical to the **worksheet binary index** (section 2.1.7.63) part, except that it applies to a macro sheet.

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2.1.7.34 Metadata

An instance of the **Metadata** part (section 2.1.7.34) type specifies metadata (section 2.2.4) information for a **workbook**.

Content type**:** application/vnd.ms-excel.sheetMetadata
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/sheetMetadata

An instance of this part type specifies metadata (section 2.2.4) information for a workbook.

A package MUST contain at most one **Metadata** part, and that part MUST be the target of an implicit relationship from the **Workbook** (section 2.1.7.61) part.

A **Metadata** part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence **ABNF**:

```
METADATA = BrtBeginMetadata ESMDTINFO [ESSTR] [ESMDX] *ESFMD 1*2ESMDB *FRT BrtEndMetadata

ESMDTINFO = BrtBeginEsmdtinfo 1*BrtMdtinfo BrtEndEsmdtinfo

ESSTR = BrtBeginEsstr 1*BrtStr BrtEndEsstr

ESMDX = BrtBeginEsmdx 1*MDX BrtEndEsmdx

MDX = BrtBeginMdx (MDXTUPLE / MDXSET / MDXMBRPROP / MDXKPI) BrtEndMdx

MDXTUPLE = BrtBeginMdxTuple *BrtMdxMbrIstr BrtEndMdxTuple

MDXSET = BrtBeginMdxSet *BrtMdxMbrIstr BrtEndMdxSet

MDXMBRPROP = BrtBeginMdxMbrProp BrtEndMdxMbrProp

MDXKPI = BrtBeginMdxKPI BrtEndMdxKPI

ESFMD = BrtBeginEsfmd 1*FMD *FRT BrtEndEsfmd

FMD = BrtBeginFmd (DYNAMICARRAYMETADATA / RICHDATAMETADATA / FRT) BrtEndFmd

ESMDB = BrtBeginEsmdb 1*BrtMdb BrtEndEsmdb

DYNAMICARRAYMETADATA = BrtFRTBegin BrtBeginDynamicArrayPr BrtEndDynamicArrayPr BrtFRTEnd

RICHDATAMETADATA = BrtFRTBegin BrtBeginRichValueBlock BrtEndRichValueBlock BrtFRTEnd
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.35 Model

The **Model** part is specified in [MS-XLDM].

Extensions to this specification are specified in [MS-XLSX] section 2.1.6.

2.1.7.36 OLE Object

The **OLE Object** part is specified in [ISO/IEC29500-1:2016] section 15.2.10.

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In addition to the explicit relationships specified in [ISO/IEC29500-1:2016] section 15.2.10, an OLE Object part is permitted to be the target of an explicit relationship from the following parts specified in this document:

- **Macro Sheet** (section 2.1.7.32)
- **Dialog Sheet** (section 2.1.7.20)
- **External Link** (section 2.1.7.25)
- **Worksheet** (section 2.1.7.62)

2.1.7.37 OLE Package

The **OLE Package** part is specified in [ISO/IEC29500-1:2016] section 15.2.11.

In addition to the explicit relationships specified in [ISO/IEC29500-1:2016] section 15.2.11, an **OLE Package** part is permitted to be the target of an explicit relationship from the following parts specified in this document:

- **Macro Sheet** (section 2.1.7.32)
- **Dialog Sheet** (section 2.1.7.20)
- **Worksheet** (section 2.1.7.62)

2.1.7.38 PivotCache Definition

An instance of the **PivotCache Definition** part type specifies a **PivotCache** (section 2.2.5.2) for one or more **PivotTables** (section 2.2.5) or **cube functions**.

Content type**:** application/vnd.ms-excel.pivotCacheDefinition
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/pivotCacheDefinition

A package MUST contain one PivotCache **Definition** part per **BrtBeginPivotCacheID** (section 2.4.168) record in the **workbook** (section 2.1.7.61) part, and each such part MUST be the target of an explicit relationship from a **workbook** part. In addition, if the **idCache** field of the **BrtBeginSXView** (section 2.4.273) record in a **PivotTable** (section 2.1.7.40) part is equal to the **idSx** field of any **BrtBeginPivotCacheID** record in the **workbook** part, then the **PivotCache Definition** part corresponding to that **BrtBeginPivotCacheID** record MUST be the target of an implicit relationship from that **PivotTable** (section 2.1.7.40) part.

A PivotCache **Definition** part is permitted to have an explicit relationship to the following part specified in this document:

- **PivotCache Records** (section 2.1.7.39)

A PivotCache **Definition** part MUST NOT have any implicit or explicit relationships to any other parts specified by this document.

Record sequence **ABNF**:

```
PIVOTCACHEDEF = [ACUID] BrtBeginPivotCacheDef PCDSOURCE PCDFIELDS [PCDCALCITEMS] [PCDHIERARCHIES]
        [PCDKPIS] [PCDCALCMEMS] [PCDSDTUPLECACHE] [DIMS] [MGS [MGMAPS]] FRTPIVOTCACHEDEF
        BrtEndPivotCacheDef

PCDSOURCE = BrtBeginPCDSource [PCDSRANGE / PCDSCONSOL] PCDSOURCE14 BrtEndPCDSource
```


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```
PCDSRANGE = BrtBeginPCDSRange BrtEndPCDSRange

PCDSCONSOL = BrtBeginPCDSConsol [PCDSCPAGES] PCDSCSETS BrtEndPCDSConsol

PCDSCPAGES = BrtBeginPCDSCPages *4PCDSCPAGE BrtEndPCDSCPages

PCDSCPAGE = BrtBeginPCDSCPage *PCDSCPITEM BrtEndPCDSCPage

PCDSCPITEM = BrtBeginPCDSCPItem BrtEndPCDSCPItem

PCDSCSETS = BrtBeginPCDSCSets 1*PCDSCSET BrtEndPCDSCSets

PCDSCSET = BrtBeginPCDSCSet BrtEndPCDSCSet

PCDFIELDS = BrtBeginPCDFields *PCDFIELD BrtEndPCDFields

PCDFIELD = BrtBeginPCDField [PNAMES] [PCDFATBL] [PCDFGROUP] FRTPCDFIELD BrtEndPCDField

FRTPCDFIELD = [FRTPCDFIELD14] [FRTPCDFIELD15] *FRT

FRTPCDFIELD14 = BrtFRTBegin BrtPCDField14 BrtFRTEnd

FRTPCDFIELD15 = BrtFRTBegin ITEMUNIQUENAMES BrtFRTEnd

ITEMUNIQUENAMES = BrtBeginItemUniqueNames 1*BrtItemUniqueName BrtEndItemUniqueNames

PNAMES = BrtBeginPNames *PNAME BrtEndPNames

PNAME = BrtBeginPName [PNPAIRS] BrtEndPName

PNPAIRS = BrtBeginPNPairs PNPAIR BrtEndPNPairs

PNPAIR = BrtBeginPNPair BrtEndPNPair

PCDFATBL = BrtBeginPCDFAtbl *(PCDI / PCDIA) BrtEndPCDFAtbl

PCDI = BrtPCDIMissing / BrtPCDINumber / BrtPCDIBoolean / BrtPCDIError / BrtPCDIString /
       BrtPCDIDatetime / PCDIRUN

PCDIA = BrtPCDIAMissing / BrtPCDIANumber / BrtPCDIABoolean / BrtPCDIAError / BrtPCDIAString /
       BrtPCDIADatetime

PCDIRUN = BrtBeginPCDIRun BrtEndPCDIRun

PCDFGROUP = BrtBeginPCDFGroup [PCDFGRANGE / PCDFGDISCRETE] [PCDFGITEMS] BrtEndPCDFGroup

PCDFGRANGE = BrtBeginPCDFGRange BrtEndPCDFGRange

PCDFGDISCRETE = BrtBeginPCDFGDiscrete 1*BrtPCDIIndex BrtEndPCDFGDiscrete

PCDFGITEMS = BrtBeginPCDFGItems *PCDI BrtEndPCDFGItems

PCDCALCITEMS = BrtBeginPCDCalcItems 1*PCDCALCITEM BrtEndPCDCalcItems

PCDCALCITEM = BrtBeginPCDCalcItem PIVOTRULE [PNAMES] *FRT BrtEndPCDCalcItem

PCDHIERARCHIES = BrtBeginPCDHierarchies 1*PCDHIERARCHY BrtEndPCDHierarchies

PCDHIERARCHY = BrtBeginPCDHierarchy [PCDHFIELDSUSAGE] [PCDHGLEVELS] FRTPCDHIERARCHY
       BrtEndPCDHierarchy
```


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```
PCDHFIELDSUSAGE = BrtBeginPCDHFieldsUsage BrtEndPCDHFieldsUsage

PCDHGLEVELS = BrtBeginPCDHGLevels 1*PCDHGLEVEL BrtEndPCDHGLevels

PCDHGLEVEL = BrtBeginPCDHGLevel [PCDHGLGROUPS] *FRT BrtEndPCDHGLevel

PCDHGLGROUPS = BrtBeginPCDHGLGroups 1*PCDHGLGROUP BrtEndPCDHGLGroups

PCDHGLGROUP = BrtBeginPCDHGLGroup PCDHGLGMEMBERS BrtEndPCDHGLGroup

PCDHGLGMEMBERS = BrtBeginPCDHGLGMembers 1*PCDHGLGMEMBER BrtEndPCDHGLGMembers

PCDHGLGMEMBER = BrtBeginPCDHGLGMember BrtEndPCDHGLGMember

FRTPCDHIERARCHY = [BrtFRTBegin BrtPCDH14 BrtFRTEnd] *FRT

PCDKPIS = BrtBeginPCDKPIs *PCDKPI BrtEndPCDKPIs

PCDKPI = BrtBeginPCDKPI BrtEndPCDKPI

PCDCALCMEMS = BrtBeginPCDCalcMems 1*PCDCALCMEM BrtEndPCDCalcMems

PCDCALCMEM = BrtBeginPCDCalcMem FRTPCDCALCMEM BrtEndPCDCalcMem

FRTPCDCALCMEM = [BrtFRTBegin PCDCALCMEM14 BrtFRTEnd] *FRT

PCDSDTUPLECACHE = BrtBeginPCDSDTupleCache [PCDSDTCENTRIES] [PCDSDTCSETS] [PCDSDTCQUERIES]
       [PCDSFCIENTRIES] *FRT BrtEndPCDSDTupleCache

PCDSDTCENTRIES = BrtBeginPCDSDTCEntries *PCDSDTCENTRY BrtEndPCDSDTCEntries

PCDSDTCENTRY = (BrtPCDIMissing / BrtPCDINumber / BrtPCDIError / BrtPCDIString) [PCDSDTCEMEMBERS]

PCDSDTCEMEMBERS = BrtBeginPCDSDTCEMembers 1*PCDSDTCEMEMBER BrtEndPCDSDTCEMembers

PCDSDTCEMEMBER = BrtBeginPCDSDTCEMember BrtEndPCDSDTCEMember

PCDSDTCSETS = BrtBeginPCDSDTCSets 1*PCDSDTCSET BrtEndPCDSDTCSets

PCDSDTCSET = BrtBeginPCDSDTCSet *PCDSDTCEMEMBERS [PCDSDTCEMEMBERSSORTBY] BrtEndPCDSDTCSet

PCDSDTCEMEMBERSSORTBY = BrtBeginPCDSDTCEMembersSortBy 1*PCDSDTCEMEMBER BrtEndPCDSDTCEMembers

PCDSDTCQUERIES = BrtBeginPCDSDTCQueries 1*PCDSDTCQUERY BrtEndPCDSDTCQueries

PCDSDTCQUERY = BrtBeginPCDSDTCQuery [PCDSDTCEMEMBERS] BrtEndPCDSDTCQuery

PCDSFCIENTRIES = BrtBeginPcdSFCIEntries 1*BrtPCDSFCIEntry BrtEndPCDSFCIEntries

DIMS = BrtBeginDims 1*DIM BrtEndDims

DIM = BrtBeginDim BrtEndDim

MGS = BrtBeginMgs *MG BrtEndMGs

MG = BrtBeginMG BrtEndMG

MGMAPS = BrtBeginMGMaps *MAP BrtEndMGMaps

MAP = BrtBeginMap BrtEndMap
```


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```
FRTPIVOTCACHEDEF = [BrtFRTBegin PCD14 BrtFRTEnd] [PCD15] *FRT

PCD14 = BrtBeginPCD14 BrtEndPCD14

PCDSOURCE14 = [BrtFRTBegin BrtPivotCacheConnectionName BrtFRTEnd] *FRT

PCD15 = BrtFRTBegin BrtPivotCacheIdVersion BrtFRTEnd

PCDH15 = BrtFRTBegin BrtPCDH15 BrtFRTEnd
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.39 PivotCache Records

An instance of the **PivotCache Records** part type specifies cache records (section 2.2.5.2.10) for a **PivotTable** (section 2.2.5).

Content type**:** application/vnd.ms-excel.pivotCacheRecords
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/spreadsheetml/pivotCacheRecords

A package MUST contain at most one PivotCache **Records** part per **PivotCache Definition** (section 2.1.7.38) part, and each such part MUST be the target of an explicit relationship from the **PivotCache Definition** part.

A PivotCache **Records** part MUST NOT have implicit or explicit relationships to any part specified in this document.

Record sequence **ABNF**:

```
PIVOTCACHERECORDS = BrtBeginPivotCacheRecords *PIVOTCACHERECORD *FRT BrtEndPivotCacheRecords

PIVOTCACHERECORD = BrtPCRRecord / PIVOTCACHERECORDDT

PIVOTCACHERECORDDT = BrtPCRRecordDt 1*PCDIDT

PCDIDT = BrtPCDIMissing / BrtPCDINumber / BrtPCDIBoolean / BrtPCDIError / BrtPCDIString /
       BrtPCDIDatetime / BrtPCDIIndex
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.40 PivotTable

An instance of the **PivotTable** part type specifies a **PivotTable** View (section 2.2.5.3).

Content type**:** application/vnd.ms-excel.PivotTable
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/PivotTable

A **PivotTable** part MUST be the target of an implicit relationship from a **worksheet** (section 2.1.7.62) part.

A PivotTable part is permitted to have implicit relationships to the following parts specified in this document:

- **PivotCache Definition** (section 2.1.7.38)

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A PivotTable part MUST NOT have any implicit or explicit relationships to any other parts specified in this document.

Record sequence **ABNF**:

```
PIVOTTABLE = [ACUID] BrtBeginSXView SXLOCATION [SXVDS] [ISXVDRWS] [SXLIRWS] [ISXVDCOLS]
       [SXLICOLS] [SXPIS] [SXDIS] [SXFORMATS] [SXCONDFMTS] [SXCRTFORMATS] [SXTHS]
       BrtTableStyleClient [SXFILTERS] [ISXTHRWS] [ISXTHCOLS] FRTSXVIEW BrtEndSXView

SXLOCATION = BrtBeginSXLocation BrtEndSXLocation

SXVDS = BrtBeginSXVDs 1*SXVD BrtEndSXVDs

ISXVDRWS = BrtBeginISXVDRws BrtEndISXVDRws

SXVD = BrtBeginSXVD [SXVIS] [AUTOSORTSCOPE] [FRTSXVD] BrtEndSXVD

AUTOSORTSCOPE = BrtBeginAutoSortScope PIVOTRULE BrtEndAutoSortScope

SXVIS = BrtBeginSXVIs 1*SXVI BrtEndSXVIs

SXVI = BrtBeginSXVI BrtEndSXVI

FRTSXVD = [BrtFRTBegin BrtSXVD14 BrtFRTEnd] *FRT

SXLIRWS = BrtBeginSXLIRws 1*SXLI BrtEndSXLIRws

SXLI = BrtBeginSXLI [ISXVIS] BrtEndSXLI

ISXVIS = BrtBeginISXVIs BrtEndISXVIs

ISXVDCOLS = BrtBeginISXVDCols BrtEndISXVDCols

SXLICOLS = BrtBeginSXLICols 1*SXLI BrtEndSXLICols

SXPIS = BrtBeginSXPIs 1*256SXPI BrtEndSXPIs

SXPI = BrtBeginSXPI *FRT BrtEndSXPI

SXDIS = BrtBeginSXDIs 1*SXDI BrtEndSXDIs

SXDI = BrtBeginSXDI FRTSXDI BrtEndSXDI

FRTSXDI = [BrtFRTBegin BrtSXDI14 BrtFRTEnd] [BrtFRTBegin BrtSXDI15 BrtFRTEnd] *FRT

SXFORMATS = BrtBeginSXFormats 1*SXFORMAT BrtEndSxFormats

SXFORMAT = BrtBeginSXFormat PIVOTRULE *FRT BrtEndSXFormat

SXCONDFMTS = BrtBeginSXCondFmts 1*SXCONDFMT BrtEndSXCondFmts

SXCONDFMT = BrtBeginSXCondFmt PIVOTRULES *FRT BrtEndSXCondFmt

SXCRTFORMATS = BrtBeginSXCrtFormats 1*SXCRTFORMAT BrtEndSXCrtFormats

SXCRTFORMAT = BrtBeginSXCrtFormat PIVOTRULE BrtEndSXCrtFormat

SXTHS = BrtBeginSXTHs 1*SXTH BrtEndSXTHs
```


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```
SXTH = BrtBeginSXTH [SXTDMPS] *SXTHITEMS FRTSXTH BrtEndSXTH

FRTSXTH = [BrtFRTBegin BrtSXTH14 BrtFRTEnd] *FRT

SXTHITEMS = BrtBeginSXTHItems 1*SXTHITEM BrtEndSXTHItems

SXTHITEM = BrtBeginSXTHItem BrtEndSXTHItem

SXTDMPS = BrtBeginSXTDMPS *SXTDMP BrtEndSXTDMPs

SXTDMP = (BrtSXTDMPOrder / BrtBeginSXTDMP) BrtEndSXTDMP

ISXTHRWS = BrtBeginISXTHRws BrtEndISXTHRws

ISXTHCOLS = BrtBeginISXTHCols BrtEndISXTHCols

SXFILTERS = BrtBeginSXFilters 1*SXFILTER BrtEndSXFilters

SXFILTER = BrtBeginSXFILTER AFILTER FRTSXFILTER BrtEndSXFilter

AFILTER = BrtBeginAFilter 1*PIVOTFILTERCOLUMN BrtEndAFilter

PIVOTFILTERCOLUMN = BrtBeginFilterColumn (BrtDynamicFilter / BrtTop10Filter / CUSTOMFILTERS /
       PIVOTFILTERS) *FRT

PIVOTFILTERS = BrtBeginFilters *BrtFilter BrtEndFilters

PIVOTRULES = BrtBeginSXRules PIVOTRULE BrtEndSxRules

FRTSXVIEW = [BrtFRTBegin SXVIEW14 BrtFRTEnd] [FRTSXVIEW15] [BrtFRTBegin SXVIEW16 BrtFRTEnd] *FRT

SXVIEW14 = BrtBeginSXView14 [SXCHANGES] [SXEDITS] [SXCONDFMTS14] BrtEndSXView14

SXCHANGE = BrtBeginSXChange BrtSXTupleItems BrtEndSXChange

SXCHANGES = BrtBeginSXChanges 1*2147483647SXCHANGE BrtEndSXChanges

SXEDITS = BrtBeginSXEdits 1*2147483647SXEDIT BrtEndSXEdits

SXEDIT = BrtBeginSXEdit BrtSXTupleItems PIVOTRULE14 BrtEndSXEdit

SXCONDFMTS14 = BrtBeginSXCondFmts14 1*SXCONDFMT14 BrtEndSXCondFmts14

SXCONDFMT14 = BrtBeginSXCondFmt14 PIVOTRULES14 BrtEndSXCondFmt14

PIVOTRULES14 = BrtBeginSXRules14 PIVOTRULE14 BrtEndSXRules14

PIVOTRULE14 = BrtBeginPRule14 [PRFILTERS14] *FRT BrtEndPRule14

PRFILTERS14 = BrtBeginPRFilters14 1*2147483647PRFILTER14 BrtEndPRFilters14

PRFILTER14 = BrtBeginPRFilter14 1*2147483647PRFITEM14 BrtEndPRFilter14

PRFITEM14 = BrtBeginPRFItem14 BrtEndPRFItem14

FRTSXVIEW15 = [PIVOTVALUECELLS15] [PIVOTTABLEUISETTINGS]

PIVOTVALUECELLS15 = BrtFRTBegin BrtBeginSxvcells 1*PIVOTROWS15 BrtEndSxvcells BrtFRTEnd
```


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```
PIVOTROWS15 = [BrtBeginSxRow 1*PIVOTVALUECELL15 BrtEndSxRow]

PIVOTVALUECELL15 = BrtSxvcellNum / BrtSxvcellStr / BrtSxvcellErr / BrtSxvcellBool /
       BrtSxvcellDate / BrtSxvcellNil

PIVOTTABLEUISETTINGS = BrtFRTBegin BrtBeginPivotTableUISettings *BrtFieldListActiveItem
       BrtEndPivotTableUISettings BrtFRTEnd

FRTSXFILTER = [BrtFRTBegin BrtSxFilter15 BrtFRTEnd] *FRT

SXVIEW16 = BrtBeginSXView16 BrtEndSXView16
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.41 Printer Settings

An instance of the **Printer Settings** part type specifies information about the initialization and environment of a printer or a display device

Content type**:** application/vnd.openxmlformats-officedocument.spreadsheetml.printerSettings
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/printerSettings

This part type MUST contain exactly one DEVMODE structure, as described in [DEVMODE], with a **dmSize** greater than 0, including printer driver specific data.

A package MUST contain at most one **Printer Settings** part per **chart sheet** (section 2.1.7.7), **dialog sheet** (section 2.1.7.20), **worksheet** (section 2.1.7.62), or **macro sheet** (section 2.1.7.32) part, and that part MUST be the target of an explicit relationship from a **chart sheet**, **dialog sheet**, **worksheet**, or **macro sheet** part.

A **Printer Settings** part MUST NOT have implicit or explicit relationships to any part specified by this document.

2.1.7.42 Query Table

An instance of the **Query Table** part type specifies a **query table** that is associated with a **table** or **range**.

Content type**:** application/vnd.ms-excel.queryTable
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/queryTable

If a Query Table part is the target of an implicit relationship from a **table** (section 2.1.7.51) part, this relationship specifies that the query table is associated with that table. If a Query Table part is the target of an implicit relationship from a **worksheet** (section 2.1.7.62) part, this relationship specifies that the query table is associated with a range on that **sheet**.

A Query Table part MUST be the target of exactly one implicit relationship from either a **worksheet** (section 2.1.7.62) part or a **table** (section 2.1.7.51) part.

A Query Table part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence **ABNF**:

```
QSI = BrtBeginQSI [QSIR] FRTQSI BrtEndQSI
```


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```
QSIR = BrtBeginQSIR QSIFS [DELETEDNAMES] [SORTSTATE] *FRT BrtEndQSIR

QSIFS = BrtBeginQSIFs *QSIF BrtEndQSIFs

QSIF = BrtBeginQSIF *FRT BrtEndQSIF

DELETEDNAMES = BrtBeginDeletedNames 1*DELETEDNAME BrtEndDeletedNames

DELETEDNAME = BrtBeginDeletedName BrtEndDeletedName

FRTQSI = [BrtQsi15] *FRT
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.43 Revision Headers

An instance of the **Revision Headers** part type specifies the revision header logs (section 2.2.12.2) for a shared workbook (section 2.2.12).

Content type**:** application/vnd.ms-excel.revisionHeaders
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/revisionHeaders

If the **workbook** is a shared workbook (section 2.2.12), the package MUST contain exactly one Revision **Headers** part, and that part MUST be the target of an implicit relationship from the **workbook** (section 2.1.7.61) part. If the workbook is not a shared workbook, the package MUST NOT contain a Revision **Headers** part.

A Revision **Headers** part is permitted to have explicit relationships to the following parts specified in this document:

- **Revision Log** (section 2.1.7.44)

A Revision **Headers** part MUST NOT have any implicit or explicit relationships to any other parts specified in this document.

Record sequence **ABNF**:

```
REVISIONHEADERS = BrtInfo *(BrtRRHeader *FRT) BrtEOF
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.44 Revision Log

An instance of the **Revision Log** part type specifies the revision logs (section 2.2.12.3) for a shared workbook (section 2.2.12).

Content type**:** application/vnd.ms-excel.revisionLog
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/revisionLog

A package MUST contain one Revision **Log** part for each revision header log (section 2.2.12.2) specified in the **revision headers** (section 2.1.7.43) part, and each part MUST be the target of an explicit relationship from the **revision headers** part.

A Revision **Log** part MUST NOT have implicit or explicit relationships to any part specified in this document.

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Record sequence **ABNF**:

```
REVISIONLOG = *(RRINSDEL / RRINSMOVE / RRCHGCELL / RRFORMAT / RRMISC) BrtEOF

RRINSDEL = BrtRRInsDel *BrtUCR *RRCF BrtRREndInsDel

RRINSMOVE = BrtRRMove *BrtUCR *RRCF BrtRREndMove

RRCF = RRCHGCELL / RRFORMAT

RRCHGCELL = BrtRRChgCell 1*2CELL 0*2DXF *FRT BrtRREndChgCell

CELL = BrtCellBlank / BrtCellRk / BrtCellError / BrtCellBool / BrtCellReal / BrtCellSt /
       BrtCellIsst / BrtFmlaString / BrtFmlaNum / BrtFmlaBool / BrtFmlaError / BrtCellRString

RRFORMAT = BrtRRFormat [DXF] *FRT BrtRREndFormat

RRMISC = BrtCUsr / BrtUsr / BrtBeginUsers / BrtRRUserView / (BrtRRRenSheet *FRT) / BrtRRInsertSh
       / (BrtRRDefName *FRT) / BrtRRNote / BrtRRConflict / BrtRRTQSIF / BrtRRAutoFmt

DXF = BrtBeginDXFs (2ACDXF / BrtDXF) BrtEndDXFs

ACDXF = BrtACBegin BrtDXF BrtACEnd
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.45 Shared Strings

An instance of the **Shared Strings (**section 2.1.7.45) part **ABNF** type specifies the unique strings that occur on all **sheets** in a **workbook**.

Content type**:** application/vnd.ms-excel.sharedStrings
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/sharedStrings

A package MUST contain at most one **Shared Strings (**section 2.1.7.45) part ABNF, and that part MUST be the target of an implicit relationship from the **workbook** (section 2.1.7.61) part.

A **Shared Strings** part MUST NOT have implicit or explicit relationships to any part specified in this document.

Record sequence ABNF:

```
SHAREDSTRINGS = BrtBeginSst *BrtSSTItem *FRT BrtEndSst
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.46 Single Cell Tables

An instance of the **Single Cell Tables** part type specifies how elements and attributes in an **XML map**, as specified by the **Custom XML Maps** (section 2.1.7.15) part, are associated with **sheet cells**. Sheet cells are used for elements and attributes in an XML map that are specified as occurring only once, or when a user forces an otherwise repeating element or attribute to occur only once.

Content type**:** application/vnd.ms-excel.tableSingleCells
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/tableSingleCells

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Use **tables**, as specified by the **table** (section 2.1.7.51) part, for elements and attributes in an XML map that are specified as occurring more than once, or to force an otherwise non-repeating element or attribute to repeat more than once.

A package MUST contain at most one **Single** Cell **Tables** part per **worksheet** (section 2.1.7.62) part, and that part MUST be the target of an implicit relationship from a **Worksheet** part.

A **Single** Cell **Tables** part MUST NOT have implicit or explicit relationships to any part specified in this document.

Record sequence **ABNF**:

```
SINGLECELLTABLES = BrtBeginSingleCells *LIST BrtEndSingleCells

LIST = [ACUID] BrtBeginList LISTCOLS *FRT BrtEndList

LISTCOLS = BrtBeginListCols LISTCOL BrtEndListCols

LISTCOL = [ACUID] BrtBeginListCol [LISTXMLCPR] *FRT BrtEndListCol

LISTXMLCPR = BrtBeginListXmlCPr *FRT BrtEndListXmlCPr
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.47 Slicer Cache

An instance of the **Slicer Cache** part type specifies a single slicer cache (section 2.2.14.1) in the workbook<2> (section 2.1.7.61).

Content type**:** application/vnd.ms-excel.slicerCache
Source relationship: http://schemas.microsoft.com/office/2007/relationships/slicerCache

A package MUST contain one Slicer Cache part per **BrtBeginSlicerCacheID** (section 2.4.203) record in the **workbook** (section 2.1.7.61) part, and that part MUST be the target of an explicit relationship from the **workbook** part.

A **Slicer Cache** part MUST NOT have implicit or explicit relationships to any part specified in this document.

Record sequence **ABNF**:

```
SLICERCACHE = BrtBeginSlicerCache [ACUID] BrtBeginSlicerCacheDef [BrtSlicerCachePivotTables]
        (SLICERCACHEOLAPIMPL / SLICERCACHENATIVEITEMS) FRTSLICERCACHE BrtEndSlicerCacheDef
        BrtEndSlicerCache

SLICERCACHEOLAPIMPL = BrtBeginSlicerCacheOlapImpl SLICERCACHELEVELSDATA SLICERCACHESELECTIONS
        *FRT BrtEndSlicerCacheOlapImpl

SLICERCACHELEVELSDATA = BrtBeginSlicerCacheLevelsData 1*2147483647SLICERCACHELEVELDATA
        BrtEndSlicerCacheLevelsData

SLICERCACHELEVELDATA = BrtBeginSlicerCacheLevelData SLICERCACHESIRANGES
        BrtEndSlicerCacheLevelData

SLICERCACHESIRANGES = BrtBeginSlicerCacheSiRanges *2147483647SLICERCACHESIRANGE
        BrtEndSlicerCacheSiRanges
```


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```
SLICERCACHESIRANGE = BrtBeginSlicerCacheSiRange 1*1000BrtSlicerCacheOlapItem
        BrtEndSlicerCacheSiRange


SLICERCACHESELECTIONS = BrtBeginSlicerCacheSelections 1*2147483647BrtSlicerCacheSelection
        BrtEndSlicerCacheSelections

SLICERCACHENATIVEITEMS = BrtBeginSlicerCacheNative BrtSlicerCacheNativeItem *FRT
        BrtEndSlicerCacheNative

FRTSLICERCACHE = [SLICERCACHEBOOKPIVOTTABLES] [TABLESLICERCACHE] [SLICERCACHECROSSFILTEREXT] *FRT

SLICERCACHEBOOKPIVOTTABLES = BrtFRTBegin BrtSlicerCacheBookPivotTables BrtFRTEnd

TABLESLICERCACHE = BrtFRTBegin BrtBeginTableSlicerCache *FRT BrtEndTableSlicerCache BrtFRTEnd

SLICERCACHECROSSFILTEREXT = BrtFRTBegin BrtSlicerCacheHideItemsWithNoData BrtFRTEnd
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.48 Slicers

An instance of the **Slicers** part specifies the Slicer Views (section 2.2.14.2) for a single **worksheet** (section 2.1.7.62).

Content type**:** application/vnd.ms-excel.slicer
Source relationship: http://schemas.microsoft.com/office/2007/relationships/slicer

The presence of a **Slicers** part indicates that there is at least one Slicer View on the associated **worksheet** (section 2.1.7.62), and this part MUST be the target of an explicit relationship from the **Worksheet** part **ABNF** (section 2.1.7.62).

A Slicers part MUST NOT have implicit or explicit relationships to any part specified in this document.

Record sequence ABNF:

```
SLICERS = BrtBeginSlicers 1*2147483647SLICER BrtEndSlicers

SLICER = [ACUID] BrtBeginSlicer *FRT BrtEndSlicer
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.49 Sort Map

An instance of the **Sort Map** part specifies a series of before and after **row** or **column (1)** mappings to resolve different **sort** operations performed on the same **range** by different users in a shared workbook (section 2.2.12).

Content type**:** application/vnd.ms-excel.wsSortMap

Source relationship: http://schemas.microsoft.com/office/2006/relationships/wsSortMap

A package MUST contain at most one Sort **Map** part for each **worksheet** (section 2.1.7.62) or **macro sheet** (section 2.1.7.32) part in a shared workbook (section 2.2.12), and that part MUST be the target of an implicit relationship from the **worksheet** or **macro sheet** part.

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A Sort **Map** part MUST NOT have implicit or explicit relationships to any part specified in this document.

Record sequence **ABNF**:

```
SORTMAP = BrtBeginWsSortMap *RRSORT BrtEndWsSortMap

RRSORT = BrtBeginRRSort *BrtRRSortItem BrtEndRRSort
```

2.1.7.50 Styles

An instance of the **Styles** part type specifies style (section 2.2.6) information for a **workbook**.

Content type**:** application/vnd.ms-excel.styles
Source relationship: http://schemas.openxmlformats.org/officeDocument/2006/relationships/styles

A package MUST contain at most one **Styles** part, and that part MUST be the target of an implicit relationship from the **workbook** (section 2.1.7.61) part.

A **Styles** part MUST NOT have implicit or explicit relationships to any part specified in this document.

Record sequence **ABNF**:

```
STYLESHEET = BrtBeginStyleSheet [FMTS] [FONTS] [FILLS] [BORDERS] CELLSTYLEXFS CELLXFS STYLES DXFS
       TABLESTYLES [COLORPALETTE] FRTSTYLESHEET BrtEndStyleSheet

FMTS = BrtBeginFmts 1*(2ACFMT / BrtFmt) BrtEndFmts

ACFMT = BrtACBegin BrtFmt BrtACEnd

FONTS = BrtBeginFonts 1*65491BrtFont [ACFONTS] BrtEndFonts

ACFONTS = BrtACBegin BrtKnownFonts BrtACEnd

FILLS = BrtBeginFills 1*65431BrtFill BrtEndFills

BORDERS = BrtBeginBorders 1*65430BrtBorder BrtEndBorders

CELLSTYLEXFS = BrtBeginCellStyleXFs 1*65430(BrtXF *FRT) BrtEndCellStyleXFs

CELLXFS = BrtBeginCellXFs 1*65430(BrtXF *FRT) BrtEndCellXFs

STYLES = BrtBeginStyles 1*65430([ACUID] BrtStyle *FRT) BrtEndStyles

DXFS = BrtBeginDXFs *2147483647DXF BrtEndDXFs

DXF = ((BrtACBegin BrtDXF BrtACEnd BrtACBegin FRTDXF BrtACEnd) / (FRTDXF))

FRTDXF = BrtDXF *FRT

TABLESTYLES = BrtBeginTableStyles *TABLESTYLE BrtEndTableStyles

TABLESTYLE = [ACUID] BrtBeginTableStyle *28BrtTableStyleElement BrtEndTableStyle

COLORPALETTE = BrtBeginColorPalette [INDEXEDCOLORS] [MRUCOLORS] BrtEndColorPalette

INDEXEDCOLORS = BrtBeginIndexedColors 64BrtIndexedColor BrtEndIndexedColors
```


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```
MRUCOLORS = BrtBeginMRUColors 1*10BrtMRUColor BrtEndMRUColors

FRTSTYLESHEET = [STYLESHEET14] [DXF14S] [STYLESHEET15] [DXFS15] *FRT

STYLESHEET14 = BrtFRTBegin BrtBeginStyleSheetExt14 [SLICERSTYLES] BrtEndStyleSheetExt14 BrtFRTEnd

SLICERSTYLES = BrtBeginSlicerStyles *2147483647SLICERSTYLE BrtEndSlicerStyles

SLICERSTYLE = BrtBeginSlicerStyle BrtBeginSlicerStyleElements *8BrtSlicerStyleElement
       BrtEndSlicerStyleElements BrtEndSlicerStyle

DXF14S = BrtFRTBegin BrtBeginDXF14s 1*2147483647BrtDXF14 BrtEndDXF14s BrtFRTEnd

STYLESHEET15 = BrtFRTBegin BrtBeginTimelineStyleSheetExt15 TIMELINESTYLES
       BrtEndTimelineStyleSheetExt15 BrtFRTEnd

TIMELINESTYLES = BrtBeginTimelineStyles *2147483647TIMELINESTYLE BrtEndTimelineStyles

TIMELINESTYLE = BrtBeginTimelineStyle BrtBeginTimelineStyleElements *7BrtTimelineStyleElement
       BrtEndTimelineStyleElements BrtEndTimelineStyle

DXFS15 = BrtFRTBegin BrtBeginDXFs15 1*2147483647BrtDXF15 BrtEndDXFs15 BrtFRTEnd
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.51 Table

An instance of the **Table** part type specifies a single **table** and its **AutoFilter** information.

Content type**:** application/vnd.ms-excel.table
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/tableSingleCells

The data contained within the table is stored in the corresponding **worksheet** (section 2.1.7.62) part.

A Table part MUST be the target of an explicit relationship from a **Worksheet** part **ABNF** (section 2.1.7.62).

A Table part is permitted to have implicit relationships to the following parts specified by this document:

- **Query Table** (section 2.1.7.42)

A Table part MUST NOT have any implicit or explicit relationships to any other part specified by this document.

Record sequence ABNF:

```
TABLE = [ACUID] BrtBeginList [AUTOFILTER] [SORTSTATE] LISTCOLS BrtTableStyleClient FRTTABLE
       BrtEndList

LISTCOLS = BrtBeginListCols 1*LISTCOL BrtEndListCols

LISTCOL = [ACUID] BrtBeginListCol [BrtListCCFmla] [BrtListTrFmla] [LISTXMLCPR] *FRT BrtEndListCol

LISTXMLCPR = BrtBeginListXmlCPr *FRT BrtEndListXmlCPr

FRTTABLE = [BrtFRTBegin BrtList14 BrtFRTEnd] *FRT
```


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For ABNF rules not listed here, see section 2.1.8.

2.1.7.52 Theme

The **Theme** part is specified in [ISO/IEC29500-1:2016] section 14.2.7. The content associated with this part is specified in [ISO/IEC29500-1:2016] section 20.1.4.

2.1.7.53 Timeline Cache

An instance of the **Timeline Cache** part type specifies a single **Timeline cache** (section 2.2.15.1) in the **workbook** (section 2.1.7.61).

Content type**:** application/vnd.ms-excel.TimelineCache+xml
Source relationship: http://schemas.microsoft.com/office/2010/relationships/TimelineCache

A package MUST contain one Timeline Cache part per **BrtBeginTimelineCacheID** (section 2.4.280) record in the **workbook** part, and that part MUST be the target of an explicit relationship from the **workbook** part.

A **Timeline Cache** part MUST NOT have implicit or explicit relationships to any part specified in this document.

The syntax of the structures contained in this part uses **XSD**, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various **XML namespaces** by using the mechanisms specified in [XMLNS].

The content of this part is **XML**, and the **root element** for the part is the **timelineCacheDefinition** element, as specified in [MS-XLSX] section 2.4.58.

2.1.7.54 Timelines

An instance of the **Timelines** part specifies the **Timeline views** (section 2.2.15.2) for a single **worksheet** (section 2.1.7.62).

Content type**:** application/vnd.ms-excel.Timeline+xml
Source relationship: http://schemas.microsoft.com/office/2010/relationships/Timeline

The presence of a **Timelines** part indicates that there is at least one **Timeline view** (section 2.2.15.2) on the associated **worksheet** (section 2.1.7.62), and this part MUST be the target of an explicit relationship from the **Worksheet** part **ABNF** (section 2.1.7.62).

A Timelines part MUST NOT have implicit or explicit relationships to any part specified in this document.

The syntax of the structures contained in this part uses **XSD**, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various **XML namespaces** by using the mechanisms specified in [XMLNS].

The content of this part is **XML**, and the **root element** for the part is the **timelines** element, as specified in [MS-XLSX] section 2.4.57.

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2.1.7.55 User Names

An instance of the **User Names** part type specifies the user log (section 2.2.12.1) for a shared workbook (section 2.2.12).

Content type**:** application/vnd.ms-excel.userNames
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/usernames

The presence of the **User Names** part indicates the **workbook** is a shared workbook (section 2.2.12). The **User Names** part MUST be the target of an implicit relationship from the **workbook** (section 2.1.7.61) part.

A **User Names** part MUST NOT have implicit or explicit relationships to any part specified in this document.

Record sequence **ABNF**:

```
USERNAMES = BrtCUsr BrtBeginUsers *255(BrtUsr *FRT) BrtEOF
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.56 VBA Project

The **VBA Project** part is specified in [MS-OVBA].

Content type**:** application/vnd.ms-office.vbaProject
Source relationship: http://schemas.microsoft.com/office/2006/relationships/vbaProject

A package MUST contain at most one VBA Project part, which MUST be the target of an implicit relationship from the **workbook** (section 2.1.7.61) part.

A VBA Project part is permitted to contain implicit relationships to the following parts specified in this document:

- **VBA Project Signature** (section 2.1.7.58)
- **VBA Project Agile Signature** (section 2.1.7.57)

A VBA Project part MUST NOT have implicit or explicit relationships to any other part specified in this document.

2.1.7.57 VBA Project Agile Signature

The **VBA Project Agile Signature** part is specified in [MS-OSHARED] section 2.3.2. The **contentInfo** field of the **VBA Project Agile Signature** part MUST be a SpcIndirectDataContent**V2** structure.

Content type**:** application/vnd.ms-office.vbaProjectSignatureAgile
Source relationship:
http://schemas.microsoft.com/office/2006/relationships/vbaProjectSignatureAgile

A package MUST contain at most one VBA Project **Agile Signature** part. That part MUST be the target of an implicit relationship from the **VBA project** (section 2.1.7.56) part.

A VBA Project **Agile Signature** part MUST NOT have implicit or explicit relationships to any part specified in this document.

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2.1.7.58 VBA Project Signature

The **VBA Project Signature** part is specified in [MS-OSHARED] section 2.3.2. The **contentInfo** field of the **VBA Project Signature** part MUST be a SpcIndirectDataContent structure.

Content type**:** application/vnd.ms-office.vbaProjectSignature
Source relationship: http://schemas.microsoft.com/office/2006/relationships/vbaProjectSignature

A package MUST contain at most one VBA Project **Signature** part. That part MUST be the target of an implicit relationship from the **VBA project** (section 2.1.7.56) part.

A VBA Project **Signature** part MUST NOT have implicit or explicit relationships to any part specified in this document.

2.1.7.59 VML Drawings

The **VML Drawings** part is specified in [ISO/IEC29500-4:2016] section 8.2. The content associated with this part is specified in [ISO/IEC29500-4:2016] section 14.4.

In addition to the explicit relationships specified in [ISO/IEC29500-4:2016] section 8.2, a **VML Drawings** part is permitted to be the target of an explicit relationship from the following parts specified by this document:

- **Chart Sheet** (section 2.1.7.7)
- **Dialog Sheet** (section 2.1.7.20)
- **Macro Sheet** (section 2.1.7.32)

2.1.7.60 Volatile Dependencies

An instance of the **Volatile Dependencies** part type specifies the Volatile Dependencies (section 2.2.13) for a **workbook**.

Content type**:** application/vnd.ms-excel.volatileDependencies
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/volatileDependencies

A package MUST contain at most one Volatile **Dependencies** part, and that part MUST be the target of an implicit relationship from the **workbook** (section 2.1.7.61) part.

A Volatile **Dependencies** part MUST NOT have implicit or explicit relationships to any part specified in this document.

Record sequence **ABNF**:

```
VOLATILEDEPENDENCIES = BrtBeginVolDeps 1*VOLTYPE *FRT BrtEndVolDeps

VOLTYPE = BrtBeginVolType 1*VOLMAIN BrtEndVolType

VOLMAIN = BrtBeginVolMain 1*VOLTOPIC BrtEndVolMain

VOLTOPIC = BrtBeginVolTopic VOLDATA *BrtVolSubtopic 1*BrtVolRef BrtEndVolTopic

VOLDATA = BrtVolNum / BrtVolErr / BrtVolStr / BrtVolBool
```

For ABNF rules not listed here, see Common Productions (section 2.1.8).

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2.1.7.61 Workbook

An instance of the **Workbook** (section 2.1.7.61) part type specifies **workbook** data and references to all of its **sheets**.

Content type**:** application/vnd.ms-excel.main

Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/officeDocument

A package MUST contain exactly one Workbook part, and that part MUST be the target of a relationship in the package relationship part, as specified in section 2.1.

A Workbook part is permitted to have implicit relationships to the following parts specified in this document:

- **Attached Toolbars** (section 2.1.7.3)
- **Calculation Chain** (section 2.1.7.4)
- **Metadata** (section 2.1.7.34)
- **External Data Connections** (section 2.1.7.24)
- **Custom XML Maps** (section 2.1.7.15)
- **Custom XML Data Storage** (section 2.1.7.13)
- **Shared Strings (**section 2.1.7.45)
- **Revision Headers** (section 2.1.7.43)
- **User Names** (section 2.1.7.55)
- **Styles** (section 2.1.7.50)
- **Theme** (section 2.1.7.52)
- **VBA Project** (section 2.1.7.56)
- **Volatile Dependencies** (section 2.1.7.60)

A Workbook part is permitted to have explicit relationships to the following parts specified in this document:

- **Chart Sheet** (section 2.1.7.7)
- **Dialog Sheet** (section 2.1.7.20)
- **External Links** (section 2.1.7.25)
- **Macro Sheet** (section 2.1.7.32)
- **International Macro Sheet** (section 2.1.7.31)
- **PivotCache Definition** (section 2.1.7.38)
- **Slicer Cache** (section 2.1.7.47)
- **Worksheet** (section 2.1.7.62)
- **Timeline Cache** (section 2.1.7.53)

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A Workbook part MUST NOT have implicit or explicit relationships to any other part specified in this document.

Record sequence **ABNF**:

```
WORKBOOK = BrtBeginBook [BrtFileVersion] [[BrtFileSharingIso] BrtFileSharing] [BrtWbProp]
        [ACABSPATH] [ACREVISIONPTR] [[BrtBookProtectionIso] BrtBookProtection] [BOOKVIEWS]
        BUNDLESHS [FNGROUP] [EXTERNALS] *BrtName [BrtCalcProp] [BrtOleSize] *(BrtUserBookView
        *FRT) [PIVOTCACHEIDS] [BrtWbFactoid] [SMARTTAGTYPES] [BrtWebOpt] *BrtFileRecover
        [WEBPUBITEMS] [CRERRS] FRTWORKBOOK BrtEndBook

ACABSPATH = BrtACBegin BrtAbsPath15 BrtACEnd

BOOKVIEWS = BrtBeginBookViews 1*([ACUID] BrtBookView *FRT) BrtEndBookViews

BUNDLESHS = BrtBeginBundleShs 1*BrtBundleSh BrtEndBundleShs

FNGROUP = BrtBeginFnGroup *BrtFnGroup BrtEndFnGroup

EXTERNALS = BrtBeginExternals *SUP BrtExternSheet BrtEndExternals

SUP = BrtSupSelf / SUPSAME / SUPADDIN / BrtSupBookSrc

SUPSAME = BrtSupSame *BrtPlaceholderName

SUPADDIN = BrtSupAddin 1*BrtPlaceholderName

PIVOTCACHEIDS = BrtBeginPivotCacheIDs 1*PIVOTCACHEID BrtEndPivotCacheIDs

PIVOTCACHEID = BrtBeginPivotCacheID BrtEndPivotCacheID

SMARTTAGTYPES = BrtBeginSmartTagTypes 1*BrtSmartTagType BrtEndSmartTagTypes

CRERRS = BrtBeginCRErrs *BrtCrashRecErr BrtEndCRErrs

FRTWORKBOOK = [NAMEEXT] [SLICERCACHESPIVOTCACHEIDS] [SLICERCACHEIDS] [WORKBOOKPR14]
        [DECOUPLEDPIVOTCACHEIDS] [PIVOTTABLEREFS] [TIMELINECACHEPIVOTCACHEIDS] [TIMELINECACHEIDS]
        [TABLESLICERCACHEIDS] [WORKBOOKPR15] [DATAMODEL] [CALCFEATURES] *FRT

NAMEEXT = BrtFRTBegin 1*BrtNameExt BrtFRTEnd

SLICERCACHESPIVOTCACHEIDS = BrtFRTBegin BrtBeginSlicerCachesPivotCacheIDs
        1*SLICERCACHESPIVOTCACHEID BrtEndSlicerCachesPivotCacheIDs BrtFRTEnd

SLICERCACHESPIVOTCACHEID = BrtBeginSlicerCachesPivotCacheID BrtEndSlicerCachesPivotCacheID

SLICERCACHEIDS = BrtFRTBegin BrtBeginSlicerCacheIDs 1*SLICERCACHEID BrtEndSlicerCacheIDs
        BrtFRTEnd

SLICERCACHEID = BrtBeginSlicerCacheID BrtEndSlicerCacheID

WORKBOOKPR14 = BrtFRTBegin BrtWbProp14 BrtFRTEnd

DECOUPLEDPIVOTCACHEIDS = BrtFRTBegin BrtBeginDecoupledPivotCacheIDs 1*BrtDecoupledPivotCacheID
        BrtEndDecoupledPivotCacheIDs BrtFRTEnd

PIVOTTABLEREFS = BrtFRTBegin BrtBeginPivotTableRefs 1*BrtPivotTableRef BrtEndPivotTableRefs
        BrtFRTEnd

TIMELINECACHEPIVOTCACHEIDS = BrtFRTBegin BrtBeginTimelineCachePivotCacheIDs
        1*TIMELINECACHEPIVOTCACHEID BrtEndTimelineCachePivotCacheIDs BrtFRTEnd
```


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```
TIMELINECACHEPIVOTCACHEID = BrtTimelineCachePivotCacheID

TIMELINECACHEIDS = BrtFRTBegin BrtBeginTimelineCacheIDs 1*TIMELINECACHEID BrtEndTimelineCacheIDs
       BrtFRTEnd

TIMELINECACHEID = BrtBeginTimelineCacheID BrtEndTimelineCacheID

TABLESLICERCACHEIDS = BrtFRTBegin BrtTableSlicerCacheIDs 1*TABLESLICERCACHEID BrtFRTEnd

TABLESLICERCACHEID = BrtTableSlicerCacheID

WORKBOOKPR15 = BrtFRTBegin BrtWorkBookPr15 BrtFRTEnd

DATAMODEL = BrtBeginDataModel MODELTABLES MODELRELATIONSHIPS FRTDATAMODEL BrtEndDataModel

MODELTABLES = BrtBeginModelTables 1*BrtModelTable BrtEndModelTables

MODELRELATIONSHIPS = brtBeginModelRelationships 1*brtModelRelationship brtEndModelRelationships

FRTDATAMODEL = [MODELTIMEGROUPINGS] *FRT

MODELTIMEGROUPINGS = BrtFRTBegin brtBeginModelTimeGroupings 1*MODELTIMEGROUPING
       brtEndModelTimeGroupings BrtFRTEnd

MODELTIMEGROUPING = brtBeginModelTimeGrouping 1*brtModelTimeGroupingCalcCol
       brtEndModelTimeGrouping

ACREVISIONPTR = BrtACBegin BrtRevisionPtr BrtACEnd

CALCFEATURES = BrtFRTBegin BrtBeginCalcFeatures 1*BrtCalcFeature BrtEndCalcFeatures BrtFRTEnd
```

For ABNF rules not listed here, see Common Productions (section 2.1.8).

2.1.7.62 Worksheet

An instance of the **Worksheet** part type specifies a **worksheet**.

Content type**:** application/vnd.ms-excel.worksheet
Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/worksheet

A Worksheet part MUST be the target of an explicit relationship from the **workbook** (section 2.1.7.61) part.

A Worksheet part is permitted to contain implicit relationships to the following parts specified in this document:

- **Comments** (section 2.1.7.8)
- **PivotTable Definitions** (section 2.1.7.40)
- **Query Table** (section 2.1.7.42)
- **Single Cell Tables** (section 2.1.7.46)
- **Worksheet Binary Index** (section 2.1.7.63)
- **Sort Map** (section 2.1.7.49)

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A Worksheet part is permitted to contain explicit relationships to the following parts specified in this document:

- **ActiveX** (section 2.1.7.1)
- **Custom Property** (section 2.1.7.12)
- **Drawings** (section 2.1.7.23)
- **OLE Object** (section 2.1.7.36)
- **OLE Package** (section 2.1.7.37)
- **Hyperlinks** (section 2.1.9)
- **Images** (section 2.1.7.30)
- **Printer Settings** (section 2.1.7.41)
- **Slicers** (section 2.1.7.48)
- **Table Definition** (section 2.1.7.51)
- **VML Drawings** (section 2.1.7.59)
- **Timelines** (section 2.1.7.54)

A Worksheet part MUST NOT have implicit or explicit relationships to any other part specified in this document.

Record sequence **ABNF**:

```
WORKSHEET = BrtBeginSheet [BrtWsProp] [BrtWsDim] [WSVIEWS2] [WSFMTINFO] *COLINFOS CELLTABLE
        [BrtSheetCalcProp] [[BrtSheetProtectionIso] BrtSheetProtection] *([BrtRangeProtectionIso]
        BrtRangeProtection) [SCENMAN] [AUTOFILTER] [SORTSTATE] [DCON] [USERSHVIEWS] [MERGECELLS]
        [BrtPhoneticInfo] *CONDITIONALFORMATTING [DVALS] *([ACUID] BrtHLink) [BrtPrintOptions]
        [BrtMargins] [BrtPageSetup] [HEADERFOOTER] [RWBRK] [COLBRK] *BrtBigName [CELLWATCHES]
        [IGNOREECS] [SMARTTAGS] [BrtDrawing] [BrtLegacyDrawing] [BrtLegacyDrawingHF] [BrtBkHim]
        [OLEOBJECTS] [ACTIVEXCONTROLS] [WEBPUBITEMS] [LISTPARTS] FRTWORKSHEET [ACUID] BrtEndSheet

WSVIEWS2 = BrtBeginWsViews 1*WSVIEW2 *FRT BrtEndWsViews

WSVIEW2 = [ACUID] BrtBeginWsView [BrtPane] *4BrtSel *4SXSELECT *FRT BrtEndWsView

SXSELECT = BrtBeginSxSelect PIVOTRULE BrtEndSxSelect

SCENMAN = BrtBeginScenMan 1*32767SCT BrtEndScenMan

SCT = BrtBeginSct 1*32BrtSlc BrtEndSct

MERGECELLS = BrtBeginMergeCells 1*BrtMergeCell BrtEndMergeCells

DVALS = BrtBeginDVals 1*65534([ACUID] [ACDVALLIST] BrtDVal) BrtEndDVals

HLINKS = 1*([ACUID] BrtHLink)

CELLWATCHES = BrtBeginCellWatches 1*BrtCellWatch BrtEndCellWatches

IGNOREECS = BrtBeginCellIgnoreECs 1*BrtCellIgnoreEC *FRT BrtEndCellIgnoreECs

SMARTTAGS = BrtBeginSmartTags 1*CELLSMARTTAGS BrtEndSmartTags
```


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```
CELLSMARTTAGS = BrtBeginCellSmartTags 1*CELLSMARTTAG BrtEndCellSmartTags

CELLSMARTTAG = BrtBeginCellSmartTag *BrtCellSmartTagProperty BrtEndCellSmartTag

ACTIVEXCONTROLS = BrtBeginActiveXControls 1*BrtActiveX BrtEndActiveXControls

LISTPARTS = BrtBeginListParts *BrtListPart BrtEndListParts

FRTWORKSHEET = [CONDITIONALFORMATTINGS] [DVALS14] [SPARKLINEGROUPS] [SLICERSEX]
       [RANGEPROTECTION14] [IGNOREECS14] [WEBEXTENSIONS] [TABLESLICERSEX] [TIMELINESEX] *FRT

CONDITIONALFORMATTINGS = BrtFRTBegin BrtBeginConditionalFormattings
       *2147483647CONDITIONALFORMATTING14 BrtEndConditionalFormattings BrtFRTEnd

DVALS14 = BrtFRTBegin BrtBeginDVals14 1*65534([ACDVALLIST] BrtDVal14) BrtEndDVals14 BrtFRTEnd

SPARKLINEGROUPS = BrtFRTBegin BrtBeginSparklineGroups 1*2147483647SPARKLINEGROUP
       BrtEndSparklineGroups BrtFRTEnd

SPARKLINEGROUP = BrtBeginSparklineGroup [ACUID] BrtBeginSparklines 1*2147483647BrtSparkline
       BrtEndSparklines BrtEndSparklineGroup

SLICERSEX = BrtFRTBegin BrtBeginSlicersEx SLICEREX BrtEndSlicersEx BrtFRTEnd

SLICEREX = BrtBeginSlicerEx BrtEndSlicerEx

TABLESLICERSEX = BrtFRTBegin BrtBeginSlicersEx TABLESLICEREX BrtEndSlicersEx BrtFRTEnd

TABLESLICEREX = BrtBeginSlicerEx BrtEndSlicerEx

RANGEPROTECTION14 = BrtFRTBegin 1*([BrtRangeProtectionIso14] BrtRangeProtection14) BrtFRTEnd

IGNOREECS14 = BrtFRTBegin BrtBeginCellIgnoreECs14 1*BrtCellIgnoreEC14 BrtEndCellIgnoreECs14
       BrtFRTEnd

ACDVALLIST = BrtACBegin BrtDValList BrtACEnd

TIMELINESEX = BrtFRTBegin BrtBeginTimelinesEx TIMELINEEX BrtEndTimelinesEx BrtFRTEnd

TIMELINEEX = BrtBeginTimelineEx BrtEndTimelineEx

WEBEXTENSIONS = BrtFRTBegin BrtBeginWebExtensions 1*BrtWebExtension BrtEndWebExtensions BrtFRTEnd
```

For ABNF rules not listed here, see section 2.1.8.

2.1.7.63 Worksheet Binary Index

An instance of the **Worksheet Binary Index** part type specifies a binary index (section 2.2.1.1) for a **worksheet**, as specified by the worksheet (section 2.1.7.62) part.

Content type**:** application/vnd.ms-excel.binIndexWs
Source relationship: http://schemas.microsoft.com/office/2006/relationships/xlBinaryIndex

A Worksheet **Binary Index** part MUST be the target of an implicit relationship from a **worksheet** (section 2.1.7.62) part.

A Worksheet **Binary Index** part MUST NOT have implicit or explicit relationships to any part specified in this document.

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Record sequence **ABNF**:

```
SHEETINDEX = 1*(BrtIndexBlock [BrtIndexRowBlock]) 1*2BrtIndexPartEnd
```

2.1.8 Common Productions

Record sequence fragments that are common to multiple parts are specified in this section. If a fragment cannot be found under its part, it can be found in the following **ABNF** grammar.

The FRT rule can contain any number of other valid Records (section 2.1.4) between **BrtFRTBegin** (section 2.4.678) and **BrtFRTEnd** (section 2.4.679).

```
WSVIEWS = BrtBeginWsViews 1*WSVIEW *FRT BrtEndWsViews

WSVIEW = BrtBeginWsView [BrtPane] *4BrtSel *FRT BrtEndWsView

WSFMTINFO = [ACWSFMTINFO] BrtWsFmtInfo

ACWSFMTINFO = BrtACBegin BrtWsFmtInfoEx14 BrtACEnd

COLINFOS = BrtBeginColInfos 1*BrtColInfo BrtEndColInfos

CELLTABLE = BrtBeginSheetData *1048576([ACCELLTABLE] BrtRowHdr *16384CELL *FRT) BrtEndSheetData

ACCELLTABLE = BrtACBegin BrtRwDescent BrtACEnd

CELL = (DATACELL / FMLACELL / SHRFMLACELL / TABLECELL) *FRT

DATACELL = CELLMETA (BrtCellBlank / BrtCellRk / BrtCellError / BrtCellBool / BrtCellReal /
       BrtCellIsst / BrtCellSt)

FMLACELL = CELLMETA (BrtFmlaString / BrtFmlaNum / BrtFmlaBool / BrtFmlaError)

SHRFMLACELL = FMLACELL (BrtShrFmla / BrtArrFmla)

TABLECELL = BrtTable CELLMETA (BrtCellRk / BrtCellError / BrtCellBool / BrtCellReal / BrtCellSt)

CELLMETA = [BrtCellMeta] [BrtValueMeta]

AUTOFILTER = [ACUID] BrtBeginAFilter *FILTERCOLUMN [SORTSTATE] *FRT BrtEndAFilter

FILTERCOLUMN = BrtBeginFilterColumn [BrtDynamicFilter / BrtTop10Filter / BrtColorFilter /
       BrtIconFilter / CUSTOMFILTERS / FILTERS / ACFILTERCONTENT / RICHFILTERCONTENT] *FRT
       BrtEndFilterColumn

CUSTOMFILTERS = BrtBeginCustomFilters 1*2BrtCustomFilter BrtEndCustomFilters

FILTERS = BrtBeginFilters *BrtFilter *BrtAFilterDateGroupItem BrtEndFilters

ACFILTERCONTENT = (ACFILTERS / ACCUSTOMFILTER / ACICONFILTER) BrtACBegin CUSTOMFILTERS BrtACEnd

ACCUSTOMFILTER = BrtBeginCustomFilters14 1*2BrtCustomFilter14 BrtEndCustomFilters

ACFILTERS = BrtACBegin BrtBeginFilters *BrtFilter14 BrtEndFilters BrtACEnd

ACICONFILTER = BrtACBegin BrtIconFilter14 BrtACEnd
```


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```
RICHFILTERCONTENT = BrtBeginRichFilterColumn (RICHFILTERS / BrtDynamicRichFilter /
        CUSTOMRICHFILTERS / BrtTop10RichFilter / *FRT) BrtEndRichFilterColumn

RICHFILTERS = BrtBeginRichFilters *BrtRichFilter *BrtRichFilterDateGroupItem *FRT
        BrtEndRichFilters

CUSTOMRICHFILTERS = BrtBeginCustomRichFilters 1*2BrtCustomRichFilter *FRT BrtEndCustomRichFilters

SORTSTATE = BrtBeginSortState (SORTCONDS / ACSORTCONDS / RICHSORTCONDITION) *FRT BrtEndSortState

SORTCONDS = *64SORTCOND

SORTCOND = BrtBeginSortCond BrtEndSortCond

ACSORTCONDS = BrtACBegin *64SORTCOND14 BrtACEnd

SORTCOND14 = BrtBeginSortCond14 BrtEndSortCond14

RICHSORTCONDITION = BrtBeginRichSortCondition BrtEndRichSortCondition

DCON = BrtBeginDCon [DREFS] BrtEndDCon

DREFS = BrtBeginDRefs *BrtDRef BrtEndDRefs

USERSHVIEWS = BrtBeginUserShViews 1*USERSHVIEW BrtEndUserShViews

USERSHVIEW = BrtBeginUserShView [BrtPane] [BrtSel] [RWBRK] [COLBRK] [BrtMargins]
        [BrtPrintOptions] [BrtPageSetup] [HEADERFOOTER] [AUTOFILTER] *FRT BrtEndUserShView

HEADERFOOTER = BrtBeginHeaderFooter BrtEndHeaderFooter

CONDITIONALFORMATTING = BrtBeginConditionalFormatting 1*65534CFRULE *FRT
        BrtEndConditionalFormatting

CFRULE = BrtBeginCFRule [COLORSCALE / DATABAR / ICONSET] FRTCFRULE BrtEndCFRule

FRTCFRULE = [BrtFRTBegin BrtCFRuleExt BrtFRTEnd] *FRT

COLORSCALE = BrtBeginColorScale ((2CFVO 2BrtColor) / (3CFVO 3BrtColor)) BrtEndColorScale

DATABAR = BrtBeginDatabar 2CFVO BrtColor BrtEndDatabar

ICONSET = BrtBeginIconSet 3*5CFVO BrtEndIconSet

CFVO = BrtCFVO *FRT

CFRULE14 = BrtBeginCFRule14 [COLORSCALE14 / DATABAR14 / ICONSET14] *FRT BrtEndCFRule14

CONDITIONALFORMATTING14 = BrtBeginConditionalFormatting14 1*65534CFRULE14 *FRT
        BrtEndConditionalFormatting14

COLORSCALE14 = BrtBeginColorScale14 ((2CFVO14 2BrtColor14) / (3CFVO14 3BrtColor14))
        BrtEndColorScale14

DATABAR14 = BrtBeginDatabar14 2CFVO14 *5BrtColor14 BrtEndDatabar14

ICONSET14 = BrtBeginIconSet14 3*5CFVO14 [3*5BrtCFIcon] BrtEndIconSet14

CFVO14 = BrtCFVO14 *FRT
```


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```
RWBRK = BrtBeginRwBrk *BrtBrk BrtEndRwBrk

COLBRK = BrtBeginColBrk *BrtBrk BrtEndColBrk

OLEOBJECTS = BrtBeginOleObjects 1*BrtOleObject BrtEndOleObjects

WEBPUBITEMS = BrtBeginWebPubItems 1*WEBPUBITEM BrtEndWebPubItems

WEBPUBITEM = BrtBeginWebPubItem BrtEndWebPubItem

PIVOTRULE = BrtBeginPRule [PRFILTERS] *FRT BrtEndPRule

PRFILTERS = BrtBeginPRFilters 1*PRFILTER BrtEndPRFilters

PRFILTER = BrtBeginPRFilter *PRFITEM BrtEndPRFilter

PRFITEM = BrtBeginPRFItem BrtEndPRFItem

PCDCALCMEMSEXT = BrtBeginPCDCalcMemsExt 1*2147483647PCDCALCMEMEXT BrtEndPCDCalcMemsExt

PCDCALCMEM14 = BrtBeginPCDCalcMem14 [SXTUPLESET] BrtEndPCDCalcMem14

PCDCALCMEMEXT = BrtBeginPCDCalcMemExt [BrtFRTBegin PCDCALCMEM14 BrtFRTEnd] [PCDCALCMEM15] *FRT
       BrtEndPCDCalcMemExt

SXTUPLESET = BrtBeginSXTupleSet SXTUPLESETHEADER SXTUPLESETDATA BrtEndSXTupleSet

SXTUPLESETHEADER = BrtBeginSXTupleSetHeader 1*3000BrtSXTupleSetHeaderItem BrtEndSXTupleSetHeader

SXTUPLESETDATA = BrtBeginSXTupleSetData 1*3000SXTUPLESETROW BrtEndSXTupleSetData

SXTUPLESETROW = BrtBeginSXTupleSetRow 1*3000BrtSXTupleSetRowItem BrtEndSXTupleSetRow

PCDCALCMEM15 = BrtFRTBegin BrtPCDCalcMem15 BrtFRTEnd

FRT = BrtFRTBegin BrtFRTEnd

ACUID = BrtACBegin BrtUid BrtACEnd
```

2.1.9 Hyperlinks

Storage of hyperlinks is specified in [ISO/IEC29500-1:2016] section 15.3.

2.1.10 External Workbooks

Source relationship: See section 2.1.10.1.

When a package uses an **external workbook**, it MUST store the location of the **workbook** using one of the relationships specified in section 2.1.10.1, and that relationship MUST be an explicit relationship from the **external link** (section 2.1.7.25) part.

An external workbook MUST be located external to the package containing the source relationship (expressed syntactically, the **TargetMode** attribute of the **Relationship** element MUST be "External").

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2.1.10.1 External Workbook Base Paths

The source relationship specifies the base path to use for the path to the external workbook (section 2.1.10).

Source relationship	Relationship base path
http://schemas.openxmlformats.org/officeDocument/2006/relationships/externalLinkPath	Specifies that the path is relative to the location of the package containing the relationship.
http://schemas.microsoft.com/office/2006/relationships/xlExternalLinkPath/xlStartup	Specifies that the path is relative to the **startup directory**.
http://schemas.microsoft.com/office/2006/relationships/xlExternalLinkPath/xlAlternateStartup	Specifies that the path is relative to the **alternate startup directory**.
http://schemas.microsoft.com/office/2006/relationships/xlExternalLinkPath/xlLibrary	Specifies that the path is relative to the **library directory**.
http://schemas.microsoft.com/office/2006/relationships/xlExternalLinkPath/xlPathMissing	No base path is inferred.

2.2 Conceptual Overview

This section specifies how higher-level features of the file format are represented by combinations of records.

2.2.1 Cell Table

Text, formulas, and numerical data within **worksheets** are primarily stored in the **cells** that make up worksheets (section 2.1.7.62) and macro sheets (section 2.1.7.32). Cells are the fundamental building blocks that contain data, formulas (section 2.2.2), and formatting to form the worksheets. The data structure associated with the grid of cells is called the cell table.

The cell table is stored in the sequence of records that conform to the **CELLTABLE** rule in the **Common Productions** (section 2.1.8) part **ABNF**. The cells are contained between **BrtBeginSheetData** (section 2.4.198) and **BrtEndSheetData** (section 2.4.546) records. They are stored in a **row**-major order, with a **BrtRowHdr** (section 2.4.746) record saved for every non-empty row, where a non-empty row is a row that contains data, formatting, metadata, or **phonetic information**.

Every row is divided into 16 **column (1)** blocks, and each column (1) block spans 1024 columns (1). Each **BrtRowHdr** (section 2.4.746) record contains an array of **BrtColSpan** (section 2.5.8) structures that specifies the column (1) blocks in that row that have non-empty cells, where a non-empty cell is a cell that contains data, individual cell formatting, metadata, or phonetic information. Formatting information for a cell can be derived from individual cell formatting, row formatting, column (1) formatting, or the default cell format as specified by the Normal Style (section 2.2.6.1.2.2). The order of precedence for formatting is individual cell formatting with the highest precedence, followed by row formatting, and then column (1) formatting, and lastly the default cell format.

Cells are specified by **BrtCellBlank** (section 2.4.314), **BrtCellRk** (section 2.4.322), **BrtCellError** (section 2.4.316), **BrtCellBool** (section 2.4.315), **BrtCellReal** (section 2.4.321), **BrtCellSt** (section 2.4.325), **BrtCellIsst** (section 2.4.319), **BrtFmlaString** (section 2.4.674), **BrtFmlaNum** (section 2.4.673), **BrtFmlaBool** (section 2.4.671), **BrtFmlaError** (section 2.4.672), or **BrtCellRString** (section 2.4.323) records. Each of these records contains a **Cell** (section 2.5.9) structure that specifies which column (1) the cell belongs to.

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The sequence of records that conform to the **CELLTABLE** rule (defined in section 2.1.8) begin with the **BrtBeginSheetData** (section 2.4.198) record, followed by the first **BrtRowHdr** (section 2.4.746) representing the first non-empty row. The **BrtRowHdr** is followed by records representing every non-empty cell in that row in column (1)-major order, including any of the records in the **CELL** rule (defined in section 2.1.8). This series of records is repeated for every non-empty row and non-empty cell, and ends with the **BrtEndSheetData** (section 2.4.546) record.

A cell in the cell table is referred to by its row and column (1) indexes, which are zero-based. The maximum row index is 1048575; the maximum column (1) index is 16383. The bounding box of the actual non-empty cells is stored in the **BrtWsDim** (section 2.4.841) record. Information pertaining to each column (1) is specified in the **COLINFOS** collection (section 2.1.8).

2.2.1.1 Retrieval of Last-Calculated Cell Values Without Loading Cell Table

The only way to retrieve formulas, formats and other cell data is to read the cell table normally as defined previously. However, in certain situations (for example when resolving external references to values) it is beneficial to retrieve only the last calculated value from a cell, without actually loading the cell table. For this reason, a binary index exists within the file that specifies data used to improve the performance of a random read access to the cell table (section 2.2.1) data in a **worksheet** (section 2.1.7.62) part or **macro sheet** (section 2.1.7.32) part. To find a position of a particular **cell** within a file, an application can perform the following steps:

1. Open the **worksheet binary index** (section 2.1.7.63) part or the **macro sheet binary index** part (section 2.1.7.33) that corresponds to the **sheet** to which the cell belongs.

2. Read **BrtIndexBlock** (section 2.4.683) records to find one such that the zero-based cell **row** is greater than or equal to **rwMic** and less than **rwMac**.

3. If no such **BrtIndexBlock** record exists, then the row has no data or formatting.

4. Read a **BrtIndexRowBlock** (section 2.4.686) record that immediately follows this **BrtIndexBlock** record, and compute the data offset according to the description of the **BrtIndexRowBlock** record.

5. Open the corresponding **Worksheet** part (section 2.1.7.62) or **macro sheet** part (section 2.1.7.32).

6. Read cell table (section 2.2.1) data starting from the previously computed position to find the cell record for the target cell.

7. If the end of the row in the cell table (section 2.2.1) or a record whose **column (1)** is greater than the column (1) of the target cell is reached, then the cell is blank and has no formatting.

2.2.2 Formulas

A formula is sequence of values, **cell references**, names, functions, or operators in a **cell** that together produce a new value. Formulas are stored in a tokenized representation known as a parsed expression. In this section, formula is a synonym for parsed expression. A parsed expression is converted into a textual formula at runtime for display and user editing. Cell formulas are specified by the **BrtFmlaBool** (section 2.4.671), **BrtFmlaError** (section 2.4.672), **BrtFmlaNum** (section 2.4.673) and **BrtFmlaString** (section 2.4.674) records. Array formulas are specified by the **BrtArrFmla** (section 2.4.6) record. Shared formulas are specified by the **BrtShrFmla** (section 2.4.770) record.

Formulas that are part of a **revision** as specified in the Shared Workbooks (section 2.2.12) overview are specified by the **rgce**.**rgce** field or the **rgceOld**.**rgce** field of the **BrtRRDefName** (section 2.4.750) record, or by the sequence of records that conform to the **CELL** rule (defined in section 2.1.7.44) in the **BrtRRChgCell** (section 2.4.748) collection.

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A parsed **expression** contains a sequence of parse tokens, each of which is either an operand token (section 2.2.2.2), an operator token (section 2.2.2.1), a control token (section 2.2.2.3), a display token (section 2.2.2.4), or a mem token (section 2.2.2.5). All tokens are stored as Parse Things (section 2.5.97.16).

With the exception of control tokens, display tokens and mem tokens that are described in subsequent sections, parsed expressions are stored in an **Rgce** (section 2.5.97.88) structure using Reverse-Polish notation. Reverse-Polish notation is a logical system for the specification of mathematical formulas in which operands are followed by operators. Inside an **Rgce**, the operands and operators are represented by an array of **Ptg** (section 2.5.97.16) structures of variable lengths. The first one or two bytes of a **Ptg** structure contain the token type that determines which specific **Ptg** type the **Ptg** is, as specified in the **Ptg** structure. The remainder of the structure varies according to the token type.

Evaluation of a formula specified in Reverse-Polish notation is usually based around an evaluation stack. The expression is parsed from beginning to end, and operands are pushed onto the stack as they are encountered. When operators are encountered, the required number of operands is popped from the stack and the result of the operation is pushed back onto the stack. Evaluation begins with an empty stack, and when the evaluation is finished, there will be exactly one value left on the stack. The value is the result of the evaluation. Subsequent subsections refer to a stack as described by this model.

2.2.2.1 Operator Tokens

Unary Operator Tokens

Unary operator tokens specify operations that are performed on the previous element in the grammar specified by **Rgce** (section 2.5.97.88). For example, **PtgPercent** (section 2.5.97.65) divides the last **expression** on the stack by 100.

Binary Operator Tokens

Binary operator tokens specify operations that are performed on the previous two elements in the grammar specified by **Rgce** (section 2.5.97.88). For example, **PtgIsect** (section 2.5.97.50) intersects the topmost two expressions on the stack.

2.2.2.2 Operand Tokens

Operand tokens represent values and references that are used by operators and functions. Operands fall into one of two classes, reference class (section 2.2.2.2.2) or value class (section 2.2.2.2.1), depending on what result type the formula expects from the operand.

2.2.2.2.1 Value Class

The value class operand is the most common type of operand, and represents a single value or array of values. When **Ptg**s (section 2.5.97.16) with reference contents are used by an operator that requires value class operands, the **Ptg**s can be stored as value class operands rather than reference class (section 2.2.2.2.2) operands. For example, in a formula where the contents of A1 is added to the integer value 1, the value of **cell** A1 is pushed onto the stack as a value class operand **PtgRef** (section 2.5.97.68) because the subsequent **PtgAdd** (section 2.5.97.17) operator requires value class operands. Arrays are stored in a similar fashion. For example, when adding the array of values {1,2,3,4,5,6}, the values are stored in a **PtgArray** (section 2.5.97.23) operand.

2.2.2.2.2 Reference Class

When operands are stored as reference class operands, any references contained in the operand are not de-referenced and do not return the underlying value or values. They are pushed onto the stack in reference form.

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2.2.2.3 Control Tokens

Control tokens do not perform operations or push values onto the stack. Conditional control tokens **PtgAttrIf** (section 2.5.97.27), **PtgAttrChoose** (section 2.5.97.25), **PtgAttrIfError** (section 2.5.97.28), and **PtgAttrGoTo** (section 2.5.97.26) are used at runtime to prescribe short-circuit evaluation inside conditional functions and can be ignored when converting parsed expressions into textual formulas.

2.2.2.4 Display Tokens

Display tokens, such as control tokens, do not perform operations or push values onto the stack. Display tokens **PtgParen** (section 2.5.97.64) and **PtgAttrSpace** (section 2.5.97.30) are used at runtime to represent parentheses and space characters in a formula when parsed expressions are converted into textual formulas. Display tokens do not affect the order of operations of the formula.

2.2.2.5 Mem Tokens

Mem tokens have two purposes: they cache the results of reference class (section 2.2.2.2) expressions and they can return the results of reference class expressions as value class (section 2.2.2.1) expressions. Mem tokens act on binary-reference-expressions (section 2.5.97.88) that follow them in a mem-area-expression (section 2.5.97.88).

2.2.2.6 Formula Elements

Some **Ptg**s (section 2.5.97.16) require extra data that is not stored in the **Rgce** (section 2.5.97.88). When an **Rgce** contains one or more of these **Ptg**s, the containing formula structure includes an **RgbExtra** (section 2.5.97.87) containing the data for those **Ptg**s. The size of these components is specified by the **RgbExtra** structures. The **Ptg**s do not contain an offset into the **RgbExtra** for their data. The **Ptg**s that require a corresponding structure in **RgbExtra** are specified in **RgbExtra**.

2.2.3 Charts

2.2.3.1 Chart Part

A **chart** part is specified in [ISO/IEC29500-1:2016] section 14.2.1. The content associated with this part is specified in [ISO/IEC29500-1:2016] section 21.2.

2.2.3.2 Pivot Chart

A pivot chart is a specific type of **chart** part (section 2.2.3.1) that uses a **PivotTable** (section 2.2.5) as its **data source**.

2.2.4 Metadata

Metadata is additional data associated with a particular **cell** or its content.

All metadata information is located in the metadata part (section 2.1.7.34), within the **BrtBeginMetadata** (section 2.4.111) and **BrtEndMetadata** (section 2.4.460) records.

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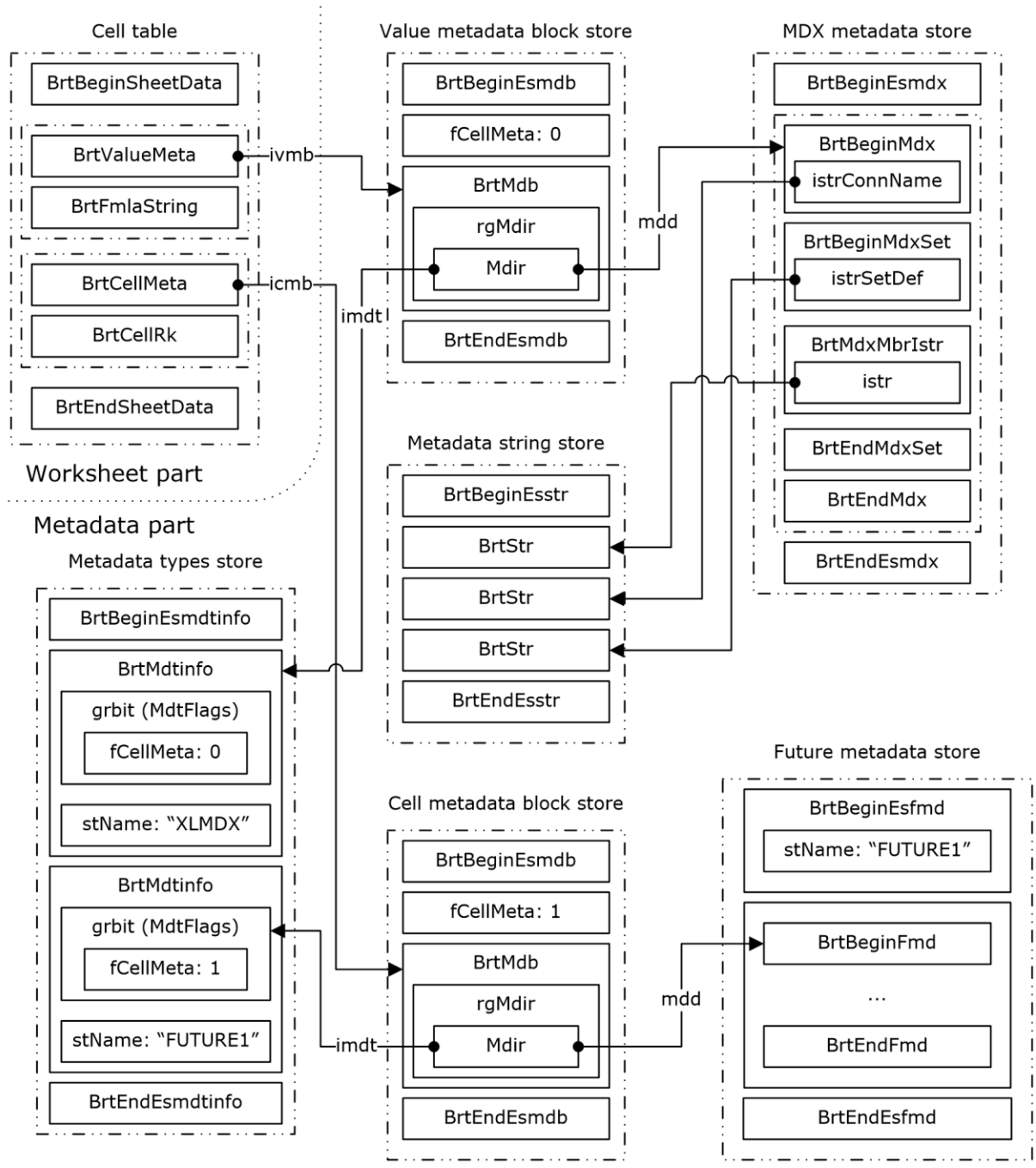

Figure 1: Metadata

The following sections define terms used in the previous figure.

2.2.4.1 Metadata Types

The architecture of metadata allows for multiple types of metadata.

Each type of metadata has a metadata store (section 2.2.4.4) inside the metadata part (section 2.1.7.34), a unique name, and a set of predefined properties. Those properties describe whether the

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metadata propagates with the **cell** or its content during runtime operations (for example, insert, shift, copy/paste, merge, or unmerge operations), as well as whether the metadata is cell metadata (section 2.2.4.2) or value metadata (section 2.2.4.3).

A metadata type is represented by a **BrtMdtinfo** (section 2.4.698) record. All metadata types are located within the **BrtBeginEsmdtinfo** (section 2.4.74) and **BrtEndEsmdtinfo** (section 2.4.423) records inside the metadata part (section 2.1.7.34).

2.2.4.2 Cell Metadata

Cell metadata is metadata associated with a **cell** itself. Cell metadata is associated with a cell through a **BrtCellMeta** (section 2.4.320) record referencing a cell metadata block (section 2.2.4.5) within the metadata part (section 2.1.7.34).

2.2.4.3 Value Metadata

Value metadata is metadata associated with the value of a particular **cell**. Value metadata is associated with a cell through a **BrtValueMeta** (section 2.4.828) record, or with an **External Cell** (section 2.2.7.4.1.2.1) through a **BrtExternValueMeta** (section 2.4.662) record. Either record references a metadata block (section 2.2.4.5) containing value metadata within the metadata part (section 2.1.7.34).

2.2.4.4 Metadata Stores

Actual metadata values are stored in metadata record stores. There are two types of metadata records stores: **MDX** metadata store for holding MDX metadata (section 2.2.4.8), and future metadata store for holding non-MDX metadata known as future metadata (section 2.2.4.9).

2.2.4.5 Metadata Block

Cells are associated with actual metadata values using a metadata mapping table, known as a metadata block. A metadata block contains a collection of indexes into a metadata store (section 2.2.4.4), along with the corresponding metadata types (section 2.2.4.1).

2.2.4.6 Metadata Block Stores

Metadata blocks (section 2.2.4.5) are stored within collections called metadata block stores inside the metadata part (section 2.1.7.34). There can be two of these metadata block collections: one for cell metadata (section 2.2.4.2) and another for value metadata (section 2.2.4.3).

The collection of records that specifies the metadata for a metadata block store starts with a **BrtBeginEsmdb** (section 2.4.73) record and ends with a **BrtEndEsmdb** (section 2.4.422) record. Within each collection is a set of **BrtMdb** (section 2.4.697) records that each specifies a metadata block.

2.2.4.7 Metadata String Store

Metadata-related text strings are assembled in a single metadata string store. The stored strings are unique, and each string can be indexed by one or more metadata records. The metadata string store is a performance optimization for reading and writing repetitive information only once. For example, a metadata string can be a connection name to an **OLAP cube** that is used in several **cube functions** in the **workbook**.

A metadata string is represented by a **BrtStr** (section 2.4.782) record. All metadata strings are located within the **BrtBeginEsstr** (section 2.4.76) and **BrtEndEsstr** section 2.4.425) records inside the metadata part.

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2.2.4.8 MDX Metadata

MDX is the only defined metadata type. MDX metadata is used to maintain cached state for **cube functions**.

The metadata type (section 2.2.4.1) of MDX metadata MUST have the following properties:

- The **grbit** field of the **BrtMdtinfo** (section 2.4.698) record MUST have the following values:

MdtFlags properties	Value
fGhostRw	0
fGhostCol	0
fEdit	0
fDelete	0
fCopy	1
fPasteAll	1
fPasteFmlas	0
fPasteValues	1
fPasteFmts	0
fPasteComments	0
fPasteDv	0
fPasteBorders	0
fPasteColWidths	0
fPasteNumFmts	0
fMerge	1
fSplitFirst	1
fSplitAll	0
fRwColShift	1
fClearAll	0
fClearFmts	1
fClearContents	0
fClearComments	1
fAssign	1
fCanCoerce	1
fAdjust	0
fCellMeta	0

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- The **metadataID** field of the **BrtMdtinfo** (section 2.4.698) record MUST be 120000.
- The **stName** field of the **BrtMdtinfo** record MUST be "XLMDX".

MDX metadata records are stored in the MDX metadata store (section 2.2.4.4). An MDX metadata record references the connection name and the cube function used to calculate the **cell value**.

An MDX metadata record also contains one additional record that further describes the MDX metadata record. That additional record depends on the type of cube function used, and MUST be an MDX tuple metadata (section 2.2.4.8.1) record, an **MDX set metadata** (section 2.2.4.8.2) record, an MDX member property metadata (section 2.2.4.8.3) record, or an MDX KPI metadata (section 2.2.4.8.4) record.

An MDX metadata record is specified by a **BrtBeginMdx** (section 2.4.105) record and ends with a **BrtEndMdx** (section 2.4.454) record. All MDX metadata records are stored in the MDX metadata store (section 2.2.4.4) specified by the **BrtBeginEsmdx** (section 2.4.75) record and ends with a **BrtEndEsmdx** (section 2.4.424) record.

2.2.4.8.1 MDX Tuple Metadata

An **MDX tuple** is the intersection between two or more **members** from different **dimensions**.

MDX tuple metadata is used by **cube functions** returning a member or a value.

MDX tuple metadata is represented within an MDX metadata (section 2.2.4.8) record as an ordered collection of members.

An MDX tuple is specified by a **BrtBeginMdxTuple** (section 2.4.109) record and ends with a **BrtEndMdxTuple** (section 2.4.458) record. Members are specified by **BrtMdxMbrIstr** (section 2.4.699) records.

2.2.4.8.2 MDX Set Metadata

An **MDX** set is an ordered collection of **members** within the same **dimension**.

MDX set metadata is used by **cube functions** returning a set or the number of items in a set.

An MDX set is specified by a **BrtBeginMdxSet** (section 2.4.108) record and ends with **BrtEndMdxSet** (section 2.4.457) record within an MDX metadata store (section 2.2.4.4) . Members are specified by **BrtMdxMbrIstr** (section 2.4.699) records.

2.2.4.8.3 MDX Member Property Metadata

An **MDX member property** represents the property value of a **member**.

MDX member property metadata references a member name and a property name.

An MDX member property is specified by a **BrtBeginMdxMbrProp** (section 2.4.107) record and a **BrtEndMdxMbrProp** (section 2.4.456) record within an MDX metadata store (section 2.2.4.4).

2.2.4.8.4 MDX KPI Metadata

An **MDX key performance indicator (KPI)** represents the KPI property value of a KPI **member**.

MDX KPI metadata references a KPI name, a KPI property, and a member name.

An MDX KPI is specified by a **BrtBeginMdxKPI** (section 2.4.106) record and a **BrtEndMdxKPI** (section 2.4.455) record within an MDX metadata store (section 2.2.4.4).

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2.2.4.9 Future Metadata

Future metadata is non-**MDX** metadata.

Each metadata type (section 2.2.4.1) of future metadata, inside the metadata part (section 2.1.7.34) , has its own metadata store (section 2.2.4.4) that is uniquely identified by its name and that contains future metadata records.

Each future metadata can be indexed by either a cell metadata (section 2.2.4.2) or a metadata block (section 2.2.4.5) for value metadata (section 2.2.4.3).

A future metadata is specified by a **BrtBeginFmd** (section 2.4.85) record and ends with a **BrtEndFmd** (section 2.4.434) record within a metadata store (section 2.2.4.4).

2.2.5 PivotTables

A PivotTable is a mechanism for summarizing source data (section 2.2.5.2.1) to get an overview of the distribution of that data. In a PivotTable, applicable **columns (1)** of the source data become fields that can be used to summarize data. In the case of using **OLAP** source data, **OLAP hierarchies** and some other OLAP entities become fields in the PivotTable.

A PivotTable has two major parts, a **PivotCache** (section 2.2.5.2) and a PivotTable view (section 2.2.5.3). There can be multiple PivotTable views based on a single **PivotCache**.

OLAP PivotTables have one PivotTable view based on a **PivotCache**, see section 2.2.5.3.1 for details. See section 2.2.5.2.1 for the specification of an OLAP **PivotCache**. See section 2.2.5.3 for the specification of an OLAP PivotTable view.

The values produced by a PivotTable are placed in cells of a **sheet** and these cells make up a PivotTable report.

The PivotTable structures are not needed to obtain values from a PivotTable report because those values are available in the sheet cells. The structures are needed for the following purposes:

- To show extra information related to a PivotTable in an application, such as sort and filter information.
- To recalculate a PivotTable view, incorporating changes made to it such as sort and filter, and update the corresponding PivotTable report accordingly.
- To refresh a **PivotCache**, incorporating changes made to the source data (section 2.2.5.2.1), and then recalculate any PivotTable views associated with the **PivotCache** and update the corresponding PivotTable reports accordingly.

In addition to being used by PivotTable views, a **PivotCache** is used by cube functions for caching data. For details, see section 2.2.5.2 and section 2.2.5.2.11.

2.2.5.1 Data Functionality Level

A data functionality level is a number that represents a set of features and runtime behaviors in areas related to data manipulation and display, which includes PivotTable view (section 2.2.5.3), **query tables** and External Connections (section 2.2.8).

The data functionality level that a **PivotCache** (section 2.2.5.2) is created with is specified by the **bVerCacheCreated** field of the **BrtBeginPivotCacheDef** (section 2.4.167) record. The data functionality level that a PivotTable view is created with is specified by the **bVerSxMacro** field of the **BrtBeginSXView** (section 2.4.273) record.

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The following table specifies various restrictions based on the value of the **bVerCacheCreated** field of the **BrtBeginPivotCacheDef** record.

Restriction	Restriction for data functionality level <3	Restriction for data functionality level >=3
Maximum number of cache fields (section 2.2.5.2.2)	1024	16384
Maximum number of cache items (section 2.2.5.2.3) of a cache field	32500	1048576
Maximum string length of a cache item name	256	32767
Maximum number of pivot items (section 2.2.5.3.3) to show in an **AutoFilter**	255	2147483647
Maximum string length of the **MDX formula** specified by the pcdCalcMemCommon.**stMdx** field in the **BrtBeginPCDCalcMem** (section 2.4.125) record	2048	32767

The **bVerSxMacro** field of the **BrtBeginSXView** (section 2.4.273) record MUST be greater than or equal to 3 if and only if the **bVerCacheCreated** field of the **BrtBeginPivotCacheDef** (section 2.4.167) record is greater than or equal to 3.

2.2.5.2 PivotCache

The **PivotCache** contains cached information about source data (section 2.2.5.2.1). The cached information is used by **PivotTable Views** (section 2.2.5.3) to generate **PivotTable** (section 2.2.5) reports, or it is used by **cube functions** to display **OLAP** data sets and values. The same **PivotCache** MUST NOT be used by both a PivotTable view and a cube function. The information contained in a **PivotCache** includes organization, data types and the values of the source data.

The PivotCache is divided into two parts. The first part consists of the optional cache record (section 2.2.5.2.10) structures, as specified by the **PivotCache record** (section 2.1.7.39) part. The cache record structures represent a snapshot of the source data (section 2.2.5.2.1) and enable a PivotTable view (section 2.2.5.3) that uses a **PivotCache** to be recalculated without retrieving the source data. The cache record structures do not exist for OLAP source data.

The second part of a **PivotCache** is the set of structures that describe metadata about the source data (section 2.2.5.2.1), such as where it comes from, the data entities it has, and the unique values of those entities, as specified by the **PivotCache definition** (section 2.1.7.38) part.

See section 2.2.5.2.1 for the specification of an OLAP **PivotCache**.

2.2.5.2.1 Source Data

A **PivotCache** (section 2.2.5.2) can be based on four different types of source data. The type of source data is specified by the **iSrcType** field of the **BrtBeginPCDSource** (section 2.4.165) record.

When the source data type is a **range**, which occurs when **iSrcType** is equal to 0x00000000, the source data is read from a range specified by the **BrtBeginPCDSRange** (section 2.4.166) record. If the range specified by the **BrtBeginPCDSRange** record is a **table** then the **PivotCache** (section 2.2.5.2) has one cache field (section 2.2.5.2.2) for each **column (1)** of the table, using the column (1) header captions for cache field names, and the **data region** of the table as source data values, specified by cache records (section 2.2.5.2.10). If the range specified by the **BrtBeginPCDSRange** record is not a table then the **PivotCache** has one cache field for each column (1) of the range, using

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the values in the first **row** of the range for cache field names, and all other rows are used as source data values, specified by cache records.

When the source data type is a scenario, which occurs when **iSrcType** is equal to 0x00000003, no new source data is available for the **PivotCache** (section 2.2.5.2) and the **PivotCache** cannot be refreshed. A snapshot of the source data might be available in the cache records.

When the source data type is multiple consolidation ranges (section 2.2.5.2.1.1), which occurs when **iSrcType** is equal to 0x00000002, the source data is read from one or more ranges. For more details, see section 2.2.5.2.1.1.

When the source data type is external, which occurs when **iSrcType** is equal to 0x00000001, the source data is read from an external **data source**. The **dwConnID** field of the **BrtBeginPCDSource** record specifies the associated external connection that is used to obtain data from the external data source. An external data source can either be an **OLAP** or non-OLAP data source.

An OLAP **PivotCache** (section 2.2.5.2) is specified to be a **PivotCache** has an associated external connection that is an OLAP connection (section 2.2.8.3.1). For an OLAP **PivotCache**, the source data is handled by the data provider specified by the associated OLAP connection. See OLAP Data Model (section 2.2.5.4) for more information. An OLAP **PivotCache** MUST NOT have cache records (section 2.2.5.2.10).

For a non-OLAP **PivotCache** the source data is a rectangular set of data and the **PivotCache** has one cache field (section 2.2.5.2.2) for each column (1) of data, using the source field names for cache field names, and the rows of the source data as data values, specified by cache records.

When a pivot field (section 2.2.5.3.2) is on the page axis (section 2.2.5.3.7.1) of the PivotTable view (section 2.2.5.3), it is a server-based page field if the **fServerBased** field of the **BrtBeginSXVD** (section 2.4.270) record is equal to 1 and the **fServerBased** field of the associated **BrtBeginPCDField** (section 2.4.135) record is equal to 1. A server-based page field is a pivot field on the page axis (section 2.2.5.3.7.1) that causes the query that is used to retrieve source data for populating the **PivotCache** to be parameterized. The query is parameterized according to the page filter criteria, as specified in section 2.2.5.3.7.1. This feature can only be used for a **PivotCache** with **ODBC** external source data.

2.2.5.2.1.1 Multiple Consolidation Ranges

A multiple consolidation ranges **PivotCache** (section 2.2.5.2) is used for summarizing multiple **ranges** containing source data in cross-tab format. Each range is specified by the **rfx** field or the **irstName** field of the **BrtBeginPCDSCSet** (section 2.4.153) record. The sequence of records that conform to the **PCDSCONSOL** rule (defined in section 2.1.7.38) specify information that only exists for a multiple consolidation ranges **PivotCache**.

An example of a range in cross-tab format is illustrated in the following figure. The first **column (1)** of the range contains names of sales people (George and Allan). The first **row** in the range contains product groups (Cars and Bikes) and the rest of the cells in the range contain numeric values representing how many products in a certain product group that each sales person sold.

	Cars	Bikes
George	1	2
Allan	3	4

Figure 2: Example of a range in cross-tab format

A multiple consolidation ranges **PivotCache** (section 2.2.5.2) is used to summarize multiple cross-tab ranges as illustrated in the next figure which shows eight cross-tab ranges.

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	A	B	C	D	E	F	G
1	2006 Q1				2007 Q1		
2		Cars	Bikes			Cars	Bikes
3	George	1	2		George	17	18
4	Allan	3	4		Allan	19	20
5							
6	2006 Q2				2007 Q2		
7		Cars	Bikes			Cars	Bikes
8	George	5	6		George	21	22
9	Allan	7	8		Allan	23	24
10							
11	2006 Q3				2007 Q3		
12		Cars	Bikes			Cars	Bikes
13	George	9	10		George	25	26
14	Allan	11	12		Allan	27	28
15							
16	2006 Q4				2007 Q4		
17		Cars	Bikes			Cars	Bikes
18	George	13	14		George	29	30
19	Allan	15	16		Allan	31	32

Figure 3: Example of eight ranges in cross-tab format

The values in the first column (1) of each range are used to create a cache field (section 2.2.5.2.2) with the default name "Row" (or corresponding localized name); each cache item (section 2.2.5.2.3) of this cache field corresponds to one of the values in the first column (1) of the ranges, eliminating duplicates. This cache field is the first cache field in the **BrtBeginPCDFields** (section 2.4.136) collection.

The values in the first row of each range are used to create a cache field with the default name "Column" (or corresponding localized name); each cache item of this cache field corresponds to one of the values in the first row of the ranges, eliminating duplicates. This cache field is the second cache field in the **BrtBeginPCDFields** collection.

The values in all other cells of each range are used to create a cache field with the default name "Value" (or corresponding localized name); each cache item of this cache field corresponds to one of the values in the ranges that are not in the first column (1) or first row, eliminating duplicates. This cache field is the third cache field in the **BrtBeginPCDFields** collection.

Up to four additional cache fields can optionally exist with the default names "Page1", "Page2", "Page3" and "Page4" (or corresponding localized names). The number of optional cache fields created

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is user defined and is equal to the **cPages** field of the **BrtBeginPCDSCPages** (section 2.4.151) record. Each optional cache field corresponds to a **BrtBeginPCDSCPage** (section 2.4.150) record.

The first through fourth **BrtBeginPCDSCPage** record in the **BrtBeginPCDSCPages** collection corresponds to the fourth through seventh cache field in the **BrtBeginPCDFields** (section 2.4.136) collection and each cache item of this cache field corresponds to the **BrtBeginPCDSCPItem** (section 2.4.152) record in that **BrtBeginPCDSCPage** collection with the same index.

The **rgiItem** field of the **BrtBeginPCDSCSet** (section 2.4.153) record is an array of indexes that specifies **BrtBeginPCDSCPItem** (section 2.4.152) records in the **PCDSCPAGE** rule (defined in section 2.1.7.38). Each **BrtBeginPCDSCPItem** record specifies the value of a cache item associated with a range.

The first element in the **rgiItem** array corresponds to the first **BrtBeginPCDSCPage** collection in the **BrtBeginPCDSCPages** collection following the **BrtBeginPCDSConsol** (section 2.4.149) collection that precedes this record.

The second element in the **rgiItem** array corresponds to the second **BrtBeginPCDSCPage** collection in the **BrtBeginPCDSCPages** collection following the **BrtBeginPCDSConsol** collection that precedes this record.

The third element in the **rgiItem** array corresponds to the third **BrtBeginPCDSCPage** collection in the **BrtBeginPCDSCPages** collection following the **BrtBeginPCDSConsol** collection that precedes this record.

The fourth element in the **rgiItem** array corresponds to the fourth **BrtBeginPCDSCPage** collection in the **BrtBeginPCDSCPages** collection following the **BrtBeginPCDSConsol** collection that precedes this record.

Each cache record (section 2.2.5.2.10) for a multiple consolidation ranges **PivotCache** (section 2.2.5.2) corresponds to the intersection of a value in the first row of one of the ranges, a value in the first column (1) of one of the ranges and the set of **BrtBeginPCDSCPItem** records associated with that range.

The preceding example with the eight ranges and with two of the optional **BrtBeginPCDSCPage** records specified ("Page1" and "Page2"), corresponds to cache records as illustrated in the following table.

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Row	Column	Value	Page1	Page2
Allan	Bikes	4	2006	Q1
Allan	Cars	3	2006	Q1
George	Bikes	2	2006	Q1
George	Cars	1	2006	Q1
Allan	Bikes	8	2006	Q2
Allan	Cars	7	2006	Q2
George	Bikes	6	2006	Q2
George	Cars	5	2006	Q2
Allan	Bikes	12	2006	Q3
Allan	Cars	11	2006	Q3
George	Bikes	10	2006	Q3
George	Cars	9	2006	Q3
Allan	Bikes	16	2006	Q4
Allan	Cars	15	2006	Q4
George	Bikes	14	2006	Q4
George	Cars	13	2006	Q4
Allan	Bikes	20	2007	Q1
Allan	Cars	19	2007	Q1
George	Bikes	18	2007	Q1
George	Cars	17	2007	Q1
Allan	Bikes	24	2007	Q2
Allan	Cars	23	2007	Q2
George	Bikes	22	2007	Q2
George	Cars	21	2007	Q2
Allan	Bikes	28	2007	Q3
Allan	Cars	27	2007	Q3
George	Bikes	26	2007	Q3
George	Cars	25	2007	Q3
Allan	Bikes	32	2007	Q4
Allan	Cars	31	2007	Q4
George	Bikes	30	2007	Q4
George	Cars	29	2007	Q4

Figure 4: Representation of cache records based on eight consolidation ranges

The following figure illustrates a **PivotTable** (section 2.2.5) report with multiple consolidation ranges and two pivot fields (section 2.2.5.3.2) on the page axis (section 2.2.5.3.7.1). The **PivotTable** report is based on the previous figure that illustrates eight ranges in cross-tab format and is summarizing the values from all the ranges because no manual filter (section 2.2.5.3.5) has been applied to any of the pivot fields on the page axis ("Page1" and "Page2" are both set to summarize all values).

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Page1	(All)		
Page2	(All)		
Sum of Value	Column		
Row	Bikes	Cars	Grand Total
Allan	144	136	280
George	128	120	248
Grand Total	272	256	528

Figure 5: Multiple consolidation ranges PivotTable

2.2.5.2.2 Cache Fields

A cache field represents an entity by which data can be summarized. An example of such an entity is country/region. Having a country/region cache field enables users to summarize data by country/region.

Consider a **PivotCache** (section 2.2.5.2) based on the following source data (section 2.2.5.2.1):

Country/Region	Product	Date	Sales
USA	Bicycle	6/5/2007	500
USA	Car	8/3/2007	20000
Canada	Bicycle	9/2/2007	300
Canada	Car	10/5/2007	35000

In this example, four cache fields exist in the **PivotCache**. Each cache field corresponds to one of the **columns (1)** in the source data: Country/Region, Product, Date and Sales.

The sequence of records that conform to the **PCDFIELD** rule (defined in section 2.1.7.38) specifies a cache field. A cache field is contained in a **PivotCache**.

The sequence of records that conform to the **PCDFIELDS** rule (defined in section 2.1.7.38) specifies all cache fields of the **PivotCache**.

A cache field index is a zero-based index of a **PCDFIELD** rule in the sequence of records specified by the **PCDFIELDS** rule.

A cache field typically corresponds to a source data column (1) or to a level of an **OLAP hierarchy**. However, grouping (section 2.2.5.2.4) cache fields and cache fields representing calculated fields (section 2.2.5.2.5) do not correspond to source data entities. Such cache fields are fully specified by information in the **PivotCache**.

The **fSrcField** field of the **BrtBeginPCDField** (section 2.4.135) record specifies whether the cache field corresponds to a source data entity. A non-**OLAP** **PivotCache** MUST have one or more cache fields corresponding to source data columns (1). An OLAP **PivotCache** MUST NOT have cache fields that do not correspond to source data entities.

All cache fields that do not correspond to source data entities MUST be located after cache fields that do correspond to source data entities in the sequence of records that conform to the **PCDFIELDS** rule.

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In a non-OLAP **PivotCache**, a cache field corresponds to one column (1) in the source data and contains information about that column (1). The cache field name is specified by the **stFldName** field of the **BrtBeginPCDField** record. The cache field name of a cache field corresponding to a source data column (1) is derived from the name of the column (1) in the source data and is used to associate the cache field with the source data column (1).

A cache field name MUST be valid as specified by the **stFldName** field of the **BrtBeginPCDField** record.

Except for grouping (section 2.2.5.2.4) cache fields in non-OLAP **PivotCaches**, all cache field names MUST be unique, when using a case-insensitive comparison, within the **PivotCache**.

In an OLAP **PivotCache**, each cache field is associated with a cache hierarchy (section 2.2.5.2.7). Each cache hierarchy has an associated sequence of records that conform to the **PCDHFIELDSUSAGE** rule (defined in section 2.1.7.38) which specify the cache field indexes of the cache fields that are associated with that cache hierarchy. The cache hierarchy to which cache fields are associated is specified by the **BrtBeginPCDHierarchy** (section 2.4.145) record preceding the sequence of records that conform to the **PCDHFIELDSUSAGE** rule.

If a cache hierarchy (section 2.2.5.2.7) is not a measure (section 2.2.5.2.7.1) or a named set (section 2.2.5.2.7.3) there can be more than one cache field associated with it. Each cache field corresponds to an **OLAP level** or to a **member** property of the associated OLAP hierarchy in the source data (section 2.2.5.2.1). The **fOlapMemPropField** of the **BrtBeginPCDField** (section 2.4.135) record specifies whether a cache field is a member property.

2.2.5.2.2.1 Member Properties

A **member** property is the **PivotTable** (section 2.2.5) representation of an **OLAP member property**. Member properties can have properties that are associated with the **PivotCache** (section 2.2.5.2) and a PivotTable view (section 2.2.5.3).

A member property is associated with one OLAP member property of the **OLAP hierarchy** specified by the associated cache hierarchy (section 2.2.5.2.7) of the member property.

A member property can be associated with a cache field (section 2.2.5.2.2) and a pivot field (section 2.2.5.3.2). The **fOlapMemPropField** field of the **BrtBeginPCDField** (section 2.4.135) record of a cache field specifies whether a cache field is a member property cache field. The associated pivot field of a member property cache field is a member property pivot field.

A member property with an associated member property cache field and member property pivot field is associated with the cache hierarchy (section 2.2.5.2.7) and pivot hierarchy (section 2.2.5.3.4) of the associated member property cache field and member property pivot field.

If a member property is associated with a member property cache field, the association of the member property and an OLAP member property is specified by the **stFldName** field of the **BrtBeginPCDField** record of the member property cache field, which specifies the **MDX unique name** of the OLAP member property.

An association between a member property and a cache field or pivot field is not required. If the value of the **isxvd** field of the **BrtBeginSXTDMP** (section 2.4.259) record for a member property is -1, then the member property is not associated with any cache field or pivot field. Such a member property is not displayed on the **row** axis or **column (1)** axis. A member property that is not associated with any cache field is associated with the pivot hierarchy that contains the member property, and with the cache hierarchy associated with the pivot hierarchy. If a member property is not associated with a cache field, the association between the member property and an OLAP member property is specified by the **irstProperty** field of the **BrtBeginSXTDMP** record specifying the unique name of the OLAP member property.

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If the value of the **bVerSxMacro** field of the **BrtBeginSXView** (section 2.4.273) record of the PivotTable view (section 2.2.5.3) containing the member property is less than 3, **BrtSXTDMPOrder** (section 2.4.803) records MUST NOT be present in the PivotTable view. If the value of the **bVerSxMacro** field of the **BrtBeginSXView** (section 2.4.273) record of the PivotTable view containing the member property is greater than or equal to 3, **BrtBeginSXTDMP** records MUST NOT be present in the PivotTable view. The **isxvd** field of a **BrtSXTDMPOrder** record MUST refer to the member property pivot field associated with the pivot hierarchy (section 2.2.5.3.4) that contains the **BrtSXTDMPOrder** record.

A member property pivot field (section 2.2.5.3.2) can be shown only in the row area or column (1) area of a PivotTable view. A member property pivot field can only be shown after the last **visible OLAP level** of the corresponding pivot hierarchy. The order of member property pivot fields shown in the PivotTable view is the same as the order of member properties in the **BrtBeginSXTDMP** (section 2.4.259) collection of the corresponding pivot hierarchy, as specified by the **SXTDMPS** rule in the **PivotTable** (section 2.1.7.40) part **ABNF**.

2.2.5.2.3 Cache Items

Cache items represent specific instances of the entities represented by cache fields (section 2.2.5.2.2). For example, an instance of a Country/Region cache field might be the USA cache item. Having a USA cache item in the Country/Region cache field enables the associated PivotTable view (section 2.2.5.3) to display data by USA.

Each cache item specifies a value and a type. In some cases, a cache item can have additional information associated with it as well.

A cache item is contained in a cache field. A cache field can have zero cache items if the cache field is not in use in the PivotTable view.

A cache item index can be used to reference a cache item within the cache field. Referencing a cache item by index requires an implicit or explicit reference to that cache field because a cache item collection is associated with a specific cache field. A cache field can be referenced by a cache field index, as specified in section 2.2.5.2.2.

If the records that specify the cache field include a sequence of records that conform to the **PCDFATBL** rule (defined in section 2.1.7.38), then the records that conform to the **PCDFATBL** rule specify the raw cache items of the cache field.

If the records that specify the cache field include a sequence of records that conform to the **PCDFGITEMS** rule (defined in section 2.1.7.38), then the records that conform to the **PCDFGITEMS** rule specify the grouping (section 2.2.5.2.4) cache items of the cache field. These are used for some grouping cache fields in non-**OLAP** **PivotCaches** (section 2.2.5.2).

If there are no grouping cache items but there are raw cache items, the cache item index is a zero-based index into the raw cache items.

If there are grouping cache items, then the cache item index is a zero-based index into the grouping cache items.

For raw cache items (records in **PCDFATBL**), each raw cache item is specified by one of the following:

- A record that conforms to the **PCDI** rule (defined in section 2.1.7.38), excluding the records specified by the sequence of records that conform to the **PCDIRUN** rule (defined in section 2.1.7.38).
- A record that conforms to the **PCDIA** rule (defined in section 2.1.7.38). These raw cache items have additional information.
- An entry in the **rgPCDINumber**, **rgPCDIString**, **rgPCDIError** or **rgPCDIDatetime** fields of the **BrtBeginPCDIRun** (section 2.4.146) record.

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There can be multiple entries of source data (section 2.2.5.2.1) that have the same combination of value and type for a cache field (section 2.2.5.2.2). Each raw cache item within a cache field MUST have a unique combination of value and type.

For grouping cache items (records in **PCDFGITEMS** (section 2.1.7.38), each grouping cache item is specified by one of the following:

- A **PCDI** rule (defined in section 2.1.7.38), excluding the records specified by the **PCDIRUN** rule (defined in section 2.1.7.38).
- An entry in the **rgPCDINumber**, **rgPCDIString**, **rgPCDIError** or **rgPCDIDatetime** fields of the **BrtBeginPCDIRun** record.

A **BrtBeginPCDIRun** record specifies multiple sequential cache items of the same type and is used to reduce file size.

A grouping (section 2.2.5.2.4) cache field MUST have grouping cache items.

A grouping cache field with the **fSrcField** field of the **BrtBeginPCDField** (section 2.4.135) record of the cache field equal to 1 MUST have raw cache items.

A cache field that is not a grouping cache field MUST NOT have grouping cache items.

If there are one or more references by index to cache items of a particular cache field, that cache field MUST have cache items.

For an OLAP **PivotCache** (section 2.2.5.2) , a measure (section 2.2.5.2.7.1) cache field associated with a cache hierarchy (section 2.2.5.2.7) MUST NOT have cache items.

For an OLAP **PivotCache**, a cache item with a string value specifies the unique name of an **OLAP member**, unless the cache field is a **member** property cache field.

Raw cache items can contain unused cache items, each specified by a sequence of records that conform to the **PCDIA** rule. Unused cache items are values that did not exist in the source data (section 2.2.5.2.1) when the **PivotCache** was last refreshed, but existed when the **PivotCache** was refreshed previously. The **PivotCache** can retain such unused cache items to preserve information associated with them to reapply that information if the value corresponding to the cache item is added back to the source data. The **fGhost** field of the **PCDIAddlInfo** (section 2.5.99) structure specifies whether a cache item is unused.

The following example shows cache items and their association with source data.

Consider a **PivotCache** based on the following source data table:

Country/Region	Product	Date	Sales
USA	Bicycle	6/5/2007	500
USA	Car	8/3/2007	20000
Canada	Bicycle	9/2/2007	500
Canada	Car	10/5/2007	35000

Four cache fields exist, and each one corresponds to one of the **columns (1)**: Country/Region, Product, Date, and Sales. Each of the four cache fields can have cache items corresponding to the unique values in the source data columns (1) as illustrated in the following tables.

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Cache items for the Country/Region cache field
Canada
USA

Cache items for the Product cache field
Bicycle
Car

Cache items for the Date cache field
6/5/2007
8/3/2007
9/2/2007
10/5/2007

Cache items for the Sales cache field
500
20000
3500

2.2.5.2.4 Grouping

Grouping is used to combine a set of cache items (section 2.2.5.2.3) into a group. There are three different types of grouping: numeric grouping, date grouping, and discrete grouping. Numeric grouping combines numeric cache items into ranges of values. Date grouping combines date cache items into date ranges. Discrete grouping combines specifically selected cache items into groups.

The cache field (section 2.2.5.2.2) that contains the cache items (section 2.2.5.2.3) that are to be grouped is called the base cache field. The resultant cache field that contains the groups of cache items is called the parent grouping cache field. Each group of cache items in the base cache field is associated with a single cache item in the parent grouping cache field. Often cache items in parent grouping cache fields can be further grouped, creating a hierarchy of parent grouping cache fields. The base cache field is at the lowest level of the hierarchy.

Grouping is specified by a sequence of records that conform to the **PCDFGROUP** rule (defined in section 2.1.7.38).

Numeric grouping and date grouping are specified by records in the **PivotCache Definition** part (section 2.1.7.38) that conform to the **PCDFGRANGE** rule (defined in section 2.1.7.38).

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Discrete grouping is specified by records in the **PivotCache Definition** part that conform to the **PCDFGDISCRETE** rule (defined in section 2.1.7.38).

A numeric grouping or date grouping cache field (section 2.2.5.2.2) is specified by the presence of a **BrtBeginPCDFGRange** (section 2.4.133) record following the **BrtBeginPCDField** (section 2.4.135) record associated with that cache field. For a numeric grouping cache field, the **iByType** field of the associated **BrtBeginPCDFGRange** record is equal to 0. For a date grouping cache field, the **iByType** field of the **BrtBeginPCDFGRange** record is greater than or equal to 1 and less than or equal to 7.

A discrete grouping cache field (section 2.2.5.2.2) is specified by the presence of a **BrtBeginPCDFGDiscrete** (section 2.4.131) record following the **BrtBeginPCDField** record associated with the cache field.

The **ifdbBase** field of the **BrtBeginPCDFGroup** (section 2.4.134) record that follows the **BrtBeginPCDField** record specifies a cache field index to the base cache field for a grouping cache field.

The **ifdbParent** field of the **BrtBeginPCDFGroup** record that follows the **BrtBeginPCDField** record specifies a cache field index to the parent grouping cache field of a grouping cache field or of a base cache field.

For numeric grouping, there is only one cache field (section 2.2.5.2.2) associated with the grouping and it serves as both the grouping cache field and the base cache field. Therefore, for a numeric grouping cache field, the **ifdbBase** field of the **BrtBeginPCDFGroup** record that follows the **BrtBeginPCDField** (section 2.4.135) record MUST specify a cache field index to that same **BrtBeginPCDField** record. For numeric grouping, the **ifdbParent** field of the **BrtBeginPCDFGroup** record MUST be -1.

For date grouping, there can be up to seven levels of grouping hierarchy. The grouping level for a cache field (section 2.2.5.2.2) is specified by the **iByType** field of the **BrtBeginPCDFGRange** record. The cache field with the lowest **iByType** value is at the lowest level of the hierarchy, the cache field with the next lowest **iByType** value is at the next lowest level of the hierarchy, and so on. See the specification of the **BrtBeginPCDFGRange** record for the list of levels of date grouping hierarchy. Each cache field in the hierarchy MUST have an **BrtBeginPCDFGRange** record with a unique **iByType** value.

The cache field (section 2.2.5.2.2) corresponding to the lowest level of the date grouping hierarchy serves as both a grouping cache field and the base cache field. Therefore, in the cache field corresponding to the lowest level of the date grouping hierarchy, the **ifdbBase** field of the **BrtBeginPCDFGroup** (section 2.4.134) record that follows the **BrtBeginPCDField** record MUST specify a cache field index to that same **BrtBeginPCDField** record.

The cache items (section 2.2.5.2.3) of a grouping cache field (section 2.2.5.2.2), each corresponding to a single group, are specified by the sequence of records that conform to the **PCDFGITEMS** rule (defined in section 2.1.7.38).

For discrete grouping, the mapping between each group in a grouping cache field (section 2.2.5.2.2) and the cache items cache items (section 2.2.5.2.3) of the base cache field that are in each group, is specified by the **PCDFGDISCRETE** rule (defined in section 2.1.7.38) in the following way: there MUST be one **BrtPCDIIndex** (section 2.4.724) record corresponding to every cache item in the cache items collection of the base cache field. Each **BrtPCDIIndex** record specifies a cache item in the **PCDFGITEMS** rule that is the parent grouping cache item of the cache item in the cache items collection for the base cache field with the same index as that **BrtPCDIIndex** record in the **PCDFGDISCRETE** rule.

The following paragraphs explain the three different types of grouping and provide examples of them.

Numeric grouping combines numeric cache items (section 2.2.5.2.3) into ranges. For example, consider the following PivotTable report where the number of people (represented by "Count of Name") of a certain age are listed.

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Age	Count of Name
5	1
11	1
20	2
34	2
45	1
50	1
Grand Total	8

Figure 6: PivotTable report with ages

Analysis of specific ages might not be particularly meaningful. Instead, looking at age groups can be more interesting. The following PivotTable (section 2.2.5) report shows numeric grouping applied to the "Age" cache field (section 2.2.5.2.2). In this example, the numeric grouping is set to start at 0, end at 100 and have groups of 20 years.

Age	Count of Name
<0	
0-19	2
20-39	4
40-59	2
60-79	
80-100	
>100	
Grand Total	8

Figure 7: PivotTable report with age groups

Date grouping is similar to numeric grouping and is used to group cache items (section 2.2.5.2.3) into date ranges.

One to seven grouping cache fields (section 2.2.5.2.2) can exist when date grouping is applied to a cache field, each corresponding to a different level of detail of date and time information. The cache field to which the date grouping is originally applied is included in the set of grouping cache fields and is considered the base cache field of the grouping cache fields. For date grouping, the base cache field represents the lowest level of the date grouping hierarchy. The following levels of detail of date information are available, each corresponding to one cache field:

- Years
- Quarters
- Months
- Days

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- Hours
- Minutes
- Seconds

For example, consider the following PivotTable report where the number of sales is listed for each individual date.

Date	# of Sales
1/1/2007	1
1/1/2008	16
2/2/2007	2
3/3/2007	3
4/4/2007	4
5/5/2007	5
6/6/2007	6
7/7/2007	7
8/8/2007	8
9/9/2007	9
10/10/2007	10
11/11/2007	11
12/12/2007	12
2/2/2008	17
3/3/2008	18
4/4/2008	19
5/5/2008	20
6/6/2008	21
7/7/2008	22
8/8/2008	23
9/9/2008	24
10/10/2008	25
11/11/2008	26
12/12/2008	27
Grand Total	336

Figure 8: PivotTable report with dates

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This information could be too granular for some analytical purposes. With date grouping, a more useful higher level summary can be created. The following PivotTable report shows the result of applying date grouping to the "Date" cache field (section 2.2.5.2.2) and including two levels of grouping ("Years" and "Quarters"). In this example, the "Quarters" cache field represents the lowest hierarchical level of date information included and is therefore the base cache field for this date grouping. The "Years" cache field is a grouping cache field with the "Quarters" cache field as its base cache field. The items "<1/1/2007" in the two cache fields represent dates before 1/1/2007, the start date specified by the **xnumStart** field of the **BrtBeginPCDFGRange** record. The items ">12/13/2008" in the two cache fields represent dates after 12/13/2008, the end date specified by the **xnumEnd** field of the **BrtBeginPCDFGRange** record.

Years - Quarters	# of Sales
<1/1/2007	
<1/1/2007	
2007	**78**
Qtr1	6
Qtr2	15
Qtr3	24
Qtr4	33
2008	**258**
Qtr1	51
Qtr2	60
Qtr3	69
Qtr4	78
>12/13/2008	
>12/13/2008	
Grand Total	**336**

Figure 9: PivotTable report with date groups

Discrete grouping combines specifically selected cache items (section 2.2.5.2.3) into groups. When discrete grouping is applied to a cache field (section 2.2.5.2.2), a separate grouping cache field is created and the cache field that the grouping is applied to is the base cache field for that grouping cache field. Multiple grouping cache fields can exist for one base cache field, forming a hierarchy of grouping cache fields. A grouping cache field higher in the hierarchy is considered a parent grouping cache field of the grouping cache field or base cache field immediately following it in the hierarchy. For a grouping cache field, each cache item in the cache items collection represents one group.

For example, consider the following PivotTable report listing sales by states in the United States.

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Row Labels	Sum of Sales Amount
Alabama	$37.29
Arizona	$2,104.02
California	$5,714,257.69
Florida	$7,760.91
Georgia	$1,658.92
Illinois	$2,828.09
Kentucky	$216.96
Massachusetts	$2,049.10
Minnesota	$91.28
Mississippi	$82.59
Missouri	$81.46
Montana	$92.08
New York	$4,124.19
North Carolina	$7.28
Ohio	$359.18
Oregon	$1,170,991.54
South Carolina	$2,434.92
Texas	$1,789.10
Utah	$4,419.58
Virginia	$39.98
Washington	$2,467,248.34
Wyoming	$7,115.01
Grand Total	**$9,389,789.51**

Figure 10: PivotTable report with state names

Discrete grouping can be used to group sets of states, for example, into geographical areas. The following PivotTable report shows the result of applying six groups ("Group1" through "Group6") to the cache field (section 2.2.5.2.2) representing states. The cache field representing states is considered the base cache field for the discrete grouping in this example. Each group in the example, represented by a cache item (section 2.2.5.2.3) in the grouping cache field, combines states in the same geographical area.

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Row Labels	Sum of Sales Amount
Group1	**$3,000.83**
Illinois	$2,828.09
Minnesota	$91.28
Missouri	$81.46
Group2	**$6,532.47**
Massachusetts	$2,049.10
New York	$4,124.19
Ohio	$359.18
Group3	**$1,171,083.62**
Montana	$92.08
Oregon	$1,170,991.54
Group4	**$2,478,782.93**
Utah	$4,419.58
Washington	$2,467,248.34
Wyoming	$7,115.01
Group5	**$12,238.85**
Alabama	$37.29
Florida	$7,760.91
Georgia	$1,658.92
Kentucky	$216.96
Mississippi	$82.59
North Carolina	$7.28
South Carolina	$2,434.92
Virginia	$39.98
Group6	**$5,718,150.81**
Arizona	$2,104.02
California	$5,714,257.69
Texas	$1,789.10
Grand Total	**$9,389,789.51**

Figure 11: PivotTable report with state groups

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2.2.5.2.5 Calculated Fields

Calculated fields allow users to add calculations to a PivotTable (section 2.2.5) report. For example, if a PivotTable report contains values for sales and cost by products but no profit values, a calculated field with the formula "=sales-cost" can be added so that profit values are calculated and can be analyzed in the PivotTable report.

A calculated field is a cache field (section 2.2.5.2.2) that does not correspond to a **column (1)** in the source data (section 2.2.5.2.1). The values for a calculated field are calculated based on the formula specified for the calculated field. A calculated field is specified by the **fLoadFmla** field of the **BrtBeginPCDField** (section 2.4.135) record being equal to 1. The formula is specified by the **fldFmla** field of the **BrtBeginPCDField** record.

The sequence of records that conforms to the **PNAMES** rule (defined in section 2.1.7.38) specifies any cache field (section 2.2.5.2.2) referenced by the formula.

For calculated fields, the **fSrcField** record of the **BrtBeginPCDField** record MUST be 0.

A pivot field (section 2.2.5.3.2) associated with a calculated field MUST NOT appear on the **row** axis, column (1) axis or page axis (section 2.2.5.3.7.1) of a PivotTable view (section 2.2.5.3).

An **OLAP** **PivotCache** (section 2.2.5.2) MUST NOT have calculated fields.

2.2.5.2.6 Calculated Items

Calculated items allow users to add cache items (section 2.2.5.2.3) to a cache field (section 2.2.5.2.2) that do not exist in a **column (1)** in the source data (section 2.2.5.2.1). For example, consider a PivotTable report displaying sales for all four quarters of 2007. If there are no source data **rows** for sales in 2008, a calculated item can be used to add an additional cache item as a calculated item that calculates the projected sales for the first quarter of the year 2008 as being 25% higher than the sales for the fourth quarter of 2007. The following figure illustrates a PivotTable report with such a calculated item ("2008 Q1 projected").

Date	Sum of Sales
2007 Q1	$4,000,000.00
2007 Q2	$3,500,000.00
2007 Q3	$5,000,000.00
2007 Q4	$5,200,000.00
2008 Q1 projected	$6,500,000.00
Grand Total	**$24,200,000.00**

Figure 12: PivotTable report with calculated item

A calculated item is a cache item (section 2.2.5.2.3) that does not correspond to values in the source data (section 2.2.5.2.1). The values for a calculated item are calculated based on the formula specified for the calculated item. The **fFmla** field of the **PCDIAddlInfo** (section 2.5.99) record specifies if a cache item specified by the **PCDIA** rule (defined in section 2.1.7.38) is a calculated item.

The sequence of records that conforms to the **PCDCALCITEMS** rule (defined in section 2.1.7.38) specifies the calculations for all calculated items of a **PivotCache**. Each **PCDCALCITEM** rule (defined in section 2.1.7.38) in the sequence of records that conforms to the **PCDCALCITEMS** rule specifies one calculation for a specific calculated item. Each calculated item can have multiple calculations associated with it and in that case, there are multiple elements in the **PCDCALCITEMS** rule

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corresponding to the same calculated item. The calculated item that a calculation is associated with is specified by the sequence of records that conforms to the **PIVOTRULE** rule (defined in section 2.1.8) in the **PCDCALCITEM** rule. The **PIVOTRULE** rule can also specify additional scoping information; for example, if one calculation for a calculated item named "2008 Q1 projected" only applies to the "Cars" product group, the **PIVOTRULE** rule (defined in section 2.1.8) will specify the cache field (section 2.2.5.2.2) corresponding to "product group" and the cache item (section 2.2.5.2.3) corresponding to "Cars".

The **fmla** field of the **BrtBeginPCDCalcItem** (section 2.4.123) record specifies the formula that is used for a calculation.

Any cache field (section 2.2.5.2.2) and associated cache items (section 2.2.5.2.3), or pivot fields (section 2.2.5.3.2) and associated pivot items (section 2.2.5.3.3) , that are referenced by the formula of a calculation are specified by the sequence of records that conforms to the **PNAMES** rule (defined in section 2.1.7.38) in each **PCDCALCITEM** rule (defined in section 2.1.7.38).

An **OLAP PivotCache** (section 2.2.5.2) MUST NOT have calculated items (section 2.2.5.2.6).

2.2.5.2.7 Cache Hierarchies

A cache hierarchy corresponds to one of the following entities in the **OLAP** source data (section 2.2.5.2.1) associated with an OLAP **PivotCache** (section 2.2.5.2):

- **OLAP hierarchy**
- **OLAP measure**
- **OLAP named set**
- OLAP **key performance indicator (KPI)**

Cache hierarchies are only present in OLAP **PivotCaches** and MUST NOT exist in a non-OLAP **PivotCache**.

The sequence of records that conforms to the **PCDHIERARCHY** rule (defined in section 2.1.7.38) specifies a cache hierarchy that corresponds to an OLAP hierarchy, an OLAP measure or an OLAP named set, as specified in the following table.

fMeasure field of BrtBeginPCDHierarchy	fSet field of BrtBeginPCDHierarchy	Meaning
0	0	OLAP hierarchy
0	1	OLAP named set
1	0	OLAP measure

The sequence of records that conforms to the **PCDKPI** rule (defined in section 2.1.7.38) specifies a cache hierarchy that corresponds to an **OLAP KPI**.

The association between a cache hierarchy and the corresponding OLAP entity in the OLAP source data (section 2.2.5.2.1) is specified by the **stUnique** field of the **BrtBeginPCDHierarchy** (section 2.4.145) record or by the **stUnique** field of the **BrtBeginPCDKPI** (section 2.4.147) record.

For a cache hierarchy that corresponds to an OLAP hierarchy, OLAP measure or OLAP named set, the cache hierarchy index is the zero-based index of a **BrtBeginPCDHierarchy** record in the **BrtBeginPCDHierarchies** (section 2.4.144) collection.

For a cache hierarchy that corresponds to an OLAP KPI, the cache hierarchy index is the *n*-based index of a **BrtBeginPCDKPI** record in the **BrtBeginPCDKPIs** (section 2.4.148) collection, where *n* is the number of **BrtBeginPCDHierarchy** records in the **BrtBeginPCDHierarchies** collection, as specified in section 2.1.7.38.

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A cache field (section 2.2.5.2.2) can be associated with a cache hierarchy as specified by the **ihdb** field of the **BrtBeginPCDField** (section 2.4.135) record of the cache field.

A cache hierarchy that corresponds to an OLAP hierarchy represents one or more **OLAP levels** related via hierarchical relationships. For example, an OLAP hierarchy consisting of country/region, province, and city can be used to summarize national/regional, area, and municipal sales data. For a cache hierarchy that corresponds to an OLAP hierarchy, and is not a single field page hierarchy, each cache field (section 2.2.5.2.2) associated with the cache hierarchy corresponds to an OLAP level of the OLAP hierarchy or is a **member** property cache field.

A single field page hierarchy is a cache hierarchy that corresponds to an OLAP hierarchy in a **PivotCache** (section 2.2.5.2) that has a **bVerCacheCreated** field of the **BrtBeginPivotCacheDef** (section 2.4.167) less than 3 and has a PivotTable view (section 2.2.5.3) that has the associated pivot hierarchy (section 2.2.5.3.4) on the page axis (section 2.2.5.3.7.1). For a single field page hierarchy a single cache field is associated with the cache hierarchy.

2.2.5.2.7.1 Measures

A measure cache hierarchy is a cache hierarchy (section 2.2.5.2.7) that is associated with an **OLAP measure**. The **fMeasure** field of the **BrtBeginPCDHierarchy** (section 2.4.145) record specifies if a cache hierarchy (section 2.2.5.2.7) is a measure cache hierarchy. An OLAP measure MUST NOT have more than one cache field (section 2.2.5.2.2) associated with it. A pivot hierarchy (section 2.2.5.3.4) corresponding to a measure cache hierarchy MUST NOT be located on the **row** axis, **column (1)** axis or page axis (section 2.2.5.3.7.1).

If a pivot field (section 2.2.5.3.2) associated with a pivot hierarchy corresponding to a measure cache hierarchy appears on the data axis (section 2.2.5.3.7.5) more than once, data items (section 2.2.5.3.7.5.1) that specify that pivot field after the first data item that specifies that pivot field MUST contain a **BrtSXDI14** (section 2.4.800) record with an **isxvd** field greater than or equal to 0.

2.2.5.2.7.2 KPIs

A **key performance indicator (KPI)** cache hierarchy (section 2.2.5.2.7) is a cache hierarchy that is associated with an **OLAP KPI**. A KPI cache hierarchy includes the four main components of an OLAP KPI; value, goal, status and trend. KPI cache hierarchies are specified by the **BrtBeginPCDKPI** (section 2.4.147) record as specified by the sequence of records that conform to the **PCDKPI** rule in section 2.1.7.38.

2.2.5.2.7.3 Named Sets

A named set cache hierarchy (section 2.2.5.2.7) is a cache hierarchy that is associated with an **OLAP named set**. The **fSet** field of the **BrtBeginPCDHierarchy** (section 2.4.145) record specifies if a cache hierarchy (section 2.2.5.2.7) is a named set cache hierarchy. An OLAP named set MUST NOT have more than one cache field (section 2.2.5.2.2) associated with it. A pivot hierarchy (section 2.2.5.3.4) corresponding to a named set cache hierarchy MUST NOT be located on the data axis (section 2.2.5.3.7.5) or page axis (section 2.2.5.3.7.1).

2.2.5.2.8 OLAP Grouping

Grouping in an **OLAP PivotCache** (section 2.2.5.2) is the associating of multiple **OLAP members** that belong to the same **OLAP level** of an **OLAP hierarchy** and have the same OLAP member parent. When OLAP members in a particular OLAP level are grouped, a parent grouping OLAP level exists. Each group is represented in the parent grouping OLAP level by one parent grouping OLAP member, and one or more child OLAP members in the OLAP level that the grouping is applied to.

The sequence of records that conforms to the **PCDHGLEVELS** rule (defined in section 2.1.7.38) specifies grouping for the associated cache hierarchy (section 2.2.5.2.7), which MUST be associated with an OLAP hierarchy. Each sequence of records that conforms to the **PCDHGLEVEL** rule (defined in

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section 2.1.7.38) specifies a grouping for one OLAP level with the same zero-based ordinal as the zero-based index of the **PCDHGLEVEL** rule in the **PCDHGLEVELS** rule.

The set of groups for one OLAP level is specified by a sequence of records that conforms to the **PCDHGLGROUPS** rule (defined in section 2.1.7.38) in the **PCDHGLEVEL** rule (defined in section 2.1.7.38). Each individual group is specified by a sequence of records that conforms to the **PCDHGLGROUP** rule (defined in section 2.1.7.38) in the **PCDHGLGROUPS** rule. The set of OLAP members for a group is specified by the sequence of records that conforms to the **PCDHGLGMEMBERS** rule (defined in section 2.1.7.38) within a **PCDHGLGROUP** rule. Membership in the group is specified by the sequence of records that conforms to the **PCDHGLGMEMBER** rule (defined in section 2.1.7.38) within the **PCDHGLGMEMBERS** rule.

2.2.5.2.9 OLAP Calculated Members

A calculated **member** is specified by the sequence of records that conform to the **PCDCALCMEM** rule (defined in section 2.1.7.38) and is used to create an **OLAP calculated member** or an **OLAP named set** with an associated user-specified **MDX expression** for a custom calculation.

The pcdCalcMemCommon.**stMdx** field in the **BrtBeginPCDCalcMem** record specifies the user-specified MDX expression.

The pcdCalcMemCommon.**fSet** field in the **BrtBeginPCDCalcMem** record specifies whether the associated calculated member creates an OLAP named set or an OLAP calculated member.

If the user-specified MDX expression associated with a calculated member defines an **OLAP measure**, then this calculated member will be associated with a measure cache hierarchy as specified in section 2.2.5.2.7.1.

If the user-specified MDX expression associated with a calculated member specifies an **OLAP member** in an **OLAP hierarchy** other than the OLAP measure hierarchy, then this calculated member can only be associated with a cache item (section 2.2.5.2.3).

If a calculated member specifies an OLAP named set, then this calculated member is associated with a named set cache hierarchy as specified in section 2.2.5.2.7.3.

If a collection of a OLAP calculated member is associated with an external connection that is not associated with a **PivotCache** (section 2.2.5.2), this collection is specified by the sequence of records that conform to the **PCDCALCMEMSEXT** rule (defined in section 2.1.8).

The extended properties of a calculated member are specified by the sequence of records that conform to the **FRTPCDCALCMEM** rule (defined in section 2.1.7.38). This sequence of records is present in the file if at least one of the following conditions is satisfied:

1. The named set is defined by an OLAP named set array.
2. The named set has a **display folder** specified.
3. The MDX expression is longer than 32765 characters.
4. Each member from a different level of the same cache hierarchy (section 2.2.5.2.7) of this named set (section 2.2.5.2.7.3) is displayed in a separate pivot field (section 2.2.5.3.2).
5. This named set is automatically ordered and has duplicate **tuples** removed.

2.2.5.2.10 Cache Records

Cache records represent a snapshot of the source data (section 2.2.5.2.1) of a **PivotCache** (section 2.2.5.2) and allow for PivotTable views (section 2.2.5.3) using a **PivotCache** to be recalculated without retrieving the source data.

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Cache records are specified by the **PivotCache Records** (section 2.1.7.39) part, which contains sequences of records that conform to the **PIVOTCACHERECORD** rule (defined in section 2.1.7.39). Each **PIVOTCACHERECORD** rule specifies one cache record (section 2.2.5.2.10) and corresponds to one **row** in the source data. The **PIVOTCACHERECORD** rules each specify a sequence of values. Each of these values MUST correspond to a different cache field (section 2.2.5.2.2) as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The order of the values, corresponding to different cache fields, in each **PIVOTCACHERECORD** rule MUST be the same as the order of the cache fields in the collection of cache fields specified by the **BrtBeginPCDFields** (section 2.4.136) collection. The number of values, corresponding to different cache fields, in each **PIVOTCACHERECORD** rule MUST be equal to the number of **BrtBeginPCDField** (section 2.4.135) records, for which the **fSrcField** field is equal to 1, in the **BrtBeginPCDFields** collection.

If a pivot field (section 2.2.5.3.2) associated with a cache field (section 2.2.5.2.2) exists in the PivotTable view (section 2.2.5.3), the cache field MUST have associated cache items; if not, associated cache items (section 2.2.5.2.3) are optional.

For cache fields that have cache items, the cache items of the cache fields are referenced by an index. For sequences of records that conform to the **PIVOTCACHERECORDDT** (defined in section 2.1.7.39), the index is specified by the **BrtPCDIIndex** (section 2.4.724) record. For **BrtPCRRecord** (section 2.4.729) records, the index is stored in the **rgb** field of the **BrtPCRRecord** record.

For cache fields (section 2.2.5.2.2) that do not have cache items (section 2.2.5.2.3), the sequence of records that conform to a **PCDIDT** (defined in section 2.1.7.39) in a **PIVOTCACHERECORD** (defined in section 2.1.7.39) specify individual values of the corresponding source data (section 2.2.5.2.1) row. For **BrtPCRRecord** (section 2.4.729) records, the values of the corresponding source data row are stored in the **rgb** field of the **BrtPCRRecord** record.

An **OLAP PivotCache** (section 2.2.5.2) MUST NOT have cache records (section 2.2.5.2.10). Cache records are optional for a non-OLAP **PivotCache**.

2.2.5.2.11 Tuple Cache

An **OLAP PivotCache** (section 2.2.5.2) can contain cached data called a **tuple** cache which is used by **cube functions** for recalculation without accessing the data provider specified by the associated OLAP connection (section 2.2.8.3.1).

A tuple cache is specified by a sequence of records that conforms to the **PCDSDTUPLECACHE** rule (defined in section 2.1.7.38).

If the OLAP **PivotCache** contains a tuple cache, the **fSheetData** field in the **BrtBeginPivotCacheDef** (section 2.4.167) record MUST be equal to 1.

A tuple cache can contain a cache of **cube** values specified by a sequence of records that conforms to the **PCDSDTCENTRIES** rule (defined in section 2.1.7.38), a cache of cube **members**(specified by a sequence of records that conforms to the **PCDSDTCQUERIES** rule (defined in section 2.1.7.38), a cache of cube sets specified by a sequence of records that conforms to the **PCDSDTCSETS** rule (defined in section 2.1.7.38), and a cache of cube value server formats (specified by a sequence of records that conforms to the **PCDSFCIENTRIES** rule).

The sequence of records that conform to the **PCDSDTCEMEMBER** rule (defined in section 2.1.7.38) specifies a tuple cache entry. A tuple cache entry specifies an **OLAP member** or a reference to a tuple cache set. See section 2.4.155 for details.

A cache of cube values is a collection of values specified by the **BrtPCDIMissing** (section 2.4.725), **BrtPCDINumber** (section 2.4.726), **BrtPCDIError** (section 2.4.723), or **BrtPCDIString** (section 2.4.727) records. Each of these values is optionally followed by a collection of tuple cache entries specified by a sequence of records that conforms to the **PCDSDTCEMEMBERS** rule (defined in section 2.1.7.38), which specify the OLAP members or tuple cache sets corresponding to the value.

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A cache of cube members is specified by a sequence of records that conforms to the **PCDSDTCQUERIES** rule. Each of the cube members has an **MDX expression**, specified by the **BrtBeginPCDSDTCQuery** (section 2.4.160) record. Each of the **BrtBeginPCDSDTCQuery** records is optionally followed by a collection of tuple cache entries specified by a sequence of records that conforms to the **PCDSDTCEMEMBERS** rule (defined in section 2.1.7.38) corresponding to the MDX expression.

A cache of cube sets is a collection of tuple cache sets specified by a sequence of records that conforms to the **PCDSDTCSETS** rule (defined in section 2.1.7.38). Each tuple cache set optionally has a collection of tuple cache entries specified by a sequence of records that conform to the **PCDSDTCEMEMBERS** rule (defined in section 2.1.7.38) corresponding to the MDX expression specified in the **BrtBeginPCDSDTCSet** (section 2.4.161) record.

A cache of cube value server formats is a collection of **number formats** specified by the **BrtPCDSFCIEntry** (section 2.4.728) record.

2.2.5.3 PivotTable View

A **PivotTable** view is a set of structures that specify layout, filtering, sorting, and other properties. These properties are used to produce a **PivotTable** (section 2.2.5) report based on data from the **PivotCache** (section 2.2.5.2).

A **PivotTable** view is specified by the sequence of records that conforms to the **PIVOTTABLE** rule (defined in section 2.1.7.40).

An **OLAP PivotTable** view has an associated **PivotCache** (see section 2.2.5.3.1) that is an OLAP **PivotCache** (section 2.2.5.2).

Functionality specified by a **PivotTable** (section 2.2.5) view includes:

- The arrangement of pivot fields (section 2.2.5.3.2) on the **row** axis, **column (1)** axis, or both to produce a **PivotTable** report.
- Using data items (section 2.2.5.3.7.5.1) on the data axis (section 2.2.5.3.7.5) to show summarized result values in the **PivotTable** report.
- Filtering data in the **PivotTable** report by performing manual filtering (section 2.2.5.3.5), filtering by criteria (section 2.2.5.3.6), or filtering in the page axis (section 2.2.5.3.7.1).
- Determining the **PivotTable** layout (section 2.2.5.3.8).
- Formatting the entire **PivotTable** report with a tables style (section 2.2.6.3). See section 2.4.818 for details.
- Formatting an area of the **PivotTable** report in a way that logically tracks changes in the **PivotTable** report. Formatting settings are associated with logical parts of the PivotTable view, and not with fixed **ranges** on the **sheet**. See the sequence of records conforming to the **SXFORMAT** rule (defined in section 2.1.7.40) for details.
- **Conditional formatting** an area of the **PivotTable** report in a way that logically tracks changes in the **PivotTable** report and performs calculations based on the fact that the area is in a **PivotTable** report. See the sequence of records conforming to the **SXCONDFMT** rule (defined in section 2.1.7.40) for details.
- Sorting pivot items (section 2.2.5.3.3) of pivot fields (section 2.2.5.3.2) within the **PivotTable** report. For details, see section 2.2.5.3.2.1.

Non-OLAP **PivotTable** views enable the creation of different **PivotTable** reports associated with the same **PivotCache**. This enables the creation of different visual representations without duplicating the **PivotCache**.

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2.2.5.3.1 Relationship to PivotCache

A PivotTable view (section 2.2.5.3) is associated with a **PivotCache** (section 2.2.5.2) through the **idSx** field of a **BrtBeginPivotCacheID** (section 2.4.168) record that matches the **idCache** field of the **BrtBeginSXView** (section 2.4.273) record that corresponds to this PivotTable view.

A PivotTable view MUST have one and only one associated **PivotCache**. An **OLAP** **PivotCache** MUST NOT be associated with more than one PivotTable view. A non-OLAP **PivotCache** can be associated with more than one PivotTable view.

2.2.5.3.2 Pivot Fields

A pivot field corresponds to a cache field (section 2.2.5.2.2). A pivot field specifies display information of the data in the PivotTable view.

A pivot field is specified by the sequence of records that conform to the **SXVD** rule (defined in section 2.1.7.40). A pivot field is contained in the PivotTable view. A PivotTable view contains a collection of pivot fields which is specified by the **SXVDS** rule (defined in section 2.1.7.40).

A pivot field index, which identifies a pivot field, is specified to be the zero-based index of a sequence of records that conform to the **SXVD** rule in the sequence of records that conforms to the **SXVDS** rule.

Each pivot field is associated with the cache field (section 2.2.5.2.2) with a cache field index equal to the pivot field index of the pivot field. For more details, see section 2.2.5.2.2. The number of pivot fields in the PivotTable view (section 2.2.5.3) MUST equal the number of cache fields in the associated **PivotCache** (section 2.2.5.2).

The principal way that the structure of a PivotTable view is used to create a PivotTable report is that pivot fields can be part of PivotTable axes (section 2.2.5.3.7). Also, a data item (section 2.2.5.3.7.5.1) can refer to a pivot field.

A pivot field can have pivot items (section 2.2.5.3.3). A pivot field can describe various information such as pivot field sorting (section 2.2.5.3.2.1) and subtotaling (section 2.2.5.3.7.4.2) settings.

The following figure illustrates a **PivotTable** (section 2.2.5) report with four pivot fields displaying Sales by Product, Country/Region, and Date.

Sum of Sales	Column Labels				
Row Labels	6/5/2007	8/3/2007	9/2/2007	10/5/2007	Grand Total
Bicycle	500		300		800
Canada			300		300
USA	500				500
Car		20000		35000	55000
Canada				35000	35000
USA		20000			20000
Grand Total	500	20000	300	35000	55800

Figure 13: PivotTable report with four pivot fields

2.2.5.3.2.1 Pivot Field Sorting

Pivot items (section 2.2.5.3.3) of a pivot field (section 2.2.5.3.2) appear in the PivotTable view (section 2.2.5.3) in a specific order. This **sort order (2)** is only applicable to pivot fields in the **row** axis or **column (1)** axis and can be based on the following entities:

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- The values of the pivot items associated with the pivot field (section 2.2.5.3.2).
- The values of the data items (section 2.2.5.3.7.5.1) that correspond to the pivot items associated with the pivot field
- The values of the pivot items (section 2.2.5.3.3) of a pivot field (section 2.2.5.3.2) associated with an **OLAP member property**. See **member** properties for more details.
- The ordering of the pivot items associated with the pivot field as determined by the source data (section 2.2.5.2.1) provider.
- The ordering of instances of the sequence of the records that conform to the **SXVI** rule (as defined in section 2.1.7.40) for the pivot field within the file.

The sort order (2) of a pivot field (section 2.2.5.3.2) is specified by the **fAutoSort** field of the **BrtBeginSXVD** (section 2.4.270) record. If **fAutoSort** is equal to 1, then the sort is performed every time the **PivotTable** (section 2.2.5) is recalculated.

If the **fAutoSort** field of the **BrtBeginSXVD** record is equal to 1, the sort order (2) is specified by the value of the **fAscendSort** field of the **BrtBeginSXVD** record which determines whether the sort is ascending or descending.

The existence of a **BrtBeginAutoSortScope** (section 2.4.9) record following the **BrtBeginSXVD** record specifies the scope of the sort, as specified in the following table.

BrtBeginAutoSortScope existence	Meaning
Does not exist	Sorting is based on the values of the pivot items (section 2.2.5.3.3) of the pivot field (section 2.2.5.3.2).
Exists	Sorting is either based on the values in the data area (section 2.2.5.3.8.1.4) or on the values of member properties associated with the pivot field as specified by the sequence of records that conform to the **PIVOTRULE** rule (as defined in section 2.1.8) in the sequence of records that conform to the **AUTOSORTSCOPE** rule (as defined in section 2.1.7.40).

If the **fAutoSort** field of the **BrtBeginSXVD** (section 2.4.270) record is equal to 0, the sort order (2) is determined by the order of instances of the sequence of the records that conform to the **SXVI** rule for this pivot field.

For **OLAP PivotTables**, if the **fTensorSort** field of the **BrtBeginSXVD** record is equal to 1, the sort order (2) is determined by the OLAP source data (section 2.2.5.2.1) provider.

2.2.5.3.3 Pivot Items

Pivot items represent specific instances of the entities represented by pivot fields (section 2.2.5.3.2). Each pivot item specifies its display properties. For example it can contain the user defined caption for the pivot item or information about whether the pivot item is hidden or not.

A pivot item is specified by the sequence of records that conform to the **SXVI** rule (as defined in section 2.1.7.40). A pivot item is contained in a pivot field. The collection specified by the sequence of records that conform to the **SXVIS** rule (as defined in section 2.1.7.40) specifies the pivot items of a pivot field.

A pivot item can be referenced by a pivot item index. A pivot item index is specified to be the zero-based index of an **SXVI** rule in the collection specified by the **SXVIS** rule.

A pivot item can be associated with a cache item (section 2.2.5.2.3). The **iCache** field of the **BrtBeginSXVI** (section 2.4.272) record of the pivot item specifies the cache item index of the

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associated cache item in the associated cache field (section 2.2.5.2.2). If the **itmtype** field of this **BrtBeginSXVI** record is not **PITDATA** (section 2.5.104), then this pivot item MUST NOT have an associated cache item. Two pivot items MUST NOT be associated with the same cache item. Note that although a pivot field (section 2.2.5.3.2) index references a pivot field that corresponds to the cache field with the same cache field index, a pivot item index might not reference a pivot item that corresponds to a cache item with the same cache item index.

The number of pivot items, where the **itmtype** field of the **BrtBeginSXVI** (section 2.4.272) record of the pivot item is **PITDATA** (section 2.5.104), MUST equal zero or the number of cache items in the cache field of the pivot field (section 2.2.5.3.2).

2.2.5.3.4 Pivot Hierarchies

A pivot hierarchy corresponds to a cache hierarchy (section 2.2.5.2.7).

A pivot hierarchy is specified by the sequence of records that conform to the **SXTH** rule (defined in section 2.1.7.40). A pivot hierarchy is contained in a PivotTable view (section 2.2.5.3).

Pivot hierarchies MUST NOT exist in a non-**OLAP** PivotTable view.

A PivotTable view has a collection of pivot hierarchies as specified by the sequence of records that conform to the **SXTHS** rule (defined in section 2.1.7.40).

A pivot hierarchy can be referenced by a pivot hierarchy index which is a zero-based index of an **SXTH** rule in the collection specified by the **SXTHS** rule.

Each pivot hierarchy is associated with a cache hierarchy with a cache hierarchy index, as specified in section 2.2.5.2.7, equal to the pivot hierarchy index of the pivot hierarchy.

A pivot hierarchy can have pivot field (section 2.2.5.3.2) associated with it. The pivot fields associated with a pivot hierarchy do not need to exist if they have not been used by the application.

The association between a pivot hierarchy and pivot fields can be determined by the following: A pivot hierarchy has an associated cache hierarchy. This associated cache hierarchy in turn has cache field (section 2.2.5.2.2) associated with it. These specific cache fields have pivot fields associated with them. See section 2.2.5.3.2 for more details.

A pivot hierarchy can be on a PivotTable axis (section 2.2.5.3.7) . When a pivot field (section 2.2.5.3.2) associated with a pivot hierarchy is referenced by a data item (section 2.2.5.3.7.5.1) the pivot hierarchy is on the data axis (section 2.2.5.3.7.5). All pivot fields associated with a pivot hierarchy that is used on a PivotTable axis MUST be placed on the same PivotTable axis as the pivot hierarchy or not on any PivotTable axis.

2.2.5.3.5 Manual Filters

A manual filter enables specific pivot items (section 2.2.5.3.3) or **OLAP members** associated with pivot fields (section 2.2.5.3.2) to be shown or **hidden** in the PivotTable view (section 2.2.5.3). Manual filtering affects subtotal calculations when pivot fields that have manual filters are located on the **row** axis, **column (1)** axis, or page axis (section 2.2.5.3.7.1). The pivot items that are hidden for such pivot fields are not included when calculating subtotals.

At least one **BrtBeginSXVI** (section 2.4.272) record in the **BrtBeginSXVIs** (section 2.4.276) collection MUST have the **fHidden** field equal to 0x0.

Manual filters are applied during **PivotTable** (section 2.2.5) report calculation prior to any of the other types of filters specified in the following sections. If there are multiple manual filters, they are not applied in a specific order.

Details about manual filtering for pivot fields (section 2.2.5.3.2) on the page axis are covered in section 2.2.5.3.7.1.

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2.2.5.3.5.1 Non-OLAP Manual Filters

For non-**OLAP** **PivotTable** (section 2.2.5), the state of the manual filter on a pivot field (section 2.2.5.3.2) can be determined by the value of the **fHidden** field of the **BrtBeginSXVI** (section 2.4.272) records directly following the corresponding **BrtBeginSXVD** (section 2.4.270). This field specifies whether the corresponding pivot item (section 2.2.5.3.3) is hidden by the manual filter and therefore not displayed in the **PivotTable** report.

If the **fFilterInclusive** field of the **BrtBeginSXVD** record is equal to 0x1, pivot items (section 2.2.5.3.3) corresponding to new values in the source data (section 2.2.5.2.1) are not displayed by default in the PivotTable (section 2.2.5) report after the associated **PivotCache** (section 2.2.5.2) has been refreshed.

2.2.5.3.5.2 OLAP Manual Filters

For **OLAP** PivotTable views (section 2.2.5.3), manual filtering operates on pivot hierarchies (section 2.2.5.3.4). OLAP manual filtering uses filtering lists to determine what filtering to apply.

The SXTHItem list is specified to be the list of the **OLAP members** specified by **BrtBeginSXTHItem** (section 2.4.262) records of the pivot hierarchy (section 2.2.5.3.4)

The selected pivot items (section 2.2.5.3.3) list is specified to be the list of pivot items, with the **fOlapFilterSelected** field of the **BrtBeginSXVI** (section 2.4.272) record equal to 0x1, in the pivot fields (section 2.2.5.3.2) associated with the pivot hierarchy.

If both the SXTHItem list and the selected pivot items list are empty then, no manual filtering is specified for the pivot hierarchy. Otherwise, the value of the **fFilterInclusive** field of the **BrtBeginSXTH** (section 2.4.261) record of the pivot hierarchy determines how the lists will be used.

If the **fFilterInclusive** field of the **BrtBeginSXTH** record of the pivot hierarchy is equal to 0x1, the OLAP members in the SXTHItem list and their ascendants and descendants are included in the manual filter, and the pivot items (section 2.2.5.3.3) in the selected pivot items list and their ascendants and descendants are included in the manual filter. New OLAP members in the source data (section 2.2.5.2.1) will be excluded by default when the PivotTable view (section 2.2.5.3) is refreshed.

If the **fFilterInclusive** field of the **BrtBeginSXTH** (section 2.4.261) record of the pivot hierarchy (section 2.2.5.3.4) is equal to 0x0, the OLAP members in the SXTHItem list and their descendants, are excluded in the manual filter, and the pivot items (section 2.2.5.3.3) in the selected pivot items list and their descendants, are excluded in the manual filter. New OLAP members in the source data will be included by default when the PivotTable view is refreshed.

The filtering lists do not include OLAP members which are ascendants or descendants of other OLAP members in the lists.

2.2.5.3.6 Filtering by Criteria

Filtering by criteria is the ability to conditionally show pivot items (section 2.2.5.3.3) of pivot fields (section 2.2.5.3.2) based on user-defined criteria. For example, a criteria **filter** might be defined to show all products that sold for more than $30,000.

2.2.5.3.6.1 Advanced Filters

An advanced filter specifies a user-defined criterion that is used to determine the pivot items (section 2.2.5.3.3) of a pivot field (section 2.2.5.3.2) that are included in subtotal calculations for the PivotTable view (section 2.2.5.3) and that are displayed in the **PivotTable** (section 2.2.5) report.

Only advanced filters that are associated with pivot fields that are located on the **row** axis or the **column (1)** axis are applied when the PivotTable view is calculated.

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An advanced filter is specified by the sequence of records that conforms to the **SXFILTER** rule (defined in section 2.1.7.40), and the **isxvd** field of the **BrtBeginSXFILTER** (section 2.4.245) record specifies the pivot field associated with the advanced filter.

Advanced filters MUST NOT be applied to pivot fields of a PivotTable view if the value of the **bVerSxMacro** field of the **BrtBeginSXView** (section 2.4.273) record corresponding to the PivotTable view is less than 3, or **OLAP** PivotTable views with a value of 0 for the **fSupportSubquery** field of the corresponding **BrtBeginPivotCacheDef** (section 2.4.167) record.

There are three types of advanced filters: label filter (section 2.2.5.3.6.1.1), date filter (section 2.2.5.3.6.1.2), and value filter (section 2.2.5.3.6.1.3).

A pivot field (section 2.2.5.3.2) MUST NOT have more than one associated advanced filter of the same type.

2.2.5.3.6.1.1 Label Filters

A label filter specifies criteria that are applied to pivot item (section 2.2.5.3.3) captions to determine which pivot items (section 2.2.5.3.3) are included in the calculation of values for the PivotTable view (section 2.2.5.3) and displayed in the **PivotTable** (section 2.2.5) report.

A label filter is specified by a **BrtBeginSXFILTER** (section 2.4.245) record with the **sxft** field equal to a value in the range 0x00000004 through 0x00000011.

Label filters are applied before any value filters (section 2.2.5.3.6.1.3), but the order of label filters is not specified.

If a caption is specified for a pivot item (section 2.2.5.3.3), the label filter is applied to the **displayName** field of the **BrtBeginSXVI** (section 2.4.272) record associated with that pivot item. If a caption is not specified for a pivot item, the label filter is applied to the value of the cache item (section 2.2.5.2.3) associated with that pivot item.

A label filter can be applied to **member** properties. The **isxvdMProp** field of the **BrtBeginSXFILTER** record specifies the member property on which this label filter is applied.

2.2.5.3.6.1.2 Date Filters

A date filter specifies a criterion that is applied to pivot items (section 2.2.5.3.3) of date type of a pivot field (section 2.2.5.3.2). A date filter determines which pivot items are included in the calculation of the PivotTable view (section 2.2.5.3) and displayed in the **PivotTable** (section 2.2.5) report.

Date filters are specified by **BrtBeginSXFILTER** (section 2.4.245) records with the **sxft** field in the range 0x0000001A through 0x00000041.

For non-**OLAP** PivotTable views, a date filter can be applied if and only if the **BrtBeginPCDFAtbl** (section 2.4.130) record associated with the corresponding cache field (section 2.2.5.2.2) has the **fDateInField** field equal to 1, the **fMixedTypesIgnoringBlanks** field equal to 0, and the **fNonDates** field is equal to 0. For OLAP PivotTable views, a date filter can be applied if and only if the **wAttributeMemberValueType** field of the **BrtBeginPCDHierarchy** (section 2.4.145) record specifies that the cache hierarchy (section 2.2.5.2.7) has a data type of date and the **fTimeHierarchy** field of the **BrtBeginPCDHierarchy** record is equal to 1, or the **fAttributeMemberValueTypeKnown** field of the **BrtBeginPCDHierarchy** record is equal to 0 and the **fTimeHierarchy** field of the **BrtBeginPCDHierarchy** record is equal to 1.

Date filters are applied before value filters (section 2.2.5.3.6.1.3) and in no specific order.

2.2.5.3.6.1.3 Value Filters

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A value filter specifies a criterion that is applied to values of a data item (section 2.2.5.3.7.5.1) for pivot items (section 2.2.5.3.3) of the pivot field (section 2.2.5.3.2) that the value filter is applied to. The value filter determines which pivot items are included in the subtotal calculation of the PivotTable view (section 2.2.5.3) and displayed in the PivotTable view report.

A value filter is specified by the sequence of records specified by the sequence of records that conforms to the **SXFILTER** rule (defined in section 2.1.7.40) that contain a **BrtBeginSXFILTER** (section 2.4.245) record with the **sxft** field equal to a value in one of the following the ranges: 0x00000001 through 0x00000003 or 0x00000012 through 0x00000019.

Value filters are applied after manual filters (section 2.2.5.3.5), date filters section 2.2.5.3.6.1.2), and label filters (section 2.2.5.3.6.1.1) are applied. Value filters are applied in the order in which they are specified in the collection specified by the sequence of records that conforms to the **SXFILTERS** rule (defined in section 2.1.7.40). The subtotals generated as a result of a value filter being applied are used to evaluate the next value filter specified in the **SXFILTERS** rule.

2.2.5.3.6.2 Simple Filters

A simple filter is a **top N filter** which is also known as an **AutoShow**. The **fAutoShow** field of the **BrtBeginSXVD** (section 2.4.270) record specifies whether a simple filter is applied for a pivot field (section 2.2.5.3.2). The **fTopAutoShow** field of the **BrtBeginSXVD** record specifies whether a simple filter applies to the top or bottom *N* items. The **citmAutoShow** field of the **BrtBeginSXVD** record specifies the number of pivot items (section 2.2.5.3.3) displayed.

Simple filters MUST only be applied to pivot fields of a PivotTable view (section 2.2.5.3) with the **bVerSxMacro** field of the corresponding **BrtBeginSXView** (section 2.4.273) record less than or equal to 2, or to pivot fields of an **OLAP** PivotTable view with the **fSupportSubquery** field of the **BrtBeginPivotCacheDef** (section 2.4.167) record of the corresponding **PivotCache** (section 2.2.5.2) equal to 0.

2.2.5.3.7 PivotTable Axes

A **PivotTable** (section 2.2.5) axis is the set of pivot fields (section 2.2.5.3.2) or pivot hierarchies (section 2.2.5.3.4) in a PivotTable view (section 2.2.5.3) used to populate an area of the **PivotTable** report. The placement and positions of pivot fields on the axes are used to determine the **PivotTable Layout** (section 2.2.5.3.8). The four axes of a PivotTable view are the page axis (section 2.2.5.3.7.1), the **row** axis, the **column (1)** axis, and the data axis (section 2.2.5.3.7.5). For non-**OLAP PivotTables**, a pivot field MUST NOT appear more than once on the PivotTable view, with the exception of the data axis. For non-OLAP **PivotTables**, a pivot field can be placed one or more times on the data axis independently of whether it was placed on any other axis. For OLAP **PivotTables**, a pivot field MUST NOT be placed more than once on any axis. For both OLAP and non-OLAP **PivotTables**, pivot fields (section 2.2.5.3.2) do not have to be placed on any **PivotTable** axis.

2.2.5.3.7.1 Page Axis

The page axis contains the pivot fields (section 2.2.5.3.2) or pivot hierarchies (section 2.2.5.3.4) used to populate the page area (section 2.2.5.3.8.1.3) of the **PivotTable** (section 2.2.5) report, as specified by **PivotTable Layout** (section 2.2.5.3.8), and are intended for use as **filters**. These pivot fields and pivot hierarchies do not affect the layout of the other areas of the **PivotTable** report, but rather filter the data used by the entire PivotTable view (section 2.2.5.3).

The page axis is specified by the sequence of records that conforms to the **SXPIS** rule (defined in section 2.1.7.40). For non-**OLAP PivotTables**, each sequence of records that conforms to the **SXPI** rule (defined in section 2.1.7.40) specifies one pivot field on the page axis. For OLAP **PivotTables**, each **SXPI** rule specifies one pivot hierarchy (section 2.2.5.3.4) on the page axis. The order in which the pivot fields and pivot hierarchies appear in the **SXPIS** rule specifies the order that the pivot fields and pivot hierarchies appear in on the page axis.

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For non-OLAP **PivotTables**, the **isxvd** field of the **BrtBeginSXPI** (section 2.4.253) record specifies the associated pivot field (section 2.2.5.3.2). For OLAP **PivotTables**, the **isxth** field of the **BrtBeginSXPI** record specifies the associated pivot hierarchy.

2.2.5.3.7.1.1 Non-OLAP Page Filtering

A non-**OLAP** PivotTable view (section 2.2.5.3) can be filtered to not include some pivot items (section 2.2.5.3.3) from the pivot field (section 2.2.5.3.2) on the page axis (section 2.2.5.3.7.1). The **PivotTable** (section 2.2.5) report only includes values specified by cache items (section 2.2.5.2.3) that are associated with pivot items that are filtered in.

The following table specifies how the filtering of pivot items of a pivot field is specified.

In the following table, the first column is the value of the **fEnableMultiplePageItems** field of the **BrtBeginSXVD** (section 2.4.270) record of the corresponding pivot field (section 2.2.5.3.2), the second column is the value of the **isxvi** field of the **BrtBeginSXPI** (section 2.4.253) record, and the third column is the value of the **fSubtotalHiddenPageItems** field of the **BrtBeginSXView** (section 2.4.273) record.

fEnableMultiplePageItems	isxvi	fSubtotalHiddenPageItems	Filtering Behavior
0	Not 0x001000FE	Any	Specifies that the **isxvi** field of the **BrtBeginSXPI** record specifies a pivot item (section 2.2.5.3.3) index, as specified by section 2.2.5.3.3, of the one pivot item of a pivot field that is filtered in.
Any	0x001000FE	0	Specifies that pivot items are filtered in if and only if the **fHidden** field of the corresponding **BrtBeginSXVI** (section 2.4.272) records is equal to 0.
Any	0x001000FE	1	Specifies that all pivot items of a pivot field filtered in.

If the **fEnableMultiplePageItems** field of the corresponding pivot field (section 2.2.5.3.2) is equal to 1, the **isxvi** field of the **BrtBeginSXPI** (section 2.4.253) record MUST be equal to 0x001000FE and MUST be ignored.

2.2.5.3.7.1.2 OLAP Page Filtering

The following table specifies which **OLAP members** in the pivot hierarchy (section 2.2.5.3.4) on the page axis (section 2.2.5.3.7.1) are filtered in.

In the following table, the first column is the value of the **fEnableMultiplePageItems** field of the **BrtBeginSXTH** (section 2.4.261) record.

fEnableMultiplePageItems	Filtering behavior
0	Specifies that the **irstUnique** field of the **BrtBeginSXPI** (section 2.4.253) record specifies the one OLAP member that is filtered in.
1	Specifies that the filtering is applied as specified by Manual Filters (section 2.2.5.3.5) and OLAP Manual Filters (section 2.2.5.3.5.2) for the pivot hierarchy (section 2.2.5.3.4).

2.2.5.3.7.2 Row Axis

The **row** axis contains the pivot fields (section 2.2.5.3.2), and an optional data field (section 2.2.5.3.7.5.2), used to populate the row area of the **PivotTable** (section 2.2.5) report, as specified by **PivotTable Layout** (section 2.2.5.3.8).

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The pivot fields on the row axis are specified by the **BrtBeginISXVDRws** (section 2.4.96) record. The order that the pivot fields and the optional data field (section 2.2.5.3.7.5.2) appear in that record specifies the order that the pivot fields and the optional data field appear in on the row axis. The order that the pivot fields and the optional data field appear in on the row axis corresponds to the order that the pivot fields and the optional data field are placed in on the row area of the **PivotTable** (section 2.2.5) report.

For adjacent **ISXVD** (section 2.5.83) records in the **rgisxvdrws** field of the **BrtBeginISXVDRws** (section 2.4.96) record, the pivot field (section 2.2.5.3.2) or data field (section 2.2.5.3.7.5.2) that the first **ISXVD** references is defined to be an outer field with respect to the pivot field or the data field that the second **ISXVD** references. The pivot field or data field that the second **ISXVD** references is defined to be an inner field with respect to the pivot field or the data field that the first **ISXVD** references.

For **OLAP PivotTables** (section 2.2.5), all **ISXVD** (section 2.5.83) records in the **rgisxvdrws** field of the **BrtBeginISXVDRws** (section 2.4.96) record that reference pivot fields that are associated with the same pivot hierarchy (section 2.2.5.3.4) MUST be adjacent. Pivot fields associated with **member** properties of the pivot hierarchy MUST be located on the row axis after other types of pivot fields associated with the same pivot hierarchy. Pivot fields not associated with member properties of the pivot hierarchy MUST appear on the row axis in an order such that the zero-based index of the level of each pivot field associated with the same pivot hierarchy is ascending. The level of a pivot field (section 2.2.5.3.2) is specified by the **isxtl** field of the **BrtBeginPCDField** (section 2.4.135) record of the cache field (section 2.2.5.2.2) associated with the pivot field.

For OLAP **PivotTables**, the **rgisxth** field of the **BrtBeginISXTHRws** (section 2.4.94) record specifies the order of pivot hierarchies (section 2.2.5.3.4) on the row axis.

See section 2.2.5.3.7.4 also.

2.2.5.3.7.3 Column Axis

The **column (1)** axis contains the pivot fields (section 2.2.5.3.2), and an optional data field (section 2.2.5.3.7.5.2), used to populate the column (1) area of the **PivotTable** (section 2.2.5) report, as specified by **PivotTable Layout** (section 2.2.5.3.8).

The pivot fields on the column (1) axis are specified by the **BrtBeginISXVDCols** (section 2.4.95) record. The order that the pivot fields and the optional data field (section 2.2.5.3.7.5.2) appear in that record specifies the order that the pivot fields and the optional data field appear on the column (1) axis. The order that the pivot fields and the optional data field appear in on the column (1) axis corresponds to the order that the pivot fields and the optional data field are placed in on the column (1) area of the **PivotTable** report.

For adjacent **ISXVD** (section 2.5.83) records in the **rgisxvdcols** field of the **BrtBeginISXVDCols** record, the pivot field (section 2.2.5.3.2) or data field that the first **ISXVD** references is defined to be an outer field with respect to the pivot field or the data field that the second **ISXVD** references. The pivot field or data field that the second **ISXVD** references is defined to be an inner field with respect to the pivot field or the data field that the first **ISXVD** references.

For **OLAP PivotTables** (section 2.2.5), all **ISXVD** (section 2.5.83) records in the **rgisxvdcols** field of the **BrtBeginISXVDCols** record that reference pivot fields that are associated with the same pivot hierarchy (section 2.2.5.3.4) MUST be adjacent. Pivot fields associated with **member** properties of the pivot hierarchy MUST be located on the column (1) axis after other types of pivot fields associated with the same pivot hierarchy. Pivot fields not associated with member properties of the pivot hierarchy MUST appear on the column (1) axis in an order such that the zero-based index of the level of each pivot field associated with the same pivot hierarchy is ascending. The level of a pivot field is specified by the **isxtl** field of the **BrtBeginPCDField** (section 2.4.135) record of the cache field (section 2.2.5.2.2) associated with the pivot field (section 2.2.5.3.2).

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For OLAP **PivotTables**, the **rgisxth** field of the **BrtBeginISXTHCols** (section 2.4.93) record specifies the order of pivot hierarchies (section 2.2.5.3.4) on the column (1) axis.

See section 2.2.5.3.7.4 also.

2.2.5.3.7.4 Nesting

This section applies to both the **row** axis and **column (1)** axis unless otherwise specified. Within this section, axis means the row axis or the column (1) axis as appropriate; fields mean pivot fields (section 2.2.5.3.2) on the axis, the data field (section 2.2.5.3.7.5.2) on the axis, or both; area means the row area or column (1) area as appropriate; items mean pivot items (section 2.2.5.3.3) or data items (section 2.2.5.3.7.5.1) as appropriate.

The axes specify an order in which the fields are represented in the areas, see section 2.2.5.3.8 for more information about the areas. Pivot lines (section 2.2.5.3.8.3) within the areas have references to items. Usually a pivot line including an item of an outer field only includes items in the inner fields that exist with the item of the outer field in the source data (section 2.2.5.2.1), subject to the filtering on the PivotTable view. Usually all the instances of an item in the area are grouped together, with grouping on the outer fields taking precedence over grouping on the inner fields. This process is called nesting.

A nested item group is specified to be the contiguous set of pivot lines (section 2.2.5.3.8.3) that have the same item in an outer field.

The following table shows an example of nested item groups for Country/Region, State, and City.

Country/Region	State	City
USA	Illinois	Chicago
USA	Illinois	Springfield
USA	Louisiana	New Orleans
USA	Louisiana	Baton Rouge
Mexico	Jalisco	Guadalajara

The first two lines are a nested item group for Illinois. The next two lines are a nested item group for Louisiana. The first four lines are a nested item group for USA. The last line is both a nested item group for Jalisco and Mexico. Note that often in a **PivotTable** (section 2.2.5) report the repeated item labels will be omitted.

For an **OLAP** PivotTable view (section 2.2.5.3), nesting can be the result of either of the following conditions but not both:

- Items of an inner field that are in a different pivot hierarchy (section 2.2.5.3.4) than an outer pivot field (section 2.2.5.3.2).
- Items of an inner field that is associated with the same pivot hierarchy as an outer pivot field and that correspond to child **OLAP members** of the OLAP members corresponding to the items of the outer field.

2.2.5.3.7.4.1 Collapsing

Settings in the file format can specify that a pivot item (section 2.2.5.3.3) of an outer pivot field (section 2.2.5.3.2), rather than having nested pivot items of inner pivot fields, is collapsed. Usually when a pivot item on an outer pivot field is collapsed, it does not have a nested pivot item group and when it appears in a pivot line (section 2.2.5.3.8.3), the pivot items of the inner pivot fields for the collapsed pivot item do not appear in the pivot line.

In the example from section 2.2.5.3.7.4, if Illinois and Mexico were collapsed, the result might look like the following table:

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Country/Region	State	City
USA	Illinois	
USA	Louisiana	New Orleans
USA	Louisiana	Baton Rouge
Mexico		

For a non-**OLAP** PivotTable view (section 2.2.5.3), the collapsed state is specified by the **fHideDetail** field of the **BrtBeginSXVI** (section 2.4.272) record.

For an OLAP PivotTable view, there are two types of collapsing: child collapsing and attribute hierarchy collapsing.

Child collapsing is when the child pivot items (section 2.2.5.3.3), corresponding to child **OLAP members**, of a pivot item corresponding to a parent OLAP member in an **OLAP hierarchy** are not shown.

If a pivot field (section 2.2.5.3.2) is the first pivot field of the pivot hierarchy (section 2.2.5.3.4) on the axis then the **fDrilledLevel** field of the **BrtBeginSXVD** (section 2.4.270) record of the pivot field MUST be 1.

If a pivot field is not the first pivot field of the pivot hierarchy on the axis and if the **fDrilledLevel** field of the **BrtBeginSXVD** record of the pivot field is 1, then there is no child collapsing for the preceding pivot field of the pivot hierarchy on the axis and the **fDrilledMember** field of the **BrtBeginSXVI** (section 2.4.272) records for the pivot items (section 2.2.5.3.3) of the preceding pivot field of the pivot hierarchy on the axis MUST be 0.

If a pivot field (section 2.2.5.3.2) is followed by another pivot field of the same pivot hierarchy on the axis, and the **fDrilledLevel** field of the **BrtBeginSXVD** record of the outer pivot field is equal to 0 and the **fDrilledMember** field of a **BrtBeginSXVI** record of the pivot item of the outer pivot field is 0, then the pivot item containing the **BrtBeginSXVI** record is collapsed using child collapsing.

Attribute hierarchy collapsing only occurs when an outer pivot field is associated with a pivot hierarchy (section 2.2.5.3.4) that is an attribute hierarchy, as specified by the **fAttributeHierarchy** field of the **BrtBeginPCDHierarchy** (section 2.4.145) record of the associated cache hierarchy (section 2.2.5.2.7), and the inner pivot field immediately following that outer pivot field is associated with a different pivot hierarchy that is an attribute hierarchy. In that case, if a pivot item (section 2.2.5.3.3) is attribute hierarchy collapsed, pivot items (section 2.2.5.3.3), corresponding to OLAP members, will not be shown for the inner pivot field. The attribute hierarchy collapsed state of a pivot item is specified by the **fCollapsedMember** field of the **BrtBeginSXVI** (section 2.4.272) record. The **fItemsDrilledByDefault** field of the **BrtBeginSXVD** (section 2.4.270) record provides a default value for pivot items of the pivot field.

For an OLAP PivotTable view (section 2.2.5.3), there can be pivot items from an inner pivot field (section 2.2.5.3.2) on the pivot line (section 2.2.5.3.8.3) if either the outer pivot field is collapsed and the inner pivot field and outer pivot field are in different pivot hierarchies (section 2.2.5.3.4) and attribute hierarchy collapsing is not being used or if the pivot items are **member** properties.

2.2.5.3.7.4.2 Subtotaling

A nested item group, as specified in section 2.2.5.3.7.4, can have summaries of the values for the items in the nested item group, called subtotals. A subtotal is typically an aggregation such as a sum, count, or average of the values of the items.

The creation of subtotals is specified by the **fDefault**, **fSum**, **fCounta**, **fAverage**, **fMax**, **fMin**, **fProduct**, **fCount**, **fStdev**, **fStdevp**, **fVar**, and **fVarp** fields of the **BrtBeginSXVD** (section 2.4.270) record of the pivot field (section 2.2.5.3.2). If none of the fields are equal to 1, then no subtotals exist for the pivot field. If the **fDefault** field is equal to 1, the subtotal calculation for each item is done according to the **aggregation functions** of the data items (section 2.2.5.3.7.5.1) on the data axis

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(section 2.2.5.3.7.5), as specified by the **iiftab** field of the **BrtBeginSXDI** (section 2.4.241) record for each data item.

For example, the subtotal is calculated as the sum of the relevant values of the nested item group for a data item with a sum aggregation function and subtotal is calculated as the average of the relevant values of the nested item group for a data item with an average aggregation function.

The other subtotal fields are called custom subtotals because they override the data item (section 2.2.5.3.7.5.1) aggregation function when calculating subtotals. In some cases, such as for certain **OLAP** PivotTable views (section 2.2.5.3), the source data (section 2.2.5.2.1) is not able to provide a requested subtotal.

The **fOutline** field of the **BrtBeginSXVD** (section 2.4.270) record specifies that an extra pivot line (section 2.2.5.3.8.3) is added at the logical top of the nested item groups if the pivot field (section 2.2.5.3.2) is on the **row** axis. This pivot line contains the item and any items of **member** property pivot fields, if they are shown, but no other items of pivot fields inner of this pivot field.

The **fOutlineData** field of the **BrtBeginSXView** (section 2.4.273) record specifies that an extra pivot line is added at the logical top of the nested item groups if the data field (section 2.2.5.3.7.5.2) is on the row axis. This pivot line contains the data item, but no other items for inner pivot fields of this data field.

If the **fDefault** field of the **BrtBeginSXVD** (section 2.4.270) record of the pivot field (section 2.2.5.3.2) is equal to 1, and the **fOutline** field of the **BrtBeginSXVD** record of the pivot field is equal to 1, the pivot field is on the row axis, and the data field is not placed inner of the pivot field on the row axis, then the **fSubtotalAtTop** field of the **BrtBeginSXVD** record of the pivot field has a value as specified in the following table:

Value of fSubtotalAtTop	Meaning
0x0	Specifies that subtotal pivot lines (section 2.2.5.3.8.3) are added at the bottom of the nested item groups. If the **irstSub** field of the **BrtBeginSXVD** (section 2.4.270) record is present, it specifies details for the subtotal label used. If the **irstSub** field of the **BrtBeginSXVD** record is not present, an application specific subtotal label is used.
0x1	Specifies that the pivot lines added, as specified by the **fOutline** field of the **BrtBeginSXVD** record being equal to 1, are used for displaying the subtotals in the data area (section 2.2.5.3.8.1.4).

In the following figure, the Category, Subcategory, and Product **columns (1)** represent pivot fields (section 2.2.5.3.2) on the row axis and the Color column (1) represents a member property pivot field associated with the Product pivot field. Subtotals are displayed at the logical top of the nested item groups for Clothing, Caps and Gloves.

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Category	Subcategory	Product	Color	Internet Sales Amount
Clothing				$54,708.80
	Caps			$19,688.10
		AWC Logo Cap	Multi	$19,688.10
	Gloves			$35,020.70
		Half-Finger Gloves, S	Black	$11,951.12
		Half-Finger Gloves, M	Black	$12,220.51
		Half-Finger Gloves, L	Black	$10,849.07
Grand Total				$54,708.80

Figure 14: PivotTable report with Category and Subcategory pivot fields with fOutline and fSubtotalAtTop fields of the BrtBeginSXVD records equal to 1

2.2.5.3.7.5 Data Axis

The data axis contains the pivot field (section 2.2.5.3.2) values that are used to populate the data area (section 2.2.5.3.8.1.4) of the **PivotTable** (section 2.2.5) report, as specified by **PivotTable Layout** (section 2.2.5.3.8). This axis also specifies additional information related to aggregation and presentation of the values, as specified in section 2.2.5.3.7.5.1. The data axis is specified by the sequence of records that conforms to the **SXDIS** rule (as defined in section 2.1.7.40). The order in which the records appear in the **SXDIS** rule specifies the order that the pivot fields appear in on the data axis.

2.2.5.3.7.5.1 Data Items

A data item is a pivot field (section 2.2.5.3.2) placed on the data axis (section 2.2.5.3.7.5). Each data item is specified by the sequence of records that conforms to the **SXDI** rule (as defined in section 2.1.7.40).

A **BrtBeginSXDI** (section 2.4.241) record or a **BrtSXDI14** (section 2.4.800) record specifies the reference to the pivot field that is associated with a data item. The **BrtBeginSXDI** record and **BrtSXDI14** records also specify additional information that is used to produce or present aggregated values.

A data item can be referenced by a data item index, which is the zero-based index of the **BrtBeginSXDI** record in the collection of **BrtBeginSXDI** records, as specified by the **SXDI** rule in the **PivotTable** (section 2.1.7.40) part **ABNF**.

2.2.5.3.7.5.2 Data Field

The data field is a conceptual field that represents all data items (section 2.2.5.3.7.5.1) and allows them to be referenced as a single object. The data field is intended to allow all data items to be placed on the **row** axis or **column (1)** axis.

If the PivotTable view (section 2.2.5.3) has more than one data item (section 2.2.5.3.7.5.1), then the data field MUST be located on either the row axis, as specified by the **rgisxvdrws** field of the **BrtBeginISXVDRws** (section 2.4.96) record, or the column (1) axis, as specified by the **rgisxvdcols** field of the **BrtBeginISXVDCols** (section 2.4.95) record. For an **OLAP PivotTable** (section 2.2.5) that has the data field located on the row axis, the data field MUST be referenced in the **rgisxth** field of the **BrtBeginISXTHRws** (section 2.4.94) record. For an OLAP **PivotTable** that has the data field

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located on the column (1) axis, the data field MUST be referenced in the **rgisxth** field of the **BrtBeginISXTHCols** (section 2.4.93) record.

2.2.5.3.8 PivotTable Layout

The **PivotTable** (section 2.2.5) report in the **sheet** has four main areas: the **row** area, the **column (1)** area, the data area (section 2.2.5.3.8.1.4), and the page area (section 2.2.5.3.8.1.3).

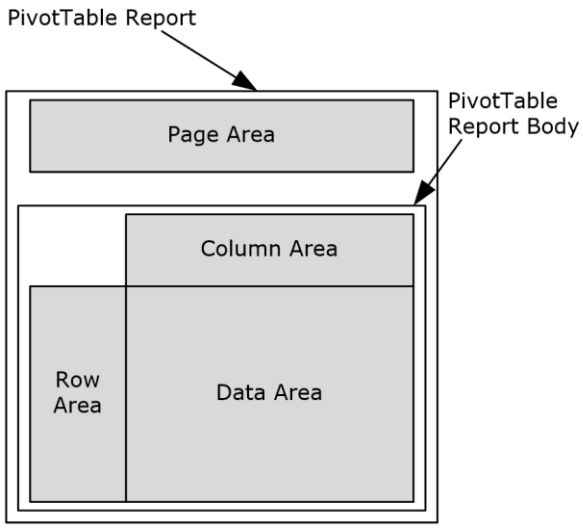

Figure 15: PivotTable report illustrating the four different areas

All the records described in this section MUST exist in the same **PivotTable** part as specified by the **PivotTable** (section 2.1.7.40) part **ABNF**.

2.2.5.3.8.1 Location and Body

The **column (1)** area is located immediately above the data area (section 2.2.5.3.8.1.4). The **cell** in the column (1) area containing the pivot item (section 2.2.5.3.3) **caption** or data item (section 2.2.5.3.7.5.1) caption to the farthest **logical left** is in the same column (1) as the **logical top-left** cell of the data area.

The **row** area is located immediately to the logical left of the data area. The cell in the row area containing the top-most pivot item caption or data item caption is in the same row as the logical top-left cell of the data area (section 2.2.5.3.8.1.4).

The **PivotTable** (section 2.2.5) report body is the rectangular area defined by the union of the row area, column (1) area, and data area.

The page area (section 2.2.5.3.8.1.3), if it is not empty, is located above the **PivotTable** report body. There is one row between the top-most cell of the **PivotTable** report body and the bottom-most cell of the page area.

The **PivotTable** report is a **non-contiguous range** containing the union of the **PivotTable** report body and the page area.

A **BrtBeginSXLocation** (section 2.4.252) record specifies details about the location in the **sheet** and sizes of the areas of the **PivotTable** report as specified by the following.

The column (1) area of the **PivotTable** (section 2.2.5) report is a **range** of cells as specified in the following table.

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Column area	Row or column index
Top row	**rfxGeom.rwFirst**
Bottom row	**rwFirstData** – 1
Logical left column (1)	**colFirstData**
Logical right column (1)	**rfxGeom.colLast**

If **colFirstData** is greater than **rfxGeom**.**colLast**, the column (1) area does not exist for this **PivotTable** report.

The row area of the **PivotTable** (section 2.2.5) report is a range of cells as specified in the following table.

Row area	Row or column index
Top row	**rwFirstData**
Bottom row	**rfxGeom.rwLast**
Logical left column (1)	**rfxGeom.colFirst**
Logical right column (1)	**colFirstData** – 1

If **colFirstData** – 1 is less than **rfxGeom**.**colFirstData**, the row area does not exist for this **PivotTable** report.

The data area (section 2.2.5.3.8.1.4) of the **PivotTable** (section 2.2.5) report is a range of cells as specified in the following table.

Data Area	Row or Column Index
Top row	**rwFirstData**
Bottom row	**rfxGeom.rwLast**
Logical left column (1)	**colFirstData**
Logical right column (1)	**rfxGeom.colLast**

If the row area or the column (1) area does not exist for this PivotTable report, the data area (section 2.2.5.3.8.1.4) does not exist for this **PivotTable** report.

The page area (section 2.2.5.3.8.1.3) of the **PivotTable** (section 2.2.5) report is a range of cells as specified in the following table.

Page area	Row or column index
Top row	**rfxGeom.rwFirst** – **crwPage** – 1
Bottom row	**rfxGeom.rwFirst** – 2
Logical left column (1)	**rfxGeom.colFirst**
Logical right column (1)	**rfxGeom.colFirst** + **cColPage** – 1

If **cRwPage** is equal to 0 and the **fNewDropZones** field of the **BrtBeginSXView** (section 2.4.273) record is equal to 1 the page area does not exist for this **PivotTable** report. If **cRwPage** is equal to 0

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and the **fNewDropZones** field of the **BrtBeginSXView** (section 2.4.273) record is equal to 0, then the page area (section 2.2.5.3.8.1.3) of the **PivotTable** report is a range of cells as specified in the following table.

Page area	Row or column index
Top row	**rfxGeom.rwFirst** - 2
Bottom row	**rfxGeom.rwFirst** - 2
Logical left column (1)	**rfxGeom.colFirst**
Logical right column (1)	**rfxGeom.colLast**

2.2.5.3.8.1.1 Row Area

The **row** area contains pivot fields (section 2.2.5.3.2), the optional data field (section 2.2.5.3.7.5.2), or both that are placed on the row axis, along with associated pivot items (section 2.2.5.3.3) and data items (section 2.2.5.3.7.5.1). The first row of the row area can contain pivot field or data field captions (or both) as specified by the **fNoHeaders** field of the **BrtBeginSXView** (section 2.4.273) record. If **fNoHeaders** is equal to 0, the pivot field and data field captions are located above their pivot items or data items.

Pivot items (section 2.2.5.3.3) or data items (section 2.2.5.3.7.5.1) of the pivot field (section 2.2.5.3.2) or data field (section 2.2.5.3.7.5.2) that have a position of zero on the row axis are placed in the first **column (1)** of the row axis. For every other pivot field or data field on the row axis, placement of pivot items or data items are calculated as follows:

- If the previous pivot field or data field is not in **compact axis** mode, then pivot items or data items of the current pivot field or data field are placed in the next column (1) of the row area. Pivot items or data items are grouped by the parent pivot item or data item, which is the pivot item or data item on the immediate **logical left**. To achieve this, pivot items or data items of the parent pivot field or data field can be repeated multiple times. In this case, when pivot items or data items are repeated, the **caption** is not necessarily displayed in every **cell** that contains a pivot item or data item. For more details, see section 2.2.5.3.8.3.
- If the previous pivot field or data field is in compact axis mode, then the pivot items or data items of the current pivot field or data field are placed in the same column (1) as pivot items of the previous pivot field or data field. Pivot items or data items are grouped by the parent pivot item or data item and placed immediately under the parent pivot item or data item.

For the data field (section 2.2.5.3.7.5.2), if the **fCompactData** field and the **fOutlineData** field of the **BrtBeginSXView** (section 2.4.273) record are equal to 1, then the data field is specified to be in compact axis mode. For pivot fields (section 2.2.5.3.2), if the **fCompact** field of the **BrtBeginSXVD** (section 2.4.270) record is equal to 1 and the **fOutline** field of the **BrtBeginSXVD** record is equal to 1, then the pivot field is specified to be in compact axis mode.

The row area can have special entries at the end for **grand totals**. If there are no pivot fields and no data field on the row axis, then the row area is empty.

2.2.5.3.8.1.2 Column Area

The **column (1)** area contains pivot fields (section 2.2.5.3.2), the optional data field (section 2.2.5.3.7.5.2), or both that are placed on the column (1) axis, along with associated pivot items (section 2.2.5.3.3) and data items (section 2.2.5.3.7.5.1). The first **row** of the column (1) area can

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contain pivot field and data field captions as specified by the **fNoHeaders** field of the **BrtBeginSXView** (section 2.4.273) record.

If the **fNoHeaders** field and the **fCompactData** field of the **BrtBeginSXView** record are both equal to 0 and no pivot fields are in **compact axis** mode, then the pivot field (section 2.2.5.3.2) or data field (section 2.2.5.3.7.5.2) captions (or both) are placed sequentially in **cells** of the first row of the column (1) area according to their placement on the column (1) axis.

If the **fNoHeaders** field of the **BrtBeginSXView** record is equal to 0 and the **fCompactData** field and the **fOutline** field of the **BrtBeginSXView** record are both equal to 1, or if the **fNoHeaders** field of the **BrtBeginSXView** record is equal to 0 and any pivot field is in compact axis mode, then the pivot field or the data field captions (or both) are placed in the top logical left cell of the column (1) area.

For the data field, if the **fCompactData** field and the **fOutlineData** field of the **BrtBeginSXView** record are equal to 1, then the data field is specified to be in compact axis mode. For pivot fields (section 2.2.5.3.2), if the **fCompact** field of the **BrtBeginSXVD** (section 2.4.270) record is equal to 1 and the **fOutline** field of the **BrtBeginSXVD** record is equal to 1, then the pivot field is specified to be in compact axis mode.

If the **fNoHeaders** field of the **BrtBeginSXView** (section 2.4.273) record is equal to 1, the pivot field (section 2.2.5.3.2) and data field (section 2.2.5.3.7.5.2) captions are not displayed. The row containing pivot item (section 2.2.5.3.3) or data items (section 2.2.5.3.7.5.1) captions for the pivot field or data field at position *n* on the column (1) axis is row *n* of the column (1) area.

If the **fNoHeaders** field of the **BrtBeginSXView** record is equal to 0, the second row in the column (1) area contains pivot item or data item captions for the pivot field or data field placed first on the column (1) axis, and each subsequent row contains the pivot item or data item captions for pivot fields or data fields that occur later on the column (1) axis. The row containing pivot item or data item captions for the pivot field or data field at position *n* is row (*n*+1) of the column (1) area.

The column (1) area can have special entries at the end for **grand totals**.

2.2.5.3.8.1.3 Page Area

The page area contains pivot fields (section 2.2.5.3.2) that are placed on the page axis (section 2.2.5.3.7.1) for non-**OLAP** PivotTable views (section 2.2.5.3) and pivot hierarchies (section 2.2.5.3.4) that are placed on the page axis for OLAP PivotTable views. For each pivot field or pivot hierarchy (section 2.2.5.3.4) on the page axis, there are two **cells** in the page area. The cells are arranged in pairs with each pair having a **logical left** cell and a **logical right** cell that are horizontally adjacent to each other. The cell on the logical left contains the **caption** of the pivot field and the cell on the logical right contains information about the current filtering associated with the pivot field or pivot hierarchy. The relative position of the page area is specified by the **BrtBeginSXLocation** (section 2.4.252) record. For more details, see section 2.2.5.3.8.1.

2.2.5.3.8.1.4 Data Area

The data area contains summarized values for the PivotTable view (section 2.2.5.3). **Cells** in the data area contain summarized values for associated data items (section 2.2.5.3.7.5.1). The summarized value in a cell is restricted by all the pivot items (section 2.2.5.3.3) in the **column (1)** area that are located in the same column (1), by all the pivot items in the **row** area that are located on the same row, and by any page filtering applied, as specified in section 2.2.5.3.7.1.

If the row area has a **grand total**, then the value in that row is not restricted by pivot items (section 2.2.5.3.3) from the row area. If the column (1) area has a grand total, then the value in that column (1) is not restricted by pivot items from the column (1) area. If the PivotTable view has more than one data item (section 2.2.5.3.7.5.1), then the associated data item is the one that is located in the same column (1) in the column (1) area or the same row in the row area as the cell with the summarized value. If a PivotTable view has zero data items then the data area is empty.

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2.2.5.3.8.2 Truncation

When a **PivotTable** (section 2.2.5) report does not fit within the boundaries of the **sheet** it is truncated from the **logical right** and the bottom. It is truncated such that a part of the **PivotTable** report is displayed within the sheet boundaries.

2.2.5.3.8.3 Pivot Lines

A pivot line specifies a collection of pivot line entries (section 2.2.5.3.8.4) for a single **row** or **column (1)** in the **PivotTable** (section 2.2.5) report.

Each range that is an intersection of one column (1) and **cells** from the column (1) area that have pivot items (section 2.2.5.3.3), data items (section 2.2.5.3.7.5.1), or a **grand total** is a pivot line of the column (1) area.

Each range that is an intersection of one row and cells from the row area that have pivot items, data items, or a grand total is a pivot line of the row area.

A pivot line is specified by the sequence of records that conforms to the **SXLI** rule (defined in section 2.1.7.40). The sequence of records that conforms to the **SXLIRWS** rule (defined in section 2.1.7.40) specifies the collection of pivot lines for the row area. The order of **SXLI** rules in **SXLIRWS** is the same as the top-to-bottom order of the pivot lines of the row area.

The sequence of records that conforms to the **SXLICOLS** rule (defined in section 2.1.7.40) specifies the collection of pivot lines for the column (1) area. The order of **SXLI** rules (defined in section 2.1.7.40) in the **SXLICOLS** rule is the same as the **logical left** to **logical right** order of pivot lines of the column (1) area.

Each pivot line contains a number of pivot line entries (section 2.2.5.3.8.4). The first number of pivot line entries are specified to be identical to those of the immediately preceding pivot line. These pivot line entries are not stored in the file for this pivot line. The number of pivot line entries that are identical to those of the immediately preceding pivot line is specified by the **cSic** field of the **BrtBeginSXLI** (section 2.4.249) record. Additional pivot line entries are specified by the **BrtBeginIsxvis** (section 2.4.97) record.

The first pivot line in the row area or the column (1) area MUST have a **cSic** field of its associated **BrtBeginSXLI** record equal to 0.

The following figure shows an example of how to construct pivot lines from an **SXLIRWS** rule (defined in section 2.1.7.40).

Country	State	City	Sales	cSic	rgisxvi	Copied	Pivot Line
Australia	Queensland	Brisbane	10779	0	{0,1,0}	{}	{0,1,0}
		Hawthorne	13721	2	{1}	{0,1}	{0,1,1}
	Queensland Total		24500	1	{1}	{0}	{0,1}
Australia Total			24500	0	{0}	{}	{0}
USA	California	San Francisco	15998	0	{1,0,2}	{}	{1,0,2}
	California Total		15998	1	{0}	{1}	{1,0}
	Washington	Seattle	12335	1	{2,3}	{1}	{1,2,3}
		Tacoma	11498	2	{4}	{1,2}	{1,2,4}
	Washington Total		23833	1	{2}	{1}	{1,2}
USA Total			39831	0	{1}	{}	{1}

Figure 16: PivotTable and the table used to create each pivot line on the row axis

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In this example, the table to the right contains the different components used to construct each pivot line (section 2.2.5.3.8.3), and the resulting pivot line. The first column (1) contains the value of the **cSic** field from each **BrtBeginSXLI** (section 2.4.249) in the **SXLIRWS** rule (defined in section 2.1.7.40). The second column (1) contains the array of pivot line entries (section 2.2.5.3.8.4) specified by the **rgisxvis** field in the **BrtBeginIsxvis** (section 2.4.97) record of each **SXLI** rule (defined in section 2.1.7.40).

The third column (1), labeled "Copied", represents the array of pivot line entries (section 2.2.5.3.8.4) of the previous pivot line that are to be copied to construct the current pivot line. The values in this column (1) are determined by copying the first *n* items, where *n* is equal to the value in the cSic column (1). If the value in the cSic column (1) is 0, no items need to be copied from the preceding pivot line.

The fourth column (1), labeled "Pivot Line", represents the final array of pivot line entries that make up the pivot line. This array is constructed by taking the union of the array in the "Copied" column (1) and the "rgisxvi" column (1), maintaining the order.

2.2.5.3.8.4 Pivot Line Entries

Pivot line entries specify references to the pivot items (section 2.2.5.3.3) or data items (section 2.2.5.3.7.5.1) of a pivot line (section 2.2.5.3.8.3). Pivot line entries are specified by the records that conform to the **ISXVIS** rule (defined in section 2.1.7.40) in the **SXLI** rule (defined in section 2.1.7.40). A pivot line entry is an element in the array specified by the **rgisxvis** field of the **BrtBeginIsxvis** (section 2.4.97) record.

All pivot line entries with a zero-based index in a pivot line less than the value specified by the **cSic** field of the **BrtBeginSXLI** (section 2.4.249) record of this pivot line are specified to be identical to those of the preceding pivot line.

For the purposes of the rest of this section, *n* specifies a position of the pivot line entry on this pivot line.

If the value of *n* is less than the **cSic** field of the **BrtBeginSXLI** record of a given pivot line (section 2.2.5.3.8.3), then the pivot line entry at position *n* is identical to the corresponding pivot line entry of the pivot line preceding the given pivot line.

If the value of *n* is greater than or equal to the **cSic** field of the **BrtBeginSXLI** record of this pivot line, then the value of *n* is equal to the sum of the **cSic** field of the **BrtBeginSXLI** record and the current index in the **rgisxvis** field of the **BrtBeginIsxvis** (section 2.4.97) record of this pivot line.

If a pivot line entry is in a pivot line in the **row** area, each pivot line entry at any position *n* specifies a pivot item (section 2.2.5.3.3) index of a pivot item in the *n*th pivot field (section 2.2.5.3.2) on the row axis or specifies a data item (section 2.2.5.3.7.5.1) index, if the *n*th field on the row axis is the data field (section 2.2.5.3.7.5.2).

If a pivot line entry is in a pivot line (section 2.2.5.3.8.3) in the **column (1)** area, each pivot line entry at any position *n* specifies a pivot item index of a pivot item in the *n*th pivot field on the column (1) axis or specifies a data item index, if the *n*th field on the column (1) axis is the data field.

If the *n*th pivot field (section 2.2.5.3.2) on the row axis or column (1) axis is the data field, the pivot line entry is a data item index, as specified in section 2.2.5.3.7.5.1.

Pivot items (section 2.2.5.3.3) and data items are specified sequentially from **logical left** to **logical right** for row pivot lines, and from top to bottom for column (1) pivot lines.

A pivot line entry with a value of 0x001000FE is used to specify the absence of a pivot item or data item (section 2.2.5.3.7.5.1).

2.2.5.3.9 PivotTable Rules

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A **PivotTable** rule can be used to identify **cells** in a **PivotTable** (section 2.2.5) report. A **PivotTable** rule is specified by the sequence of records that conforms to the **PIVOTRULE** (section 2.1.8) or **PIVOTRULE14** rule (as defined in section 2.1.7.40). Each **PivotTable** rule references a specific area of a **PivotTable** report, pivot fields (section 2.2.5.3.2), the data field (section 2.2.5.3.7.5.2), or cache fields (section 2.2.5.2.2) and optionally corresponding pivot items (section 2.2.5.3.3), data items (section 2.2.5.3.7.5.1), or cache items (section 2.2.5.2.3) associated with cells in a **PivotTable** report. When cache items are referenced, the **PivotTable** rule references calculated items (section 2.2.5.2.6) associated with those cache items.

Each sequence of records that conforms to the **PRFILTER** (defined in section 2.1.8) or **PRFILTER14** rule (as defined in section 2.1.7.40) in the **PIVOTRULE** or **PIVOTRULE14** rule (respectively) specifies a set of pivot items (section 2.2.5.3.3), data items (section 2.2.5.3.7.5.1), or cache items for an individual pivot field (section 2.2.5.3.2), data field, or cache field. This set of pivot items, data items, or cache items is specified by the sequence of records that conforms to the **PRFITEM** (section 2.1.8) or **PRFITEM14** rules (as defined in section 2.1.7.40) within the **PRFILTER** or **PRFILTER14** rule, respectively.

The pruleheaderdata.fCacheBased field in the **BrtBeginPRule** (section 2.4.183) record specifies whether the **PivotTable** rule specifies cache items (section 2.2.5.2.3). The pruleheaderdata.**isxvd** field in the **BrtBeginPRule** and **BrtBeginPRule14** (section 2.4.184) records specifies whether the **PivotTable** rule specifies pivot items (section 2.2.5.3.3), or data items (section 2.2.5.3.7.5.1) as follows:

- If pruleheaderdata.fCacheBased field in the **BrtBeginPRule** record equals 1, then this **PivotTable** rule references cache items. The pruleheaderdata.**fCacheBased** field in the **BrtBeginPRule14** record equals 0.
- If the pruleheaderdata.**fCacheBased** field in the **BrtBeginPRule** record equals 0 and the record is a **BrtBeginPRule14** record and the pruleheaderdata.**isxvd** field in the same **BrtBeginPRule** or **BrtBeginPRule14** record equals -2, then this **PivotTable** rule references the data field (section 2.2.5.3.7.5.2).
- If the pruleheaderdata.**fCacheBased** field in the **BrtBeginPRule** record equals 0 and the record is a **BrtBeginPRule14** record and the pruleheaderdata.**isxvd** field in the same **BrtBeginPRule** or **BrtBeginPRule14** record does not equal -2, then this **PivotTable** rule references pivot items.

Cells that are associated with any pivot item, data item (section 2.2.5.3.7.5.1), or cache item (section 2.2.5.2.3) from an individual **PRFILTER** (defined in section 2.1.8) or **PRFILTER14** rule (as defined in section 2.1.7.40) and that meet restrictions specified by the corresponding **BrtBeginPRFilter** (section 2.4.177) or **BrtBeginPRFilter14** (section 2.4.178) record are associated with this **PRFILTER** or **PRFILTER14** rule, respectively.

Cells that are associated with every **PRFILTER** (defined in section 2.1.8) or **PRFILTER14** rule (as defined in section 2.1.7.40) of the **PIVOTRULE** (section 2.1.8) or **PIVOTRULE14** rule (as defined in section 2.1.7.40) (respectively) are associated with the **PRFILTERS** or **PRFILTERS14** rule (respectively) in the **PIVOTRULE** or **PIVOTRULE14** rule (respectively). Cells that are associated with the **PRFILTERS** or **PRFILTERS14** rule (as defined in section 2.1.7.40) in the **PIVOTRULE** (section 2.1.8) or **PIVOTRULE14** rule (respectively) and that meet the restrictions specified by the corresponding **BrtBeginPRule** (section 2.4.183) or **BrtBeginPRule14** (section 2.4.184) record are the cells specified by the **PivotTable** rule (section 2.2.5.3.9).

A cell is associated with a particular cache item (section 2.2.5.2.3) if it is associated with the pivot item (section 2.2.5.3.3) that has an association with that cache item.

2.2.5.3.10 PivotTable What-if Analysis

PivotTable What-if Analysis enables the editing of summarized values in an **OLAP** **PivotTable** view (section 2.2.5.3), for example, editing summarized values in the data area (section 2.2.5.3.8.1.4) of the **PivotTable** view.

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The sequence of records that conform to the **SXEDITS** rule (defined in section 2.1.7.40) specifies the values in the OLAP **PivotTable** view that have been modified and specifies the corresponding values in the OLAP source data (section 2.2.5.2.1). The sequence of records that conform to the **SXEDIT** rule (defined in section 2.1.7.40) specifies a value or a formula. A value is specified by the **Xnum** (section 2.5.171) field of a **BrtBeginSXEdit** (section 2.4.243) record and MUST exist if and only if the **sxet** field of the **BrtBeginSXEdit** record is equal to **SXET_NUM** (section 2.5.146). A formula is specified by the **FRTHeader** field of the **BrtBeginSXEdit** record. The location of the modified value in the OLAP **PivotTable** view is specified by the **PivotTable** rule (section 2.2.5.3.9) that immediately follows the **BrtBeginSXEdit** record. The **OLAP tuple** that identifies the corresponding value in the OLAP source data is specified by the **rgStTuple** field of the **BrtSXTupleItems** (section 2.4.805) record that immediate follows the **BrtBeginSXEdit** record.

The sequence of records that conforms to the **SXCHANGES** rule (defined in section 2.1.7.40) specifies the values in the OLAP **PivotTable** view that have been designated for **OLAP allocation** and specifies the corresponding values in the OLAP source data. The order of the **BrtBeginSXChange** (section 2.4.233) records determines the order in which they are designated for OLAP allocation. The sequence of records that conforms to the **SXCHANGE** rule (defined in section 2.1.7.40) specifies a single edited value designated for OLAP allocation. An OLAP allocation value is specified by the **xnum** field of a **BrtBeginSXChange** record. The OLAP tuple that identifies the location of the edited value in the OLAP **PivotTable** view and the corresponding value in the OLAP source data is specified by the **rgStTuple** field of a **BrtSXTupleItems** record that immediately follows the **BrtBeginSXChange** record. The **sxma** field of the **BrtBeginSXChange** record specifies the OLAP allocation method.

For example, when an OLAP **PivotTable** is refreshed, the values designated for OLAP allocation (**SXCHANGES**) are sent to the OLAP source data (section 2.2.5.2.1) provider along with the OLAP allocation method indicating how to allocate the updated values. The OLAP source data provider updates the values, and those new values are then refreshed and summarized in the data area (section 2.2.5.3.8.1.4) of the **PivotTable** view (section 2.2.5.3) instead of summarizing the original values from the OLAP source data.

If the **fEnableWB** field of the **BrtBeginSXView14** (section 2.4.274) is 0x0, **SXEDITS** (section 2.1.7.40) and **SXCHANGES** (section 2.1.7.40) MUST NOT exist in the part. **PivotTable** What-if Analysis is enabled if and only if the **fEnableWB** field of the **BrtBeginSXView14** record is 0x1 and the source data is OLAP.

2.2.5.4 OLAP Data Model

This section provides background information about the underlying data model for **OLAP** entities.

The principal unit of scope is an **OLAP cube**. See section 2.2.8 for information about how an OLAP cube is accessed. Items within an OLAP cube can be addressed by an **MDX unique name** string. Within an OLAP cube, there are **OLAP hierarchies**, **OLAP measures** and **OLAP named sets**.

An OLAP hierarchy consists of one or more **OLAP levels** and **OLAP member properties**. An OLAP level consists of one or more **OLAP members**. An OLAP member is an atomic unit of data, for example customer "Jim Smith", or a grouping of data, for example "customers in the city of Chicago". OLAP levels contain OLAP members of similar type within an OLAP hierarchy. OLAP members can have parent and child **members** in OLAP levels above and below them, for example "Jim Smith" might be a child of "customers in the city of Chicago". An OLAP member property can be associated with a single OLAP level or all OLAP levels of an OLAP hierarchy, for example a "Mayor" OLAP member property might be associated with a "City" OLAP level.

An **OLAP tuple** is a way of combining multiple OLAP members to reference a particular point in an OLAP cube, for example "customers in the city of Chicago" and "2008" references data in the OLAP cube corresponding to the year 2008 and customers in Chicago.

An OLAP measure is a value that is available in the OLAP cube. Usually it is numeric, "Sales" and "Head Count" are typical examples of OLAP measures. An OLAP measure is an OLAP member in a

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measures OLAP hierarchy. For a PivotTable view (section 2.2.5.3), OLAP measures are stored differently from other OLAP members in this file format.

An OLAP tuple including an OLAP measure can be used to get a value, for example "customers in the city of Chicago", "2008" and "sales" might reference the value $659,000.

An OLAP named set is a collection of OLAP tuples. OLAP named sets are typically used for specific analytical needs that require custom logic, for example an OLAP named set might be defined as the OLAP tuples corresponding to "the top 10 customers by month and sales".

2.2.5.5 Non-Worksheet PivotTables

A **PivotTable** (section 2.2.5) with a **PivotTable** (section 2.1.7.40) part that is a target of an explicit relationship from a **workbook** (section 2.1.7.61) part, is specified to be a Non-Worksheet PivotTable. Non-Worksheet PivotTables provide a way for **Charts** (section 2.2.3) to be based on PivotTable data without having to show the data in a **worksheet** (section 2.1.7.62), for more information see [MS-ODRAWXML] section 2.6.1.21. A Non-Worksheet PivotTable MUST NOT be referenced by any other part than the **workbook** part.

There MUST be a **BrtPivotCacheIdVersion** (section 2.4.733) record between the **BrtBeginPivotCacheDef** (section 2.4.167) and **BrtEndPivotCacheDef** (section 2.4.515) records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**, that specify the **PivotCache** (section 2.2.5.2) associated with a Non-Worksheet PivotTable.

The value of the **bVerSxMacro** field defined in the **BrtBeginSXView** (section 2.4.273) record associated with a Non-Worksheet PivotTable MUST be greater than or equal to 3.

The field **rfxGeom** of the **BrtBeginSXLocation** (section 2.4.252) record as specified by the SXLOCATION rule in the **PivotTable** (section 2.1.7.40) part ABNF, MUST have value 0 for its members **rwFirst** and **colFirst**.

The records **BrtBeginSxEdits** (section 2.4.244) and **BrtEndSxEdits** (section 2.4.592) as specified by SXEDITS rule in the **PivotTable** part ABNF MUST NOT exist in this PivotTable part.

The records **BrtBeginSxChanges** (section 2.4.234) and **BrtEndSxChanges** (section 2.4.582) as specified by SXCHANGES rule in the **PivotTable** part ABNF MUST NOT exist in this PivotTable part.

The records **BrtBeginSXCondFmts** (section 2.4.237) and **BrtEndSXCondFmts** (section 2.4.585) as specified by SXCONDFMTS rule in the **PivotTable** part ABNF MUST NOT exist in this PivotTable part.

The **BrtBeginSXView** (section 2.4.273) record that specifies a Non-Worksheet PivotTable MUST satisfy the following conditions.

- The **fEnableDataEd** field MUST be 0.
- The PivotTable name specified by the **irstName** field MUST be unique among all the Non-Worksheet PivotTables in the **workbook.**

2.2.5.6 PivotValues

The **PivotValues** collection is a collection of values that exist in the data area (section 2.2.5.3.8.1.4) of a **PivotTable** view (section 2.2.5.3). **PivotValues** contains a collection of **PivotValueCell** (section 2.2.5.6.1) data units that are organized as **rows** and **columns (1)** in the data area of the **PivotTable** view.

For a **Non-Worksheet PivotTable** (section 2.2.5.5), the values of **PivotValues** are specified by the **BrtBeginSxvcells** (section 2.4.269) and the **BrtEndSxvcells** (section 2.4.617) records.

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For **PivotTable** structures on a **worksheet** (section 2.1.7.62), the values of **PivotValues** are specified by the cells of the worksheet cell table in the locations that are specified by the **BrtBeginSXLocation** (section 2.4.252) record and the **BrtEndSXLocation** (section 2.4.600) record.

2.2.5.6.1 PivotValueCell

A PivotValueCell is an individual data unit in the Data Area (section 2.2.5.3.8.1.4) of a PivotTable View (section 2.2.5.3). PivotValueCells contain summarized values for associated PivotTable Data Items (section 2.2.5.3.7.5.1). Every PivotValueCell can have two kinds of information associated with it, the Value (section 2.2.5.6.1.1) and the Server Formatting (section 2.2.5.6.1.2) information.

2.2.5.6.1.1 Value

The value of a PivotValueCell (section 2.2.5.6.1) is specified to be the number, string, error, date associated with the PivotValueCell.

2.2.5.6.1.2 Server Formatting

The server formatting of a PivotValueCell (section 2.2.5.6.1) specifies formatting to be applied to the PivotValueCell and is specified by the **PCDISrvFmt** (section 2.5.101) structure.

2.2.6 Styles

The **styles** (section 2.1.7.50) part contains formatting and **protection** information. This information is used to describe the **cell** formatting in a **sheet**.

Cell formatting is composed of several sets of properties:

- **Font** properties such as bold, italic, font color, and font size.
- **Fill** properties such as foreground and **background colors**, pattern, and gradient.
- Alignment properties such as left, center, and right alignment.
- **Border** properties such as left, right, top, bottom, thick or thin, and color.
- Number formatting properties (date, time, number of decimal places, etc…)
- Protection properties such as **locked** and **hidden**.

These properties, as a whole, describe how a particular cell is displayed and printed.

There are two types of objects in the **styles** part that contain formatting properties. They are **XFs** (section 2.2.6.1) and **DXFs** (section 2.2.6.2). In general, **XFs** describe the formatting directly associated with a cell, and **DXFs** describe additional formatting properties that can be applied to one or more cells.

2.2.6.1 XFs

XFs specify formatting for **cells** and cell styles (section 2.2.6.1.2).

XFs are specified by **BrtXF** (section 2.4.845) records. **BrtXF** records specify **font**, **fill**, **border** and number formatting via indices into the **FONTS** (section 2.1.7.50), **FILLS** (section 2.1.7.50), **BORDERS** (section 2.1.7.50), and **FMTS** (section 2.1.7.50) collections. Alignment and **protection** properties are specified directly in the **BrtXF** record.

2.2.6.1.1 Cell XFs

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Cell XFs are specified by **BrtXF** (section 2.4.845) records in the **CELLXFS** (section 2.1.7.50) collection. Each **cell** MUST reference a cell XF. These records specify the complete set of formatting properties for the cells that reference them.

2.2.6.1.2 Cell Styles

Cell styles specify a set of formatting properties that can be associated with one or more **cells**. Cell styles provide the following two benefits:

- The set of formatting properties in a cell style can be applied to one or more cells in a single operation.
- Once a cell style is applied to a cell, subsequent changes to the formatting properties in the cell style can be propagated to the cell automatically.

For example, if it is desired that multiple cells in a **sheet** share a common set of formatting properties, such as bold **font** with a blue **fill**, then cell styles make it convenient to apply this set of formatting, and potentially modify the set later.

A **BrtStyle** (section 2.4.783) record specifies a **friendly name** for a cell style.

2.2.6.1.2.1 Cell Style XFs

A cell style XF defines the set of formatting properties in a cell style (section 2.2.6.1.2), and is specified by a **BrtXF** (section 2.4.845) record in the **CELLSTYLEXFS** (section 2.1.7.50) collection. Each **cell** MUST reference a **cell XF** (section 2.2.6.1.1) , and each **cell XF** MUST reference a cell style XF with the **ixfeParent** field.

2.2.6.1.2.2 Normal Style

At least one cell style (section 2.2.6.1.2) MUST be included in the **STYLES** (section 2.1.7.50) collection and this cell style (section 2.2.6.1.2) is called the normal style. The normal style MUST reference the first **BrtXF** (section 2.4.845) record in the **CELLSTYLEXFS** collection, and this **BrtXF** record MUST be a cell style XF (section 2.2.6.1.2.1), where the **fStyle** field equals 1.

The normal style, being the only required cell style, ensures that all **cells** have a cell style to reference. The normal style also provides a convenient object in which to store default cell formatting properties for an entire **workbook**, because all cells reference the normal style by default, until they are modified to reference a different cell style.

2.2.6.2 Differential Formatting (DXFs)

Like **XFs** (section 2.2.6.1), **DXFs** define a set of formatting properties. Unlike **XFs**, **DXFs** can define any number of formatting properties, from just one to all of them.

DXFs provide a way for features to reference a set of formatting properties. How those properties are used depends on the feature. The subsections that follow describe each of these features and how they use DXFs.

DXFs are specified by **BrtDXF** (section 2.4.354) records in the **DXFS** (section 2.1.7.50) collection, or by **BrtDXF14** (section 2.4.355) records in the **DXF14S** collection.

Future records (section 2.1.6) that refer to differential formatting MUST refer to **BrtDXF14** records.

2.2.6.2.1 Conditional Formatting

Some conditional formatting rules, as specified by **BrtBeginCFRule** (section 2.4.22), reference a **DXF** (section 2.2.6.2). That **DXF** describes additional formatting applied to **cells** within the bounds of the rule, if the rule's condition is TRUE for those cells.

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2.2.6.2.2 Table Style Elements

Table style elements are specified either by **BrtTableStyleElement** (section 2.4.819) or, in the case of table style element specific to slicer styles (section 2.2.6.3.1), by **BrtSlicerStyleElement** (section 2.4.778), or, in the case of table style element specific to timeline styles (section 2.2.6.3.2), by **BrtTimelineStyleElement** (section 2.4.822). In whichever case, table style elements can reference a **DXF** (section 2.2.6.2) which specifies the formatting to apply to a particular portion of a **table**, **PivotTable** (section 2.2.5), slicer (section 2.2.14.2) or timeline (section 2.2.15.2) within the bounds of the table style element. If no **DXF** is referenced, this specifies no formatting.

The bounds of a table style element are specified by the **tseType** field in the **BrtTableStyleElement** record, the **tseType** field in the **BrtSlicerStyleElement** record, or the **tseType** field in the **BrtTimelineStyleElement** record.

2.2.6.2.3 Table Block-Level Formatting

A **table**, as specified by the **BrtBeginList** (section 2.4.99) record, can reference a **DXF** (section 2.2.6.2) via the **nDxfHeader**, **nDxfData**, **nDxfAgg**, **nDxfBorder**, **nDxfHeaderBorder** or **nDxfAggBorder** fields. These **DXFs** (section 2.2.6.2) represent formatting that can be applied to the **cells** within those areas of the table.

2.2.6.2.4 PivotTable Areas

A **PivotTable** (section 2.2.5) format record, as specified by **BrtBeginSXFormat** (section 2.4.247), can reference a **DXF** (section 2.2.6.2). This **DXF** represents formatting that can be applied to the **cells** within the appropriate area of the **PivotTable**.

2.2.6.2.5 Sorting and Filtering

Sorting, as specified by the **BrtBeginSortCond** (section 2.4.222), and filtering, as specified by the **BrtColorFilter** (section 2.4.334) record**,** can include formatting properties as part of their criteria. These properties are stored as **DXFs** (section 2.2.6.2). For example, a **filter** criteria that is "filter only **cells** with red **font** color" will reference a **DXF** with the property "font color = red".

2.2.6.3 Table Styles

Table styles specify additional formatting for cells inside **tables**, **PivotTables** (section 2.2.5), for visual components of slicer views (section 2.2.14.2), or for visual components of timeline views (section 2.2.15.2). Table styles used for slicer views are specified in slicer styles (section 2.2.6.3.1). Table styles used for timeline views are specified in timeline styles (section 2.2.6.3.2).

Tables and **PivotTables** specify an applied table style with the **BrtTableStyleClient** (section 2.4.818) record. For tables, this record MUST exist in the collection of records beginning with **BrtBeginList** (section 2.4.99). For **PivotTables**, this record MUST exist in the collection of records beginning with **BrtBeginSXView** (section 2.4.273).

A **BrtTableStyleClient** (section 2.4.818) record references a table style by name with the **stStyleName** field.

Table styles are either built-in or user-defined. Built-in table styles for tables and **PivotTables** (section 2.2.5) are specified in [ISO/IEC29500-1:2016] section 18.8. User-defined table styles are specified in the collection of records beginning with **BrtBeginTableStyles** (section 2.4.279).

A table style consists of a collection of table style elements (section 2.2.6.2.2). For user-defined table styles, these elements are specified by the collection of **BrtTableStyleElement** (section 2.4.819) records following **BrtBeginTableStyle** (section 2.4.278).

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Each table style element specifies the formatting to be applied to **cells** in a particular region of the table or **PivotTable**, or visual components in a particular region of a slicer view or timeline view. These regions or visual components are specified by the possible values of the **tseType** field of the **BrtTableStyleElement**, **BrtSlicerStyleElement** (section 2.4.778) and **BrtTimelineStyleElement** (section 2.4.822) records.

2.2.6.3.1 Slicer Styles

Slicer styles specify the formatting to apply to visual components of slicer views (section 2.2.14.2).

The **stStyle** field of the **BrtBeginSlicer** (section 2.4.200) record specifies the slicer style to be applied. A slicer style can be either built-in or user-defined. Built-in slicer styles are specified in **BrtBeginSlicer**. User-defined slicer styles are specified in the collection of records beginning with **BrtBeginSlicerStyles** (section 2.4.219).

A slicer style is an extension of a table style (section 2.2.6.3). A user-defined slicer style is specified by a **BrtBeginSlicerStyle** (section 2.4.217) record and the **BrtBeginTableStyle** (section 2.4.278) record it references. A slicer style consists of a collection of table style elements (section 2.2.6.2.2). For user-defined slicer styles, these elements are specified by the collection of **BrtSlicerStyleElement** (section 2.4.778) records following **BrtBeginSlicerStyle** and the table style elements specified by the user-defined table style referenced by **stName** field of the **BrtBeginSlicerStyle** record.

2.2.6.3.2 Timeline Styles

Timeline styles specify the formatting to apply to visual components of timeline views (section 2.2.15.2).

The **style** attribute of the **CT_Timeline** element ([MS-XLSX] section 2.6.111) specifies the timeline style to be applied. A timeline style can be either built-in or user-defined. Built-in timeline styles are specified in **CT_Timeline** element. User-defined timeline styles are specified in the collection of records beginning with **BrtBeginTimelineStyles** (section 2.4.287).

A timeline style is an extension of a table style (section 2.2.6.3). A user-defined timeline style is specified by a **BrtBeginTimelineStyle** (section 2.4.285) record and the **BrtBeginTableStyle** (section 2.4.278) record it references. A timeline style consists of a collection of table style elements (section 2.2.6.2.2). For user-defined timeline styles, these elements are specified by the collection of **BrtTimelineStyleElement** (section 2.4.822) records following **BrtBeginTimelineStyle** and the table style elements specified by the user-defined table style referenced by **stName** field of the **BrtBeginTimelineStyle** record.

2.2.6.4 Format Conflicts

As described previously, the formatting to be displayed or printed for a particular **cell** can be specified in several independent records. It is up to the application to resolve conflicting formatting properties for a particular cell.

For example, suppose a cell has a conditional format (section 2.2.6.2.1) applied and also falls within the bounds of a **table** with a table style (section 2.2.6.3). Furthermore, suppose the **cell XF** (section 2.2.6.1.1), conditional format and table style element (section 2.2.6.2.2) all specify a different **font** color. It is up to the application to decide the appropriate font color to use in this situation.

2.2.7 External References

The External References infrastructure exists to support formulas (section 2.2.2) that reference **data sources** outside the scope of the **sheet** on which the formula resides. These sources could be other sheets in the same **workbook**, data in another workbook, **DDE** links, or **Object Linking and Embedding (OLE)** links. A workbook which uses External References will contain a collection of

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supporting link records (section 2.2.7.3), each of which denotes a link to a data source. Each formula which incorporates an external reference will point to the appropriate supporting link record to specify the source of the data.

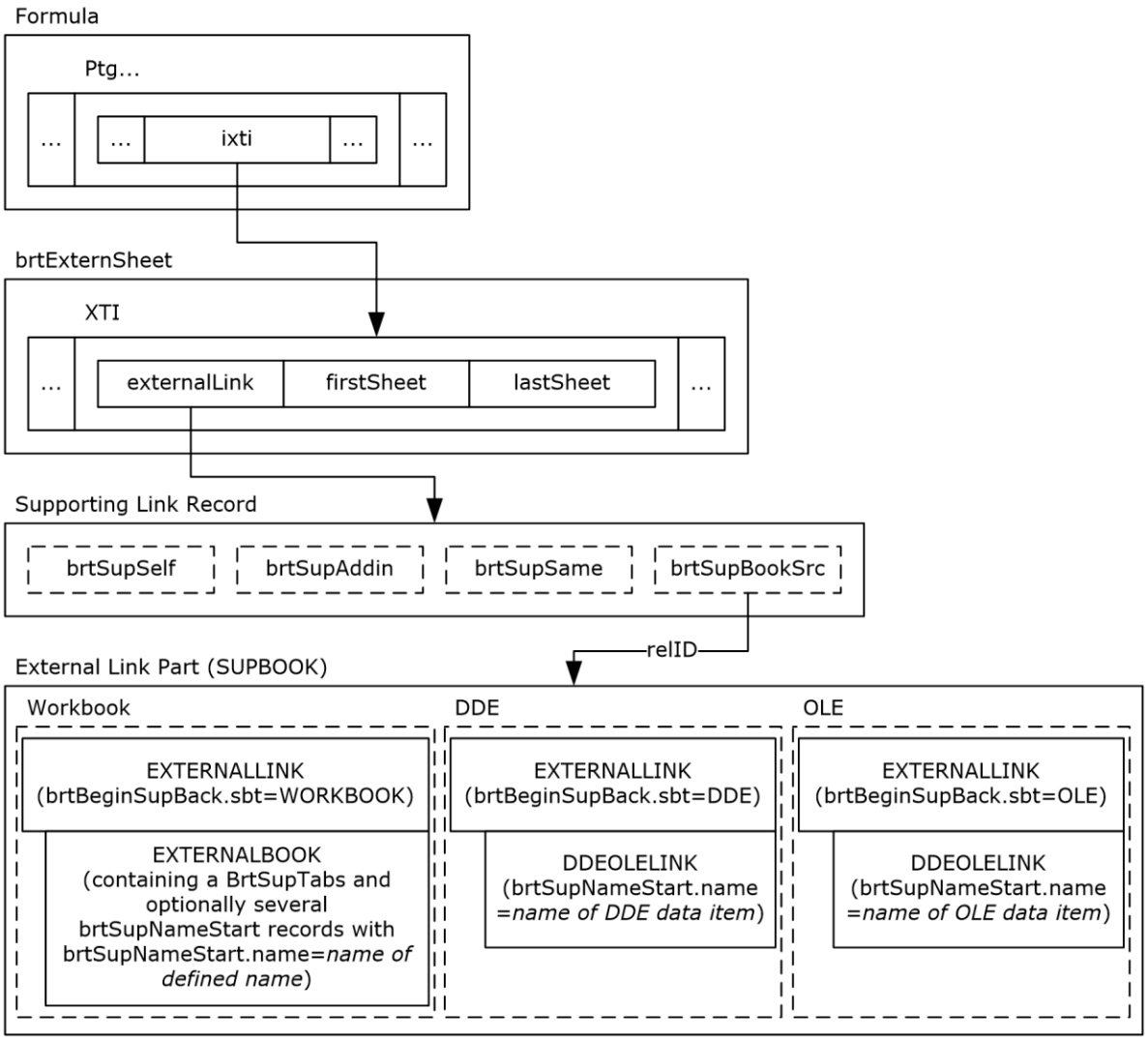

Figure 17: External references

The following sections define terms used in the preceding diagram.

2.2.7.1 External Reference Consumers

Within the formula, only certain formula elements (section 2.2.2.6) can contain external references. These specific formula elements contain an **XtiIndex** (section 2.5.97.103) structure specifying an **Xti** (section 2.5.172), which in turn specifies the location and type of the external reference data. Only the following **Ptgs** (section 2.5.97.16) can be external reference consumers:

- **PtgRef3d** (section 2.5.97.69)
- **PtgRefErr3d** (section 2.5.97.71)
- **PtgArea3d** (section 2.5.97.19)

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- **PtgAreaErr3d** (section 2.5.97.21)
- **PtgNameX** (section 2.5.97.61)
- **PtgList** (section 2.5.97.52)

2.2.7.2 Supporting Link

Each formula element (section 2.2.2.6) which references external data refers to an **Xti** (section 2.5.172). The **Xti** specifies a particular supporting link record (section 2.2.7.3) from the collection stored in the **workbook**. The **Xti** and supporting link record together specify where the data used by the formula element resides, and in certain cases, additional data about the supporting link.

2.2.7.3 Supporting Link Record

There are four types of supporting links, which are represented by the four types of supporting link records. The type of the supporting link used is specified by the type of supporting link record that is specified by the **Xti** (section 2.5.172). These supporting link types, and the corresponding supporting link record types, are defined in the following table.

Supporting link type	Supporting link record type	Meaning
Self-Referencing	**BrtSupSelf** (section 2.4.798)	A reference back into the same **workbook**. This supporting link type supports cross-sheet references, where the target **sheets** are specified by the scope information in the **Xti**. This record can also support **defined name** or **UDF** reference on the same book, although using the **PtgName** (section 2.5.97.60) formula element (section 2.2.2.6) can be simpler.
Same-Sheet Referencing	**BrtSupSame** (section 2.4.797)	A reference to the **active sheet** in the context of the consuming formula (section 2.2.2). This supporting link type is used by formula in **macro sheets** and in defined names to reference the sheet of the caller.
Add-in Referencing	**BrtSupAddin** (section 2.4.784)	A reference to a UDF on any **Excel Linked Library (XLL)** or **COM** automation **add-in**.
External Link Referencing	**BrtSupBookSrc** (section 2.4.785)	A reference to an external link (section 2.2.7.4).

2.2.7.4 External Link

An external link is a type of supporting link (section 2.2.7.2) that references a **data source** outside the current **workbook**. The **BrtSupBookSrc** (section 2.4.785) record that specifies an external link that contains a relationship to an **External Links** (section 2.1.7.25) part that will contain further information about this external link. There are three types of external links. The type is specified by the **sbt** field in the **BrtBeginSupBook** (section 2.4.232) record in the **External Links** part. These three types of external links are specified by the sequence of records that conform to the

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EXTERNALBOOK rule (as defined in section 2.1.7.25) or by the sequence of records that conform to the **DDEOLELINK** rule (as defined in section 2.1.7.25) in the **External Links** part **ABNF**, and are defined in the following table.

External link type	Record sequence ABNF
External Workbook (section 2.1.10)	**EXTERNALBOOK**
DDE Data Source (section 2.2.7.4.2)	**DDEOLELINK**
OLE Data Source (section 2.2.7.4.3)	**DDEOLELINK**

2.2.7.4.1 External Workbook Links

An external workbook link is a reference to a **workbook** other than the one in which the source formula (section 2.2.2) resides. It contains the referencing **expression**, and data relating to that expression. This data includes the workbook location, **sheet** names, external defined names (section 2.2.7.4.1.1), and an external cell cache (section 2.2.7.4.1.2) for referenced cells in that workbook.

2.2.7.4.1.1 External Defined Name

An external defined name is a reference to a **defined name** in an external workbook (section 2.1.10). The records specifying the external defined name will provide the name, scope, and formula (section 2.2.2) of the defined name on that **workbook**. The restrictions on the types of formulas supported in external defined names are described in section 2.4.790.

2.2.7.4.1.2 External Cell Cache

To allow external **cell references** to be calculated without opening the referenced **workbook**, an external cell cache is stored in the file which contains cached values for cells in a **sheet** in an external workbook (section 2.1.10). The external cell cache contains **cell values** and value metadata (section 2.2.4.3) information only about the specific cells which are referenced in that sheet.

The external cell cache is composed of a collection of **rows** that correspond to rows in the source sheet. These rows, and their row indexes in the source sheet, are specified by a **BrtExternRowHdr** (section 2.4.658) record. The rows MUST be specified in order of increasing row index. Each row MUST contain one or more external cells (section 2.2.7.4.1.2.1).

2.2.7.4.1.2.1 External Cells

An external cell is cached data about a single cell in the external cell cache (section 2.2.7.4.1.2) and is represented by the following records:

- **BrtExternCellBlank** (section 2.4.653)
- **BrtExternCellString** (section 2.4.657)
- **BrtExternCellReal** (section 2.4.656)
- **BrtExternCellError** (section 2.4.655)
- **BrtExternCellBool** (section 2.4.654)

External cell records specify the data type, data value, and the **column (1)** location of that **cell** in the source **sheet**. The external cells in a **row** in an external cell cache (section 2.2.7.4.1.2) MUST be specified in order of increasing column (1) index. Any value metadata (section 2.2.4.3) in the External

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cell is specified by an optional **BrtExternValueMeta** (section 2.4.662) record preceding the data records listed earlier.

2.2.7.4.2 DDE Data Source

A DDE Data Source will provide information about the **DDE server** and **DDE topic** name of a **Dynamic Data Exchange (DDE)** connection. The **External Links** (section 2.1.7.25) part specifying this DDE Data Source will also specify individual DDE data items (section 2.2.7.4.2.1) used by this **data source**.

2.2.7.4.2.1 DDE Data Item

A DDE data item will specify the name and properties of a **DDE** item. It also contains cached values from the most recent DDE data update.

2.2.7.4.3 OLE Data Source

An OLE data source will provide information about an **OLE2** data connection. It will specify the path to the OLE2 **data source**, and the **ProgID** of the application handler. This also specifies the names of the OLE Data Items (section 2.2.7.4.3.1) used in this data source.

2.2.7.4.3.1 OLE Data Item

An OLE data item will specify the name and properties of a connection to an **OLE2** data object, and optionally<3> cached values for the most recent data update.

2.2.8 External Connections

A **workbook** often pulls in data from external **data sources**, such as a database or an **OLAP cube**. An external connection represents a link between a workbook and a particular external data source. It contains properties about the way that the application establishes the connection to the data source and retrieves the data, such as the type of **data provider** (**OLE DB**, **ODBC**, and other data providers), a **server name**, security information, and a command to execute on the server. In addition, the external connection contains details about the way the connection is used in the workbook, such as how often to **refresh** the data.

A data connection object contains external connection information for an external data source that a workbook uses. Data connection objects are independent of the constructs in the workbook that display data, such as **tables** or **PivotTables** (section 2.2.5).

A connection definition can be established in an external connection file for easier sharing and reuse, but this overview describes the representation for external data connections that are directly embedded within a workbook file. This embedded representation is required whenever external data is used, and ensures portability of the document and continued operation of the external query in the most cases.

An external connection is specified by a set of records, as defined in **EXTCONNECTION** (section 2.1.7.24). The types of records in the collection are specified by the **idbtype** field of the **BrtBeginExtConnection** (section 2.4.79) record.

The following record types refer to external connections:

- **BrtBeginPCDSource** (section 2.4.165)
- **BrtBeginQSI** (section 2.4.185)
- **BrtBeginList** (section 2.4.99)

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The link between a **BrtBeginExtConnection** record and the records referring to it is specified by the unique connection identifier. The connection identifier is specified by the **dwConnID** field in the **BrtBeginExtConnection** record and in the **dwConnID** fields in the records that refer to it. If the **dwConnID** field in one of the referring records is 0, this record does not refer to **external data**.

It is possible for an external connection to not be used by any workbook object. In this case there is no record referring to it.

2.2.8.1 Connection Name

Each external connection has a unique name, which can be used by the application as a **friendly name** for the connection, for example for user interface purposes. The connection name is specified by the **stConnName** field of the **BrtBeginExtConnection** (section 2.4.79) record.

2.2.8.2 External Connection Files

An external connection file specifies an external connection in a separate file (external to the **workbook**). An external connection file enables managing connection information separately from a specific workbook and sharing it among multiple workbooks. It is used for creating a new external connection in a workbook or for restoring a lost connection. The **stConnectionFile** field of the **BrtBeginExtConnection** (section 2.4.79) record specifies a path to an external connection file.

2.2.8.3 OLE DB Connections

An **OLE DB** connection is a connection to an OLE DB **data provider**. An external connection is an OLE DB connection if the **idbtype** field of the **BrtBeginExtConnection** (section 2.4.79) record is **DBTOLEDB** (section 2.5.30). Properties of an OLE DB connection are specified by a **BrtBeginECDbProps** (section 2.4.60) record that MUST follow the **BrtBeginExtConnection** (section 2.4.79) record. For more information about OLE DB, see [MSDN-OLEDBP-OI].

2.2.8.3.1 OLAP Connections

An **OLAP** connection is a connection to an **OLE DB** for OLAP **data provider**. An OLE DB connection is an OLAP connection if the **icmdtype** field of the **BrtBeginECDbProps** (section 2.4.60) is **CMDCUBE** (section 2.5.20). Properties of an OLAP connection are specified by a **BrtBeginECOlapProps** (section 2.4.61) record that MUST follow the **BrtBeginECDbProps** record.

2.2.8.4 ODBC Connections

An **ODBC** connection is a connection to an ODBC **data provider**. An external connection is an ODBC connection if the **idbtype** field of the **BrtBeginExtConnection** (section 2.4.79) record is **DBTODBC** (section 2.5.30). Properties of an ODBC connection are specified by a **BrtBeginECDbProps** (section 2.4.60) record that MUST follow the **BrtBeginExtConnection** (section 2.4.79) record. If an ODBC connection has parameters, these parameters are specified by a **BrtBeginECParams** (section 2.4.63) record. For more information about ODBC, see [MSFT-ODBCODCO].

2.2.8.5 Web Connections

A Web connection pulls the content of a Web page, or part of a Web page (an **HTML** table), into the **workbook**. An external connection is a Web connection if the **idbtype** field of the **BrtBeginExtConnection** (section 2.4.79) record is **DBTWEB** (section 2.5.30). Properties of a Web connection are specified by a **BrtBeginECWebProps** (section 2.4.70) record that MUST follow the **BrtBeginExtConnection** (section 2.4.79) record. If a Web connection has parameters, these parameters are specified by a **BrtBeginECParams** (section 2.4.63) record.

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2.2.8.6 Text Import Connections

A **text importation** connection pulls in data from a structured text file into the **workbook**. An external connection is a text importation connection if the **idbtype** field of the **BrtBeginExtConnection** (section 2.4.79) record is **DBTTEXT** (section 2.5.30). Properties of a text importation connection are specified by a **BrtBeginECTxtWiz** (section 2.4.68) record that MUST follow the **BrtBeginExtConnection** record.

2.2.8.7 ADO Recordset Connections

An ADO recordset pulls in data from a set of records in an ADO **data provider**. An external connection is an ADO recordset connection if the **idbtype** field of the **BrtBeginExtConnection** (section 2.4.79) record is **DBTADO** (section 2.5.30). The sequence of records that conforms to the **EXTCONNECTION** rule (as defined in section 2.1.7.24) for this connection type MUST NOT contain the sequence of records that conforms to any of the following rules: **ECDBPROPS** (section 2.1.7.24), **ECOLAPPROPS** (section 2.1.7.24), **ECWEBPROPS** (section 2.1.7.24), **ECTXTWIZ** (section 2.1.7.24), or **ECPARAMS** (section 2.1.7.24).

Note: For this type of connection, the file format does not contain sufficient information for establishing the connection and fetching a recordset. Data is provided to the application through another mechanism, for example by script code using an **object model**.

2.2.8.8 DAO Recordset Connections

A **DAO** recordset pulls in data from a set of records in a DAO **data provider**. An external connection is a DAO recordset connection if the **idbtype** field of the **BrtBeginExtConnection** (section 2.4.79) record is **DBTDAO** (section 2.5.30). The sequence of records that conforms to the **EXTCONNECTION** rule (as defined in section 2.1.7.24) for this connection type MUST NOT contain the sequence of records that conforms to any of the following rules: **ECDBPROPS** (section 2.1.7.24), **ECOLAPPROPS** (section 2.1.7.24), **ECWEBPROPS** (section 2.1.7.24), **ECTXTWIZ** (section 2.1.7.24), or **ECPARAMS** (section 2.1.7.24).

Note: For this type of connection, the file format does not contain sufficient information for establishing the connection and fetching a recordset. Data is provided to the application through another mechanism, for example by script code using an **object model**.

2.2.8.9 Model Data Source Connections

Model **data source** connections pull data in to the **spreadsheet data model** (as specified in [MS-XLDM]) instead of directly pulling it into workbook. A connection is a model data source if the **idbtype** field of the **BrtBeginExtConnection** (section 2.4.79) record is one of the following (section 2.5.30):

- **DBTOLEDBPP**
- **DBTDATAFEED**
- **DBTWORKSHEET**
- **DBTTEXTPP**

2.2.8.9.1 Model Data Source OLE DB Connections

An **OLE DB** connection is a connection to an OLE DB **data provider**. An external connection is a **model data source OLE DB connection** if the **idbtype** field of the **BrtBeginExtConnection** (section 2.4.79) record is **DBTOLEDBPP**, as specified in section 2.5.30. Properties of a **model data source OLE DB connection** are specified by a **BrtBeginOledbPr15** record (section 2.4.120) that MUST follow the **BrtBeginExtConn15** record (section 2.4.78). For more information about OLE DB, see [MSDN-OLEDBP-OI].

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2.2.8.9.2 Model Data Source Data Feed Connections

A data feed connection is a connection to an **OData data provider**. An external connection is a **model data source data feed connection** if the **idbtype** field of the **BrtBeginExtConnection** record (section 2.4.79) is **DBTDATAFEED** (section 2.5.30). Properties of a **model data source data feed connection** are specified by a **BrtBeginDataFeedPr15** record (section 2.4.44) that MUST follow the **BrtBeginExtConn15** record (section 2.4.78). For more information about OData, see [OData-Protocol].

2.2.8.9.3 Model Data Source Worksheet Connections

A Worksheet data connection pulls data from a workbook **range**. An external connection is a **model data source worksheet connection** if the **idbtype** field of the **BrtBeginExtConnection** (section 2.4.79) record is **DBTWORKSHEET**, as specified in section 2.5.30. Properties of a **model data source worksheet connection** are specified by a **BrtRangePr15** record (section 2.4.738) that MUST follow the **BrtBeginExtConn15** record (section 2.4.78).

2.2.8.9.4 Model Data Source Text import Connections

A text importation connection pulls in data from a structured text file into the **workbook**. A model data source connection is a text importation connection if the **idbtype** field of the **BrtBeginExtConnection** record (section 2.4.79) is **DBTTEXTPP** (section 2.5.30). Properties of a text importation connection are specified by a **BrtBeginECTxtWiz15** record (section 2.4.69) that MUST follow the **BrtBeginExtConn15** record (section 2.4.78). The **BrtBeginECTxtWiz15** record could be followed by a **BrtTextPr15** record (section 2.4.820).

2.2.9 Password Verifier Algorithm

Several **protection** records **BrtBookProtection** (section 2.4.306), **BrtSheetProtection** (section 2.4.768), **BrtCsProtection** (section 2.4.340), **BrtRangeProtection** (section 2.4.739), **BrtRangeProectionIso** (section 2.4.741), **BrtRangeProtectionIso14** (section 2.4.742), **BrtRangeProtection14** (section 2.4.740), and **BrtFileSharing** (section 2.4.665) use a password verifier to provide a locking and unlocking system for viewing or editing parts of the **workbook**. This password verifier is used to prevent accidental editing, and is not designed to be used as a security feature. The verifier value is calculated in two stages. First, the provided **Unicode** password string is converted to a new character string in the ANSI codepage of the current system using the algorithm specified in the **revisionsPassword** attribute in [ISO/IEC29500-1:2016] section 18.2.29. Second, this string is input into the **XOR obfuscation** algorithm specified in [MS-OFFCRYPTO] section 2.3.7.1, Binary Document Password Verifier Derivation Method 1 to produce a 16-bit password verifier value.

See section 4 for information about security concerns related to the use of this algorithm for password verification in this file format.<4>

2.2.10 Strong Password Verifier Algorithm

Several **protection** records **BrtBookProtectionIso** (section 2.4.307), **BrtSheetProtectionIso** (section 2.4.769), **BrtCsProtectionIso** (section 2.4.341), **BrtRangeProectionIso** (section 2.4.741), **BrtRangeProtection14** (section 2.4.740), and **BrtFileSharingIso** (section 2.4.666) use a strong password hash (compatible with ISO/IEC 29500 as described in [ISO/IEC29500-1:2016] sections 18.2.12, 18.2.29, 18.3.1.71, 18.3.1.84, and 18.3.1.85) to provide a locking and unlocking system for viewing or editing parts of the **workbook**. This password hash is used to prevent accidental editing, and is not designed to be used as a security feature. Password hashes are usually computed by the algorithm specified in [MS-OFFCRYPTO] section 2.4.2.4 ISO Write Protection Method. Under some circumstances, the password is first converted to a 16-bit verifier value as specified by the Password Verifier Algorithm (section 2.2.9) and reinterpreted as a single **Unicode** character, which is then passed to the algorithm specified in [MS-OFFCRYPTO] section 2.4.2.4 ISO Write Protection Method.

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There is no way to determine which method was used to generate a hash without knowledge of the password; it is necessary to compute both hashes to verify the password.

See section 4 for information about security concerns related to the use of this algorithm for password verification in this file format.

2.2.11 Encryption (Password to Open)

Workbook files can contain sensitive information that needs to be protected. A file can be protected by encrypting it using a password. Once a file is encrypted, the data can only be accessed by decrypting the file using a password.

File encryption for this format is specified in [MS-OFFCRYPTO] section 2.3.4.

See section 4 for information about security concerns relating to file encryption for this file format.

2.2.12 Shared Workbooks

The **shared workbook** infrastructure is used to enable multiple users to make changes to a **workbook** at the same time and track changes made by certain users. A shared workbook contains a collection of users that currently have the document open and revision logs (section 2.2.12.3) that contain the changes that users have made to the workbook. Each of these logs has a corresponding revision header associated with it and contains either zero or more revision records (section 2.2.12.4) that have been made to the shared workbook since it has been shared. A workbook is a shared workbook if and only if the user names (section 2.1.7.55) stream exist.

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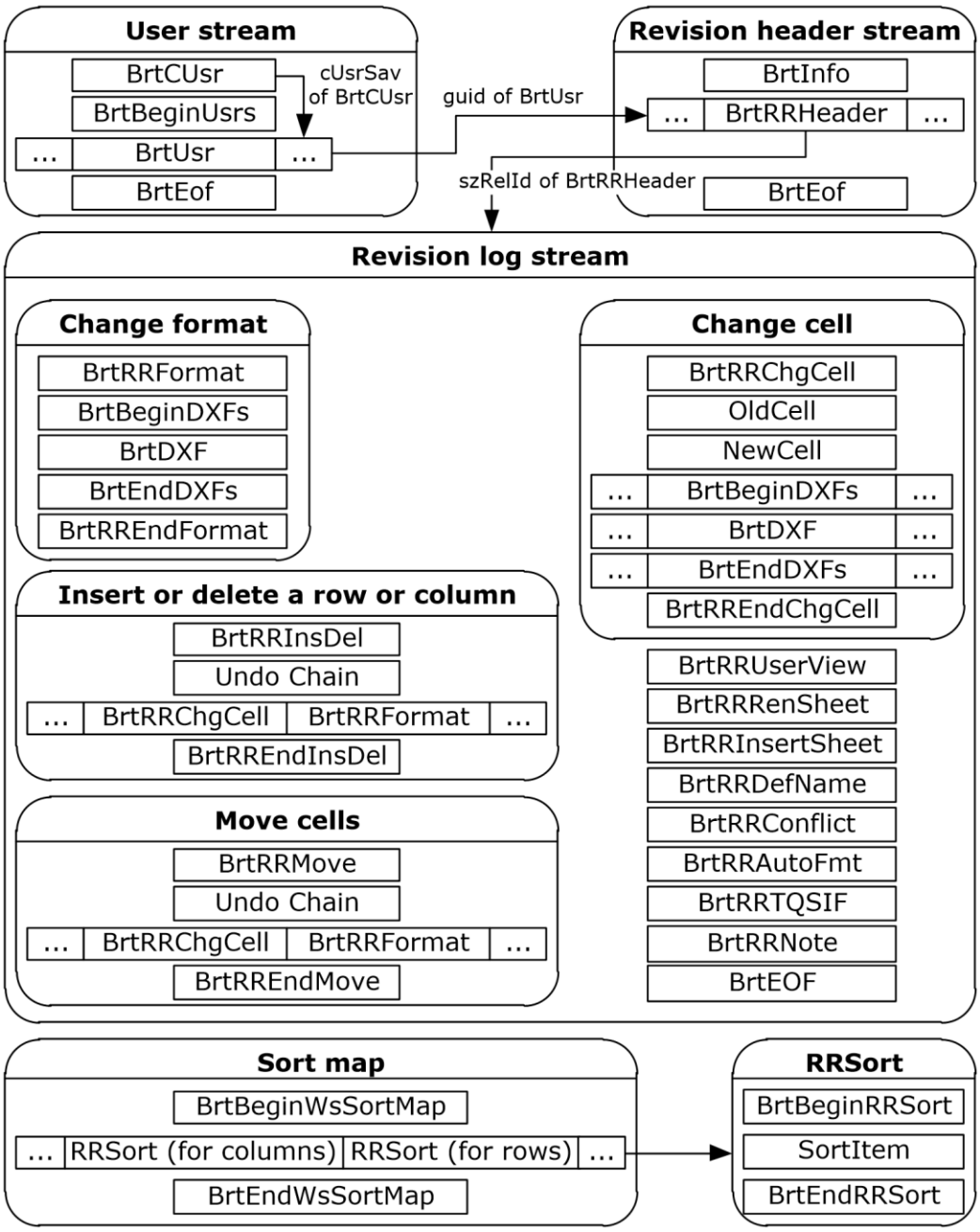

Figure 18: Shared workbooks

The following sections define terms used in the preceding diagram.

2.2.12.1 User Log

The user log contains the set of users who currently have the **workbook** open. **BrtCUsr** (section 2.4.342) specifies the number of **BrtUsr** (section 2.4.827) records that the user log contains. Each **BrtUsr** record corresponds to a user that currently has the workbook open. The **guid** field of **BrtUsr** maps to the **guid** field of **BrtRRHeader** (section 2.4.756) to specify the latest revision header and revision logs (section 2.2.12.3) pair that the user is currently synchronized to.

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2.2.12.2 Revision Headers Log

The revision header log contains revision headers **BrtRRHeader** (section 2.4.756) that are used to provide general information about the revision logs (section 2.2.12.3). A single revision header exists for each of the revision logs in the **workbook** and specifies basic information about that particular revision log. The **szRelId** field of the **BrtRRHeader** specifies a relationship identifier for the corresponding revision log (section 2.2.12.3). Each revision log and revision header specifies a user action, such as a unique user opening the workbook for the first time, or a set of changes made by a single user to the shared workbook (section 2.2.12). The user's name is specified in the **stName** field of **BrtRRHeader**. The **Revision Headers** (section 2.1.7.43) part **ABNF** also contains general information about the shared workbook in **BrtInfo** (section 2.4.687).

2.2.12.3 Revision Logs

The revision logs contain either various revision records (section 2.2.12.4) that a single user has made to a shared workbook (section 2.2.12) or no revision records if the revision log is meant to specify a user action.

2.2.12.4 Revision Records

Revision records specify changes, or revisions, that a single user has made to a shared workbook (section 2.2.12). The following changes can be recorded by the shared workbook:

- Inserting or deleting a row or **column (1)** **BrtRRInsDel** (section 2.4.757).
- Moving a **cell** **BrtRRMove** (section 2.4.759).
- Changing a cell **BrtRRChgCell** (section 2.4.748).
- Adding or removing a **custom view** **BrtRRUserView** (section 2.4.764).
- Renaming an existing **sheet** **BrtRRRenSheet** (section 2.4.761).
- Inserting a new sheet **BrtRRInsertSh** (section 2.4.758).
- Changing a **defined name** **BrtRRDefName** (section 2.4.750).
- Changing a **comment** **BrtRRNote** (section 2.4.760).
- Conflict resolution from previous conflicting changes **BrtRRConflict** (section 2.4.749).
- Removing a **query table** **BrtRRTQSIF** (section 2.4.763).
- Changing the format **BrtRRFormat** (section 2.4.755).
- Changing the **AutoFormat** information for a **table** **BrtRRAutoFmt** (section 2.4.747).

If a change is a reviewable **revision**, then it will have a **revid** field that is greater than or equal to the **revidMin** field and less than or equal to the **revidMax** field from the corresponding revision header to the revision log (section 2.2.12.3) that this is contained in.

2.2.12.5 Format Revision

This **revision** corresponds to a change in formatting. In between **BrtRRFormat** (section 2.4.755) and **BrtRREndFormat** (section 2.4.752), a **BrtDXF** (section 2.4.354) record can appear in between a **BrtBeginDXFs** (section 2.4.57) and a **BrtEndDXFs** (section 2.4.408). This record specifies the new formatting information associated with this format change.

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2.2.12.6 Insertion / Deletion of Rows / Columns Revision

This **revision** corresponds to an insertion or deletion of a **row** or **column (1)**. In between **BrtRRInsDel** (section 2.4.757) and **BrtRREndInsDel** (section 2.4.753), any number of **BrtRRFormat** (section 2.4.755) and **BrtRRChgCell** (section 2.4.748) records can appear as well as the other records associated with them. These records specify the **cell** and format changes as a result of inserting or deleting the row or column (1). Immediately following **BrtRRInsDel** (section 2.4.757), an undo chain (section 2.2.12.9) can appear.

2.2.12.7 Move Cells Revision

This **revision** corresponds to moving of a **range** of **cells**. In between **BrtRRMove** (section 2.4.759) and **BrtRREndMove** (section 2.4.754), any number of **BrtRRFormat** (section 2.4.755) and **BrtRRChgCell** (section 2.4.748) records can appear as well as the other records associated with them. These records specify the cell and format changes as a result of moving the range of cells. Immediately following **BrtRRMove**, an undo chain (section 2.2.12.9) can appear.

2.2.12.8 Change Cells Revision

This **revision** corresponds to a change or edit of a **cell**. In between **BrtRRChgCell** (section 2.4.748) and **BrtRREndChgCell** (section 2.4.751), one or two cell descriptions as well as zero to two **BrtDXF** (section 2.4.354) records can appear in between a **BrtBeginDXFs** (section 2.4.57) and a **BrtEndDXFs** (section 2.4.408). The cell descriptions are one of the following records:

- **BrtCellBlank** (section 2.4.314)
- **BrtCellRk** (section 2.4.322)
- **BrtCellError** (section 2.4.316)
- **BrtCellBool** (section 2.4.315)
- **BrtCellReal** (section 2.4.321)
- **BrtCellSt** (section 2.4.325)
- **BrtCellIsst** (section 2.4.319)
- **BrtFmlaString** (section 2.4.674)
- **BrtFmlaNum** (section 2.4.673)
- **BrtFmlaBool** (section 2.4.671)
- **BrtFmlaError** (section 2.4.672)

If there are two cell descriptions, the first one specifies the old **cell value**, and the second one specifies the new cell value. If there is just one cell description, it specifies the new cell value. If **BrtDXF** (section 2.4.354) records follow, the first one specifies the old formatting information associated with the cell and the second one specifies the new formatting information that is associated with the cell. If only one **BrtDXF** record appears, the following heuristic can be used to determine if the formatting information specifies the old or new formatting.

If the **fDxf** field of **BrtRRChgCell** (section 2.4.748) is true and **fDxfNull** is false, then it specifies new formatting information. If the **fOldFmt** field of **BrtRRChgCell** is true and **fOldFmtNull** is false, then it specifies old formatting information.

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2.2.12.9 Undo Chain

The undo chain is made up of a group of zero or more **BrtUCR** (section 2.4.825) records that specify undo information for the **revision** that it is associated with.

2.2.12.10 Sort Map

The sort map contains changes to sorting done on the **sheet** level in a shared workbook (section 2.2.12); each sheet can have a **sort** map **BrtBeginWsSortMap** (section 2.4.301) / **BrtEndWsSortMap** (section 2.4.648). At a maximum, there are only ever two sorts **BrtBeginRRSort** (section 2.4.193) / **BrtEndRRSort** (section 2.4.541) per sort map, one specifies sheet level sort changes in **rows** followed by sheet level sort changes in **columns (1)**. If there are not any changes in sort for rows or columns (1), the sort map does not exist for rows or columns (1) respectively.

2.2.13 Volatile Dependencies

Volatile dependencies specify information necessary to update cells that depend on values provided by **real-time data (RTD)** server or **cube functions**. A **cell** has a dependency upon an **RTD server** if it contains a formula (section 2.2.2) with a call to the RTD **sheet function**. A cell has a dependency upon an cube function if it contains a formula with a call to one of the cube functions.

All volatile dependencies are organized into a **hierarchy**. The first level of the hierarchy separates dependencies based on their types. Within each type, dependencies are grouped based on their main topic. Within a main topic, each particular volatile dependency on this main topic is specified in a collection.

2.2.13.1 Types

Volatile dependencies are specified in two collections, each specifying all volatile dependency information relating to a specific type of volatile dependencies. The two types of volatile dependencies are those relating to **RTD servers** and those relating to **cube functions**. Each of these collections is specified by **BrtBeginVolType** (section 2.4.297) and **BrtEndVolType** (section 2.4.644) records, as defined in the **Volatile Dependencies** (section 2.1.7.60) part.

2.2.13.2 Main Topic

All volatile dependency information that relates to calls to an **RTD** or **cube function** that share the same first parameter value is grouped together in a collection specified by **BrtBeginVolMain** (section 2.4.295) and **BrtEndVolMain** (section 2.4.642) records, as defined in the **Volatile Dependencies** (section 2.1.7.60) part.

2.2.13.3 Subtopic Sequences

All volatile dependency information relating to cells that contain calls to an **RTD** or **cube function** that share the same set of parameter values is specified by a collection of records specified by **BrtBeginVolTopic** (section 2.4.296) and **BrtEndVolTopic** (section 2.4.643) records, as defined in the **Volatile Dependencies** (section 2.1.7.60) part.

A volatile dependency collection specifies the following:

- The sequence of subtopics which define the dependency, corresponding to a call's parameter values. This is specified by the sequence of **BrtVolSubtopic** (section 2.4.834) records.
- The last value returned by the call that corresponds to the volatile dependency.

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- The set of cells which depend upon the data specified by this volatile dependency, and need to be updated whenever the value cached for this dependency changes. This is specified by the set of **BrtVolRef** (section 2.4.832) records.

2.2.13.4 Cached returned values

The type of the last value returned by the call that corresponds to a volatile dependency, as well as the value itself, are specified by the **BrtVolNum** (section 2.4.831), **BrtVolErr** (section 2.4.830), **BrtVolBool** (section 2.4.829), or **BrtVolStr** (section 2.4.833) records, as defined in the **Volatile Dependencies** (section 2.1.7.60) part **ABNF**. The value is stored with the volatile dependency until a different value is returned by the corresponding call.

2.2.14 Slicers

A slicer is a mechanism for filtering data in PivotTable views (section 2.2.5.3) and **cube functions**, **tables** and Charts ([ISO/IEC29500-1:2016] section 21.2) based on Non-Worksheet PivotTables. A slicer is based on a **column (1)** in the source data (section 2.2.14.1.1) and the slicer filters on distinct values in that column (1). In the case of using **OLAP** source data, a slicer is based on an **OLAP hierarchy**.

A slicer has two major parts, a **slicer cache** (section 2.2.14.1) and a **slicer view** (section 2.2.14.2). There can be more than one slicer view based on a single slicer cache. When filtering multi-level OLAP hierarchies using slicers, separate slicer views are used for each **OLAP level**.

2.2.14.1 Slicer Cache

A slicer cache specifies the subset of slicer source data (section 2.2.14.1.1) that is cached for display in slicer views (section 2.2.14.2) as well as properties related to slicer (section 2.2.14) filtering. A slicer cache is specified by the sequence of records that conform to the **SLICERCACHE** rule (defined in section 2.1.7.47).

A slicer cache has an associated **PivotCache** (section 2.2.5.2) as specified in section 2.2.14.1.2, or **Table** (section 2.1.7.51).

If the slicer source data is an **OLAP data source**, the **stHierarchy** field of the **BrtBeginSlicerCacheDef** (section 2.4.202) record specifies the **MDX unique name** of the associated **OLAP hierarchy**.

If the slicer source data is a non-OLAP data source, the **stHierarchy** field of the **BrtBeginSlicerCacheDef** record specifies the associated cache field (section 2.2.5.2.2) of the associated **PivotCache**.

If the slicer source data is a table data source, the **stHierarchy** field of the **BrtBeginSlicerCacheDef** record specifies the associated **table column (1)**.

If the slicer (section 2.2.14) is used to **filter** PivotTable views (section 2.2.5.3), the slicer cache specifies the PivotTable views being filtered as specified in section 2.2.14.1.3.

2.2.14.1.1 Slicer Source Data

The source data for a slicer (section 2.2.14) is specified by the associated **PivotCache** (section 2.2.5.2) or **Table** (section 2.1.7.51). See section 2.2.14.1.2.

2.2.14.1.2 Slicer Cache Relationship to PivotCache

A slicer cache (section 2.2.14.1) is associated with a **PivotCache** (section 2.2.5.2) or **Table** (section 2.1.7.51). The association is specified by the following rules.

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If a slicer cache contains the sequence of records that conforms to the **SLICERCACHEOLAPIMPL** rule (defined in section 2.1.7.47) then the type of slicer source data (section 2.2.14.1.1) is **OLAP** and the associated **PivotCache** (section 2.2.5.2) of the slicer cache is specified by the **ipivotcacheid** field of the **BrtBeginSlicerCacheOlapImpl** (section 2.4.208) record of the slicer cache. The associated **PivotCache** MUST be an OLAP **PivotCache** as specified in section 2.2.5.2.1. The **fSlicerData** field of the **BrtBeginPCD14** (section 2.4.122) record of the associated **PivotCache** MUST be 1.

If a slicer cache contains the sequence of records that conforms to the **SLICERCACHENATIVEITEMS** rule (defined in section 2.1.7.47) then the type of slicer source data (section 2.2.14.1.1) is non-OLAP and the associated **PivotCache** (section 2.2.5.2) of the slicer cache is specified by the **dwcacheId** field of the **BrtBeginSlicerCacheNative** (section 2.4.207) record of the slicer cache. The associated **PivotCache** MUST NOT be an OLAP **PivotCache** (section 2.2.5.2) as specified in section 2.2.5.2.1.

If a slicer cache contains the sequence of records that conforms to the **TABLESLICERCACHE** rule (defined in section 2.1.7.47) then the type of slicer source data (section 2.2.14.1.1) is table and the associated **Table** (section 2.1.7.51) of the slicer cache is specified by the **dwLstd** field of the **BrtBeginTableSlicerCache** (section 2.4.277) record of the slicer cache.

Multiple slicer caches can be associated with one **PivotCache**.

If a slicer cache is associated (as specified in section 2.2.14.1.3) with one or more PivotTable views (section 2.2.5.3) and the slicer source data (section 2.2.14.1.1) type is non-OLAP then the slicer cache and each associated PivotTable view (section 2.2.5.3), as specified in section 2.2.5.3.1, MUST be associated with the same **PivotCache** and the **fSlicerData** field of the **BrtBeginPCD14** record of that **PivotCache** MUST be 0.

If a slicer cache is associated (as specified in section 2.2.14.1.3) with one or more PivotTable views and the slicer source data type is OLAP then the **PivotCache** that is associated with the slicer cache and all **PivotCaches** that are associated with the PivotTable views MUST be based on the same OLAP connection (section 2.2.8.3.1) and the **PivotCaches** associated with the PivotTable views MUST NOT be associated with any slicer cache. The **fSlicerData** field of the **BrtBeginPCD14** record for each **PivotCache** associated with the PivotTable views MUST be 0.

2.2.14.1.3 Slicer Cache Relationship to PivotTable View

A slicer cache (section 2.2.14.1) can be associated with PivotTable views (section 2.2.5.3) and Charts ([ISO/IEC29500-1:2016] section 21.2) based on Non-Worksheet PivotTables. Associated PivotTable views are specified by the **BrtSlicerCachePivotTables** (section 2.4.776) record of the slicer cache.

If the associated **PivotCache** (section 2.2.5.2) of a slicer cache (as specified in section 2.2.14.1.2) is an **OLAP** **PivotCache**, then the slicer items (section 2.2.14.1.4) in the slicer cache are used to apply OLAP manual filters (section 2.2.5.3.5.2) to the pivot hierarchy (section 2.2.5.3.4) specified by the **stHierarchy** field of the **BrtBeginSlicerCacheDef** (section 2.4.202) record in all associated PivotTable views (section 2.2.5.3) and Charts based on Non-Worksheet PivotTables of the slicer cache. The selected slicer items (section 2.2.14.1.4) in the slicer cache are converted into OLAP manual filters by the application to apply the filter state of the slicer cache to the associated PivotTable views.

If the associated **PivotCache** of a slicer cache (as specified in section 2.2.14.1.2) is a non-OLAP **PivotCache**, then the **PivotCache** of the PivotTable views and the **PivotCache** of the slicer cache MUST be the same. If the slicer cache is associated with at least one Chart based on Non-Worksheet PivotTable then the slicer cache MUST be OLAP sourced.

If the associated **PivotCache** of a slicer cache (as specified in section 2.2.14.1.2) is a non-OLAP **PivotCache**, then the slicer items (section 2.2.14.1.4) in the slicer cache are used to apply non-OLAP manual filters (section 2.2.5.3.5.1) to the pivot field (section 2.2.5.3.2) specified by the **stHierarchy** field of the **BrtBeginSlicerCacheDef** record in all associated PivotTable views (section 2.2.5.3) of the slicer cache. The selected slicer items in the slicer cache are converted into selected pivot items (section 2.2.5.3.3) in the non-OLAP manual filters by the application to apply the filter state of the slicer cache to the associated PivotTable views.

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When an OLAP PivotTable views is associated with a slicer cache, there MUST NOT be more than one slicer cache for each **OLAP hierarchy**.

A slicer cache (section 2.2.14.1) can be associated with a **column (1)** in a **Table** (section 2.1.7.51). Associated column (1) is specified by the **dwColumn** field of the **BrtBeginTableSlicerCache** (section 2.4.277) record of the slicer cache.

2.2.14.1.4 Slicer Items

Slicer items in a slicer cache (section 2.2.14.1) represent distinct values in a **column (1)** of the slicer source data (section 2.2.14.1.1). In the case of slicers (section 2.2.14) based on **OLAP** slicer source data, the slicer cache is based on an **OLAP hierarchy** and slicer items represent **OLAP members** within levels of that OLAP hierarchy.

For slicers that are associated with PivotTable views (section 2.2.5.3), each slicer item specifies whether slicer source data exists for that slicer item. For more information, see section 2.2.14.1.5.

Each slicer item also specifies item **selection** state, used for filtering, and can specify additional properties. For more information see section 2.2.14.1.4.1 and section 2.2.14.1.4.2.

2.2.14.1.4.1 Non-OLAP Slicer Items

The slicer items of a non–**OLAP** slicer are specified by an ordered sequence of records that conform to the **SLICERCACHENATIVEITEMS** rule (as defined in section 2.1.7.47). Each slicer item is associated with a cache item (section 2.2.5.2.3) of the associated cache field (section 2.2.5.2.2) in the associated **PivotCache** (section 2.2.5.2). Also see section 2.2.14.1.2.

The associated cache field is specified by the **stHierarchy** field of the **BrtBeginSlicerCacheDef** (section 2.4.202) record and MUST be equal to the **stFldName** field of a **BrtBeginPCDField** (section 2.4.135) record in the collection of cache fields of the associated **PivotCache**. The associated cache item is specified by the **iCache** field of the **SlicerCacheNativeItem** (section 2.5.135) structure. The **iCache** field of the **SlicerCacheNativeItem** structure specifies a cache item index of the associated cache item in the associated cache field. Two non–OLAP slicer items MUST NOT be associated with the same cache item.

The order of non–OLAP slicer items in the slicer cache (section 2.2.14.1) is specified by the **fSortOrder**, **fCrossFilter** and **fSortUsingCustomLists** fields of the **BrtBeginSlicerCacheNative** (section 2.4.207) record.

The **SlicerCacheNativeItem** structure also specifies whether the non–OLAP slicer item is selected for filtering and if data exists in the slicer source data (section 2.2.14.1.1) for it. Also see section 2.2.14.1.5.

2.2.14.1.4.2 OLAP Slicer Items

OLAP slicer items are specified by the sequence of records that conform to the **SLICERCACHEOLAPIMPL** rule (as defined in section 2.1.7.47).

The cache for an **OLAP level** in an **OLAP** slicer cache (section 2.2.14.1) is specified by the sequence of records that conform to the **SLICERCACHESIRANGES** rule (as defined in section 2.1.7.47).

The cache is organized into ranges of cached OLAP slicer items for each OLAP level in the slicer cache. Each range is specified by the sequence of records that conform to the **SLICERCACHESIRANGE** rule (as defined in section 2.1.7.47). The **iitemstart** field of the **BrtBeginSlicerCacheSiRange** (section 2.4.210) record specifies the zero-based index of the first OLAP slicer item in this cached range in the ordered collection of all **OLAP members** that exist in the slicer source data (section 2.2.14.1.1) for the associated OLAP level. The collection in the slicer source data is ordered as specified by the **fSortOrder** and **fCrossFilter** fields of the preceding **BrtBeginSlicerCacheLevelData** (section 2.4.205) record.

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Each cached OLAP slicer item in a range is specified by a **BrtSlicerCacheOlapItem** (section 2.4.775) record.

The OLAP slicer items that are selected for filtering are specified by the sequence of records that conform to the **SLICERCACHESELECTIONS** rule (as defined in section 2.1.7.47).

Each individual OLAP slicer item selected for filtering is specified by a **BrtSlicerCacheSelection** (section 2.4.777) record.

2.2.14.1.5 Slicer Cross Filtering

Cross filtering is an application behavior that allows one slicer to reflect the results of filtering by another. This behavior exposes whether data exists in the slicer source data (section 2.2.14.1.1) for each slicer item (section 2.2.14.1.4) when the slicer source data is filtered by the selected slicer items of all associated slicer caches (section 2.2.14.1) of a PivotTable view (section 2.2.5.3), as specified in section 2.2.14.1.3, and all manual filters (section 2.2.5.3.5) in the PivotTable view.

If the type of slicer source data is **OLAP** then the existence of data, after filtering, for a slicer item is specified by the **fNoData** field of the **BrtSlicerCacheOlapItem** (section 2.4.775) record. If the type of source data (section 2.2.5.2.1) is non-OLAP then the existence of data for a slicer item is specified by the **fNoData** field of the **SlicerCacheNativeItem** (section 2.5.135) structure contained in the **BrtSlicerCacheNativeItem** (section 2.4.774) record.

If the type of slicer source data (section 2.2.14.1.1) is non-OLAP, the **fCrossFilter** field of the **BrtBeginSlicerCacheNative** record as specified by the **Slicer Cache** (section 2.1.7.47) part **ABNF** specifies how the non-OLAP slicer items (section 2.2.14.1.4.1) that have no data are displayed.

If the type of slicer source data is OLAP, the **fCrossFilter** field of the **BrtBeginSlicerCacheLevelData** (section 2.4.205) record as specified by the **Slicer Cache** (section 2.1.7.47) part ABNF specifies how the OLAP slicer items (section 2.2.14.1.4.2) that have no data are displayed for the **OLAP level** specified by the **stUniqueName** field of the **BrtBeginSlicerCacheLevelData** record.

2.2.14.2 Slicer View

A slicer view specifies the display of a slicer (section 2.2.14) on a **worksheet**. A slicer view is displayed as a list of slicer items (section 2.2.14.1.4). A slicer view is specified by the sequence of records that conform to the **SLICER** rule (as defined in section 2.1.7.48.

Each slicer view is associated with a slicer cache (section 2.2.14.1) as specified in section 2.2.14.2.1. The filtering state of slicer items displayed in the slicer view is specified by the associated slicer cache.

Each slicer view is associated with a drawing ([ISO/IEC29500-1:2016] section 20.5), contained in the **drawing** part ([ISO/IEC29500-1:2016] section 12.3.8) associated with the worksheet with which the slicer view is associated. The associated drawing ([ISO/IEC29500-1:2016] section 20.5) contains a slicer element of type CT_Slicer ([MS-XLSX] section 2.6.68) that contains a **name** attribute that matches the **stName** field of the **BrtBeginSlicer** (section 2.4.200) record that specifies the slicer view.

For information about slicer formatting see slicer styles (section 2.2.6.3.1).

2.2.14.2.1 Slicer View Relationship to Slicer Cache

Each slicer view (section 2.2.14.2) is associated with a slicer cache (section 2.2.14.1). The slicer view is associated with a slicer cache through the **stName** field of the **BrtBeginSlicerCacheDef** (section 2.4.202) record in the slicer cache that matches the **stSlicerCacheName** field of the **BrtBeginSlicer** (section 2.4.200) record that specifies this slicer view.

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If a slicer view is associated with an **OLAP** slicer cache, the slicer view also has an associated **OLAP level**, specified by the **dwLevel** field of the **BrtBeginSlicer** record. In this case the slicer view displays OLAP Slicer Items (section 2.2.14.1.4.2) of that OLAP level.

There can be multiple slicer views associated with a single slicer cache (section 2.2.14.1), for the following two reasons:

- For a user-defined **OLAP hierarchy** with several OLAP levels (for example a Geography OLAP hierarchy with Country/Region, State, and City OLAP levels), each slicer view is associated with a single OLAP level, providing a mechanism for filtering different OLAP levels of the OLAP hierarchy.
- Multiple slicer views associated with either the same slicer cache (for a non-OLAP slicer cache) or the same OLAP level (for an OLAP slicer cache) provides a mechanism for displaying the filter state in more than one location in the **workbook**.

2.2.14.3 Slicers and Cube Functions

Each slicer cache (section 2.2.14.1) has a **defined name** associated with it specified by the **stName** field of the **BrtBeginSlicerCacheDef** (section 2.4.202) record. The value of the **formula.rgce** field of each **BrtName** (section 2.4.705) record specifying a defined name associated with a slicer cache MUST consist of a single **PtgErr** (section 2.5.97.39) with **err** equal to 0x2A (#N/A).

If the slicer source data (section 2.2.14.1.1) type of a slicer cache (section 2.2.14.1) is **OLAP** then **cube functions** can use the defined name of the slicer cache as a parameter to refer to **selection** state of the slicer cache.

2.2.15 Timelines

A Timeline is a mechanism for filtering data in PivotTable ([ISO/IEC29500-1:2016] section 18.10) views, **cube functions**, and Charts ([ISO/IEC29500-1:2016] section 21.2) based on Non-Worksheet PivotTables. In the case of using OLAP Timeline source data (section 2.2.15.1.1), a Timeline is based on a key **attribute** of an **OLAP hierarchy**. In the case of using native Timeline source data (section 2.2.15.1.1), a Timeline is based on **data table** column.

A Timeline has two major parts a Timeline cache, and a Timeline view. There can be more than one Timeline view based on a single Timeline cache.

2.2.15.1 Timeline Cache

A **Timeline cache** specifies the subset of **Timeline source data** (section 2.2.15.1.1) that is cached for display in **Timeline views** (section 2.2.15.2), as well as properties related to **Timeline** filtering (section 2.2.15). A **Timeline cache** is specified by the **CT_TimelineCacheDefinition** element ([MS-XLSX] section 2.6.112).

A **Timeline cache** has an associated **PivotTable** ([ISO/IEC29500-1:2016] section 18.10) **PivotCache** (section 2.2.5.2).

If the **timeline source data** is an **OLAP data source**, the **sourceName** attribute of the **CT_TimelineCacheDefinition** element specifies the key **attribute** name of the associated **OLAP hierarchy**. If the **timeline source data** is a native data source, the **sourceName** attribute of the **CT_TimelineCacheDefinition** element specifies the name of the associated **data table** column.

If the timeline is used to **filter** **PivotTable** views, the **Timeline cache** specifies the **PivotTable** views being filtered as specified in **Timeline Cache Relationship to PivotTable View** (section 2.2.15.1.3).

2.2.15.1.1 Timeline Source Data

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The **source data** for a Timeline is specified by the associated PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache as specified in Timeline Cache Relationship to PivotCache.

2.2.15.1.2 Timeline Cache Relationship to PivotCache

A Timeline cache is associated with a PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache through the **pivotCacheId** attribute of the **CT_TimelineState** ([MS-XLSX] section 2.6.116) element. If the Timeline cache has an associated PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache, the **timelineData** attribute of the **CT_TimelinePivotCacheDefinition** ([MS-XLSX] section 2.6.109) element MUST be "true".

Multiple Timeline caches can be associated with one PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache.

If a Timeline cache (section 2.2.15.1) is associated, as specified by Timeline Cache Relationship to PivotTable View (section 2.2.15.1.3), with one or more PivotTable ([ISO/IEC29500-1:2016] section 18.10) views, the PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache that is associated with the Timeline cache (section 2.2.15.1) and all PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCaches that are associated with the PivotTable ([ISO/IEC29500-1:2016] section 18.10) views MUST be based on the same source – an OLAP connection ([ISO/IEC29500-1:2016] section 18.13.5) if the Timeline source data (section 2.2.15.1.1) is **OLAP** and a **data table** if the Timeline source data (section 2.2.15.1.1) is native, and the PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCaches associated with the PivotTable ([ISO/IEC29500-1:2016] section 18.10) views MUST NOT be associated with any Timeline cache (section 2.2.15.1). The **timelineData** attribute of the **CT_TimelinePivotCacheDefinition** ([MS-XLSX] section 2.6.109) element for each PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache associated with the PivotTable ([ISO/IEC29500-1:2016] section 18.10) views MUST be "false".

2.2.15.1.3 Timeline Cache Relationship to PivotTable View

A Timeline cache can be associated with PivotTable ([ISO/IEC29500-1:2016] section 18.10) views and Charts **(**[ISO/IEC29500-1:2016] section 21.2) based on Non-Worksheet PivotTables, as specified by the **pivotTables** group element of the **CT_TimelineCacheDefinition** ([MS-XLSX] section 2.6.112) element.

If the associated PivotTable **PivotCache** of a Timeline cache, as specified by the Timeline Cache Relationship to PivotCache, is an **OLAP** PivotTable **PivotCache**, the Timeline State of the Timeline cache is used to apply PivotTable OLAP date filter to the PivotTable **hierarchy** which belongs to the same **dimension** as the hierarchy associated with the **sourceName** attribute of the **CT_TimelineState** ([MS-XLSX] section 2.6.116) element, in all associated PivotTable views and Charts based on Non-Worksheet PivotTables, of the Timeline cache. The **selected** date range in the Timeline cache is converted into selected PivotTable items in the PivotTable OLAP date filters by the application to apply the filter state of the Timeline cache to the associated PivotTable views and Charts based on Non-Worksheet PivotTables.

When an OLAP PivotTable view is associated with an OLAP Timeline cache (section 2.2.15.1), there MUST NOT be more than one Timeline cache (section 2.2.15.1) for each **OLAP hierarchy**. If the Timeline cache has at least one Chart based on Non-Worksheet PivotTables then the Timeline cache MUST be OLAP sourced. When a native PivotTable view is associated with a native Timeline cache, there MUST NOT be more than one Timeline cache for each **data table** column.

2.2.15.1.4 Timeline State

Timeline state specifies the information used for display in Timeline view. The **Timeline state** contains two elements, selection and bounds, of type **CT_TimelineRange** ([MS-XLSX] section 2.6.115). The selection element specifies the start and end dates of the selection in the Timeline and is used for filtering data in PivotTable ([ISO/IEC29500-1:2016] section 18.10) views and **cube**

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functions. The bounds element specifies the minimum and maximum dates that can be displayed by the Timeline view.

2.2.15.2 Timeline View

A Timeline view specifies the display of a Timeline on a **worksheet**. The Timeline view is specified by a **CT_Timeline** ([MS-XLSX] section 2.6.111) element.

Each Timeline view is associated with a Timeline cache as specified in Timeline View Relationship to Timeline Cache. The filtering state of Timeline displayed in the Timeline view is specified by the associated Timeline cache.

Each Timeline view is associated with a drawing ([ISO/IEC29500-1:2016] section 20.5), contained in the Drawings part ([ISO/IEC29500-1:2016] section 12.3.8).

2.2.15.2.1 Timeline View Relationship to Timeline Cache

Each Timeline view is associated with a Timeline cache. The Timeline view is associated with Timeline cache through the **name** attribute of the **CT_TimelineCacheDefinition** ([MS-XLSX] section 2.6.112) element in the Timeline cache that matches the **cache** attribute of the **CT_Timeline** ([MS-XLSX] section 2.6.111) element that specifies this Timeline view.

There can be multiple Timeline views associated with a single Timeline cache, providing a mechanism for displaying the filter state in more than one location in the **workbook**.

2.2.15.3 Timelines and Cube Functions

Each **Timeline cache** (section 2.1.7.53) has a **defined name** associated with it as specified by the **name** attribute of the **CT_TimelineCacheDefinition** ([MS-XLSX] section 2.6.112) element.

The value of the **CT_DefinedName** ([ISO/IEC29500-1:2016] section 18.2.5) element specifying a defined name associated with a Timeline cache MUST be #N/A.

If the Timeline source data type of a Timeline cache is **OLAP**, **cube functions** can use the defined name of the Timeline cache as a parameter to refer to the selection state of the Timeline cache.

2.3 Record Enumeration

This section specifies the record name associated with a specified record type value<5>. For more information about record types, see section 2.1.4.

These associations between record name and record type are listed by record name as well as by record type.

The type-specific meaning and fields for each record type are specified in the subsection of section 2.4 corresponding to the record name.

2.3.1 By Name

Name	Record type (number)
BrtAbsPath15 (section 2.4.1)	2071
BrtACBegin (section 2.4.2)	37
BrtACEnd (section 2.4.3)	38
BrtActiveX (section 2.4.4)	644

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Name	Record type (number)
BrtAFilterDateGroupItem (section 2.4.5)	175
BrtArrFmla (section 2.4.6)	426
BrtBeginActiveXControls (section 2.4.7)	643
BrtBeginAFilter (section 2.4.8)	161
BrtBeginAutoSortScope (section 2.4.9)	459
BrtBeginBook (section 2.4.10)	131
BrtBeginBookViews (section 2.4.11)	135
BrtBeginBorders (section 2.4.12)	613
BrtBeginBundleShs (section 2.4.13)	143
BrtBeginCalcFeatures (section 2.4.14)	5095
BrtBeginCellIgnoreECs (section 2.4.15)	648
BrtBeginCellIgnoreECs14 (section 2.4.16)	1169
BrtBeginCellSmartTag (section 2.4.17)	590
BrtBeginCellSmartTags (section 2.4.18)	592
BrtBeginCellStyleXFs (section 2.4.19)	626
BrtBeginCellWatches (section 2.4.20)	605
BrtBeginCellXFs (section 2.4.21)	617
BrtBeginCFRule (section 2.4.22)	463
BrtBeginCFRule14 (section 2.4.23)	1048
BrtBeginColBrk (section 2.4.24)	394
BrtBeginColInfos (section 2.4.25)	390
BrtBeginColorPalette (section 2.4.26)	473
BrtBeginColorScale (section 2.4.27)	469
BrtBeginColorScale14 (section 2.4.28)	1157
BrtBeginComment (section 2.4.29)	635
BrtBeginCommentAuthors (section 2.4.30)	630
BrtBeginCommentList (section 2.4.31)	633
BrtBeginComments (section 2.4.32)	628
BrtBeginConditionalFormatting (section 2.4.33)	461
BrtBeginConditionalFormatting14 (section 2.4.34)	1046
BrtBeginConditionalFormattings (section 2.4.35)	1135

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Name	Record type (number)
BrtBeginCRErrs (section 2.4.36)	608
BrtBeginCsView (section 2.4.37)	141
BrtBeginCsViews (section 2.4.38)	139
BrtBeginCustomFilters (section 2.4.39)	172
BrtBeginCustomFilters14 (section 2.4.40)	1178
BrtBeginCustomRichFilters (section 2.4.41)	5086
BrtBeginDatabar (section 2.4.42)	467
BrtBeginDatabar14 (section 2.4.43)	1051
BrtBeginDataFeedPr15 (section 2.4.44)	2113
BrtBeginDataModel (section 2.4.45)	2121
BrtBeginDbTables15 (section 2.4.46)	2118
BrtBeginDCon (section 2.4.47)	495
BrtBeginDecoupledPivotCacheIDs (section 2.4.48)	2048
BrtBeginDeletedName (section 2.4.49)	453
BrtBeginDeletedNames (section 2.4.50)	451
BrtBeginDim (section 2.4.51)	275
BrtBeginDims (section 2.4.52)	273
BrtBeginDRefs (section 2.4.53)	497
BrtBeginDVals (section 2.4.54)	573
BrtBeginDVals14 (section 2.4.55)	1054
BrtBeginDxF14s (section 2.4.56)	1172
BrtBeginDXFs (section 2.4.57)	505
BrtBeginDXFs15 (section 2.4.58)	2103
BrtBeginDynamicArrayPr (section 2.4.59)	4096
BrtBeginECDbProps (section 2.4.60)	203
BrtBeginECOlapProps (section 2.4.61)	205
BrtBeginECParam (section 2.4.62)	267
BrtBeginECParams (section 2.4.63)	265
BrtBeginECTwFldInfo (section 2.4.64)	542
BrtBeginECTwFldInfo15 (section 2.4.65)	2133
BrtBeginECTWFldInfoLst (section 2.4.66)	540

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Name	Record type (number)
BrtBeginECTWFldInfoLst15 (section 2.4.67)	2131
BrtBeginECTxtWiz (section 2.4.68)	538
BrtBeginECTxtWiz15 (section 2.4.69)	2129
BrtBeginECWebProps (section 2.4.70)	261
BrtBeginEcWpTables (section 2.4.71)	263
BrtBeginEsfmd (section 2.4.72)	339
BrtBeginEsmdb (section 2.4.73)	337
BrtBeginEsmdtinfo (section 2.4.74)	334
BrtBeginEsmdx (section 2.4.75)	372
BrtBeginEsstr (section 2.4.76)	380
BrtBeginExtConn14 (section 2.4.77)	1068
BrtBeginExtConn15 (section 2.4.78)	2109
BrtBeginExtConnection (section 2.4.79)	201
BrtBeginExtConnections (section 2.4.80)	429
BrtBeginExternals (section 2.4.81)	353
BrtBeginFills (section 2.4.82)	603
BrtBeginFilterColumn (section 2.4.83)	163
BrtBeginFilters (section 2.4.84)	165
BrtBeginFmd (section 2.4.85)	52
BrtBeginFmts (section 2.4.86)	615
BrtBeginFnGroup (section 2.4.87)	664
BrtBeginFonts (section 2.4.88)	611
BrtBeginHeaderFooter (section 2.4.89)	479
BrtBeginIconSet (section 2.4.90)	465
BrtBeginIconSet14 (section 2.4.91)	1052
BrtBeginIndexedColors (section 2.4.92)	565
BrtBeginISXTHCols (section 2.4.93)	322
BrtBeginISXTHRws (section 2.4.94)	320
BrtBeginISXVDCols (section 2.4.95)	311
BrtBeginISXVDRws (section 2.4.96)	309
BrtBeginISXVIs (section 2.4.97)	388

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Name	Record type (number)
BrtBeginItemUniqueNames (section 2.4.98)	2106
BrtBeginList (section 2.4.99)	343
BrtBeginListCol (section 2.4.100)	347
BrtBeginListCols (section 2.4.101)	345
BrtBeginListParts (section 2.4.102)	660
BrtBeginListXmlCPr (section 2.4.103)	349
BrtBeginMap (section 2.4.104)	492
BrtBeginMdx (section 2.4.105)	54
BrtBeginMdxKPI (section 2.4.106)	378
BrtBeginMdxMbrProp (section 2.4.107)	376
BrtBeginMdxSet (section 2.4.108)	374
BrtBeginMdxTuple (section 2.4.109)	56
BrtBeginMergeCells (section 2.4.110)	177
BrtBeginMetadata (section 2.4.111)	332
BrtBeginMG (section 2.4.112)	490
BrtBeginMGMaps (section 2.4.113)	488
BrtBeginMgs (section 2.4.114)	486
BrtBeginModelRelationships (section 2.4.115)	2126
BrtBeginModelTables (section 2.4.116)	2123
brtBeginModelTimeGrouping (section 2.4.117)	2139
brtBeginModelTimeGroupings (section 2.4.118)	2137
BrtBeginMRUColors (section 2.4.119)	569
BrtBeginOledbPr15 (section 2.4.120)	2111
BrtBeginOleObjects (section 2.4.121)	638
BrtBeginPCD14 (section 2.4.122)	1066
BrtBeginPCDCalcItem (section 2.4.123)	245
BrtBeginPCDCalcItems (section 2.4.124)	243
BrtBeginPCDCalcMem (section 2.4.125)	433
BrtBeginPCDCalcMem14 (section 2.4.126)	1038
BrtBeginPCDCalcMemExt (section 2.4.127)	1137

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Name	Record type (number)
BrtBeginPCDCalcMems (section 2.4.128)	431
BrtBeginPCDCalcMemsExt (section 2.4.129)	1139
BrtBeginPCDFAtbl (section 2.4.130)	189
BrtBeginPCDFGDiscrete (section 2.4.131)	225
BrtBeginPCDFGItems (section 2.4.132)	221
BrtBeginPCDFGRange (section 2.4.133)	223
BrtBeginPCDFGroup (section 2.4.134)	219
BrtBeginPCDField (section 2.4.135)	183
BrtBeginPCDFields (section 2.4.136)	181
BrtBeginPCDHFieldsUsage (section 2.4.137)	199
BrtBeginPCDHGLevel (section 2.4.138)	437
BrtBeginPCDHGLevels (section 2.4.139)	435
BrtBeginPCDHGLGMember (section 2.4.140)	445
BrtBeginPCDHGLGMembers (section 2.4.141)	443
BrtBeginPCDHGLGroup (section 2.4.142)	441
BrtBeginPCDHGLGroups (section 2.4.143)	439
BrtBeginPCDHierarchies (section 2.4.144)	195
BrtBeginPCDHierarchy (section 2.4.145)	197
BrtBeginPCDIRun (section 2.4.146)	191
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BrtBeginPCDSCPage (section 2.4.150)	211
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BrtBeginPCDSCPItem (section 2.4.152)	213
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BrtBeginPCDSCSets (section 2.4.154)	215
BrtBeginPCDSDTCEMember (section 2.4.155)	233
BrtBeginPCDSDTCEMembers (section 2.4.156)	231
BrtBeginPCDSDTCEMembersSortBy (section 2.4.157)	646

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Name	Record type (number)
BrtBeginPCDSDTCEntries (section 2.4.158)	229
BrtBeginPCDSDTCQueries (section 2.4.159)	235
BrtBeginPCDSDTCQuery (section 2.4.160)	237
BrtBeginPCDSDTCSet (section 2.4.161)	241
BrtBeginPCDSDTCSets (section 2.4.162)	239
BrtBeginPCDSDTupleCache (section 2.4.163)	227
BrtBeginPcdSFCIEntries (section 2.4.164)	657
BrtBeginPCDSource (section 2.4.165)	185
BrtBeginPCDSRange (section 2.4.166)	187
BrtBeginPivotCacheDef (section 2.4.167)	179
BrtBeginPivotCacheID (section 2.4.168)	386
BrtBeginPivotCacheIDs (section 2.4.169)	384
BrtBeginPivotCacheRecords (section 2.4.170)	193
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BrtColor14 (section 2.4.333)	1055
BrtBeginSparklines (section 2.4.227)	1056
BrtEndSparklines (section 2.4.575)	1057
BrtBeginSparklineGroups (section 2.4.226)	1058
BrtEndSparklineGroups (section 2.4.574)	1059
BrtSXVD14 (section 2.4.814)	1061
BrtBeginSxView14 (section 2.4.274)	1062
BrtEndSxView14 (section 2.4.622)	1063
BrtBeginSXView16 (section 2.4.275)	1064
BrtEndSXView16 (section 2.4.623)	1065
BrtBeginPCD14 (section 2.4.122)	1066

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Name	Record type (number)
BrtEndPCD14 (section 2.4.471)	1067
BrtBeginExtConn14 (section 2.4.77)	1068
BrtEndExtConn14 (section 2.4.426)	1069
BrtBeginSlicerCacheIDs (section 2.4.204)	1070
BrtEndSlicerCacheIDs (section 2.4.552)	1071
BrtBeginSlicerCacheID (section 2.4.203)	1072
BrtEndSlicerCacheID (section 2.4.551)	1073
BrtBeginSlicerCache (section 2.4.201)	1075
BrtEndSlicerCache (section 2.4.549)	1076
BrtBeginSlicerCacheDef (section 2.4.202)	1077
BrtEndSlicerCacheDef (section 2.4.550)	1078
BrtBeginSlicersEx (section 2.4.216)	1079
BrtEndSlicersEx (section 2.4.564)	1080
BrtBeginSlicerEx (section 2.4.214)	1081
BrtEndSlicerEx (section 2.4.562)	1082
BrtBeginSlicer (section 2.4.200)	1083
BrtEndSlicer (section 2.4.548)	1084
BrtSlicerCachePivotTables (section 2.4.776)	1085
BrtBeginSlicerCacheOlapImpl (section 2.4.208)	1086
BrtEndSlicerCacheOlapImpl (section 2.4.556)	1087
BrtBeginSlicerCacheLevelsData (section 2.4.206)	1088
BrtEndSlicerCacheLevelsData (section 2.4.554)	1089
BrtBeginSlicerCacheLevelData (section 2.4.205)	1090
BrtEndSlicerCacheLevelData (section 2.4.553)	1091
BrtBeginSlicerCacheSiRanges (section 2.4.211)	1092
BrtEndSlicerCacheSiRanges (section 2.4.559)	1093
BrtBeginSlicerCacheSiRange (section 2.4.210)	1094
BrtEndSlicerCacheSiRange (section 2.4.558)	1095

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Name	Record type (number)
BrtSlicerCacheOlapItem (section 2.4.775)	1096
BrtBeginSlicerCacheSelections (section 2.4.209)	1097
BrtSlicerCacheSelection (section 2.4.777)	1098
BrtEndSlicerCacheSelections (section 2.4.557)	1099
BrtBeginSlicerCacheNative (section 2.4.207)	1100
BrtEndSlicerCacheNative (section 2.4.555)	1101
BrtSlicerCacheNativeItem (section 2.4.774)	1102
BrtRangeProtection14 (section 2.4.740)	1103
BrtRangeProtectionIso14 (section 2.4.742)	1104
BrtCellIgnoreEC14 (section 2.4.318)	1105
BrtList14 (section 2.4.692)	1111
BrtCFIcon (section 2.4.327)	1112
BrtBeginSlicerCachesPivotCacheIDs (section 2.4.213)	1113
BrtEndSlicerCachesPivotCacheIDs (section 2.4.561)	1114
BrtBeginSlicers (section 2.4.215)	1115
BrtEndSlicers (section 2.4.563)	1116
BrtWbProp14 (section 2.4.837)	1117
BrtBeginSXEdit (section 2.4.243)	1118
BrtEndSXEdit (section 2.4.591)	1119
BrtBeginSXEdits (section 2.4.244)	1120
BrtEndSXEdits (section 2.4.592)	1121
BrtBeginSXChange (section 2.4.233)	1122
BrtEndSXChange (section 2.4.581)	1123
BrtBeginSXChanges (section 2.4.234)	1124
BrtEndSXChanges (section 2.4.582)	1125
BrtSXTupleItems (section 2.4.805)	1126
BrtBeginSlicerStyle (section 2.4.217)	1128
BrtEndSlicerStyle (section 2.4.565)	1129
BrtSlicerStyleElement (section 2.4.778)	1130
BrtBeginStyleSheetExt14 (section 2.4.231)	1131

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Name	Record type (number)
BrtEndStyleSheetExt14 (section 2.4.579)	1132
BrtBeginSlicerCachesPivotCacheID (section 2.4.212)	1133
BrtEndSlicerCachesPivotCacheID (section 2.4.560)	1134
BrtBeginConditionalFormattings (section 2.4.35)	1135
BrtEndConditionalFormattings (section 2.4.387)	1136
BrtBeginPCDCalcMemExt (section 2.4.127)	1137
BrtEndPCDCalcMemExt (section 2.4.476)	1138
BrtBeginPCDCalcMemsExt (section 2.4.129)	1139
BrtEndPCDCalcMemsExt (section 2.4.478)	1140
BrtPCDField14 (section 2.4.712)	1141
BrtBeginSlicerStyles (section 2.4.219)	1142
BrtEndSlicerStyles (section 2.4.567)	1143
BrtBeginSlicerStyleElements (section 2.4.218)	1144
BrtEndSlicerStyleElements (section 2.4.566)	1145
BrtCFRuleExt (section 2.4.328)	1146
BrtBeginSXCondFmt14 (section 2.4.236)	1147
BrtEndSXCondFmt14 (section 2.4.584)	1148
BrtBeginSXCondFmts14 (section 2.4.238)	1149
BrtEndSXCondFmts14 (section 2.4.586)	1150
BrtBeginSortCond14 (section 2.4.223)	1152
BrtEndSortCond14 (section 2.4.571)	1153
BrtEndDVals14 (section 2.4.406)	1154
BrtEndIconSet14 (section 2.4.440)	1155
BrtEndDatabar14 (section 2.4.394)	1156
BrtBeginColorScale14 (section 2.4.28)	1157
BrtEndColorScale14 (section 2.4.380)	1158
BrtBeginSxrules14 (section 2.4.257)	1159
BrtEndSxrules14 (section 2.4.605)	1160
BrtBeginPRule14 (section 2.4.184)	1161
BrtEndPRule14 (section 2.4.532)	1162

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Name	Record type (number)
BrtBeginPRFilters14 (section 2.4.180)	1163
BrtEndPRFilters14 (section 2.4.528)	1164
BrtBeginPRFilter14 (section 2.4.178)	1165
BrtEndPRFilter14 (section 2.4.526)	1166
BrtBeginPRFItem14 (section 2.4.182)	1167
BrtEndPRFItem14 (section 2.4.530)	1168
BrtBeginCellIgnoreECs14 (section 2.4.16)	1169
BrtEndCellIgnoreECs14 (section 2.4.368)	1170
BrtDxf14 (section 2.4.355)	1171
BrtBeginDxF14s (section 2.4.56)	1172
BrtEndDxf14s (section 2.4.407)	1173
BrtFilter14 (section 2.4.670)	1177
BrtBeginCustomFilters14 (section 2.4.40)	1178
BrtCustomFilter14 (section 2.4.344)	1180
BrtIconFilter14 (section 2.4.682)	1181
BrtPivotCacheConnectionName (section 2.4.732)	1182
BrtBeginDecoupledPivotCacheIDs (section 2.4.48)	2048
BrtEndDecoupledPivotCacheIDs (section 2.4.399)	2049
BrtDecoupledPivotCacheID (section 2.4.348)	2050
BrtBeginPivotTableRefs (section 2.4.171)	2051
BrtEndPivotTableRefs (section 2.4.519)	2052
BrtPivotTableRef (section 2.4.734)	2053
BrtSlicerCacheBookPivotTables (section 2.4.772)	2054
BrtBeginSxvcells (section 2.4.269)	2055
BrtEndSxvcells (section 2.4.617)	2056
BrtBeginSxRow (section 2.4.255)	2057
BrtEndSxRow (section 2.4.603)	2058
BrtPcdCalcMem15 (section 2.4.711)	2060
BrtQsi15 (section 2.4.737)	2067

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Name	Record type (number)
BrtBeginWebExtensions (section 2.4.298)	2068
BrtEndWebExtensions (section 2.4.645)	2069
BrtWebExtension (section 2.4.838)	2070
BrtAbsPath15 (section 2.4.1)	2071
BrtBeginPivotTableUISettings (section 2.4.172)	2072
BrtEndPivotTableUISettings (section 2.4.520)	2073
BrtTableSlicerCacheIDs (section 2.4.817)	2075
BrtTableSlicerCacheID (section 2.4.816)	2076
BrtBeginTableSlicerCache (section 2.4.277)	2077
BrtEndTableSlicerCache (section 2.4.625)	2078
BrtSxFilter15 (section 2.4.802)	2079
BrtBeginTimelineCachePivotCacheIDs (section 2.4.282)	2080
BrtEndTimelineCachePivotCacheIDs (section 2.4.630)	2081
BrtTimelineCachePivotCacheID (section 2.4.821)	2082
BrtBeginTimelineCacheIDs (section 2.4.281)	2083
BrtEndTimelineCacheIDs (section 2.4.629)	2084
BrtBeginTimelineCacheID (section 2.4.280)	2085
BrtEndTimelineCacheID (section 2.4.628)	2086
BrtBeginTimelinesEx (section 2.4.284)	2087
BrtEndTimelinesEx (section 2.4.632)	2088
BrtBeginTimelineEx (section 2.4.283)	2089
BrtEndTimelineEx (section 2.4.631)	2090
BrtWorkBookPr15 (section 2.4.840)	2091
BrtPCDH15 (section 2.4.714)	2092
BrtBeginTimelineStyle (section 2.4.285)	2093
BrtEndTimelineStyle (section 2.4.633)	2094
BrtTimelineStyleElement (section 2.4.822)	2095
BrtBeginTimelineStylesheetExt15 (section 2.4.288)	2096

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Name	Record type (number)
BrtEndTimelineStylesheetExt15 (section 2.4.636)	2097
BrtBeginTimelineStyles (section 2.4.287)	2098
BrtEndTimelineStyles (section 2.4.635)	2099
BrtBeginTimelineStyleElements (section 2.4.286)	2100
BrtEndTimelineStyleElements (section 2.4.634)	2101
BrtDxf15 (section 2.4.356)	2102
BrtBeginDxfs15 (section 2.4.58)	2103
BrtEndDXFs15 (section 2.4.409)	2104
BrtSlicerCacheHideItemsWithNoData (section 2.4.773)	2105
BrtBeginItemUniqueNames (section 2.4.98)	2106
BrtEndItemUniqueNames (section 2.4.447)	2107
BrtItemUniqueName (section 2.4.688)	2108
BrtBeginExtConn15 (section 2.4.78)	2109
BrtEndExtConn15 (section 2.4.427)	2110
BrtBeginOledbPr15 (section 2.4.120)	2111
BrtEndOledbPr15 (section 2.4.469)	2112
BrtBeginDataFeedPr15 (section 2.4.44)	2113
BrtEndDataFeedPr15 (section 2.4.395)	2114
BrtTextPr15 (section 2.4.820)	2115
BrtRangePr15 (section 2.4.738)	2116
BrtDbCommand15 (section 2.4.346)	2117
BrtBeginDbTables15 (section 2.4.46)	2118
BrtEndDbTables15 (section 2.4.397)	2119
BrtDbTable15 (section 2.4.347)	2120
BrtBeginDataModel (section 2.4.45)	2121
BrtEndDataModel (section 2.4.396)	2122
BrtBeginModelTables (section 2.4.116)	2123
BrtEndModelTables (section 2.4.465)	2124
BrtModelTable (section 2.4.702)	2125
BrtBeginModelRelationships (section	2126

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Name	Record type (number)
2.4.115)	
BrtEndModelRelationships (section 2.4.464)	2127
BrtModelRelationship (section 2.4.701)	2128
BrtBeginECTxtWiz15 (section 2.4.69)	2129
BrtEndECTxtWiz15 (section 2.4.418)	2130
BrtBeginECTWFldInfoLst15 (section 2.4.67)	2131
BrtEndECTWFldInfoLst15 (section 2.4.416)	2132
BrtBeginECTWFldInfo15 (section 2.4.67)	2133
BrtFieldListActiveItem (section 2.4.663)	2134
BrtPivotCacheIdVersion (section 2.4.733)	2135
BrtSXDI15 (section 2.4.801)	2136
brtBeginModelTimeGroupings (section 2.4.118)	2137
brtEndModelTimeGroupings (section 2.4.467)	2138
brtBeginModelTimeGrouping (section 2.4.117)	2139
brtEndModelTimeGrouping (section 2.4.466)	2140
brtModelTimeGroupingCalcCol (section 2.4.703)	2141
brtRevisionPtr (section 2.4.743)	3073
BrtBeginDynamicArrayPr (section 2.4.59)	4096
BrtEndDynamicArrayPr (section 2.4.410)	4097
BrtBeginRichValueBlock (section 2.4.192)	5002
BrtEndRichValueBlock (section 2.4.540)	5003
BrtBeginRichFilters (section 2.4.190)	5081
BrtEndRichFilters (section 2.4.538)	5082
BrtRichFilter (section 2.4.744)	5083
BrtBeginRichFilterColumn (section 2.4.189)	5084
BrtEndRichFilterColumn (section 2.4.537)	5085
BrtBeginCustomRichFilters (section 2.4.41)	5086
BrtEndCustomRichFilters (section 2.4.392)	5087
BRTCustomRichFilter (section 2.4.345)	5088

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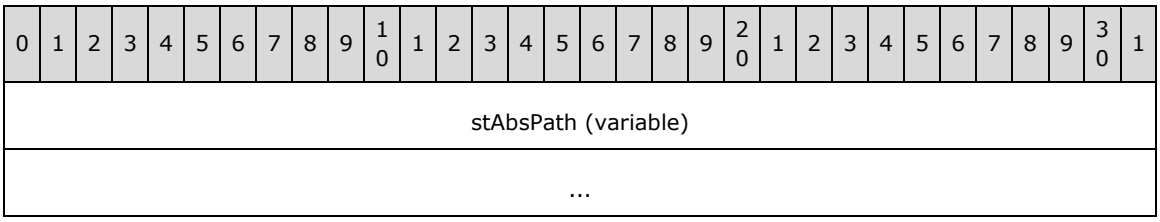
Name	Record type (number)
BrtTop10RichFilter (section 2.4.824)	5089
BrtDynamicRichFilter (section 2.4.358)	5090
BrtBeginRichSortCondition (section 2.4.191)	5092
BrtEndRichSortCondition (section 2.4.539)	5093
BrtRichFilterDateGroupItem (section 2.4.745)	5094
BrtBeginCalcFeatures (section 2.4.14)	5095
BrtEndCalcFeatures (section 2.4.366)	5096
BrtCalcFeature (section 2.4.312)	5097
BrtExternalLinksPr (section 2.4.652)	5099

2.4 Records

2.4.1 BrtAbsPath15

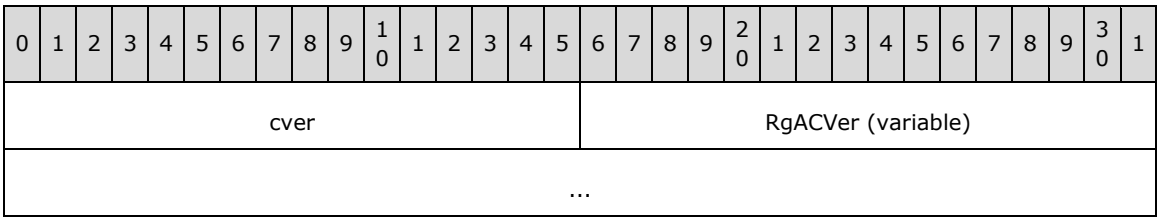
The **BrtAbsPath15** record specifies the location of the workbook.



stAbsPath (variable): An **XLWideString** (section 2.5.168) that specifies the location of the workbook as **absolute path** or **absolute URL**, not including the file name and extension.

2.4.2 BrtACBegin

The **BrtACBegin** record specifies the beginning of an alternate content block as specified by future record (section 2.1.6).



cver (2 bytes): An unsigned integer that specifies the count of **ACProductVersion** (section 2.5.1) structures in **RgACVer**. MUST be greater than or equal to 1.

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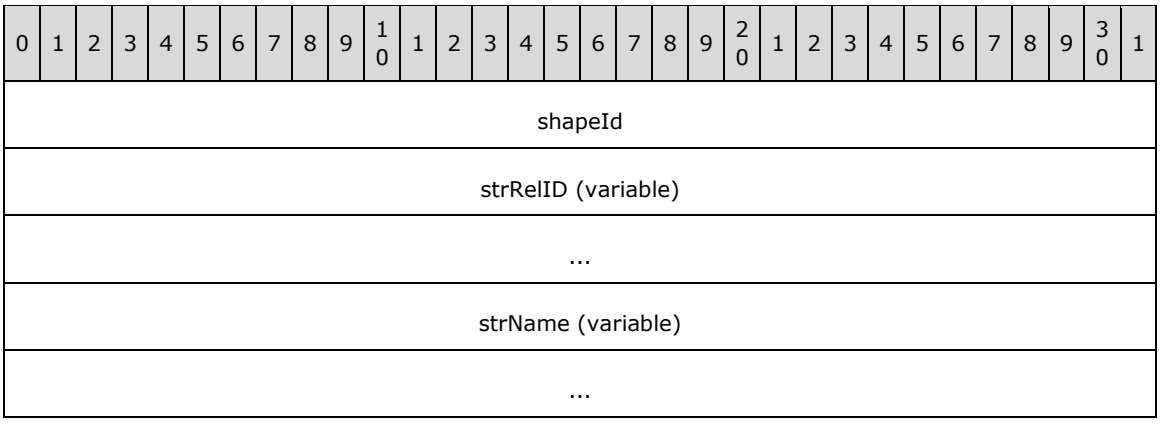
RgACVer (variable): An array of **ACProductVersion** (section 2.5.1) structures that specifies the applications and versions that can process the alternate content block. The count of items in this array MUST be equal to **cver**.

2.4.3 BrtACEnd

The **BrtACEnd** record specifies the end of an alternate content block as specified by future record (section 2.1.6).

2.4.4 BrtActiveX

The **BrtActiveX** record specifies an **ActiveX control**.



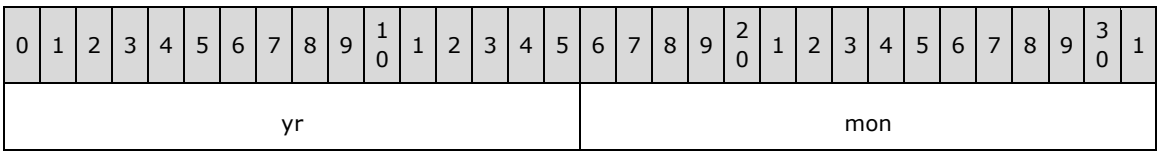
shapeId (4 bytes): An unsigned integer that corresponds to the **spid** attribute of a **shape** element in the **VML Drawings** (section 2.1.7.59) part as specified in [ISO/IEC29500-1:2016] section 18.2.29. This value MUST be greater than or equal to 0x00000001 and less than or equal to 0x03FFD7FF. The value of the **ObjectType** attribute of the **ClientData child element** (specified in [ISO/IEC29500-4:2016] section 19.4.2.12) of the shape element MUST be "Pict" as specified in [ISO/IEC29500-4:2016] section 19.4.3.2. The total number of unique identifiers specified by all **shapeId** fields in **BrtActiveX** records and **shapeId** fields in **BrtOleObject** (section 2.4.707) records in the worksheet (section 2.1.7.62) MUST NOT exceed 65535.

strRelID (variable): A **RelID** (section 2.5.114) that specifies a relationship that specifies an **ActiveX** (section 2.1.7.1) part containing control-specific properties and state information for the ActiveX control.

strName (variable): An **XLWideString** (section 2.5.168) that specifies a name for the ActiveX control. The length of this string MUST NOT exceed 32 characters. The name of the shape MUST correspond to the **id** attribute of a shape element in the **VML Drawings** (section 2.1.7.59) part as specified in [ISO/IEC29500-1:2016] section 19.1.2.19. This name MUST be unique among all shape names specified in the **VML Drawings** part of the worksheet (section 2.1.7.62).

2.4.5 BrtAFilterDateGroupItem

The **BrtAFilterDateGroupItem** record specifies information about a criterion for a date **AutoFilter**.



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dom	
hour	min
sec	unused1
unused2	
dntChecked	

yr (2 bytes): An unsigned integer that specifies the year for the AutoFilter. This value MUST be greater than or equal to 1000 and less than or equal to 9999.

mon (2 bytes): An unsigned integer that specifies the month for the AutoFilter. If **dntChecked** is greater than or equal to 0x00000001, this value MUST be greater than or equal to 1 and less than or equal to 12.

dom (4 bytes): An unsigned integer that specifies the day of the month for the AutoFilter. If **dntChecked** is greater than or equal to 0x00000002, this value MUST be greater than or equal to 1 and less than or equal to 31.

hour (2 bytes): An unsigned integer that specifies the hour for the AutoFilter. If **dntChecked** is greater than or equal to 0x00000003, this value MUST be less than or equal to 23.

min (2 bytes): An unsigned integer that specifies the minute for the AutoFilter. If **dntChecked** is greater than or equal to 0x00000004, this value MUST be less than or equal to 59.

sec (2 bytes): An unsigned integer that specifies the second for the AutoFilter. If **dntChecked** is equal to 0x00000005, this value MUST be less than or equal to 59.

unused1 (2 bytes): Undefined, and MUST be ignored.

unused2 (4 bytes): Undefined, and MUST be ignored.

dntChecked (4 bytes): An unsigned integer that specifies what comparisons are made to determine if a **cell** is displayed. For example, if this value is equal to DNTMONTH, only cells with the same year and month specified in this record are displayed. **dntChecked** MUST be equal to a value from the following table.

Name	Value	Meaning
DNTYEAR	0x00000000	Group by year
DNTMONTH	0x00000001	Group by month and year
DNTDAY	0x00000002	Group by day, month, and year
DNTHOUR	0x00000003	Group by hour, day, month, and year
DNTMINUTE	0x00000004	Group by minute, hour, day, month, and year
DNTSECOND	0x00000005	Group by second, minute, hour, day, month, and year

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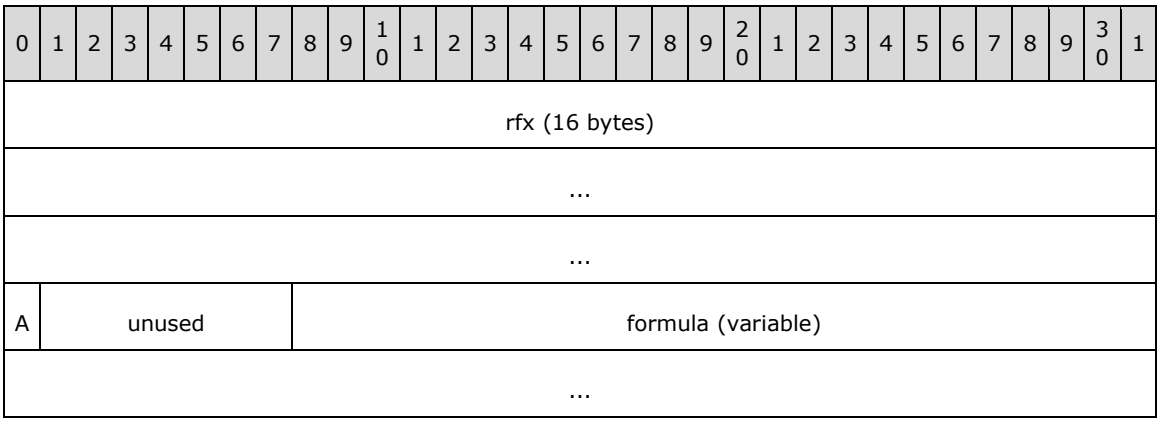
2.4.6 BrtArrFmla

The **BrtArrFmla** record type specifies an array formula (section 2.2.2) for a **range** of **cells**, as specified in **Worksheet** (section 2.1.7.62) part **ABNF** and **Macro Sheet** (section 2.1.7.32) part ABNF, that performs calculations on one or more sets of values, and then returns either a single result or multiple results across a continuous range of cells. This record is preceded by a single **BrtFmlaString** (section 2.4.674), **BrtFmlaNum** (section 2.4.673), **BrtFmlaBool** (section 2.4.671), or **BrtFmlaError** (section 2.4.672) record that represents the **logical top-left** cell in the range that uses this array formula. Other **BrtFmlaString**, **BrtFmlaNum**, **BrtFmlaBool**, or **BrtFmlaError** records that use this array formula follow after the **BrtArrFmla** record in the file, and are not necessarily in a contiguous sequence. The **BrtFmlaString**, **BrtFmlaNum**, **BrtFmlaBool**, or **BrtFmlaError** records that use this array formula MUST have a **cell** field that is within the range specified in the **ref** field of this record and MUST have their **formula** begin with **PtgExp** (section 2.5.97.40).



rfx (16 bytes): An **RfX** (section 2.5.117) that specifies the **row** and **column (1)** bounds of the array formula (section 2.2.2). Every cell specified by **rfx** MUST use the array formula.

A - fAlwaysCalc (1 bit): A bit that specifies if the array formula (section 2.2.2) needs to be calculated as part of the next recalculation.

Value	Meaning
0	Formula does not need to be calculated as part of the next recalculation.
1	Formula needs to be calculated as part of the next recalculation.

unused (7 bits): Undefined and MUST be ignored.

formula (variable): An **ArrayParsedFormula** (section 2.5.97.1) that contains this formula (section 2.2.2).

2.4.7 BrtBeginActiveXControls

The **BrtBeginActiveXControls** record specifies the beginning of a collection of **BrtActiveX** (section 2.4.4) records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of **BrtActiveX** records specifies **ActiveX controls** embedded in the **sheet**.

2.4.8 BrtBeginAFilter

The **BrtBeginAFilter** record specifies the **range** of **cells** the **AutoFilter** applies to and specifies the beginning of a collection of records as defined by the **Macro Sheet** (section 2.1.7.32) part **ABNF**, the

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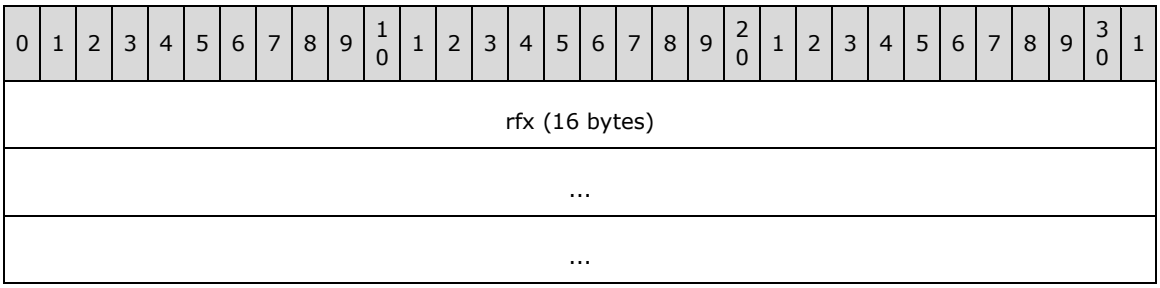
PivotTable (section 2.1.7.40) part ABNF, the **Table** (section 2.1.7.51) part ABNF, and the **Worksheet** (section 2.1.7.62) part ABNF. The collection of records specifies an AutoFilter.



rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the range of cells the AutoFilter applies to. If this **filter** is applied to a PivotTable (section 2.2.5), **rwFirst**, **rwLast**, **colFirst**, and **colLast** MUST all be equal to 0.

2.4.9 BrtBeginAutoSortScope

The **BrtBeginAutoSortScope** record specifies the beginning of a collection of records as specified by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection specifies pivot field sorting (section 2.2.5.3.2.1) properties.

If the value of the **PRFilter.isxvd** field in the first **BrtBeginPRFilter** (section 2.4.177) record followed by this record is -2, then sorting is specified to be by values, otherwise sorting is specified to be by **member** property captions.

When sorting by values, the collection of records specifies the **row** or **column (1)** that contains the values by which the pivot items (section 2.2.5.3.3) of this pivot field (section 2.2.5.3.2) are sorted.

When sorting by member property captions, the collection of records specifies a member property pivot field on the row axis or the column (1) axis of the PivotTable view (section 2.2.5.3). The pivot items of this pivot field are sorted by the pivot item captions of the specified member property pivot field.

The **BrtBeginPRFilters** (section 2.4.179) collection followed by this record MUST be sorted by the **PRFilter.isxvd** field in the **BrtBeginPRFilter** (section 2.4.177) in ascending order.

If this record exists, the **fAutoSort** field of the **BrtBeginSXVD** (section 2.4.270) record immediately preceding this record MUST be 1.

2.4.10 BrtBeginBook

The **BrtBeginBook** record specifies the beginning of a collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies properties of a **workbook**.

2.4.11 BrtBeginBookViews

The **BrtBeginBookViews** record specifies the beginning of a collection of **BrtBookView** (section 2.4.308) records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of **BrtBookView** records specifies **workbook views**.

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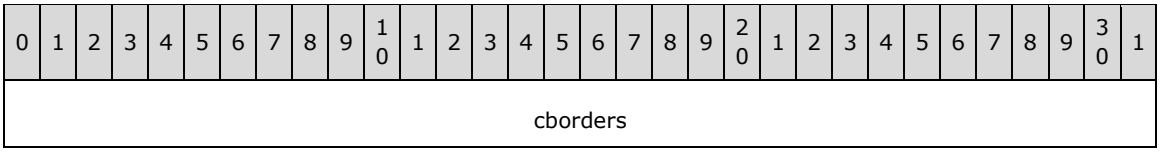
2.4.12 BrtBeginBorders

The **BrtBeginBorders** record specifies a count of **BrtBorder** (section 2.4.309) records and specifies the beginning of a collection of **BrtBorder** records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtBorder** records specifies **cell border style**.



cborders (4 bytes): An unsigned integer that specifies the number of **BrtBorder**. MUST be less than or equal to 0x0000FF96.

2.4.13 BrtBeginBundleShs

The **BrtBeginBundleShs** record specifies the beginning of a collection of **BrtBundleSh** (section 2.4.311) records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of **BrtBundleSh** records specifies the **sheets** in the **workbook**.

2.4.14 BrtBeginCalcFeatures

The **BrtBeginCalcFeatures** record specifies the beginning of a collection of **BrtCalcFeature** (section 2.4.312) records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of **BrtCalcFeature** records specifies features that are part of the calculation engine.

2.4.15 BrtBeginCellIgnoreECs

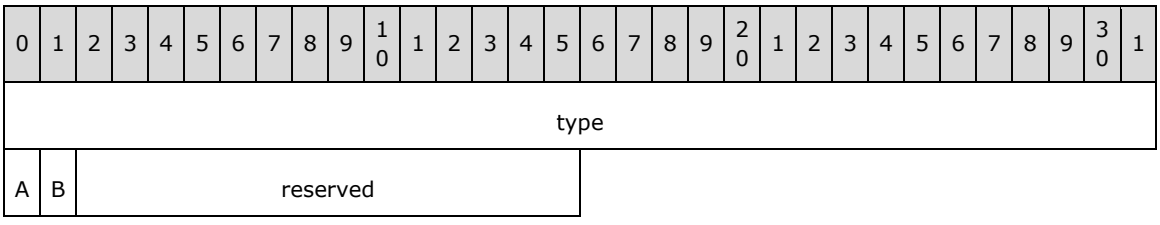
The **BrtBeginCellIgnoreECs** record specifies the beginning of a collection of **BrtCellIgnoreEC** (section 2.4.317) records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of **BrtCellIgnoreEC** records specifies the types of **cell** errors that are to be ignored for specific cell **ranges**.

2.4.16 BrtBeginCellIgnoreECs14

The **BrtBeginCellIgnoreECs14** record specifies the beginning of a collection of **BrtCellIgnoreEC14** (section 2.4.318) records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of **BrtCellIgnoreEC14** records specifies the types of **cell** errors that are to be ignored for specific cell **ranges**.

2.4.17 BrtBeginCellSmartTag

The **BrtBeginCellSmartTag** record specifies **smart tag** properties and specifies the beginning of a collection of **BrtCellSmartTagProperty** (section 2.4.324) records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of **BrtCellSmartTagProperty** (section 2.4.324) records specifies a smart tag associated with a **cell**.<6>



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type (4 bytes): An unsigned integer that specifies a zero-based index of a **BrtSmartTagType** record (section 2.4.779) in the collection of all records directly following **BrtBeginSmartTagTypes** (section 2.4.221) in the **Workbook** part **(**section 2.1.7.61**)**. This value MUST be less than the total number of **BrtSmartTagType** (section 2.4.779) records.

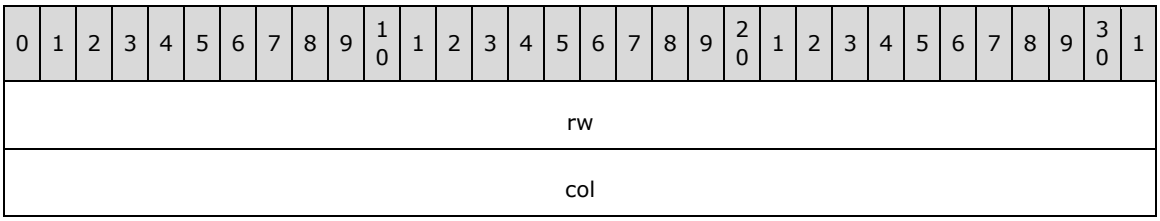
A - fDeleted (1 bit): A bit that specifies that the application does not display the smart tag because of explicit user choice.

B - fXMLBased (1 bit): A bit that specifies that smart tag recognition is triggered because the cell is associated with an **XML map**, where the element in the XML map has the same **XML namespace** and name as the **smart tag recognizer**.

reserved (14 bits): This value MUST be 0, and MUST be ignored.

2.4.18 BrtBeginCellSmartTags

The **BrtBeginCellSmartTags** record specifies the **row** and **column (1)** properties of a **cell** with a **smart tag** and specifies the beginning of a collection of records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of records specifies smart tag properties of a cell.<7>

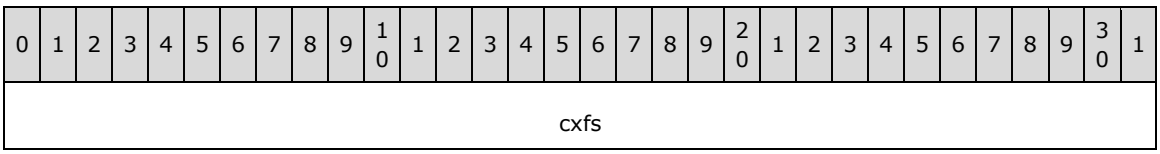


rw (4 bytes): A **Rw** (section 2.5.125) that specifies the row of the cell.

col (4 bytes): A **Col** (section 2.5.22) that specifies the column (1) of the cell.

2.4.19 BrtBeginCellStyleXFs

The **BrtBeginCellStyleXFs** record specifies a count of **BrtXF** (section 2.4.845) records and specifies the beginning of a collection of **BrtXF** records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. This collection specifies all cell style XFs (section 2.2.6.1.2.1) in the **workbook**. The collection MUST contain at least 0x0001 and no more than 0xFF96 **BrtXF** records.



cxfs (4 bytes): An unsigned integer that specifies the number of **BrtXF** (section 2.4.845) records in this collection. MUST be at least 0x0001 and no more than 0xFF96.

2.4.20 BrtBeginCellWatches

The **BrtBeginCellWatches** record specifies the beginning of a collection of **BrtCellWatch** (section 2.4.326) records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of **BrtCellWatch** records specifies a set of references to **watched cells**.

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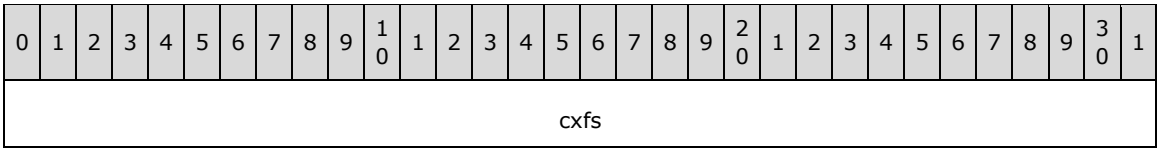
2.4.21 BrtBeginCellXFs

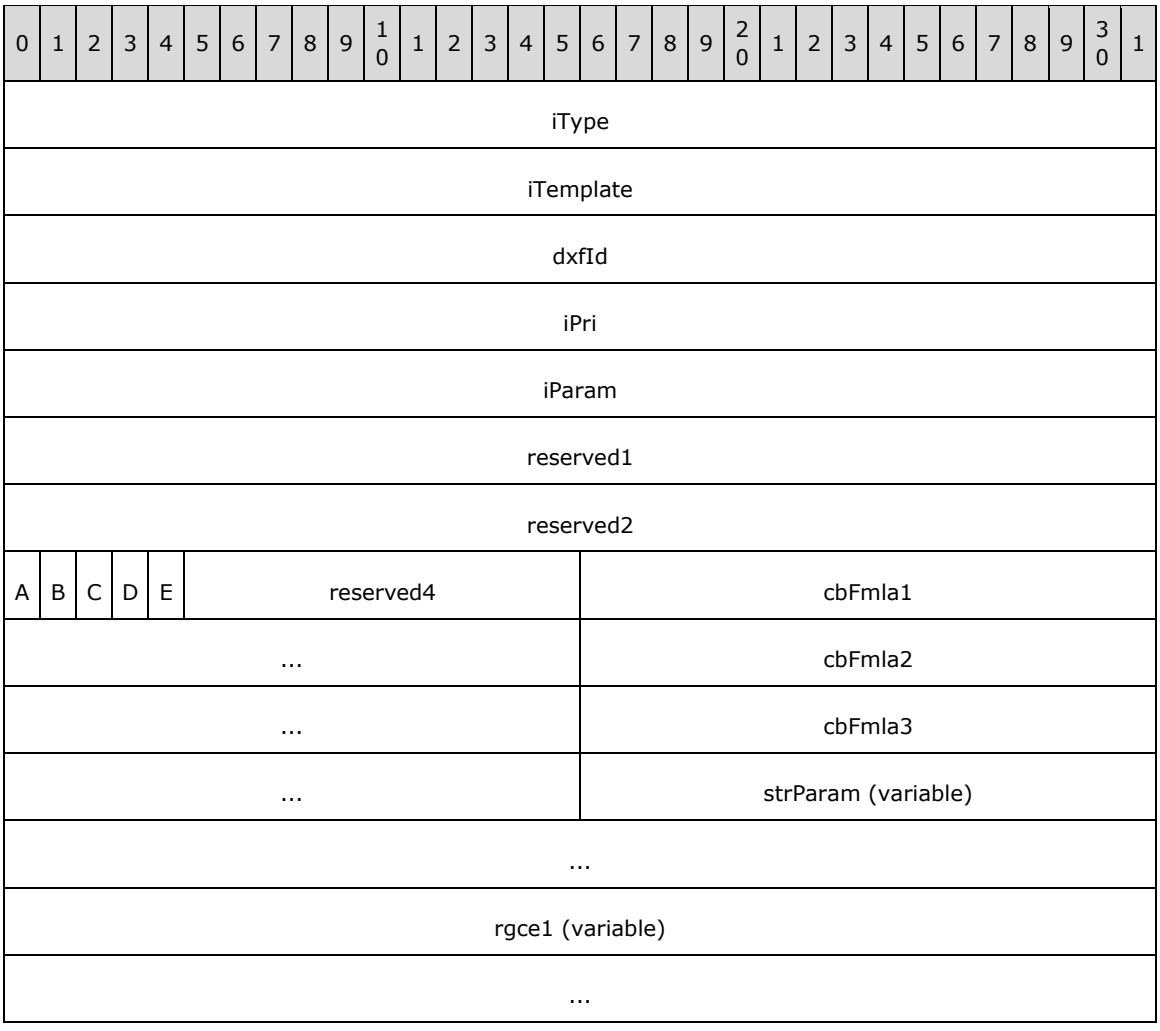
The **BrtBeginCellXFs** record specifies a count of **BrtXF** (section 2.4.845) records and specifies the beginning of a collection of **BrtXF** records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. This collection specifies all cell XFs (section 2.2.6.1.1) in the **workbook**. The collection MUST contain at least 0x0001 and no more than 0xFF96 **BrtXF** records.



cxfs (4 bytes): An unsigned integer that specifies the number of **BrtXF** (section 2.4.845) records in this collection. MUST be at least 0x0001 and no more than 0xFF96.

2.4.22 BrtBeginCFRule

The **BrtBeginCFRule** record specifies the properties of a **conditional formatting** rule and specifies the beginning of a collection of records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF** and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies a conditional formatting rule for a **range**.



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rgce2 (variable)
...
rgce3 (variable)
...

iType (4 bytes): A **CFType** (section 2.5.17) that specifies the way conditional formatting is displayed in the range.

When **iType** is CF_TYPE_GRADIENT, there MUST be one **BrtBeginColorScale** (section 2.4.27) record in the collection of conditional formatting records following this record.

When **iType** is CF_TYPE_DATABAR, there MUST be one **BrtBeginDatabar** (section 2.4.42) record in the collection of conditional formatting records following this record.

When **iType** is CF_TYPE_MULTISTATE, there MUST be one **BrtBeginIconSet** (section 2.4.90) record in the collection of conditional formatting records following this record.

iTemplate (4 bytes): A **CFTemp** (section 2.5.15) that specifies the type of logical condition that determines when conditional formatting is shown. The following table specifies the allowable combinations of **iType** and **iTemplate**. Other combinations MUST NOT be used.

Value of iType	Value of iTemplate
CF_TYPE_CELLIS	CF_TEMPLATE_EXPR
CF_TYPE_EXPRIS	CF_TEMPLATE_FMLA
CF_TYPE_EXPRIS	CF_TEMPLATE_UNIQUEVALUES
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSTEXT
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSBLANKS
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSNOBLANKS
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSERRORS
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSNOERRORS
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTODAY
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTOMORROW
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODYESTERDAY
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLAST7DAYS
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLASTMONTH
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODNEXTMONTH
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTHISWEEK
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODNEXTWEEK
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLASTWEEK
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTHISMONTH

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Value of iType	Value of iTemplate
CF_TYPE_EXPRIS	CF_TEMPLATE_ABOVEAVERAGE
CF_TYPE_EXPRIS	CF_TEMPLATE_BELOWAVERAGE
CF_TYPE_EXPRIS	CF_TEMPLATE_DUPLICATEVALUES
CF_TYPE_EXPRIS	CF_TEMPLATE_EQUALABOVEAVERAGE
CF_TYPE_EXPRIS	CF_TEMPLATE_EQUALBELOWAVERAGE
CF_TYPE_GRADIENT	CF_TEMPLATE_GRADIENT
CF_TYPE_DATABAR	CF_TEMPLATE_DATABAR
CF_TYPE_FILTER	CF_TEMPLATE_FILTER
CF_TYPE_MULTISTATE	CF_TEMPLATE_MULTISTATE

dxfId (4 bytes): A **DXFId** (section 2.5.37) that specifies the differential formatting (section 2.2.6.2) applied to the range. If **iType** is CF_TYPE_GRADIENT, CF_TYPE_DATABAR, or CF_TYPE_MULTISTATE, **dxfId** MUST be 0xFFFFFFFF and MUST be ignored.

iPri (4 bytes): A signed integer that specifies the relative priority of this rule compared to the other rules in this **sheet**. Rules are applied in order from the smallest **iPri** to the largest **iPri**. This value MUST be greater than 0 and MUST NOT duplicate an **iPri** value in any other **BrtBeginCFRule** (section 2.4.22) or **BrtBeginCFRule14** (section 2.4.23) record that exists in the same **worksheet** (section 2.1.7.62) or **macro sheet** (section 2.1.7.32) part.

iParam (4 bytes): This structure specifies a parameter for the conditional formatting rule. The value, type, and meaning of **iParam** depend on the value of **iType** and **iTemplate**, as specified in the following table.

Value of iType	Value of iTemplate	Meaning of iParam
CF_TYPE_CELLIS	CF_TEMPLATE_EXPR	A **CFOper** (section 2.5.14) that specifies the type of value comparison used.
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSTEXT	A **CFTextOper** (section 2.5.16) that specifies the type of text comparison operation used.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTODAY	A **CFDateOper** (section 2.5.11) that MUST be CF_TIMEPERIOD_TODAY.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTOMORROW	A **CFDateOper** that MUST be CF_TIMEPERIOD_TOMORROW.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODYESTERDAY	A **CFDateOper** that MUST be CF_TIMEPERIOD_YESTERDAY.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLAST7DAYS	A **CFDateOper** that MUST be CF_TIMEPERIOD_LAST7DAYS.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLASTMONTH	A **CFDateOper** that MUST be CF_TIMEPERIOD_LASTMONTH.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODNEXTMONTH	A **CFDateOper** that MUST be CF_TIMEPERIOD_NEXTMONTH.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTHISWEEK	A **CFDateOper** that MUST be CF_TIMEPERIOD_THISWEEK.

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Value of iType	Value of iTemplate	Meaning of iParam
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODNEXTWEEK	A **CFDateOper** that MUST be CF_TIMEPERIOD_NEXTWEEK.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLASTWEEK	A **CFDateOper** that MUST be CF_TIMEPERIOD_LASTWEEK.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTHISMONTH	A **CFDateOper** that MUST be CF_TIMEPERIOD_THISMONTH.
CF_TYPE_EXPRIS	CF_TEMPLATE_ABOVEAVERAGE	An unsigned integer that specifies the number of standard deviations above the average to format. The value of **iParam** MUST be greater than or equal to 0 and less than 4. If **iParam** is 0, conditional formatting applies to all values greater than the average.
CF_TYPE_EXPRIS	CF_TEMPLATE_BELOWAVERAGE	An unsigned integer that specifies the number of standard deviations below the average to format. The value of **iParam** MUST be greater than or equal to 0 and less than 4. If **iParam** is 0, conditional formatting applies to all values below the average.
CF_TYPE_EXPRIS	CF_TEMPLATE_EQUALABOVEAVERAGE	MUST be 0x00000000.
CF_TYPE_EXPRIS	CF_TEMPLATE_EQUALBELOWAVERAGE	MUST be 0x00000000.
CF_TYPE_FILTER	CF_TEMPLATE_FILTER	An unsigned integer that specifies how many **cells** are formatted by this rule. The value of **fPercent** specifies whether **iParam** is a percentage or a quantity of cells. When **fPercent** is 1, **iParam** MUST be greater than or equal to 0 and less than or equal to 100. Otherwise **iParam** MUST be greater than or equal to 1 and less than or equal to 1000.

For all combinations of **iType** and **iTemplate** that are not specified in this table, **iParam** MUST be 0x00000000.

reserved1 (4 bytes): This value MUST be 0 and MUST be ignored.

reserved2 (4 bytes): This value MUST be 0 and MUST be ignored.

A - reserved3 (1 bit): This value MUST be 0 and MUST be ignored.

B - fStopTrue (1 bit): A bit that specifies whether evaluation of additional conditional formatting rules is skipped for a cell if the rule evaluates to TRUE for that cell. This value MUST be 0 when **iType** is CF_TYPE_DATABAR, CF_TYPE_GRADIENT, or CF_TYPE_MULTISTATE.

Value	Meaning
0	After this rule has been evaluated, the rule with the next largest **iPri** value is evaluated normally.
1	If this rule evaluates to TRUE for a cell, rules with a larger **iPri** value are not evaluated for that cell. If this rule evaluates to FALSE for a cell, the rule with the next largest **iPri** value is evaluated normally.

C - fAbove (1 bit): A bit that specifies whether conditional formatting is applied to cells with values above or below the average value of other cells in the range. If **iTemplate** is

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CF_TEMPLATE_ABOVEAVERAGE or CF_TEMPLATE_EQUALABOVEAVERAGE, **fAbove** MUST be 1. Otherwise, **fAbove** MUST be 0.

D - fBottom (1 bit): A bit that specifies how cells are formatted as specified by the following table.

Value	Meaning
0	Conditional formatting is applied to cells whose value is in the top end of the range specified by **iParam** and **fPercent**.
1	Conditional formatting is applied to cells whose value is in the bottom end of the range specified by **iParam** and **fPercent**.

If **iType** is not CF_TYPE_FILTER, **fBottom** is unused and MUST be 0.

E - fPercent (1 bit): A bit that specifies how cells are formatted as specified by the following table.

Value	Meaning
0	Conditional formatting is applied to the number of cells specified by **iParam**.
1	**iParam** specifies the percentage of cells in the range to which conditional formatting is applied.

If **iType** is not CF_TYPE_FILTER, **fPercent** is unused and MUST be 0.

reserved4 (11 bits): This value MUST be 0 and MUST be ignored.

cbFmla1 (4 bytes): An unsigned integer. If this value is equal to 0x00000000, **rgce1** MUST NOT exist. If this value is nonzero, **rgce1** MUST exist and the value of **cbFmla1** MUST be ignored.

cbFmla2 (4 bytes): An unsigned integer. If this value is equal to 0x00000000, **rgce2** MUST NOT exist. If nonzero, **rgce2** MUST exist and the value of **cbFmla2** MUST be ignored.

cbFmla3 (4 bytes): An unsigned integer. If this value is equal to 0x00000000, **rgce3** MUST NOT exist. If nonzero, **rgce3** MUST exist and the value of **cbFmla3** MUST be ignored.

strParam (variable): An **XLNullableWideString** (section 2.5.166) that specifies a value used in this conditional formatting rule. If **iTemplate** is not CF_TEMPLATE_CONTAINSTEXT, **strParam** MUST be NULL and MUST be ignored. Otherwise, **strParam** MUST contain a string that specifies the value that is searched for, and **strParam** MUST be greater than 0 and less than 256 characters long.

rgce1 (variable): A **CFParsedFormula** (section 2.5.97.6) that specifies the first formula (section 2.2.2) used in this rule. The following table specifies the conditions for which **rgce1** MUST contain a formula. For any conditions not specified in the following table, **cbFmla1** MUST be 0x00000000 and **rgce1** MUST be omitted.

Condition	Formula in rgce1
iType = CF_TYPE_CELLIS	A **CFParsedFormula** that specifies the formula (section 2.2.2), numeric value, or **cell reference** that specifies the first operand for the **CFOper** specified by **iParam**.
iType = CF_TYPE_EXPRIS and **iTemplate**=CF_TEMPLATE_FMLA	A **CFParsedFormula**. When the formula (section 2.2.2) returns 0, conditional formatting is not displayed. When the formula returns a nonzero value, conditional formatting is displayed.
iType = CF_TYPE_EXPRIS and **iTemplate** = CF_TEMPLATE_CONTAINSTEXT	A **CFParsedFormula** that implements the text comparison operation specified by **iParam**.
iType = CF_TYPE_EXPRIS and **iTemplate** = CF_TEMPLATE_CONTAINSBLANKS	A **CFParsedFormula** that returns a nonzero value when the cell is blank.

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Condition	Formula in rgce1
iType = CF_TYPE_EXPRIS and **iTemplate** = CF_TEMPLATE_CONTAINSNOBLANKS	A **CFParsedFormula** that returns a nonzero value when the cell is not blank.
iType = CF_TYPE_EXPRIS and **iTemplate** = CF_TEMPLATE_CONTAINSERRORS	A **CFParsedFormula** that returns a nonzero value when the cell contains an error.
iType = CF_TYPE_EXPRIS and **iTemplate** = CF_TEMPLATE_CONTAINSNOERRORS	A **CFParsedFormula** that returns a nonzero value when the cell does not contain an error.
iType = CF_TYPE_EXPRIS, and **iTemplate** greater than or equal to 0x0F and less than or equal to 0x18	A **CFParsedFormula** that implements the date comparison operation specified by **iParam**.

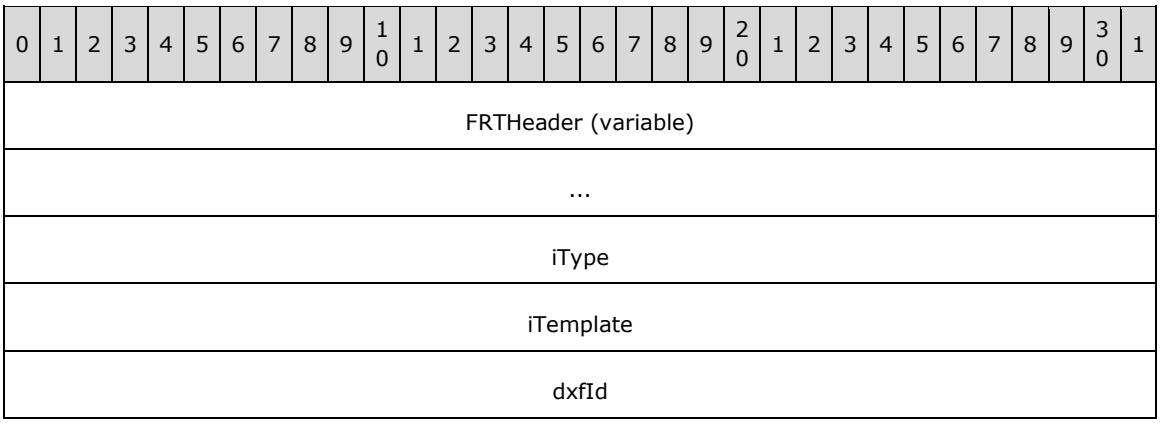
rgce2 (variable): A **CFParsedFormula** that specifies the second formula (section 2.2.2) used in this rule. The following table specifies the conditions for which **rgce2** MUST contain a formula. For any conditions not specified in the following table, **cbFmla2** MUST be 0x00000000 and **rgce2** MUST be omitted.

Condition	Formula in rgce2
iType = CF_TYPE_CELLIS, and **iParam**=CF_OPER_BN or CF_OPER_NB	A **CFParsedFormula** that specifies the formula (section 2.2.2), numeric value, or cell reference that specifies the second operand for the **CFOper** specified by **iParam**.

rgce3 (variable): A **CFParsedFormula** that specifies the third formula (section 2.2.2) used in this rule. If **iType** is not CF_TYPE_GRADIENT, CF_TYPE_DATABAR, or CF_TYPE_MULTISTATE, **cbFmla3** MUST be 0x00000000 and **rgce3** MUST be omitted. Otherwise, **rgce3** can contain a **CFParsedFormula**. When this formula returns zero, conditional formatting is not displayed. When the formula returns a nonzero value, or when **rgce3** is omitted, conditional formatting is displayed.

2.4.23 BrtBeginCFRule14

The **BrtBeginCFRule14** record specifies the properties of a **conditional formatting** rule and specifies the beginning of a collection of records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of records specifies a conditional formatting rule for a **range**. This record is equivalent to **BrtBeginCFRule** (section 2.4.22) but this record allows a **GUID** to be specified for the associated **BrtCFRuleExt** (section 2.4.328) record.



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iPri							
iParam							
reserved1							
reserved2							
A	B	C	D	E	reserved4		cbFmla1
...							cbFmla2
...							cbFmla3
...							unused1
...							guid (16 bytes)
...							
...							
...							fGuid
...							strParam (variable)
...							

FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the future record (section 2.1.6) information for this record. The **FRTHeader** fields MUST have the values listed in the following table.

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	0
FRTHeader.fFormulas	0 or 1
FRTHeader.fRelID	0

FRTHeader.fFormulas MUST be 1 if any of the fields **cbFmla1**, **cbFmla2**, or **cbFmla3** are nonzero. Otherwise, it MUST be 0.

FRTHeader.rgFormulas contains an array of one or two formulas (section 2.2.2) in the conditional formatting rule. The number of formulas in this array MUST be equal to the number of fields (**cbFmla1**, **cbFmla2**, and **cbFmla3**) that are nonzero. **cbFmla1**, **cbFmla2**, and **cbFmla3** MUST NOT all be nonzero.

The following table explains how to interpret the first formula in the array, if it is present.

Condition	Interpretation of first formula in FRTHeader.rgFormulas
iType = CF_TYPE_CELLIS	A **FRTCFParsedFormula14** (section 2.5.55) that specifies the formula (section 2.2.2), numeric value, or **cell**

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Condition	Interpretation of first formula in FRTHeader.rgFormulas
	reference that specifies the first operand for the **CFOper** (section 2.5.14) specified by **iParam**.
iType = CF_TYPE_EXPRIS and **iTemplate**=CF_TEMPLATE_FMLA	A **FRTCFParsedFormula14**. When the formula (section 2.2.2) returns 0, conditional formatting is not displayed. When the formula returns a nonzero value, conditional formatting is displayed.
iType = CF_TYPE_EXPRIS and **iTemplate** = CF_TEMPLATE_CONTAINSTEXT	A **FRTCFParsedFormula14** that implements the text comparison operation specified by **iParam**.
iType = CF_TYPE_EXPRIS and **iTemplate** = CF_TEMPLATE_CONTAINSBLANKS	A **FRTCFParsedFormula14** that returns a nonzero value when the **cell** is blank.
iType = CF_TYPE_EXPRIS and **iTemplate** = CF_TEMPLATE_CONTAINSNOBLANKS	A **FRTCFParsedFormula14** that returns a nonzero value when the cell is not blank.
iType = CF_TYPE_EXPRIS and **iTemplate** = CF_TEMPLATE_CONTAINSERRORS	A **FRTCFParsedFormula14** that returns a nonzero value when the cell contains an error.
iType = CF_TYPE_EXPRIS and **iTemplate** = CF_TEMPLATE_CONTAINSNOERRORS	A **FRTCFParsedFormula14** that returns a nonzero value when the cell does not contain an error.
iType = CF_TYPE_EXPRIS, and **iTemplate** greater than or equal to 0x0F and less than or equal to 0x18	A **FRTCFParsedFormula14** that implements the date comparison operation specified by **iParam**.
iType = CF_TYPE_GRADIENT, CF_TYPE_DATABAR, or CF_TYPE_MULTISTATE	A **FRTCFParsedFormula14** that specifies whether to display conditional formatting. When this formula (section 2.2.2) returns zero, conditional formatting is not displayed. When the formula returns a nonzero value, or is not present, conditional formatting is displayed.

If none of the preceding conditions hold, **FRTHeader.fFormulas** MUST be 0.

The following table explains how to interpret the second formula (section 2.2.2) in the array, if it is present.

Condition	Interpretation of second formula in FRTHeader.rgFormulas
iType = CF_TYPE_CELLIS, and **iParam**=CF_OPER_BN or CF_OPER_NB	A **FRTCFParsedFormula14** (section 2.5.55) that specifies the formula (section 2.2.2), numeric value, or cell reference that specifies the second operand for the **CFOper** specified by **iParam**.

If the preceding condition does not hold, **FRTHeader.rgFormulas** MUST contain fewer than two formulas.

iType (4 bytes): A **CFType** (section 2.5.17) that specifies the way conditional formatting is displayed in the range.

When **iType** is CF_TYPE_GRADIENT, there MUST be one **BrtBeginColorScale14** (section 2.4.28) record in the collection of conditional formatting records following this record.

When **iType** is CF_TYPE_DATABAR, there MUST be one **BrtBeginDatabar14** (section 2.4.43) record in the collection of conditional formatting records following this record.

When **iType** is CF_TYPE_MULTISTATE, there MUST be one **BrtBeginIconSet14** (section 2.4.91) record in the collection of conditional formatting records following this record.

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iTemplate (4 bytes): A **CFTemp** (section 2.5.15) that specifies the type of logical condition that determines when conditional formatting is shown. The following table specifies the allowable combinations of **iType** and **iTemplate**. Other combinations MUST NOT be used.

Value of iType	Value of iTemplate
CF_TYPE_CELLIS	CF_TEMPLATE_EXPR
CF_TYPE_EXPRIS	CF_TEMPLATE_FMLA
CF_TYPE_EXPRIS	CF_TEMPLATE_UNIQUEVALUES
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSTEXT
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSBLANKS
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSNOBLANKS
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSERRORS
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSNOERRORS
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTODAY
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTOMORROW
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODYESTERDAY
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLAST7DAYS
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLASTMONTH
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODNEXTMONTH
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTHISWEEK
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODNEXTWEEK
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLASTWEEK
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTHISMONTH
CF_TYPE_EXPRIS	CF_TEMPLATE_ABOVEAVERAGE
CF_TYPE_EXPRIS	CF_TEMPLATE_BELOWAVERAGE
CF_TYPE_EXPRIS	CF_TEMPLATE_DUPLICATEVALUES
CF_TYPE_EXPRIS	CF_TEMPLATE_EQUALABOVEAVERAGE
CF_TYPE_EXPRIS	CF_TEMPLATE_EQUALBELOWAVERAGE
CF_TYPE_GRADIENT	CF_TEMPLATE_GRADIENT
CF_TYPE_DATABAR	CF_TEMPLATE_DATABAR
CF_TYPE_DATABAR	CF_TEMPLATE_EXPR
CF_TYPE_FILTER	CF_TEMPLATE_FILTER
CF_TYPE_MULTISTATE	CF_TEMPLATE_MULTISTATE

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dxfId (4 bytes): A **DXFId14**<8> (section 2.5.38) that specifies the differential formatting (section 2.2.6.2) applied to the range. If **iType** is CF_TYPE_GRADIENT, CF_TYPE_DATABAR, or CF_TYPE_MULTISTATE, and **iPri** is greater than 0, **dxfId** MUST be 0xFFFFFFFF and MUST be ignored.

If **iPri** is equal to -1, this field MUST be 0, and MUST be ignored.

iPri (4 bytes): A signed integer that specifies the relative priority of this rule compared to the other rules in the **sheet**, or whether this **BrtBeginCFRule14** (section 2.4.23) specifies extension information for a conditional formatting **data bar** rule specified by a **BrtBeginCFRule** (section 2.4.22) record. MUST be greater than 0 or equal to -1.

Rules with **iPri** field greater than -1 are applied in order from the smallest **iPri** to the largest **iPri**. If **iPri** is greater than 0, it MUST NOT duplicate an **iPri** value in any other **BrtBeginCFRule** or **BrtBeginCFRule14** record that exists in the same **worksheet** (section 2.1.7.62) part.

If **iPri** is equal to -1, this record specifies extension information for a conditional formatting data bar rule, and MUST be followed by a **BrtBeginDatabar14** (section 2.4.43) record describing this additional information. The value of the **guid** field MUST equal the value of the **guid** field of the associated **BrtCFRuleExt** (section 2.4.328) record. The **iPri** field of the **BrtBeginCFRule** record associated with this **BrtCFRuleExt** record specifies the relative priority of this rule. If **iPri** is equal to -1 and **fGuid** is 0x00, or if **fGuid** is 0x01 but there exists no **BrtCFRuleExt** record containing a matching GUID, then this record and the succeeding **BrtBeginDatabar14** (section 2.4.43) record MUST be ignored. If **iPri** is not equal to -1 **fGuid** and **guid** MUST be ignored.

iParam (4 bytes): This structure specifies a parameter for this conditional formatting rule. The value, type, and meaning of **iParam** depend on the value of **iType** and **iTemplate**, as specified in the following table:

Value of iType	Value of iTemplate	Meaning of iParam
CF_TYPE_CELLIS	CF_TEMPLATE_EXPR	A **CFOper** that specifies the type of value comparison used.
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSTEXT	A **CFTextOper** (section 2.5.16) that specifies the type of text comparison operation used.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTODAY	A **CFDateOper** (section 2.5.11) that MUST be CF_TIMEPERIOD_TODAY.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTOMORROW	A **CFDateOper** that MUST be CF_TIMEPERIOD_TOMORROW.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODYESTERDAY	A **CFDateOper** that MUST be CF_TIMEPERIOD_YESTERDAY.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLAST7DAYS	A **CFDateOper** that MUST be CF_TIMEPERIOD_LAST7DAYS.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLASTMONTH	A **CFDateOper** that MUST be CF_TIMEPERIOD_LASTMONTH.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODNEXTMONTH	A **CFDateOper** that MUST be CF_TIMEPERIOD_NEXTMONTH.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTHISWEEK	A **CFDateOper** that MUST be CF_TIMEPERIOD_THISWEEK.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODNEXTWEEK	A **CFDateOper** that MUST be CF_TIMEPERIOD_NEXTWEEK.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLASTWEEK	A **CFDateOper** that MUST be CF_TIMEPERIOD_LASTWEEK.

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Value of iType	Value of iTemplate	Meaning of iParam
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTHISMONTH	A **CFDateOper** that MUST be CF_TIMEPERIOD_THISMONTH.
CF_TYPE_EXPRIS	CF_TEMPLATE_ABOVEAVERAGE	An unsigned integer that specifies the number of standard deviations above the average to format. **iParam** MUST be greater than or equal to 0 and less than 4. If **iParam** is 0, conditional formatting applies to all values greater than the average.
CF_TYPE_EXPRIS	CF_TEMPLATE_BELOWAVERAGE	An unsigned integer that specifies the number of standard deviations below the average to format. **iParam** MUST be greater than or equal to 0 and less than 4. If **iParam** is 0, conditional formatting applies to all values below the average.
CF_TYPE_EXPRIS	CF_TEMPLATE_EQUALABOVEAVERAGE	MUST be 0x00000000.
CF_TYPE_EXPRIS	CF_TEMPLATE_EQUALBELOWAVERAGE	MUST be 0x00000000.
CF_TYPE_FILTER	CF_TEMPLATE_FILTER	An unsigned integer that specifies how many cells are formatted by this rule. The value of **fPercent** specifies whether **iParam** is a percentage or a quantity of cells. When **fPercent** is 1, **iParam** MUST be greater than or equal to 0 and less than or equal to 100. Otherwise **iParam** MUST be greater than or equal to 1 and less than or equal to 1000.

For all combinations of **iType** and **iTemplate** that are not specified in this table, **iParam** MUST be 0x00000000.

reserved1 (4 bytes): This value MUST be 0 and MUST be ignored.

reserved2 (4 bytes): This value MUST be 0 and MUST be ignored.

A - reserved3 (1 bit): This value MUST be 0 and MUST be ignored.

B - fStopTrue (1 bit): A bit that specifies whether evaluation of additional conditional formatting rules is skipped for a cell if this rule evaluates to TRUE for that cell. The value MUST be 0 when **iType** is CF_TYPE_DATABAR, CF_TYPE_GRADIENT, or CF_TYPE_MULTISTATE. The following table explains the meanings of each value for **fStopTrue**.

Value	Meaning
0	After this rule has been evaluated, the rule with the next largest **iPri** value is evaluated normally.
1	If this rule evaluates to TRUE for a cell, rules with a larger **iPri** value are not evaluated for that cell. If this rule evaluates to FALSE for a cell, the rule with the next largest **iPri** value is evaluated normally.

C - fAbove (1 bit): A bit that specifies whether conditional formatting is applied to cells with values above or below the average value of other cells in the range. If **iTemplate** is CF_TEMPLATE_ABOVEAVERAGE or CF_TEMPLATE_EQUALABOVEAVERAGE, **fAbove** MUST be 1. Otherwise, **fAbove** MUST be 0.

D - fBottom (1 bit): A bit that specifies how cells are formatted as specified by the following table.

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Value	Meaning
0	Conditional formatting is applied to cells whose value is in the top end of the range specified by **iParam** and **fPercent**.
1	Conditional formatting is applied to cells whose value is in the bottom end of the range specified by **iParam** and **fPercent**.

If **iType** is not CF_TYPE_FILTER, **fBottom** is unused and MUST be 0.

E - fPercent (1 bit): A bit that specifies how cells are formatted as specified by the following table.

Value	Meaning
0	Conditional formatting is applied to the number of cells specified by **iParam**.
1	**iParam** specifies the percentage of cells in the range to which conditional formatting is applied.

If **iType** is not CF_TYPE_FILTER, **fPercent** is unused and MUST be 0.

reserved4 (11 bits): This value MUST be 0 and MUST be ignored.

cbFmla1 (4 bytes): An unsigned integer that MUST equal either the **cce** of the first formula (section 2.2.2) in **FRTHeader.rgFormulas** or 0x00000000. If **iType** is CF_TYPE_GRADIENT, CF_TYPE_DATABAR, or CF_TYPE_MULTISTATE, **cbFmla1** MUST be 0x00000000. If **cbFmla1** is nonzero, **cbFmla3** MUST be 0x00000000.

cbFmla2 (4 bytes): If **cbFmla1** is nonzero, this value is an unsigned integer that MUST equal the **cce** of the second formula (section 2.2.2) in **FRTHeader.rgFormulas,** or 0x00000000. When **cbFmla1** is 0x00000000, **cbFmla2** MUST be 0x00000000. If **cbFmla2** is nonzero, **cbFmla3** MUST be 0x00000000.

cbFmla3 (4 bytes): An unsigned integer that MUST equal either the **cce** of the first formula (section 2.2.2) in **FRTHeader.rgFormulas** or 0x00000000. If **cbFmla3** is nonzero, both **cbFmla1** and **cbFmla2** MUST be 0x00000000. If **iType** is not equal to CF_TYPE_GRADIENT, CF_TYPE_DATABAR, or CF_TYPE_MULTISTATE, **cbFmla3** MUST be 0x00000000.

unused1 (4 bytes): Undefined, and MUST be ignored.

guid (16 bytes): If **fGuid** is 1, this value is a GUID as specified in [MS-DTYP] section 2.3.4 that identifies the conditional formatting rule. If **fGuid** is 0, this field is unused and MUST be ignored.

fGuid (4 bytes): A Boolean (section 2.5.97.3) that specifies whether the conditional formatting rule contains a GUID. This value MUST be a value from the following table.

Value	Meaning
0x00000000	The conditional formatting rule does not contain a GUID. **guid** is unused and MUST be ignored.
0x00000001	The conditional formatting rule contains a GUID.

If **iPri** is -1 and **fGuid** is 0x00000001, the value of the **guid** field MUST equal the value of the **guid** field of the associated **BrtCFRuleExt** (section 2.4.328) record. If **iPri** is -1 and **fGuid** is 0x00000000, this **BrtBeginCFRule14** (section 2.4.23) and the succeeding **BrtBeginDatabar14** (section 2.4.43) record MUST be ignored.

strParam (variable): An **XLNullableWideString** (section 2.5.166) that specifies a value used in the conditional formatting rule. If **iTemplate** is not CF_TEMPLATE_CONTAINSTEXT, **strParam** MUST be NULL and MUST be ignored. Otherwise, **strParam** MUST contain a string that specifies the value that is searched for, and **strParam** MUST be greater than 0 and less than 256 characters long.

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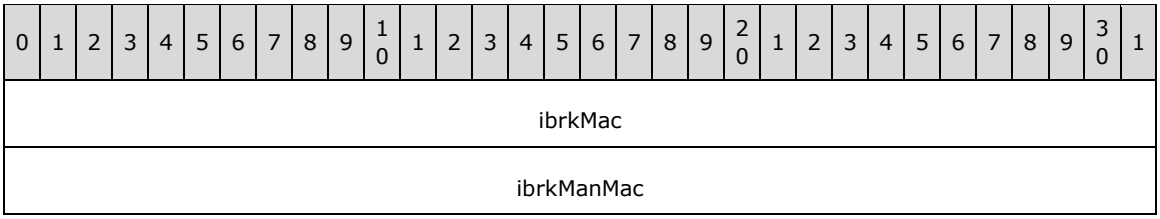
2.4.24 BrtBeginColBrk

The **BrtBeginColBrk** record specifies vertical **page break** properties and specifies the beginning of a collection of **BrtBrk** (section 2.4.310) records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF** and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of **BrtBrk** records specifies vertical page breaks.



ibrkMac (4 bytes): An unsigned integer that specifies the number of vertical page breaks in the **workbook**. MUST be less than or equal to 1023.

ibrkManMac (4 bytes): An unsigned integer that specifies the number of manual vertical page breaks that occur at locations specified by the user. This value MUST be equal to **ibrkMac**.

2.4.25 BrtBeginColInfos

The **BrtBeginColInfos** record specifies the beginning of a collection of **BrtColInfo** (section 2.4.331) records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF** and **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of **BrtColInfo** records specifies the **column (1)** width and formatting for one or more columns (1) of a **sheet**.

2.4.26 BrtBeginColorPalette

The **BrtBeginColorPalette** record specifies the beginning of a collection of records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of records specifies the color information associated with this **workbook**.

When the color palette is modified, the **BrtIndexedColor** (section 2.4.684) collection is updated. When a custom color has been **selected**, the **BrtMRUColor** (section 2.4.704) collection is updated.

2.4.27 BrtBeginColorScale

The **BrtBeginColorScale** record specifies the beginning of a collection of records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF** and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies a **color scale** used in **conditional formatting**.

If this record is followed by two **BrtCFVO** (section 2.4.329) records and two **BrtColor** (section 2.4.332) records, this record specifies a two-color color scale. The first **BrtCFVO** specifies the **cell value** for the beginning of the color scale, and the second **BrtCFVO** specifies the cell value for the end of the color scale. The first **BrtColor** specifies the color for the beginning of the color scale, and the second **BrtColor** specifies the color for the end of the color scale.

If this record is followed by three **BrtCFVO** records and three **BrtColor** records, this record specifies a three-color color scale. The first **BrtCFVO** specifies the cell value for the beginning of the color scale, the second **BrtCFVO** specifies the cell value for the midpoint of the color scale, and the third **BrtCFVO** specifies the cell value for the end of the color scale. The first **BrtColor** specifies the color for the beginning of the color scale, the second **BrtColor** specifies the color for the midpoint of the color scale, and the third **BrtColor** specifies the color for the end of the color scale.

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2.4.28 BrtBeginColorScale14

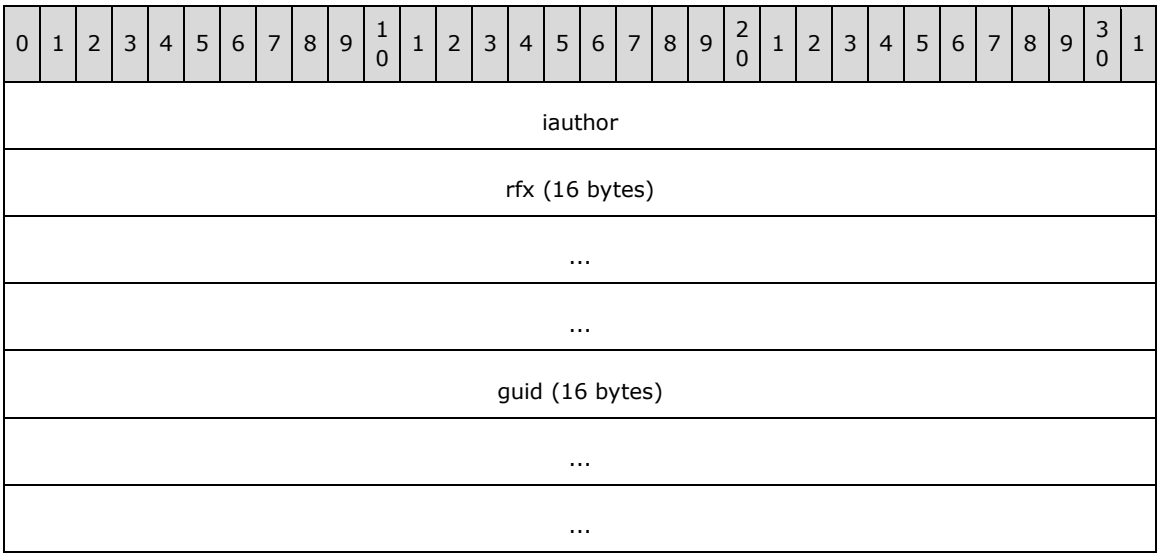
The **BrtBeginColorScale14** record specifies the beginning of a collection of records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of records specifies a **color scale** used in **conditional formatting**.

If this record is followed by two **BrtCFVO14** (section 2.4.330) records and two **BrtColor14** (section 2.4.333) records, this record specifies a two-color color scale. The first **BrtCFVO2.4.319** specifies the **cell value** for the beginning of the color scale, and the second **BrtCFVO2.4.319** specifies the cell value for the end of the color scale. The first **BrtColor14** specifies the color for the beginning of the color scale, and the second **BrtColor14** specifies the color for the end of the color scale.

If this record is followed by three **BrtCFVO2.4.319** records and three **BrtColor14** records, this record specifies a three-color color scale. The first **BrtCFVO2.4.319** specifies the cell value for the beginning of the color scale, the second **BrtCFVO14** specifies the cell value for the midpoint of the color scale, and the third **BrtCFVO2.4.319** specifies the cell value for the end of the color scale. The first **BrtColor14** specifies the color for the beginning of the color scale, the second **BrtColor14** specifies the color for the midpoint of the color scale, and the third **BrtColor14** specifies the color for the end of the color scale.

2.4.29 BrtBeginComment

The **BrtBeginComment** record specifies the beginning of a **BrtCommentText** (section 2.4.336) record as defined by the **Comments** (section 2.1.7.8) part **ABNF**. The **BrtCommentText** record specifies the text of a **comment**.



iauthor (4 bytes): A signed integer that specifies a zero-based index of a **BrtCommentAuthor** (section 2.4.335) record in the collection of all records directly following **BrtBeginCommentAuthors** (section 2.4.30). The referenced **BrtCommentAuthor** specifies a comment author for this comment.

rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the **cell** the comment is associated with. **rfx.rwFirst** MUST be equal to **rfx.rwLast**. **rfx.colFirst** MUST be equal to **rfx.colLast**.

guid (16 bytes): A **GUID** as specified in [MS-DTYP] section 2.3.4 that identifies this comment. If the **workbook** is not a shared workbook (section 2.2.12), this field is undefined and MUST be ignored.

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2.4.30 BrtBeginCommentAuthors

The **BrtBeginCommentAuthors** record specifies the beginning of a collection of **BrtCommentAuthor** (section 2.4.335) records as defined by the **Comments** (section 2.1.7.8) part **ABNF**. The collection of **BrtCommentAuthor** records specifies a list of authors of **comments**.

2.4.31 BrtBeginCommentList

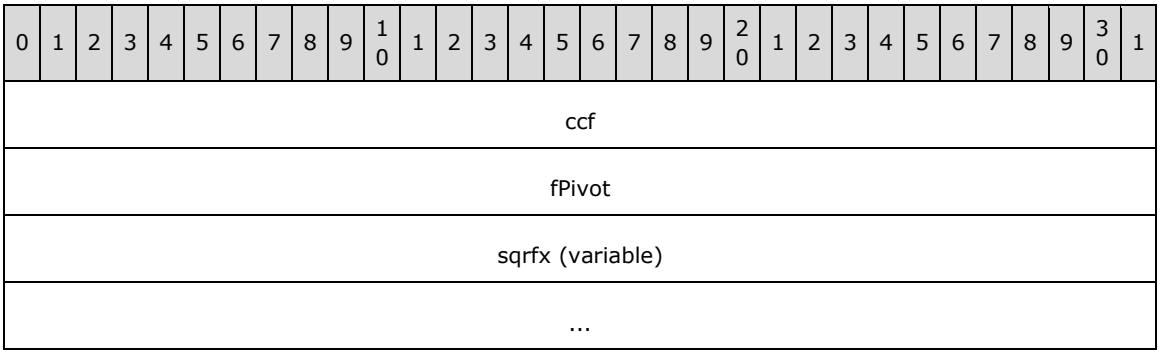
The **BrtBeginCommentList** record specifies the beginning of a collection of records as defined by the **Comments** (section 2.1.7.8) part **ABNF**. The collection specifies a list of **comments**.

2.4.32 BrtBeginComments

The **BrtBeginComments** record specifies the beginning of a collection of records as defined by the **Comments** (section 2.1.7.8) part **ABNF**. The collection of records specifies lists of authors and their **comments**.

2.4.33 BrtBeginConditionalFormatting

The **BrtBeginConditionalFormatting** record specifies **conditional formatting** properties for a **range** and specifies the beginning of a collection of records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of records specifies conditional formatting information for a range.



ccf (4 bytes): An unsigned integer that equals the count of **BrtBeginCFRule** (section 2.4.22) records contained in the collection.

fPivot (4 bytes): A Boolean (section 2.5.97.3) that specifies whether the conditional formatting is applied only to a **PivotTable** (section 2.1.7.40). This value MUST be a value from the following table.

Value	Meaning
0x00000000	The area specified by **sqrfx** includes some cells that are not part of a **PivotTable** data area (section 2.2.5.3.8.1.4).
0x00000001	The area specified by **sqrfx** only includes cells that are part of a **PivotTable** data area (section 2.2.5.3.8.1.4).

sqrfx (variable): An **UncheckedSqRfX** (section 2.5.155) that specifies the range the conditional formatting applies to.

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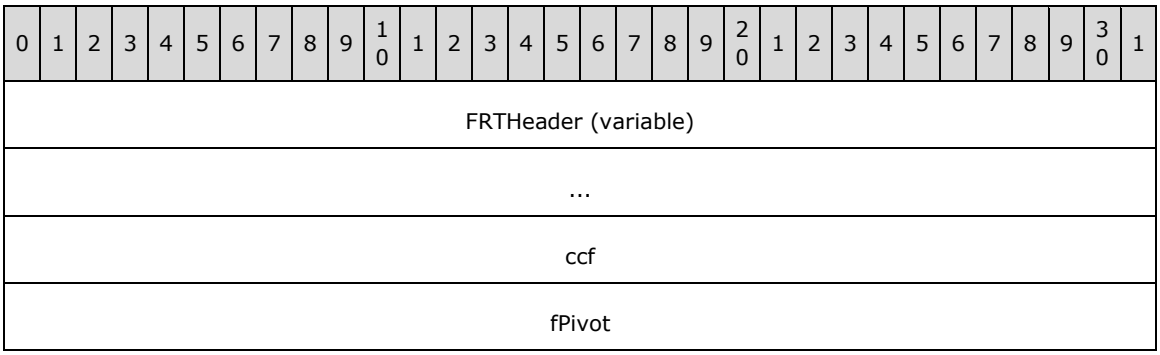
2.4.34 BrtBeginConditionalFormatting14

The **BrtBeginConditionalFormatting14** record specifies **conditional formatting** properties for a **range** and specifies the beginning of a collection of records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of records specifies conditional formatting information for a range. This record is equivalent to **BrtBeginConditionalFormatting** (section 2.4.33) but allows for more than 8192 ranges to which this conditional formatting is applied.



FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the Future Record (section 2.1.6) information for this record.

The **FRTHeader** fields MUST have the values listed in the following table.

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	1
FRTHeader.fFormulas	0
FRTHeader.fRelID	0

The **FRTHeader.rgSqrefs** specifies the range this conditional formatting applies to. The **FRTHeader.rgSqrefs.csqref** field MUST equal 1. The **sqrfx.crfx** field of the single **FRTSqref** (section 2.5.65) comprising the array of the **FRTHeader.rgSqrefs** field MUST be greater than or equal to 1.

ccf (4 bytes): An unsigned integer that specifies the count of **BrtBeginCFRule14** (section 2.4.23) records contained in this collection.

fPivot (4 bytes): A Boolean (section 2.5.97.3) that specifies whether this conditional formatting is applied only to a **PivotTable** (section 2.1.7.40). This value MUST be a value from the following table.

Value	Meaning
0x00000000	The range specified within **FRTHeader.rgSqrefs** includes some cells that are not part of a PivotTable data area (section 2.2.5.3.8.1.4).
0x00000001	The range specified within **FRTHeader.rgSqrefs** only includes cells that are part of a PivotTable data area (section 2.2.5.3.8.1.4).

2.4.35 BrtBeginConditionalFormattings

The **BrtBeginConditionalFormattings** record specifies the beginning of a collection of records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of records specifies **conditional formatting** information for the **Worksheet**.

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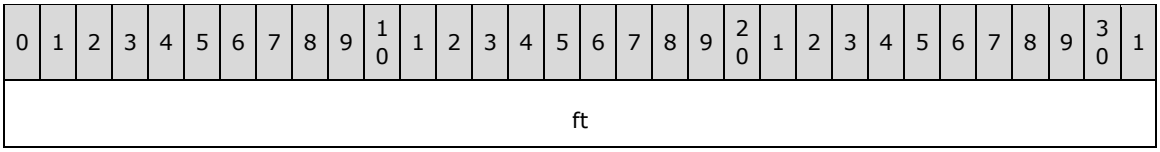
2.4.36 BrtBeginCRErrs

The **BrtBeginCRErrs** record specifies the file type of the document and specifies the beginning of a collection of **BrtCrashRecErr** (section 2.4.337) records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of **BrtCrashRecErr** records specify the errors that occurred during an application fault.



ft (4 bytes): A signed integer that specifies the file type of the document before the application failure. This value MUST be a value from the following table.

Value	Meaning
0x00000001	SYLK (Symbolic Link) (*.slk)
0x00000002	Text (Tab delimited) (*.txt)
0x00000005	CSV (Comma delimited) (*.csv)
0x00000008	DIF (Data Interchange Format) (*.dif)
0x00000010	Excel 97-2003 Template (*.xlt)
0x00000011	Excel 97-2003 Add-In (*.xla)
0x00000012	Text (Macintosh) (*.txt)
0x00000013	Text (MS-DOS) (*.txt)
0x00000015	CSV (Macintosh) (*.csv)
0x00000016	CSV (MS-DOS) (*.csv)
0x0000001C	Microsoft Excel 3.0 Worksheet (*.xls)
0x00000020	Microsoft Excel 4.0 Worksheet (*.xls)
0x00000023	Formatted Text (Space delimited) (*.prn)
0x00000026	Microsoft Excel 5.0/95 Workbook (*.xls)
0x00000029	Unicode Text (*.txt)
0x0000002A	Microsoft Excel 97-2003 \& 5.0/95 Workbook (*.xls)
0x0000002B	Web Page (*.htm, *.html)
0x0000002C	Single File Web Page (*.mht, *.mhtml)
0x0000002D	XML Spreadsheet 2003 (*.xml)
0x00000030	XML Data (*.xml)
0x00000031	Excel Binary Workbook (*.xlsb)
0x00000032	Excel Workbook (*.xlsx)
0x00000033	Excel Macro-Enabled Workbook (*.xlsm)
0x00000034	Excel Macro-Enabled Template (*.xltm)
0x00000035	Excel Template (*.xltx)
0x00000036	Excel Add-In (*.xlam)
0x00000037	Excel 97-2003 Workbook (*.xls)

2.4.37 BrtBeginCsView

The **BrtBeginCsView** record specifies **chart sheet view** settings for the current **chart sheet**. It also specifies the beginning of a collection of records as specified by the **Chart Sheet** (section 2.1.7.7)

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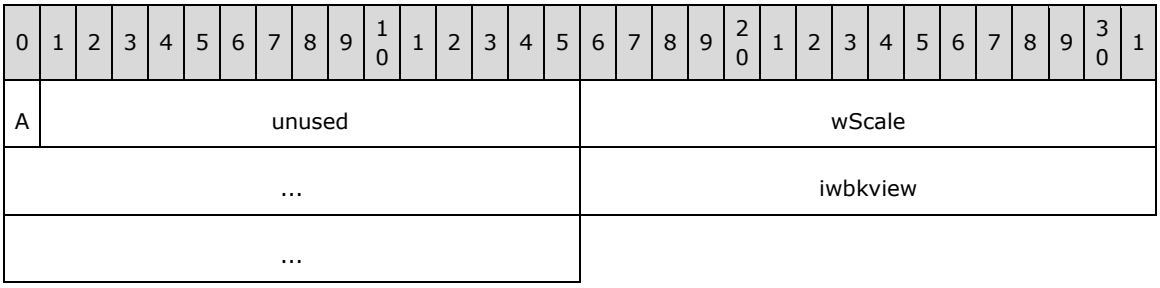
part **ABNF**. This collection specifies additional chart sheet view settings for the current chart sheet. Chart sheet view settings and **workbook view** settings for the associated workbook view (specified by **iwbkview)** together define the display of a chart sheet.



A - fSelected (1 bit): A bit that specifies that the chart sheet is currently **selected**.

unused (15 bits): Undefined and MUST be ignored.

wScale (4 bytes): An unsigned integer that specifies the window **zoom level** as a percentage value. The value MUST be greater than or equal to 10 and less than or equal to 400, or equal to 0. A value of 0 specifies that there is no zoom level set.

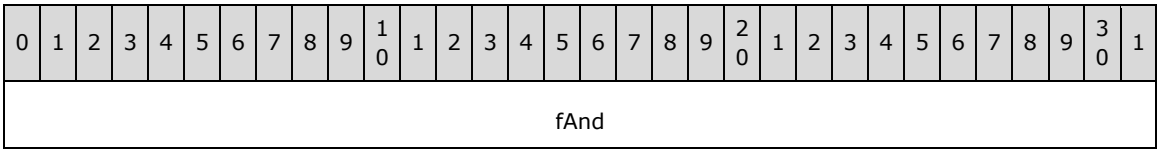
iwbkview (4 bytes): An unsigned integer that specifies the zero-based index of a **BrtBookView** (section 2.4.308) record in the collection of all records directly following **BrtBeginBookViews** (section 2.4.11) in the **Workbook** (section 2.1.7.61) part. The referenced **BrtBookView** specifies the workbook view the chart sheet view is associated with.

2.4.38 BrtBeginCsViews

The **BrtBeginCsViews** record specifies the beginning of a collection of records as defined by the **Chart Sheet** (section 2.1.7.7) part **ABNF**. The collection of records specifies the **chart sheet views** of the **chart sheet**.

2.4.39 BrtBeginCustomFilters

The **BrtBeginCustomFilters** record specifies a property of a **filter** and specifies the beginning of a collection of **BrtCustomFilter** (section 2.4.343) records as defined by the **Macro Sheet** (section 2.1.7.32) part **ABNF**, the PivotTable (section 2.1.7.40) part ABNF, the **Table** (section 2.1.7.51) part ABNF, and the **Worksheet** (section 2.1.7.62) part ABNF. The collection of **BrtCustomFilter** records specifies custom filter criteria to be applied to a filter.



fAnd (4 bytes): A Boolean (section 2.5.97.3) that specifies whether the criteria specified by the **BrtCustomFilter** records in this collection have an "AND" relationship if there are two criteria. This value MUST be one of the values specified in the following table.

Value	Meaning
0x00000000	AND relationship will be used.
0x00000001	OR relationship will be used.

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2.4.40 BrtBeginCustomFilters14

The **BrtBeginCustomFilters14** record specifies a property of a **filter** and specifies the beginning of a collection of **BrtCustomFilter14** (section 2.4.344) records as defined by the **Macro Sheet** (section 2.1.7.32) part **ABNF**, the **PivotTable** (section 2.1.7.40) part ABNF, the **Table** (section 2.1.7.51) part ABNF, and the **Worksheet** (section 2.1.7.62) part ABNF. The collection of **BrtCustomFilter14** records specifies custom filter criteria to be applied to a filter.

fAnd (4 bytes): A Boolean (section 2.5.97.3) that specifies whether the criteria specified by the **BrtCustomFilter14** (section 2.4.344) records in this collection have an "AND" relationship if there are two criteria. This value MUST be one of the values specified in the following table.

Value	Meaning
0x00000000	AND relationship will be used.
0x00000001	OR relationship will be used.

2.4.41 BrtBeginCustomRichFilters

The **BrtBeginCustomRichFilters** record specifies a property of a **filter** and specifies the beginning of a collection of **BrtCustomRichFilter** (section 2.4.345) records as defined by the **Common Productions** (section 2.1.8) part **ABNF**. The collection of **BrtCustomRichFilter** records specifies custom filter criteria to applied to a filter associated with **rich values**.

fAnd (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether the criteria specified by the **BrtCustomRichFilter** records in this collection have an "AND" relationship if there are two criteria. This value MUST be one of the values specified in the following table.

Value	Meaning
0x00000000	AND relationship will be used.
0x00000001	OR relationship will be used.

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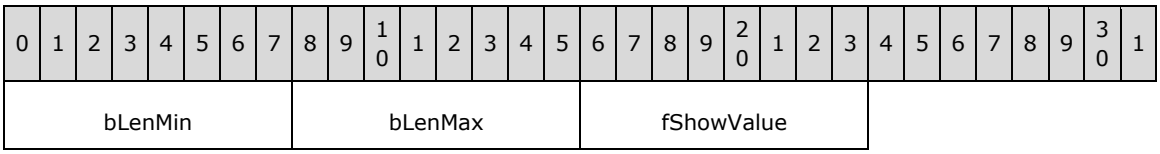
2.4.42 BrtBeginDatabar

The **BrtBeginDatabar** record specifies **data bar** properties and specifies the beginning of a collection of records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF** and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies a data bar used in **conditional formatting**.

In the collection of records following this record, the first **BrtCFVO** (section 2.4.329) record specifies the minimum **cell value** used for the data bars in this conditional formatting **range**. The second **BrtCFVO** record specifies the maximum cell value used for the data bars in this conditional formatting range. The **BrtColor** (section 2.4.332) record specifies the color of the data bar.



bLenMin (1 byte): An unsigned integer that specifies the minimum **cell** width occupied by the data bars in this conditional formatting range, expressed as a percentage of the width of the cell being formatted. This value MUST be greater than or equal to 0 and less than or equal to **bLenMax**.

bLenMax (1 byte): An unsigned integer that specifies the maximum cell width occupied by the data bars in this conditional formatting range, expressed as a percentage of the width of the cell being formatted. This value MUST be greater than or equal to **bLenMin** and less than or equal to 100.

fShowValue (1 byte): A Boolean (section 2.5.97.3) that specifies whether the cells in the conditional formatting range display both the data bar and the numeric value or only the data bar. The following table specifies the meaning of each value.

Value	Meaning
0x00	Only the data bar is displayed in the cell.
0x01	Both the data bar and the numeric value are displayed in the cell.

2.4.43 BrtBeginDatabar14

The **BrtBeginDatabar14** record specifies **data bar** properties and specifies the beginning of a collection of records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of records specifies a data bar used in **conditional formatting**.

In the collection of records following this record, the first **BrtCFVO14** (section 2.4.330) record specifies the minimum **cell value** used for the data bars in the conditional formatting **range**. The second **BrtCFVO14** record specifies the maximum cell value used for the data bars in the conditional formatting range.

In the collection of records following this record, there are five optional **BrtColor14** (section 2.4.333) records. They specify, in order, if they exist, the data bar positive bar color, data bar **border** color, data bar negative bar color, data bar negative border color, and data bar axis color.

The first optional **BrtColor14** (section 2.4.333) record specifies the data bar positive bar color and MUST exist if and only if the **iPri** field of the **BrtBeginCFRule14** (section 2.4.23) record specified by the **CFRULE14** rule (as defined in section 2.1.8) that contains this record does not equal -1.

The second optional **BrtColor14** record specifies the data bar border color and MUST exist if and only if the **fBorder** attribute equals 1.

The third optional **BrtColor14** record specifies the data bar negative bar color and MUST exist if and only if the **fCustomNegativeFillColor** attribute equals 1.

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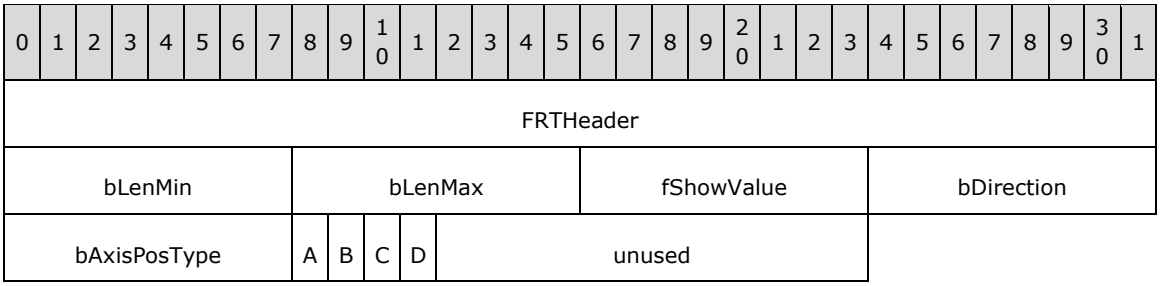
The fourth optional **BrtColor14** record specifies the data bar negative border color and MUST exist if and only if the **fCustomNegativeBorderColor** attribute equals 1 and the **fBorder** attribute equals 1.

The fifth optional **BrtColor14** record specifies the data bar axis color and MUST exist if and only if **bAxisPosType** does not equal 0x02.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the Future Record (section 2.1.6) information for this record.

bLenMin (1 byte): An unsigned integer that specifies the minimum **cell** width occupied by the data bars in the conditional formatting range, expressed as a percentage of the width of the cell being formatted. This value MUST be greater than or equal to 0 and less than or equal to **bLenMax**. If there exists a **BrtCFRuleExt** (section 2.4.328) record with a **guid** field in the **sheet** equal to the **guid** field of the **BrtBeginCFRule14** (section 2.4.23) that begins the collection of records that contains this record, and this record's **bLenMin** is 0 and this record's **bLenMax** is 100, then the **bLenMin** field of the **BrtBeginDataBar** (section 2.4.42) record contained in the collection of records that begins with the **BrtBeginConditionalFormatting** (section 2.4.33) record that contains the **BrtCFRuleExt** record with the same **guid** field MUST be 10. If there exists a **BrtCFRuleExt** record with a **guid** field in this sheet equal to the **guid** field of the **BrtBeginCFRule14** (section 2.4.23) that begins the collection of records that contains this record, and this record's **bLenMin** is not 0 or this record's **bLenMax** is not 100, then the **bLenMin** field of the **BrtBeginDataBar** record contained in the collection of records that begins with the **BrtBeginConditionalFormatting** record that contains the **BrtCFRuleExt** record with the same **guid** field MUST be equal to this record's **bLenMin**.

bLenMax (1 byte): An unsigned integer that specifies the maximum cell width occupied by the data bars in the conditional formatting range, expressed as a percentage of the width of the cell being formatted. This value MUST be greater than or equal to **bLenMin** and less than or equal to 100. If there exists a **BrtCFRuleExt** (section 2.4.328) record with a **guid** field in the sheet equal to the **guid** field of the **BrtBeginCFRule14** (section 2.4.23) that begins the collection of records that contains this record, and this record's **bLenMin** is 0 and this record's **bLenMax** is 100, then the **bLenMax** field of the **BrtBeginDataBar** (section 2.4.42) record contained in the collection of records that begins with the **BrtBeginConditionalFormatting** (section 2.4.33) record that contains the **BrtCFRuleExt** (section 2.4.328) record with the same **guid** field MUST be 90. If there exists a **BrtCFRuleExt** record with a **guid** field in the sheet equal to the **guid** field of the **BrtBeginCFRule14** (section 2.4.23) that begins the collection of records that contains this record, and this record's **bLenMin** is not 0 or this record's **bLenMax** is not 100, then the **bLenMax** field of the **BrtBeginDataBar** record contained in the collection of records that begins with the **BrtBeginConditionalFormatting** record that contains the **BrtCFRuleExt** record with the same **guid** field MUST be equal to this record's **bLenMax**.

fShowValue (1 byte): A **Boolean** (section 2.5.97.3) that specifies whether the cells in the conditional formatting range display both the data bar and the numeric value or only the data bar. The following table specifies the meaning of each value.

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Value	Meaning
0x00	Only the data bar is displayed in the cell.
0x01	Both the data bar and the numeric value are displayed in the cell.

bDirection (1 byte): An unsigned integer that specifies the direction of the data bar. This value MUST be one of the values specified in the following table.

Value	Meaning
0x00	The direction of the data bar is determined by context.
0x01	The data bar is displayed in a **left-to-right** manner.
0x02	The data bar is displayed in a **right-to-left** manner.

bAxisPosType (1 byte): An unsigned integer that specifies the axis position for the data bar. This value MUST be one of the values specified in the following table.

Value	Meaning
0x00	The axis position for the data bar is calculated automatically.
0x01	The axis position for the data bar is the midpoint of the cell.
0x02	There is no axis for the data bar.

A - fBorder (1 bit): A bit that specifies whether the data bar has a border.

B - fGradient (1 bit): A bit that specifies whether the data bar fill is a gradient. The following table specifies the meaning of each value.

Value	Meaning
0	The data bar fill is a solid color.

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Value	Meaning
1	The data bar fill is a gradient.

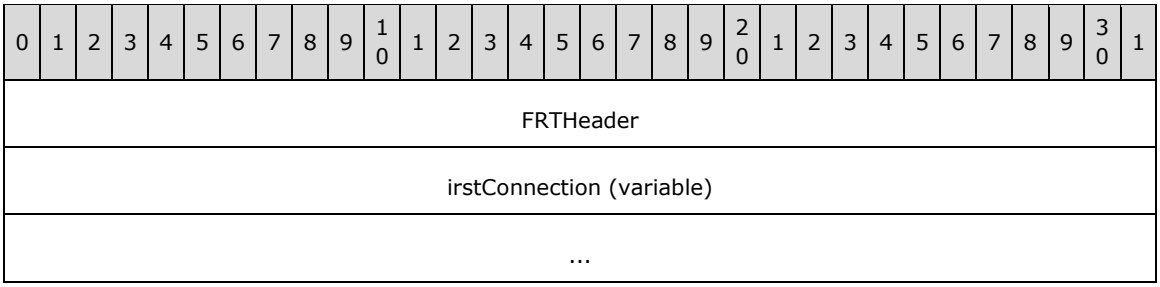
C - fCustomNegativeFillColor (1 bit): A bit that specifies whether the negative bar color of the data bar is different from the positive bar color.

D - fCustomNegativeBorderColor (1 bit): A bit that specifies whether the negative border color of the data bar is different from the positive border color.

unused (12 bits): Undefined and MUST be ignored.

2.4.44 BrtBeginDataFeedPr15

The **BrtBeginDataFeedPr15** record specifies properties of a **model data source data feed connection** (section 2.2.8.9.2) and specifies the beginning of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**.

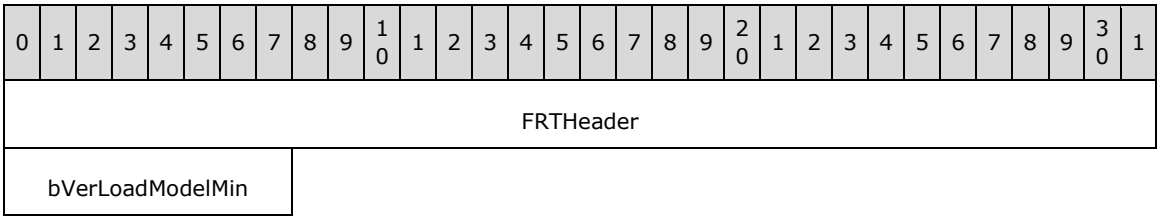


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

irstConnection (variable): An **XLWideString** section 2.5.168) that specifies the connection string for this connection.

2.4.45 BrtBeginDataModel

The **BrtBeginDataModel** record specifies the beginning of a collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies properties of the **spreadsheet data model**.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

bVerLoadModelMin (1 byte): A byte which specifies the minimum application version required to load the spreadsheet data model in this workbook. This MUST be greater than or equal to 5.

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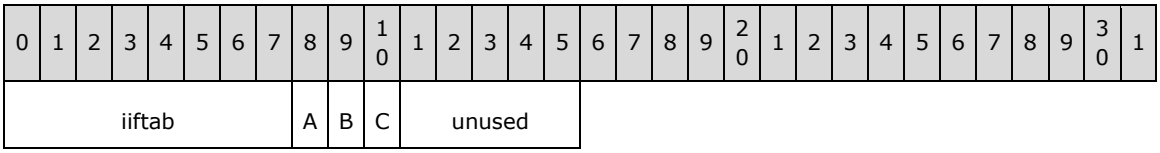
2.4.46 BrtBeginDbTables15

The **BrtBeginDbTables15** record specifies the beginning of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies the list of database tables used by this **model data source OLE DB connection** (section 2.2.8.9.1) or **model data source data feed connection** (section 2.2.8.9.2).

2.4.47 BrtBeginDCon

The **BrtBeginDCon** record specifies **data consolidation** properties and specifies the beginning of a collection of records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF** and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies data consolidation information.



iiftab (1 byte): An **IIFtab** (section 2.5.78) that specifies the data consolidation **function** that is used.

A - fLeftCat (1 bit): A bit that specifies whether the values in the left **column (1)** of the data consolidation **range** will be treated as labels or data. The following table specifies the meaning of each value.

Value	Meaning
0	Treat the left column (1) of the data consolidation range as data that will be operated on by the data consolidation function specified by **iiftab**.
1	Treat the left column (1) of the data consolidation range as labels that will be used to identify the **rows** operated on by the data consolidation function.

B - fTopCat (1 bit): A bit that specifies whether the values in the top row of the data consolidation range will be treated as labels or data. The following table specifies the meaning of each value.

Value	Meaning
0	Treat the top row of the data consolidation range as data that will be operated on by the data consolidation function specified by **iiftab**.
1	Treat the top row of the data consolidation range as labels that will be used to identify the columns (1) operated on by the data consolidation function.

C - fLinkConsol (1 bit): A bit that specifies whether data consolidation will create references to the **source data**. The following table specifies the meaning of each value.

Value	Meaning
0	References are not created to the source data.
1	References are created to the source data.

unused (5 bits): Undefined and MUST be ignored.

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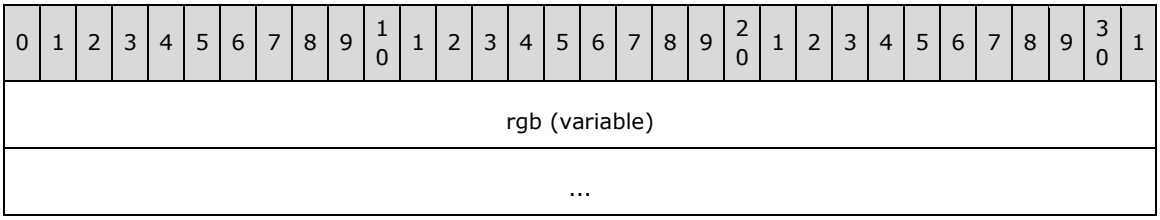
2.4.48 BrtBeginDecoupledPivotCacheIDs

The **BrtBeginDecoupledPivotCacheIDs** record specifies the beginning of a collection of **PivotCache** identifier records as defined by the **Workbook** (section 2.1.7.61) part **ABNF** rules. The collection of records specifies the **PivotCache** structures that are associated with Non-Worksheet PivotTables (section 2.2.5.5).

2.4.49 BrtBeginDeletedName

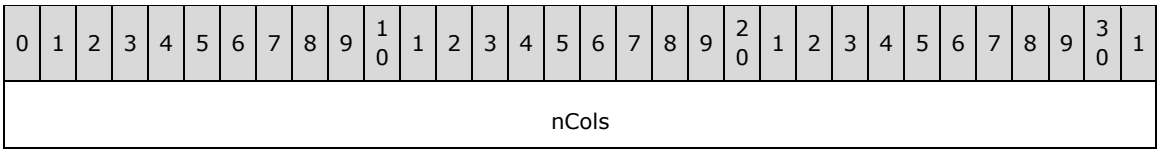
The **BrtBeginDeletedName** record specifies the name of a **query** field that has been deleted from a **query table** and specifies the beginning of an empty collection of records as defined by the **Query Table** (section 2.1.7.42) part **ABNF**.



rgb (variable): An **XLWideString** (section 2.5.168) that specifies the name of the deleted query field. The length of **rgb** MUST be greater than or equal to 1 character and less than or equal to 255 characters.

2.4.50 BrtBeginDeletedNames

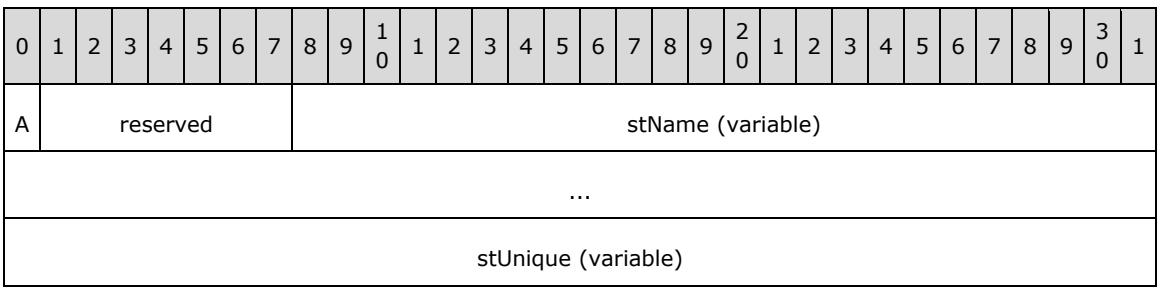
The **BrtBeginDeletedNames** record specifies properties of **query** fields that have been deleted from a **query table** and specifies the beginning of a collection of records as defined by the **Query Table** (section 2.1.7.42) part **ABNF**. The collection of records specifies query fields that have been deleted from the query table.



nCols (4 bytes): A **DCol** (section 2.5.31) that specifies how many deleted query fields there are. This value MUST equal the number of **BrtBeginDeletedName** (section 2.4.49) records in the collection.

2.4.51 BrtBeginDim

The **BrtBeginDim** record specifies a **PivotCache** (section 2.2.5.2) **OLAP dimension** and the beginning of an empty collection as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**.



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...
stDisplay (variable)
...

A - fMeasure (1 bit): A bit that that indicates whether this is a **measure** dimension.

reserved (7 bits): This value MUST be 0, and MUST be ignored.

stName (variable): An **XLWideString** (section 2.5.168) that specifies the name of the dimension. The length of this value MUST be greater than 0.

stUnique (variable): An **XLWideString** that specifies the unique name of the dimension. The length of this value MUST be greater than 0 and less than 32768 characters.

stDisplay (variable): An **XLWideString** that specifies the display name of the dimension. The length of this value MUST be greater than 0.

2.4.52 BrtBeginDims

The **BrtBeginDims** record specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies **PivotTable** (section 2.2.5) **OLAP dimensions**. MUST exist if and only if this record is an OLAP **PivotCache** (section 2.2.5.2).

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cDims																															

cDims (4 bytes): An unsigned integer that specifies the number of OLAP dimensions in the **PivotTable** (section 2.2.5). This value MUST match the number of **BrtBeginDim** (section 2.4.51) records in the collection.

2.4.53 BrtBeginDRefs

The **BrtBeginDRefs** record specifies a count of **BrtDRef** (section 2.4.350) records in the collection and specifies the beginning of a collection of **BrtDRef** records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF** and **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of **BrtDRef** records specifies the references used by **data consolidation**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cdref																															

cdref (4 bytes): An unsigned integer that specifies the number of **BrtDRef** (section 2.4.350) records contained in the collection.

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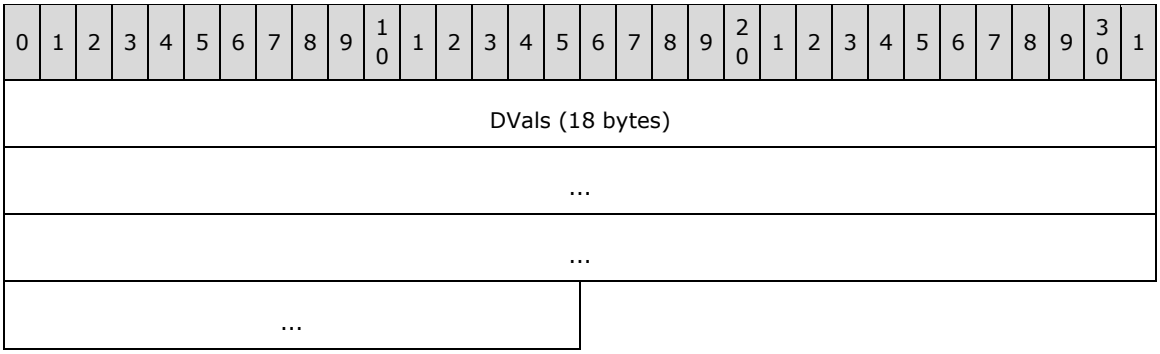
2.4.54 BrtBeginDVals

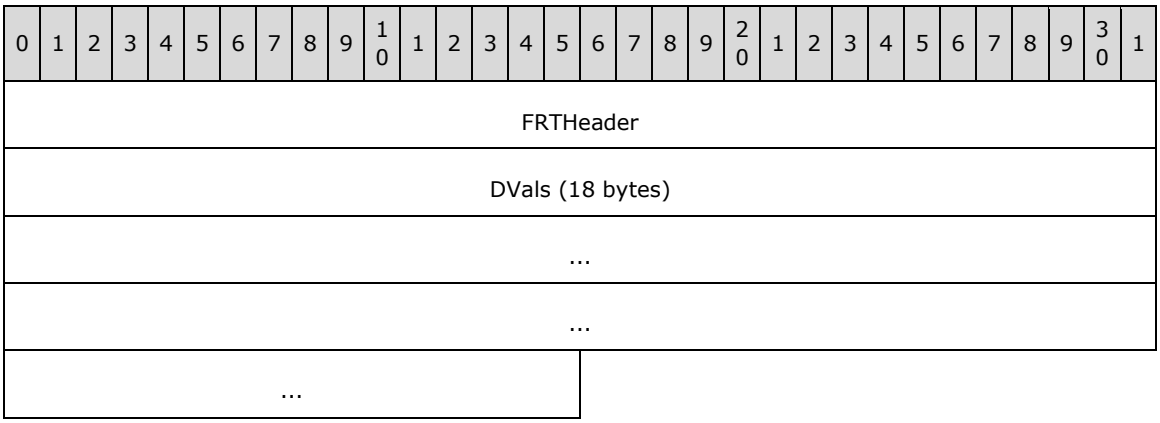
The **BrtBeginDVals** record specifies the beginning of a collection of **BrtDVal** (section 2.4.351) records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. This record also specifies **data validation** properties of a worksheet that are used by the application's user interface (UI).



DVals (18 bytes): A **DVals** (section 2.5.35) that specifies data validation properties of a worksheet that are used by the application's UI.

2.4.55 BrtBeginDVals14

The **BrtBeginDVals14** record specifies the beginning of a collection of **BrtDVal14** (section 2.4.352) records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. This record also specifies **data validation** properties of a worksheet that are used by the application's UI.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the Future Record (section 2.1.6) information for this record.

DVals (18 bytes): A **DVals** (section 2.5.35) that specifies data validation properties of a worksheet that are used by the application's UI.

2.4.56 BrtBeginDXF14s

The **BrtBeginDXF14s** record specifies a count of **BrtDXF14** records (section 2.4.355) and specifies the beginning of a collection of records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of records specifies a set of differential formatting (section 2.2.6.2).

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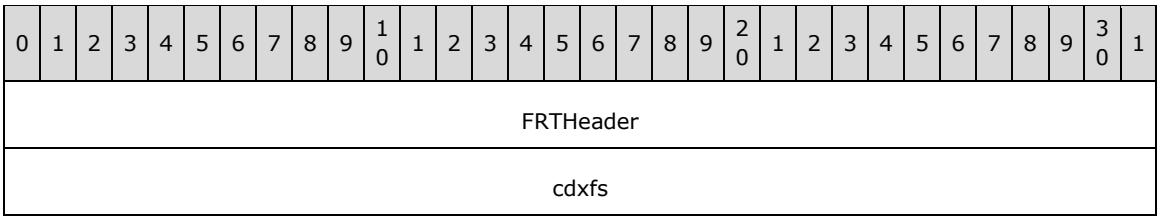


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

cdxfs (4 bytes): An unsigned integer that specifies the number of **BrtDXF14** (section 2.4.355) records in the collection. This value MUST be less than or equal to 0x7FFFFFFF.

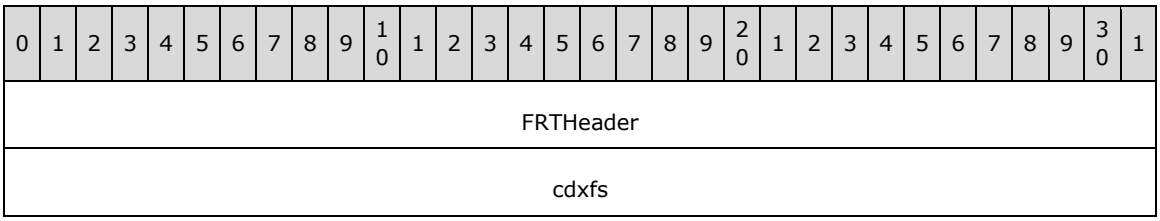
2.4.57 BrtBeginDXFs

The **BrtBeginDXFs** record specifies a count of **BrtDXF** (section 2.4.354) records and specifies the beginning of a collection of **BrtDXF** records as defined by the **Revision Log** (section 2.1.7.44) part **ABNF** and the **Styles** (section 2.1.7.50) part ABNF. The collection of **BrtDXF** records specifies a set of differential formatting (section 2.2.6.2).

cdxfs (4 bytes): An unsigned integer that specifies the number of differential formatting records (**BrtDXF**). This value MUST be less than or equal to 0x7FFFFFFF.

2.4.58 BrtBeginDXFs15

The **BrtBeginDXFs15** record specifies a count of **BrtDXF15** records (section 2.4.356) and specifies the beginning of a collection of records as defined by the Styles part **ABNF**. The collection of records specifies a set of Differential Formatting.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

cdxfs (4 bytes): An unsigned integer that specifies the number of **BRTDXF15** records (section 2.4.356) in the collection. This value MUST be less than or equal to 0x7FFFFFFF.

2.4.59 BrtBeginDynamicArrayPr

The **BrtBeginDynamicArrayPr** record specifies the beginning of an empty collection of records that specifies information about **dynamic arrays**, as defined by the **Metadata** (section 2.1.7.34) part **ABNF**.

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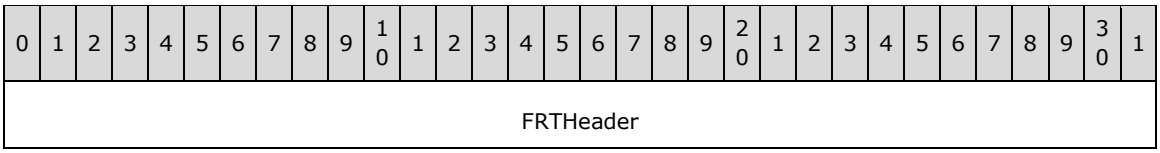
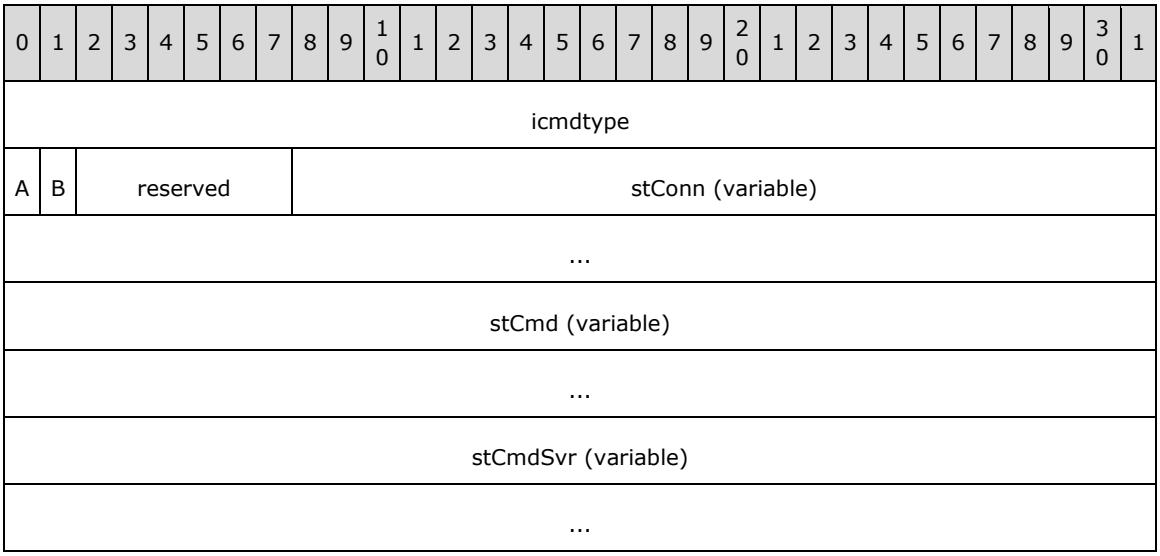


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

2.4.60 BrtBeginECDbProps

The **BrtBeginECDbProps** record specifies the properties associated with an **ODBC** or **OLE DB** external connection (section 2.2.8) and specifies the beginning of an empty collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**.



icmdtype (4 bytes): A **CmdType** (section 2.5.20) that specifies the OLE DB or ODBC command type. This value MUST be **CMDSQL** (section 2.5.20) if this record is an ODBC data connection, as specified in section 2.2.8.4.

A - fLoadCmdSvr (1 bit): A bit that specifies whether **stCmdSvr** exists after the fixed-size portion of this record. This value MUST be 0 if this record is an OLE DB data connection, as specified in section 2.2.8.3.

B - fLoadCmd (1 bit): A bit that specifies whether **stCmd** exists after the fixed-size portion of this record.

reserved (6 bits): This value MUST be 0, and MUST be ignored.

stConn (variable): An **XLWideString** (section 2.5.168) that specifies the **connection string** used to connect to an OLE DB or ODBC **data source**. The length of this value MUST be less than 65536 characters. The length of this value MUST be 0 if the **fDeleted** field of the preceding **BrtBeginExtConnection** (section 2.4.79) record is 1.

stCmd (variable): An optional **XLWideString** that specifies the database command to pass to the **data provider**. This field MUST exist if and only if **fLoadCmd** is 1.

stCmdSvr (variable): An optional **XLWideString** that specifies the database command to use instead of **stCmd** if the cache field that is used as a server-based page field, as specified in Source

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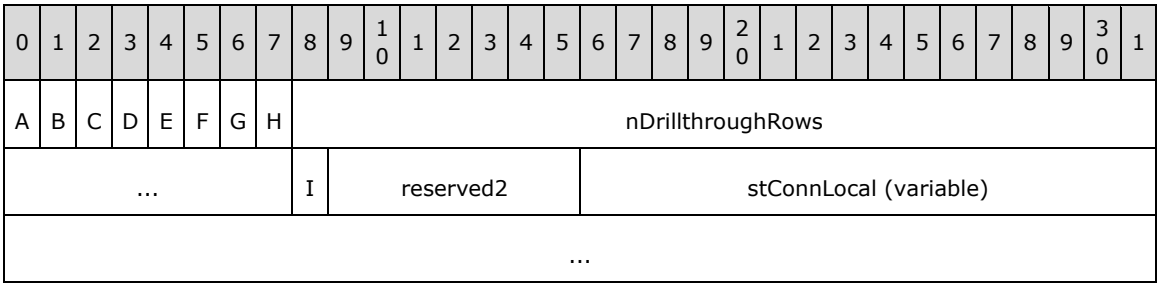
Data (section 2.2.5.2.1), is removed from the page axis (section 2.2.5.3.7.1) or made into a page field that is not a server-based page field. This field MUST exist if and only if **fLoadCmdSvr** is 1.

2.4.61 BrtBeginECOlapProps

The **BrtBeginECOlapProps** record specifies the properties of an OLAP connection (section 2.2.8.3.1) and specifies the beginning of an empty collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The properties that specify server formatting options are used to specify whether server formatting retrieved from the **OLAP data source** is applied to the cells used by **PivotTables** (section 2.2.5) or **cube functions** associated with the **PivotCache** (section 2.2.5.2) that is associated with the external connection (section 2.2.8), as specified in section 2.2.5.2.1. In the case of **PivotTables**, the formatting is applied to the cells in data area (section 2.2.5.3.8.1.4) of the **PivotTable** report. In the case of cube functions, the formatting is applied to the cells that contain the result of the cube function. When a local **cube** file is used, as specified by **fLocalConn**, the **OLE DB** for OLAP **data provider** is used to connect to a file, which is a cache of the OLAP data source.



A - fLocalConn (1 bit): A bit that specifies whether data is retrieved from a local cube file. This value MUST be one of the values in the following table.

Value	Meaning
0	The data is retrieved using the connection string specified by the **stConn** field of the **BrtBeginECDbProps** (section 2.4.60) record preceding this record.
1	The data is retrieved from the connection string specified by **stConnLocal**.

B - fNoRefreshCube (1 bit): A bit that specifies whether the OLE DB for OLAP data provider is requested to rebuild the local cube file. This value is applicable only when **fLocalConn** is equal to 1. This value MUST be one of the values in the following table.

Value	Meaning
0	The OLE DB for OLAP data provider is requested to rebuild the local cube file on refresh.
1	The OLE DB for OLAP data provider is requested to query the existing local cube file on refresh.

C - fSrvFmtBack (1 bit): A bit that specifies whether the **background color** retrieved from the OLAP data source is used for cell formatting. This value MUST be one of the values in the following table.

Value	Meaning
0	**Fill colors** retrieved from the OLAP data source are ignored.

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Value	Meaning
1	Fill colors retrieved from the OLAP data source are used for cell formatting.

D - fSrvFmtFore (1 bit): A bit that specifies whether the **font face color** retrieved from the OLAP data source is used for cell formatting. This value MUST be one of the values in the following table.

Value	Meaning
0	Font colors retrieved from the OLAP data source are ignored.
1	Font colors retrieved from the OLAP data source are used for cell formatting.

E - fSrvFmtFlags (1 bit): A bit that specifies whether the **font family** name retrieved from the OLAP data source is used for cell formatting. This value MUST be one of the values in the following table.

Value	Meaning
0	Font family names retrieved from the OLAP data source are ignored.
1	Font family names retrieved from the OLAP data source are used for cell formatting.

F - fSrvFmtNum (1 bit): A bit that specifies whether the format string retrieved from the OLAP data source is used for cell formatting. This value MUST be one of the values in the following table.

Value	Meaning
0	Formats strings retrieved from the OLAP data source are ignored.
1	Formats strings retrieved from the OLAP data source are used for cell formatting.

G - fUseOfficeLcid (1 bit): A bit that specifies whether the **language code identifier (LCID)** is sent to the OLE DB for OLAP data provider to retrieve data in a localized manner.

H - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

nDrillthroughRows (4 bytes): A **DRw** (section 2.5.34) that specifies the maximum number of **drillthrough rows** to return when the user drills through an aggregate value in a **PivotTable** (section 2.2.5). This value MUST be greater than 0 and less than 1048577.

I - bLoadConnLocal (1 bit): A bit that specifies whether **stConnLocal** exists after the fixed size portion of the record. This value MUST be 1 if **fLocalConn** is 1.

reserved2 (7 bits): This value MUST be 0, and MUST be ignored.

stConnLocal (variable): An optional **XLWideString** (section 2.5.168) that specifies a connection string to use when a local cube file is available. This field MUST exist if and only if **bLoadConnLocal** is 1. The length of this value MUST be less than 65536.

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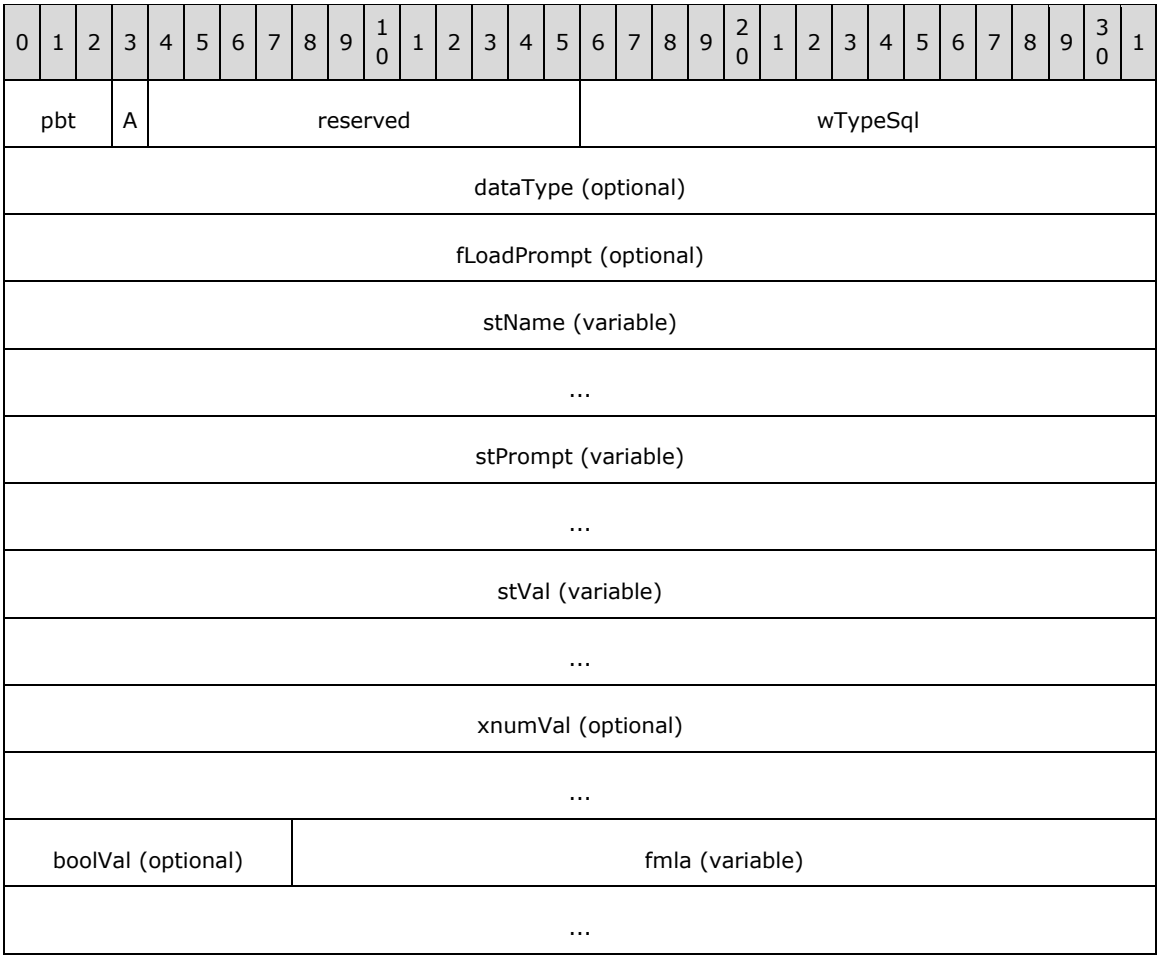
2.4.62 BrtBeginECParam

The **BrtBeginECParam** record specifies parameters of an external connection (section 2.2.8) and specifies the beginning of an empty collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**.



pbt (3 bits): An unsigned integer that specifies the type of the parameter. This value MUST be one of the values from the following table.

Value	Meaning
0x0	Prompt. An application collects the parameter value from the user.
0x1	Value. This record contains the value in one of the fields: **stVal**, **xnumVal**, or **boolVal**.
0x2	**Cell reference**. **fmla** specifies the **sheet cell** that contains the value.

A - fAutoRefresh (1 bit): A bit that specifies whether the **external data** is automatically refreshed when the content of a cell containing the parameter's value changes. This value MUST be 0 if **pbt** is not 0x2. The following table specifies the meaning of each value.

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Value	Meaning
0	External data is refreshed only when requested by the user or when triggered by some other event (for example, the **workbook** is opened).
1	External data is refreshed whenever the content of a cell containing the parameter's value changes.

reserved (12 bits): This value MUST be 0, and MUST be ignored.

wTypeSql (2 bytes): A **TypeSql** (section 2.5.151) that specifies the **SQL** data type of the parameter. This value MUST be ignored when the external connection is not an **ODBC data source**.

dataType (4 bytes): An optional unsigned integer that specifies the data type of the parameter value. This field MUST exist if and only if **pbt** is not 0x0 and MUST be ignored if **pbt** is 0x2. This value MUST be one of the values in the following table.

Value	Meaning
0x00000001	Double. The parameter value is specified by the **xnumVal** field.
0x00000002	String. The parameter value is specified by the **stVal** field.
0x00000004	Boolean. The parameter value is specified by the **boolVal** field.
0x00000800	Integer. The parameter value is specified by the **xnumVal** field.

fLoadPrompt (4 bytes): An optional **Boolean** (section 2.5.97.3) that specifies whether **stPrompt** exists after the fixed size portion of the record. If the value is 1, **stPrompt** exists. **fLoadPrompt** MUST exist if and only if **pbt** is 0x0.

stName (variable): An **XLWideString** (section 2.5.168) that specifies the name of the parameter. The length of this value MUST be less than 256 characters.

stPrompt (variable): An optional **XLWideString** that specifies the prompt string for the parameter. The length of this value MUST be less than 65536 characters. This field MUST exist if and only if **pbt** is 0x0 and **fLoadPrompt** is 0x00000001.

stVal (variable): An optional **XLWideString** that specifies the string value of the parameter. The length of this value MUST be less than 256 characters. This field MUST exist if and only if **pbt** is 0x1 and **dataType** is 0x00000002.

xnumVal (8 bytes): An optional **Xnum** (section 2.5.171) that specifies the value of the parameter. This field MUST exist if and only if **pbt** is 0x1 and **dataType** is 0x00000001 or 0x00008000. If **dataType** is 0x00008000, the integer value specified by this field MUST be less than or equal to 0x7FFFFFFF and greater than or equal to 0x80000000.

boolVal (1 byte): An optional BYTE that specifies the Boolean value of the parameter. This field MUST exist if and only if **pbt** is 0x1 and **dataType** is 0x00000004.

fmla (variable): An optional **ParameterParsedFormula** (section 2.5.97.14) that specifies the formula (section 2.2.2) that MUST evaluate to the **range** containing the value or values to use for the parameter. If this is an ODBC connection (section 2.2.8.4), the cell range MUST specify a single cell. If this is a Web connection (section 2.2.8.5), the cell range MUST specify a single **row**

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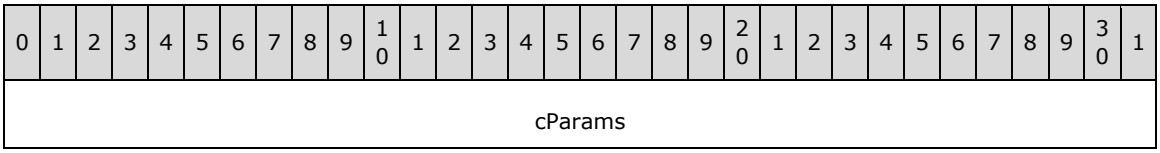
or a single **column (1)** of cells; each cell of the range can contain one of the parameter values. This field MUST exist if and only if **pbt** is 2.

2.4.63 BrtBeginECParams

The **BrtBeginECParams** record specifies properties of connection parameters and specifies the beginning of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection specifies connection parameters for an ODBC connection (section 2.2.8.4) or for a Web connection (section 2.2.8.5). If this record exists for an ODBC connection, it MUST follow the **BrtBeginECDbProps** (section 2.4.60) record. If this record exists for a Web connection, it MUST follow the **BrtBeginECWebProps** (section 2.4.70) record.

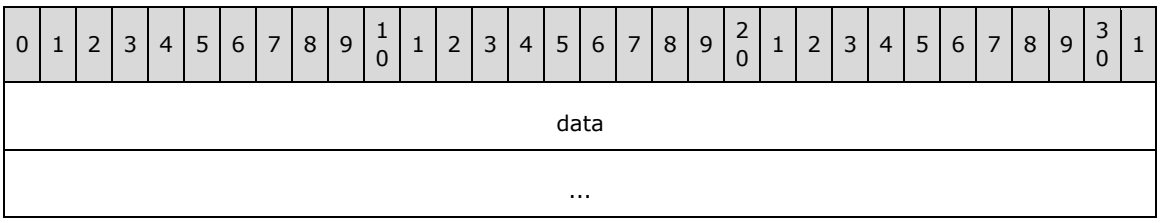


cParams (4 bytes): An unsigned integer that specifies the number of connection parameters. This value MUST match the number of **BrtBeginECParam** (section 2.4.62) records in this collection.

2.4.64 BrtBeginECTwFldInfo

The **BrtBeginECTwFldInfo** record specifies field settings for **text importation** and specifies the beginning of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection specifies field settings for text importation.

A field in the context of text importation is a **column (1)** of data that is imported into a **range** in a **sheet**.

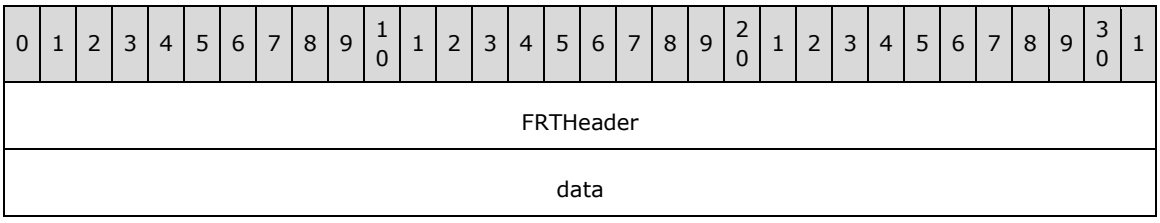


data (8 bytes): An **ECTwFldInfoData** structure (section 2.5.39) which specifies field settings.

2.4.65 BrtBeginECTwFldInfo15

The **BrtBeginECTwFldInfo15** record specifies field settings for **model data source text importation connection** (section 2.2.8.9.4) and specifies the beginning of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection specifies field settings for text importation.

A field in the context of text importation is a **column (1)** of data that is imported into a **range** in a sheet.



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...

FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the Future Record (section 2.1.6) information for this record.

data (8 bytes): A **ECTwFldInfoData** structure (section 2.5.39), which specifies field settings.

2.4.66 BrtBeginECTWFldInfoLst

The **BrtBeginECTWFldInfoLst** record specifies the number of **columns (1)** of data in a text file and specifies the beginning of a collection of **BrtBeginECTwFldInfo** (section 2.4.64) records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection specifies a collection of columns (1) of data in a text file.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cFields																															

cFields (4 bytes): An unsigned integer that specifies the number of columns (1) of data in the text file. This value MUST equal the number of **BrtBeginECTwFldInfo** records in the collection.

2.4.67 BrtBeginECTWFldInfoLst15

The **BrtBeginECTWFldInfoLst15** record specifies the number of **columns (1)** of data in a text file and specifies the beginning of a collection of **BrtBeginECTwFldInfo15** (section 2.4.65) records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection specifies a collection of columns (1) of data in a text file.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
FRTHeader																															
cFields																															

FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the Future Record (section 2.1.6) information for this record.

cFields (4 bytes): An unsigned integer that specifies the number of columns (1) of data in the text file. This value MUST equal the number of **BrtBeginECTwFldInfo15** records in the collection.

2.4.68 BrtBeginECTxtWiz

The **BrtBeginECTxtWiz** record specifies **text importation** properties and specifies the beginning of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection specifies text importation properties.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
data																															

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...
...
stFile (variable)
...

data (12 bytes): An **ECTxtWizData** structure (section 2.5.40) which specifies text importation properties.

stFile (variable): An **XLWideString** (section 2.5.168) that specifies the path to the text file to use to import external data. The length of the string MUST be greater than or equal to 0 characters and less than 219 characters.

2.4.69 BrtBeginECTxtWiz15

The **BrtBeginECTxtWiz15** record specifies the **model data source text importation connection** properties (section 2.2.8.9.4), and the beginning of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
FRTHeader																															
data																															
...																															
...																															
stFile (variable)																															
...																															

FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the Future Record (section 2.1.6) information for this record.

data (12 bytes): An **ECTxtWizData** structure (section 2.5.40) which specifies **model data source text importation connection** properties.

stFile (variable): An **XLWideString** (section 2.5.168) that specifies the path to the text file to use to import external data. The length of the string MUST be greater than or equal to zero characters and less than 219 characters.

2.4.70 BrtBeginECWebProps

The **BrtBeginECWebProps** record specifies the properties of a Web connection (section 2.2.8.5) and specifies the beginning of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies the properties of a Web connection.

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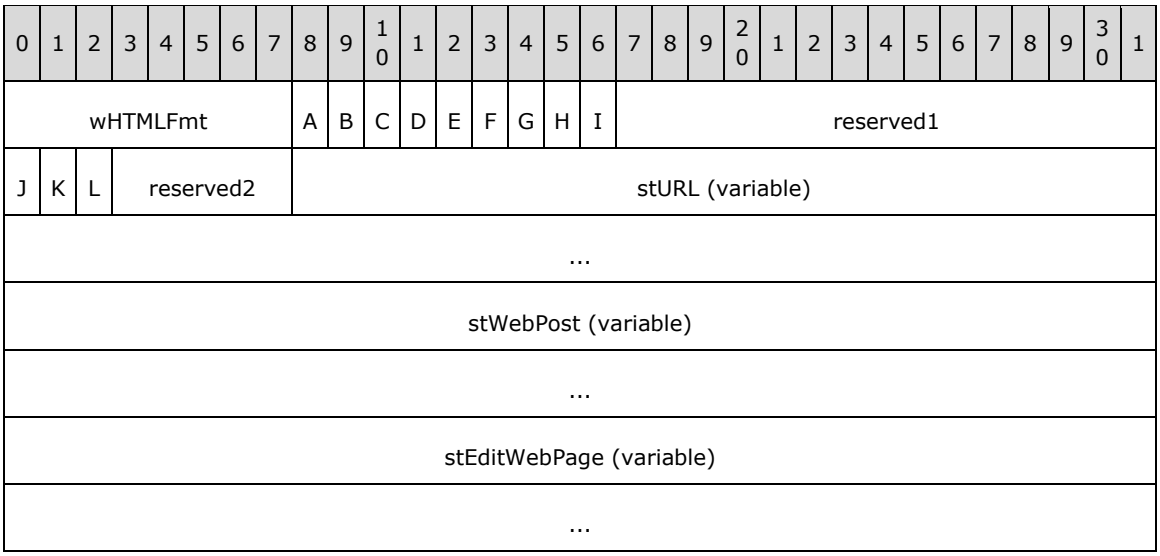

wHTMLFmt (8 bits): An unsigned integer that specifies how to handle formatting from the HTML source when bringing Web connection (section 2.2.8.5) data into the **sheet**. This value MUST be one of the values in the following table.

Value	Meaning
0x00	None. There is no formatting.
0x01	RTF. Handle the formatting as rich text formatting.
0x02	All. Handle the formatting as all HTML formatting.

A - fSrcIsXML (1 bit): A bit that specifies whether the Web connection (section 2.2.8.5) source is XML. The following table specifies the meaning of each value.

Value	Meaning
0	The Web connection source is HTML.
1	The Web connection source is XML.

B - fImportSourceData (1 bit): A bit that specifies whether the source data is imported from a specified **Uniform Resource Locator (URL)** instead of the HTML table itself. This value is used when a Web connection (section 2.2.8.5) connects to an HTML table with the following attribute.

```
<TABLE ... o:WebQuerySourceHRef="http://..." ... > ... </TABLE>
```

The value of the **WebQuerySourceHRef** attribute specifies the URL to obtain the source data from. The following table specifies the meaning of each value.

Value	Meaning
0	Specifies that **source data** is not imported.
1	Specifies that source data is imported.

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C - fParsePreFormatted (1 bit): A bit that specifies whether the data contained within HTML <PRE> tags in the web page is parsed into **columns (1)** when the page is imported into a **query table**. The following table specifies the meaning of each value.

Value	Meaning
0	Specifies that <PRE> tags are not parsed.
1	Specifies that <PRE> tags are parsed.

D - fConsecDelim (1 bit): A bit that specifies whether consecutive delimiters are treated as just one delimiter. The following table specifies the meaning of each value.

Value	Meaning
0	Each delimiter is treated as a separate delimiter.
1	Consecutive delimiters are treated as just one delimiter.

E - fSameSettings (1 bit): A bit that specifies whether all tables inside a <PRE> block are parsed with the same width settings as the first **row**.

F - fXL97Format (1 bit): A bit that specifies whether this Web connection (section 2.2.8.5) was created using a specific version of the application<9>.

G - fNoDateRecog (1 bit): A bit that specifies whether dates are imported into **cells** in the sheet as text rather than dates. The following table specifies the meaning of each value.

Value	Meaning
0	Dates are imported as date values.
1	Dates are imported as text.

H - fRefreshedInXL9 (1 bit): A bit that specifies whether this Web connection (section 2.2.8.5) was refreshed using a version of the application newer than a specific version<10>.

I - fTablesOnlyHTML (1 bit): A bit that specifies whether this Web connection (section 2.2.8.5) only works on HTML tables. The following table specifies the meaning of each value.

Value	Meaning
0	The Web connection only works on the whole Web page.
1	The Web connection only works on HTML tables.

reserved1 (15 bits): This value MUST be 0, and MUST be ignored.

J - fLoadWebPost (1 bit): A bit that specifies whether the **stWebPost** field exists after the fixed size portion of this record.

K - fLoadEditWebPage (1 bit): A bit that specifies whether the **stEditWebPage** field exists after the fixed size portion of this record.

L - fLoadURL (1 bit): A bit that specifies whether the **stURL** field exists after the fixed size portion of the record. If the **fDeleted** field in the preceding **BrtBeginExtConnection** (section 2.4.79)

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record is 0, this value MUST be 1. If the **fDeleted** field in the preceding **BrtBeginExtConnection** record is 1 and the **fSrcIsXML** field is 0, this value MUST be 0.

reserved2 (5 bits): This value MUST be 0, and MUST be ignored.

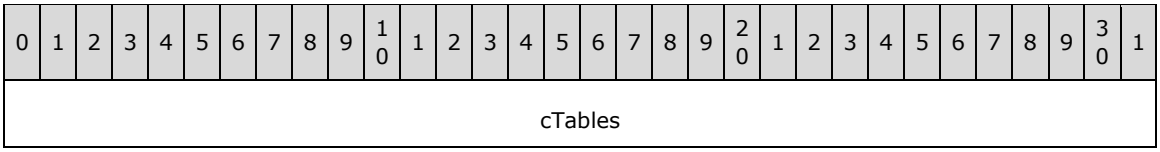
stURL (variable): An optional **XLWideString** (section 2.5.168) that specifies the URL to use to refresh external data. The length of this string MUST be greater than 0. This field MUST exist if and only if **fLoadURL** is 1.

stWebPost (variable): An optional **XLWideString** (section 2.5.168) that specifies the string used with the HTTP post method of sending data to a Web server. This field MUST exist if and only if **fLoadWebPost** is 1.

stEditWebPage (variable): An optional **XLWideString** (section 2.5.168) that specifies the URL of the user-facing Web page displaying the Web connection (section 2.2.8.5) data. This URL is persisted if **fImportSourceData** is 1 and **stURL** contains the URL specified by the **o:WebQuerySourceHRef** attribute in the selected HTML table. This field MUST exist if and only if **fLoadEditWebPage** is 1.

2.4.71 BrtBeginEcWpTables

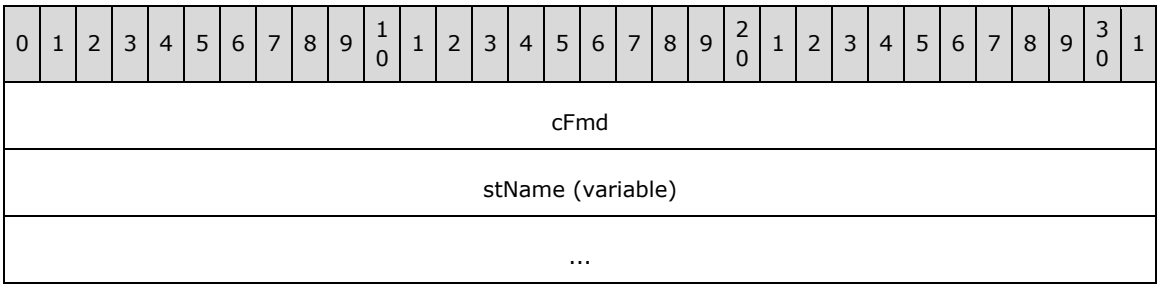
The **BrtBeginEcWpTables** record specifies the beginning of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection specifies a collection of tables to be returned via a **Web query** data connection. The collection of tables is specified by **BrtPCDIIndex** (section 2.4.724), **BrtPCDIString** (section 2.4.727), or **BrtPCDIMissing** (section 2.4.725) records. The **BrtPCDIString** record specifies the HTML table by its ID attribute and the **BrtPCDIIndex** record specifies the HTML table by its index (in order of the `<Table>` tags in the HTML page). The **BrtPCDIMissing** record is used when the user has specified an invalid reference to an HTML page.



cTables (4 bytes): An unsigned integer that specifies the number of tables to pull data from when refreshing from a Web query. This value MUST match the number of records in the collection.

2.4.72 BrtBeginEsfmd

The **BrtBeginEsfmd** record specifies the name of the metadata type (section 2.2.4.1) and specifies the beginning of a collection of records as defined by the **Metadata** (section 2.1.7.34) part **ABNF**. The collection of records specifies a future metadata store (section 2.2.4.4).



cFmd (4 bytes): A signed integer that specifies the number of records in the collection. This number MUST be greater than or equal to 1, and MUST be equal to the number of records in the collection.

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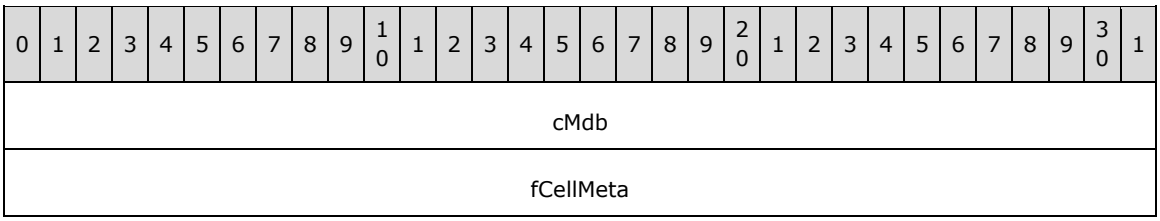
stName (variable): An **XLWideString** (section 2.5.168) that specifies the name of the metadata type (section 2.2.4.1). This name MUST be equal to the **stName** of one of the **BrtMdtinfo** (section 2.4.698) records in the collection of metadata types specified by the **BrtBeginEsmdtinfo** (section 2.4.74) and **BrtEndEsmdtinfo** (section 2.4.423) records. The names of future metadata types MUST be unique within the collection of metadata types and MUST NOT be equal to "XLMDX".

2.4.73 BrtBeginEsmdb

The **BrtBeginEsmdb** record specifies the type of metadata block (section 2.2.4.5) records and specifies the beginning of a collection of **BrtMdb** (section 2.4.697) records as defined by the **Metadata** (section 2.1.7.34) part **ABNF**. The collection of records MUST contain metadata block records of the same kind: either only cell metadata (section 2.2.4.2) records or only value metadata (section 2.2.4.3) records.



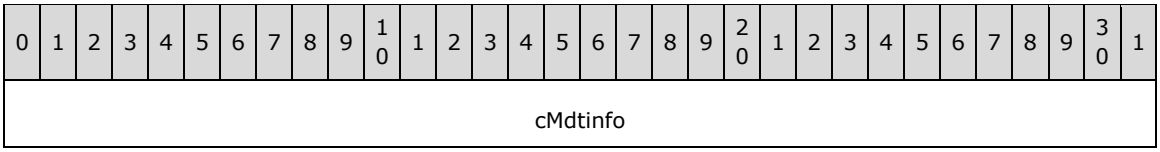
cMdb (4 bytes): A signed integer that specifies the number of records in the collection. This number MUST be greater than or equal to 1, and MUST be equal to the number of records in the collection.

fCellMeta (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether **BrtMdb** (section 2.4.697) records of a cell metadata (section 2.2.4.2) or value metadata (section 2.2.4.3) type directly follow this record. This value MUST be one of the values in the following table.

Value	Meaning
0x00000000	The collection contains value metadata records.
0x00000001	The collection contains cell metadata records.

2.4.74 BrtBeginEsmdtinfo

The **BrtBeginEsmdtinfo** record specifies the beginning of the collection of **BrtMdtinfo** (section 2.4.698) records as defined by the **Metadata** (section 2.1.7.34) part **ABNF**. The collection of records specifies the list of metadata types (section 2.2.4.1).



cMdtinfo (4 bytes): A signed integer that specifies the number of records in the collection. This number MUST be greater than or equal to 1, and MUST be equal to the number of records in the collection.

2.4.75 BrtBeginEsmdx

The **BrtBeginEsmdx** record specifies the beginning of a collection of records as defined by the **Metadata** (section 2.1.7.34) part **ABNF**. The collection of records specifies the **MDX** metadata store (section 2.2.4.4).

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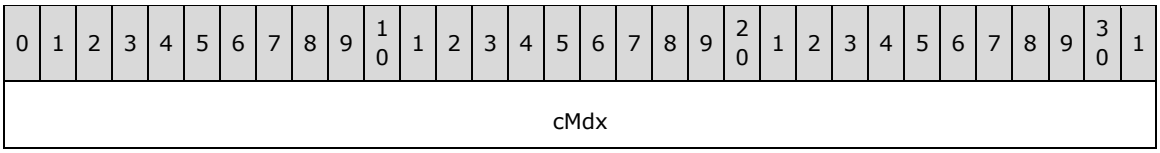
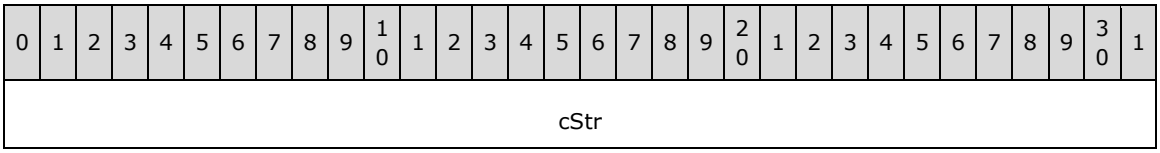


cMdx (4 bytes): A signed integer that specifies the number of records in the collection. This number MUST be greater than or equal to 1, and MUST be equal to the number of records in the collection.

2.4.76 BrtBeginEsstr

The **BrtBeginEsstr** record specifies the beginning of a collection of **BrtStr** (section 2.4.782) records as defined by the **Metadata** (section 2.1.7.34) part **ABNF**.

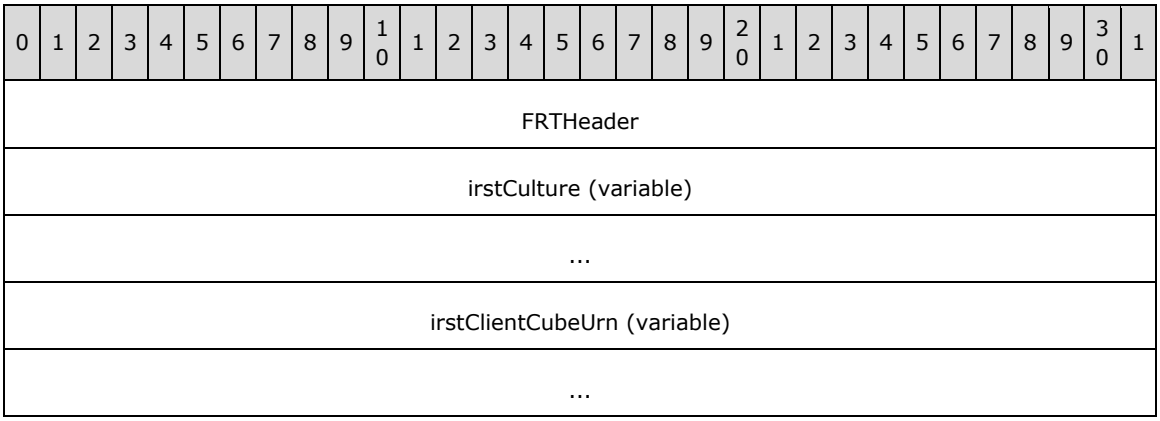


cStr (4 bytes): A signed integer that specifies the number of **BrtStr** records in the collection. This number MUST be greater than or equal to 1, and MUST be equal to the number of records in the collection.

2.4.77 BrtBeginExtConn14

The **BrtBeginExtConn14** record specifies the extended properties of an external connection (section 2.2.8) and specifies the beginning of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies the OLAP calculated **members** that are associated with this external connection. If this external connection is associated with a **PivotCache** (section 2.2.5.2), the collection MUST be empty.

The **idbtype** field of the **BrtBeginExtConnection** (section 2.4.79) record that precedes this record MUST be **DBTOLEDB** (section 2.5.30). If this collection is not empty, **icmdtype** field of the **BrtBeginECDbProps** (section 2.4.60) record that immediately precedes this record MUST be **CMDCUBE** (section 2.5.20).



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the Future Record (section 2.1.6) information for this record.

irstCulture (variable): An **XLWideString** (section 2.5.168) that specifies the language associated with this connection. The length of this string MUST be less than 85 characters. If the length of

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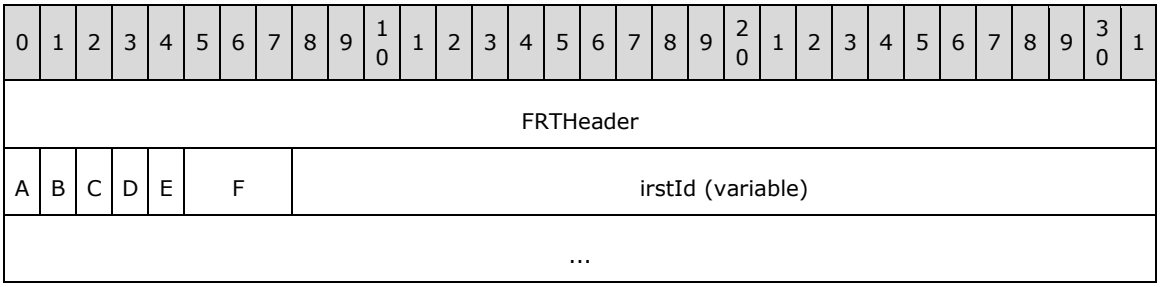
this string is greater than 0, the contents of this string MUST be a language tag as specified in [RFC3066]<11>. If this field is not present, the data connection is using the server language.

irstClientCubeUrn (variable): An **XLWideString** that specifies an embedded **Custom Data** (section 2.1.7.10) part. The length of this value MUST be less than 65536 characters. If the length of this string is greater than 0, the contents of this string MUST be equal to the **id** attribute of a **datastoreItem** element, as specified in [MS-XLSX] section 2.4.35, in a **Custom Data Properties** (section 2.1.7.11) part in this package (section 2.1.1).

2.4.78 BrtBeginExtConn15

The **BrtBeginExtConn15** record specifies the extended properties of an external connection (section 2.2.8).



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the Future Record (section 2.1.6) information for this record.

A - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

B - fSandbox (1 bit): A bit that specifies whether this is a connection to the **spreadsheet data model** (as specified in [MS-XLDM]) The following table specifies the meaning of each value.

Value	Meaning
0	This is a not connection to the spreadsheet data model.
1	This is a connection to the spreadsheet data model.

If this value equals 1, the **idbtype** field of the **BrtBeginExtConnection** (section 2.4.79) record that precedes this record MUST be equal to **DBTOLEDB** (section 2.5.30).

C - fExcludeFromRefreshAll (1 bit): A bit that specifies whether this connection is excluded from Refresh All operation. The following table specifies the meaning of each value.

Value	Meaning
0	This connection is not excluded from Refresh All operation.
1	This connection is excluded from Refresh All operation.

D - fAutoDelete (1 bit): A bit that specifies whether this connection is automatically deleted when all data features that use it are deleted. The following table specifies the meaning of each value.

Value	Meaning
0	This connection is not automatically deleted when all data features that use it are deleted.

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Value	Meaning
1	This connection is automatically deleted when all data features that use it are deleted.

E - fUsedByAddin (1 bit): A bit that specifies whether this connection is used by an external data feature. The following table specifies the meaning of each value.

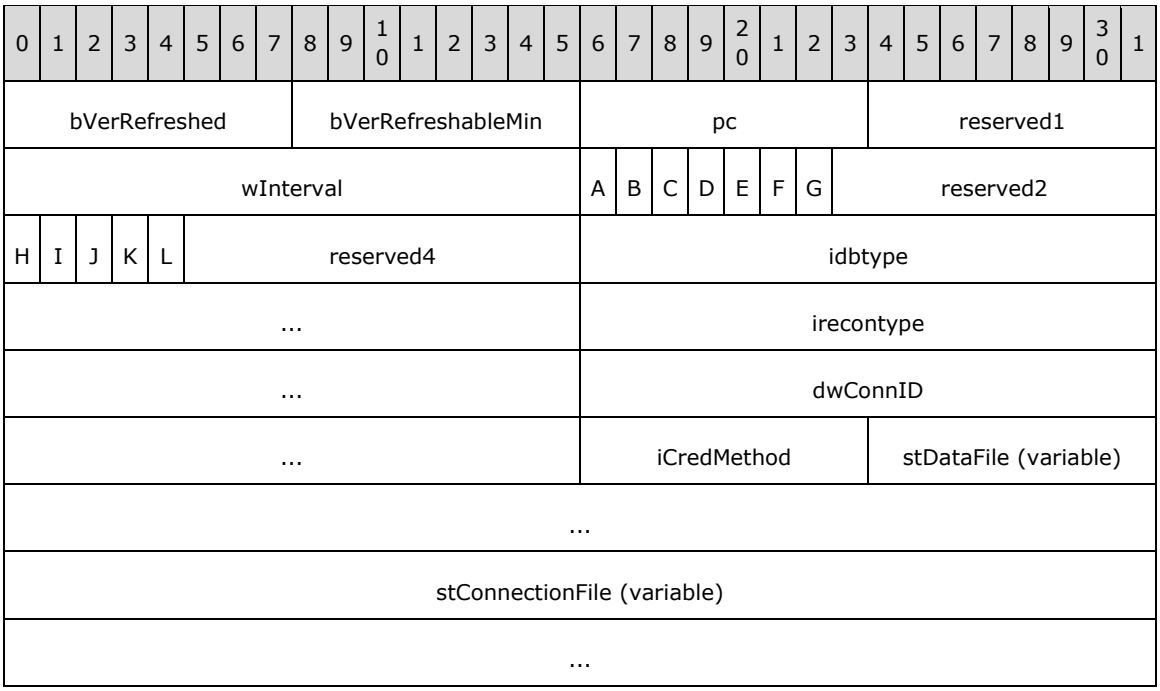
Value	Meaning
0	This connection is not used by an external data feature.
1	This connection is used by an external data feature.

F - reserved2 (3 bits): This value MUST be 0 and MUST be ignored.

irstId (variable): An **XLNullableWideString** (section 2.5.166) that specifies the string identifier of the spreadsheet data model **data source**. The string length MUST be less than or equal to 65535 characters. If the **fSandbox** field is equal to 1, the string length MUST be NULL and MUST be ignored.

2.4.79 BrtBeginExtConnection

The **BrtBeginExtConnection** record specifies the properties of an external connection (section 2.2.8) and specifies the beginning of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies properties of an external connection; the records that this collection contains are specified by the connection type, as specified in section 2.2.8.



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stConnDesc (variable)
...
stConnName (variable)
...
stSso (variable)
...

bVerRefreshed (1 byte): A **DataFunctionalityLevel** (section 2.5.28) structure that specifies the data functionality level (section 2.2.5.1) that the external connection was last refreshed with.

bVerRefreshableMin (1 byte): A **DataFunctionalityLevel** (section 2.5.28) structure that specifies the minimum data functionality level (section 2.2.5.1) that the application is required to support to correctly **refresh** the external connection.

pc (8 bits): An unsigned integer that specifies whether the password is saved as part of the **connection string**. This value MUST be ignored if the value of the **idbtype** field is not **DBTOLEDB** (section 2.5.30) or **DBTODBC** (section 2.5.30); otherwise this value MUST be one of the values in the following table.

Value	Meaning
0x01	The password is saved in the connection string.
0x02	The password is not saved in the connection string.

reserved1 (8 bits): This value MUST be 0, and MUST be ignored.

wInterval (16 bits): An unsigned integer that specifies the number of minutes between automatic refreshes of the external connection. This value MUST be less than 32768. If the value is 0, the external connection is not automatically refreshed.

A - fMaintain (1 bit): A bit that specifies whether the external connection is maintained after the refresh. This value MUST be ignored if the value of **idbtype** is not **DBTOLEDB** (section 2.5.30).

B - fNewQuery (1 bit): A bit that specifies whether the external connection has been refreshed for the first time. The following table specifies the meaning of each value.

Value	Meaning
0	The external connection has been refreshed at least once.
1	The external connection has not been refreshed for the first time.

C - fDeleted (1 bit): A bit that specifies whether the external connection has been deleted. A deleted external connection MUST contain **stConnName**.

D - fAlwaysUseConnectionFile (1 bit): A bit that specifies whether the external connection information in the external connection file (section 2.2.8.2) specified in the **stConnectionFile** field is used when the external connection is refreshed. This value MUST be ignored if **idbtype** is not

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DBTOLEDB (section 2.5.30) or **DBTODBC** (section 2.5.30). The following table specifies the meaning of each value.

Value	Meaning
0	The procedure specified by the **irecontype** field is used.
1	The connection information in the external connection file specified by the **stConnectionFile** field is used.

E - fBackgroundQuery (1 bit): A bit that specifies whether the preferred usage of the external connection is to refresh asynchronously in the background. The following table specifies the meaning of each value.

Value	Meaning
0	The preferred usage of the external connection is to refresh synchronously in the foreground.
1	The preferred usage of the external connection is to refresh asynchronously in the background.

If this external connection is associated with a **PivotCache** (section 2.2.5.2), this value MUST be equal to the **fBackgroundQuery** field in the **BrtBeginPivotCacheDef** (section 2.4.167) record. If this external connection is associated with a **query table**, this value MUST be equal to the value in the **fAsync** field in the **BrtBeginQSI** (section 2.4.185) record.

F - fRefreshOnLoad (1 bit): A bit that specifies whether this external connection is refreshed when the **workbook** is opened.

G - fSaveData (1 bit): A bit that specifies whether the data retrieved from the external connection is saved within the workbook. If this external connection is associated with a query table, this value MUST be equal to the value in the **fSaveData** field in the **BrtBeginQSI** (section 2.4.185) record.

reserved2 (9 bits): This value MUST be 0, and MUST be ignored.

H - fLoadSourceDataFile (1 bit): A bit that specifies whether **stDataFile** exists after the fixed-size portion of the record.

I - fLoadSourceConnectionFile (1 bit): A bit that specifies whether **stConnectionFile** exists after the fixed-size portion of the record.

J - fLoadConnectionDesc (1 bit): A bit that specifies whether **stConnDesc** exists after the fixed-size portion of the record.

K - reserved3 (1 bit): A bit that MUST have a value of 1, and MUST be ignored.

L - fLoadSSOApplicationID (1 bit): A bit that specifies whether **stSso** exists after the fixed-size portion of the record. This value MUST be 0 if **idbtype** is not **DBTOLEDB** (section 2.5.30) or **DBTODBC** (section 2.5.30).

reserved4 (11 bits): This value MUST be 0, and MUST be ignored.

idbtype (4 bytes): A **DBType** (section 2.5.30) that specifies the **data source** type.

irecontype (4 bytes): An unsigned integer that specifies when external connection information is retrieved from the external connection file (section 2.2.8.2). This value MUST be ignored when the value for **fAlwaysUseConnectionFile** is 1 and MUST be ignored if **idbtype** is not **DBTOLEDB** (section 2.5.30); otherwise the value in this field MUST be one of the values in the following table.

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Value	Meaning
0x00000001	Retrieve external connection information as required. When **external data** has to be refreshed from the external connection, use the existing external connection information; otherwise if the external data refresh from the external connection fails then retrieve updated external connection information, if available, from the external connection file.
0x00000002	Retrieve external connection information. When external data has to be refreshed from the external connection, retrieve updated external connection information from the external connection file, if available, and use that instead of the existing external connection information. In this case the external data refresh will fail if the external connection file is unavailable.
0x00000003	Never retrieve external connection information. Never get updated external connection information from the external connection file even if it is available and even if the existing external connection information is invalid.

dwConnID (4 bytes): An unsigned integer that specifies the unique identifier of this external connection. This value MUST be greater than 0.

iCredMethod (1 byte): An unsigned integer that specifies the authentication method that is used when establishing or reestablishing the external connection. This value MUST be 0 and MUST be ignored if **idbtype** is not **DBTOLEDB** (section 2.5.30) or **DBTODBC** (section 2.5.30); otherwise this value MUST be one of the values listed in the following table.

Value	Meaning
0x00	Integrated authentication.
0x01	No credentials.
0x02	Use credentials that are stored as part of a **single sign-on (SSO)** repository.

stDataFile (variable): An optional **XLWideString** (section 2.5.168) value that specifies the path to the file containing the data to import. The length of the string MUST be less than 256 characters. This field MUST exist if and only if **fLoadSourceDataFile** is 1.

stConnectionFile (variable): An optional **XLWideString** value that specifies the path to the external connection file (section 2.2.8.2) from which this external connection was created. As specified by **fAlwaysUseConnectionFile** and **irecontype**, the information in the external connection file can be used in place of information specified by this collection of records. The length of the string MUST be less than 256 characters. This field MUST exist if and only if **fLoadSourceConnectionFile** is 1.

stConnDesc (variable): An optional **XLWideString** value that specifies the description for this external connection. The length of the string MUST be less than 256 characters. This field MUST exist if and only if **fLoadConnectionDesc** is 1.

stConnName (variable): An **XLWideString** value that specifies the name of the external connection. The external connection name MUST be unique within a workbook. The length of the string MUST be greater than 0 and less than 256 characters.

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stSso (variable): An optional **XLWideString** value that specifies the identifier for single sign-on (SSO) used for authentication between a multi-tier application and the external data. The length of the string MUST be less than 256 characters. This field MUST exist if and only if **fLoadSSOApplicationID** is 1.

2.4.80 BrtBeginExtConnections

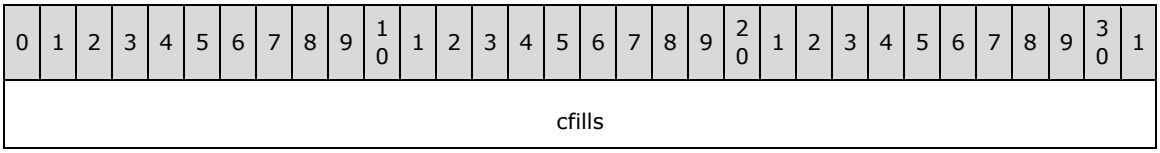
The **BrtBeginExtConnections** record specifies the beginning of a collection of **BrtBeginExtConnection** (section 2.4.79) records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies external connections (section 2.2.8).

2.4.81 BrtBeginExternals

The **BrtBeginExternals** record specifies the beginning of a collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies a collection of supporting links (section 2.2.7.2) and a collection of **Xti** (section 2.5.172) structures.

2.4.82 BrtBeginFills

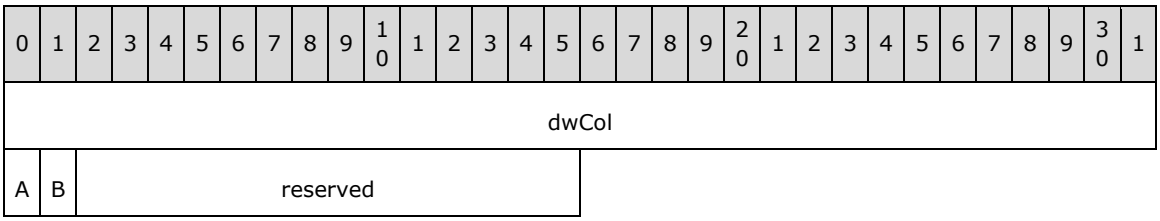
The **BrtBeginFills** record specifies a count of **BrtFill** (section 2.4.668) records and specifies the beginning of a collection of **BrtFill** records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtFill** records specifies **cell fill pattern**.



cfills (4 bytes): An unsigned integer that specifies the number of **BrtFill** (section 2.4.668) records between **BrtBeginFills** record and the subsequent **BrtEndFills** (section 2.4.431) record. This value MUST be greater than or equal 1 and less than or equal to 0xFF97.

2.4.83 BrtBeginFilterColumn

The **BrtBeginFilterColumn** record specifies properties of an **AutoFilter column (1)** and specifies the beginning of a collection of records as defined by the **Macro Sheet** (section 2.1.7.32) part **ABNF**, the **PivotTable** (section 2.1.7.40) part ABNF, the **Table** (section 2.1.7.51) part ABNF, and the **Worksheet** (section 2.1.7.62) part ABNF. The collection of records specifies an AutoFilter column (1).



dwCol (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies a zero-based index to the column (1) in the AutoFilter **range** to which this **filter** information applies. This value MUST be greater than or equal to 0 and less than or equal to the number of columns (1) in the region described by the **rfx** value in the **BrtBeginAFilter** (section 2.4.8) record associated with this **BrtBeginFilterColumn** record.

A - fHideArrow (1 bit): A bit that specifies whether the AutoFilter button for this column (1) is **hidden**.

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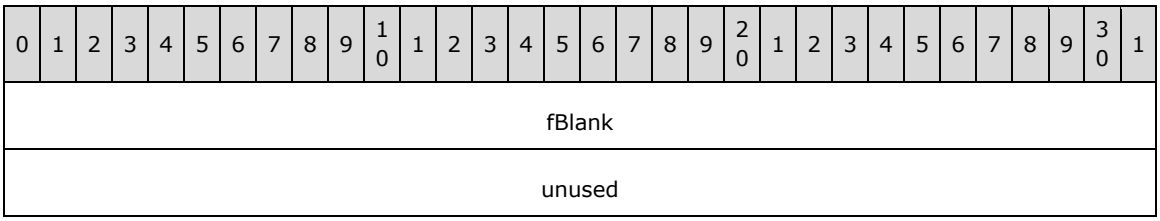
B - fNoBtn (1 bit): A bit that specifies whether the AutoFilter button for this column (1) will appear in the next column (1) after this one. This value MUST be one of the values listed in the following table:

Value	Meaning
0	The AutoFilter button for this column (1) will not appear in the next column (1) after this one
1	The AutoFilter button for this column (1) will appear in the next column (1) after this one, replacing any filter button in that **cell**. If the value in the **fHideArrow** field is equal to 1, the button will appear in the next column (1) but the user will not be able to interact with it.

reserved (14 bits): This value MUST be 0, and MUST be ignored.

2.4.84 BrtBeginFilters

The **BrtBeginFilters** record specifies the beginning of a collection of records as defined by the **Macro Sheet** (section 2.1.7.32) part **ABNF**, the **PivotTable** (section 2.1.7.40) part ABNF, the **Table** (section 2.1.7.51) part ABNF, and the **Worksheet** (section 2.1.7.62) part ABNF. The collection of records specifies information about the **filter**.



fBlank (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether to display blank values.

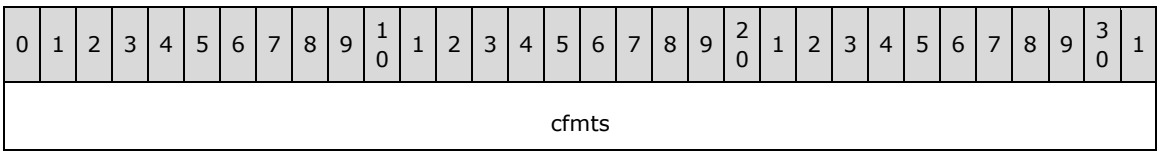
unused (4 bytes): This value is undefined and MUST be ignored.

2.4.85 BrtBeginFmd

The **BrtBeginFmd** record specifies the beginning of a collection of records as defined by the **Metadata** (section 2.1.7.34) part **ABNF**. The collection of records specifies future records (section 2.1.6).

2.4.86 BrtBeginFmts

The **BrtBeginFmts** record specifies a count of **BrtFmt** (section 2.4.675) records and specifies the beginning of a collection of **BrtFmt** records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtFmt** records specifies the properties of the **number formats** that indicate how to format and render the numeric value of the **cells**.



cfmts (4 bytes): An unsigned integer that specifies the number of **BrtFmt** (section 2.4.675) records in this collection. The value in this field SHOULD be less than or equal to 0x000000CE.<12>

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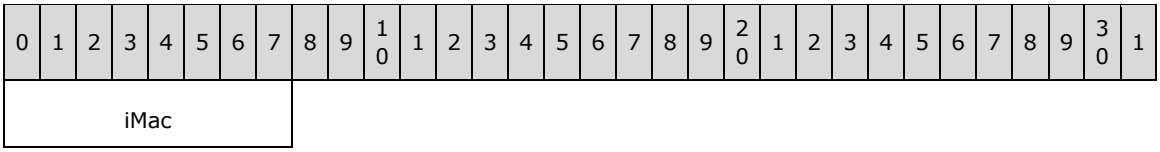
2.4.87 BrtBeginFnGroup

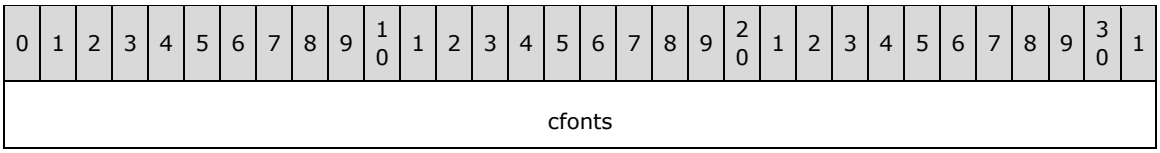
The **BrtBeginFnGroup** record specifies the number of built-in **function categories** and specifies the beginning of a collection of **BrtFnGroup** (section 2.4.676) records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of **BrtFnGroup** records specifies properties of a function category.



iMac (1 byte): An unsigned integer that specifies the number of built-in function categories in the current **workbook**. The value in this field plus the count of **BrtFnGroup** (section 2.4.676) records MUST be less than or equal to 255.

2.4.88 BrtBeginFonts

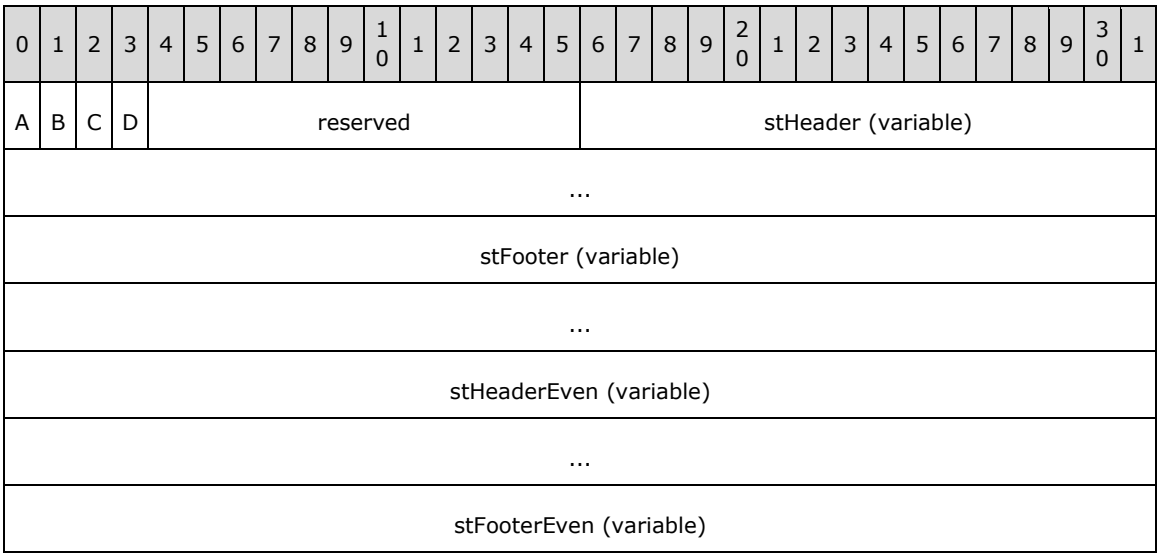
The **BrtBeginFonts** record specifies a count of **BrtFont** (section 2.4.677) records and specifies the beginning of a collection of **BrtFont** records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtFont** records specifies the fonts for the **workbook**.



cfonts (4 bytes): An unsigned integer that specifies the number of **BrtFont** (section 2.4.677) records in this collection. This value MUST be less than or equal to 0x0000FFD3.

2.4.89 BrtBeginHeaderFooter

The **BrtBeginHeaderFooter** record specifies the header and footer information for a **sheet** and specifies the beginning of an empty collection of records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**, the **Chart Sheet** (section 2.1.7.7) part ABNF, the **Dialog Sheet** (section 2.1.7.20) part ABNF, and the **Macro Sheet** (section 2.1.7.32) part ABNF.



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...
stHeaderFirst (variable)
...
stFooterFirst (variable)
...

A - fHFDiffOddEven (1 bit): A bit that specifies that the header and footer used on even-numbered printed pages are different from those used on odd-numbered printed pages.

B - fHFDiffFirst (1 bit): A bit that specifies that the header and footer used on the first printed page are different from those used on subsequent pages.

C - fHFScaleWithDoc (1 bit): A bit that specifies that the headers and footers scale with the **print scale**.

D - fHFAlignMargins (1 bit): A bit that specifies that the headers and footers align with the **page margins**.

reserved (12 bits): This value MUST be 0 and MUST be ignored.

stHeader (variable): A **HeaderFooterString** (section 2.5.72) that specifies the contents of the header. This header is used for odd-numbered pages except for the first page. If **fHFDiffOddEven** is 0, this header also is used for even-numbered pages. If **fHFDiffFirst** is 0, this header also is used for the first page.

stFooter (variable): A **HeaderFooterString** that specifies the contents of the footer. This footer is used for odd-numbered pages except for the first page. If **fHFDiffOddEven** is 0, this footer also used for even-numbered pages. If **fHFDiffFirst** is 0 this footer also is used for the first page.

stHeaderEven (variable): A **HeaderFooterString** that specifies the contents of the header for even-numbered printed pages. This field MUST be ignored if **fHFDiffOddEven** is 0.

stFooterEven (variable): A **HeaderFooterString** that specifies the contents of the footer for even-numbered printed pages. This field MUST be ignored if **fHFDiffOddEven** is 0.

stHeaderFirst (variable): A **HeaderFooterString** (section 2.5.72) that specifies the contents of the header for the first printed page. This field MUST be ignored if **fHFDiffFirst** is 0.

stFooterFirst (variable): A **HeaderFooterString** that specifies the contents of the footer for the first printed page. This field MUST be ignored if **fHFDiffFirst** is 0.

2.4.90 BrtBeginIconSet

The **BrtBeginIconSet** record specifies properties of a **conditional formatting** rule that uses an **icon set** and specifies the beginning of a collection of **BrtCFVO** (section 2.4.329) records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF** and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of **BrtCFVO** records specifies the set of values that specify the thresholds used by the conditional formatting rule to determine which **icons** to display in the applied **range**. Each **BrtCFVO** record following this record specifies the minimum value associated with the corresponding icon from the icon set. The first **BrtCFVO** record following this record MUST be ignored.

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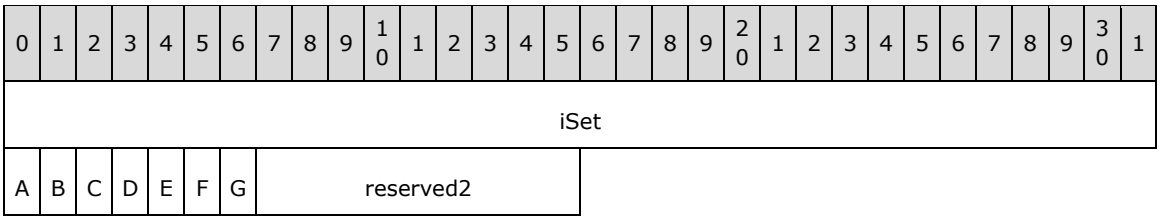


iSet (4 bytes): A **KPISets** (section 2.5.85) integer that specifies the icon set used in the collection of **BrtCFVO** (section 2.4.329) records.

A - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

B - fIcon (1 bit): A bit that specifies whether the **cells** in the applied range display the icon and **cell value**, or the icon only.

Value	Meaning
0	The icon and cell value are shown in the cell.
1	Only the icon is shown in the cell.

C - fReverse (1 bit): A bit that specifies whether the icons in the icon set specified in **iSet** are shown in reverse order.

Value	Meaning
0	The icons specified in **iSet** are shown in reverse order.
1	The icons specified in **iSet** are shown in the order defined by the icon set.

D - unused1 (1 bit): This value is undefined and MUST be ignored.

E - unused2 (1 bit): This value is undefined and MUST be ignored.

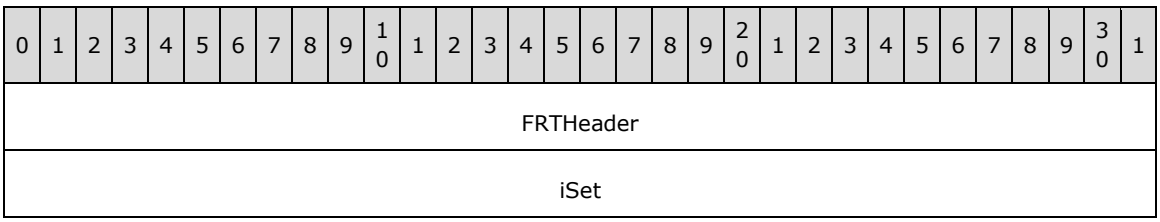
F - unused3 (1 bit): This value is undefined and MUST be ignored.

G - unused4 (1 bit): This value is undefined and MUST be ignored.

reserved2 (9 bits): This value MUST be 0, and MUST be ignored.

2.4.91 BrtBeginIconSet14

The **BrtBeginIconSet14** record specifies properties of a **conditional formatting** rule that uses an **icon set** and specifies the beginning of a collection of records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of **BrtCFVO14** (section 2.4.330) records specifies the set of values that specify the thresholds used by the conditional formatting rule to determine which **icons** to display in the applied **range**. The collection of **BrtCFIcon** (section 2.4.327) records specifies a custom set of icons if the **fCustom** value is 1. The first **BrtCFVO14** record following this record MUST be ignored.



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A	B	C	D	E	F	G	reserved

FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) value that specifies the future record (section 2.1.6) information for this record.

iSet (4 bytes): A **KPISets14** (section 2.5.86) value that specifies the icon set used in the collection of **BrtCFVO14** (section 2.4.330) records.

A - fCustom (1 bit): A bit that specifies whether a custom set of icons is used. If the value equals 1, then there MUST be the same number of **BrtCFIcon** (section 2.4.327) records as **BrtCFVO14** records and the icons specified by the **BrtCFIcon** records are used rather than those specified by the **iSet** field. If the value equals 0, then there MUST be 0 **BrtCFIcon** records.

Value	Meaning
0	No custom set of icons is used.
1	A custom set of icons is used.

B - fIcon (1 bit): A bit that specifies whether the **cells** in the applied range display the icon and **cell value**, or the icon only.

Value	Meaning
0	The icon and cell value are shown in the cell.
1	Only the icon is shown in the cell.

C - fReverse (1 bit): A bit that specifies whether the icons in the icon set specified in **iSet** are shown in reverse order. If **fCustom** equals one, this value MUST be ignored.

Value	Meaning
0	The icons specified in **iSet** are shown in reverse order.
1	The icons specified in **iSet** are shown in the order defined by the icon set.

D - unused1 (1 bit): This value is undefined, and MUST be ignored.

E - unused2 (1 bit): This value is undefined, and MUST be ignored.

F - unused3 (1 bit): This value is undefined, and MUST be ignored.

G - unused4 (1 bit): This value is undefined, and MUST be ignored.

reserved (9 bits): This value MUST be 0, and MUST be ignored.

2.4.92 BrtBeginIndexedColors

The **BrtBeginIndexedColors** record specifies the beginning of a collection of **BrtIndexedColor** (section 2.4.684) records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtIndexedColor** records specifies indexed colors. The number of **BrtIndexedColor** records MUST be less than or equal to 64.

2.4.93 BrtBeginISXTHCols

The **BrtBeginISXTHCols** record specifies a collection of references to pivot hierarchies (section 2.2.5.3.4) and any data fields (section 2.2.5.3.7.5.2) that appear on the **column (1)** axis of a

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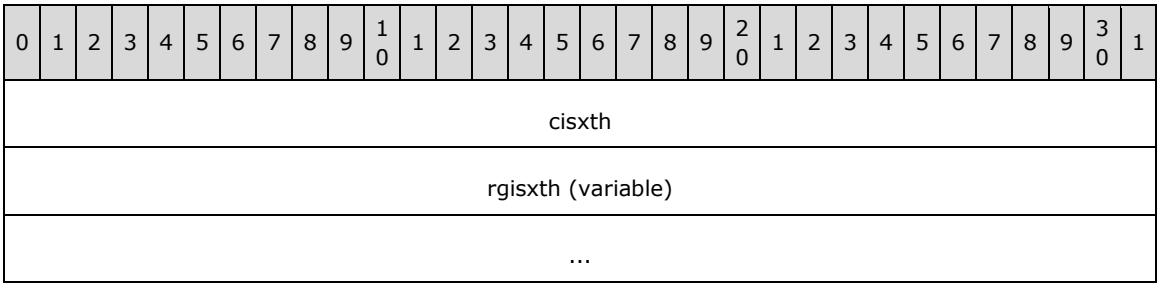
PivotTable view (section 2.2.5.3), and specifies the beginning of an empty collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. If this record is present, the **PivotTable** view MUST be an **OLAP** **PivotTable** view.



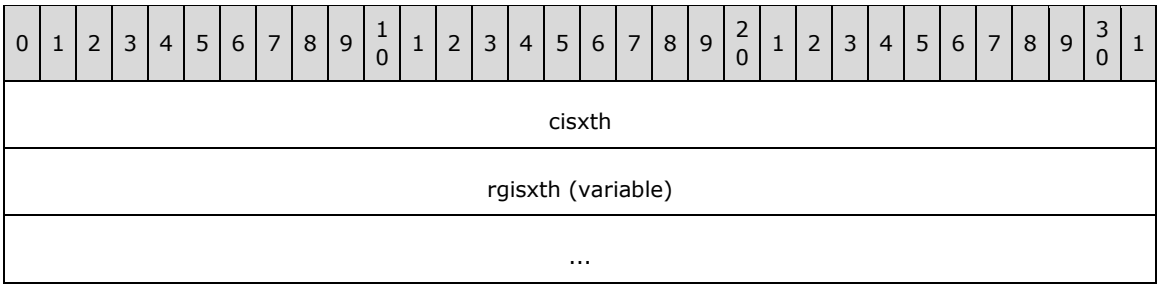
cisxth (4 bytes): An unsigned integer that specifies the count of items in the **rgisxth** array.

rgisxth (variable): An array of **ISXTH** (section 2.5.82) structures that specifies the collection of references to pivot hierarchies (section 2.2.5.3.4) and any data field (section 2.2.5.3.7.5.2) that appear on the column (1) axis of a **PivotTable** view (section 2.2.5.3). The count of items in this array MUST be equal to **cisxth**.

Each item MUST NOT equal -1. Each item MUST have a unique value. This array MUST specify pivot hierarchies and any data field reference in the same order as the pivot hierarchies associated with the pivot fields (section 2.2.5.3.2), omitting duplicates, and any data field reference specified by the **BrtBeginISXVDCols** (section 2.4.95) record.

2.4.94 BrtBeginISXTHRws

The **BrtBeginISXTHRws** record specifies a collection of references to pivot hierarchies (section 2.2.5.3.4) and any data field (section 2.2.5.3.7.5.2) that appear on the **row** axis of a PivotTable view (section 2.2.5.3), and specifies the beginning of an empty collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. If this record is present, the PivotTable view MUST be an **OLAP** PivotTable view.



cisxth (4 bytes): An unsigned integer that specifies the count of items in the **rgisxth** array.

rgisxth (variable): An array of **ISXTH** (section 2.5.82) structures that specifies the collection of references to pivot hierarchies (section 2.2.5.3.4) and any data field (section 2.2.5.3.7.5.2) that appear on the row axis of a PivotTable view (section 2.2.5.3). The count of items in this array MUST be equal to the value in the **cisxth** field.

Each item MUST NOT equal -1. Each item MUST have a unique value. This array MUST specify pivot hierarchies and any data field reference in the same order as the pivot hierarchies associated with the pivot fields (section 2.2.5.3.2), omitting duplicates, and any data field reference specified by the **BrtBeginISXVDRws** (section 2.4.96) record.

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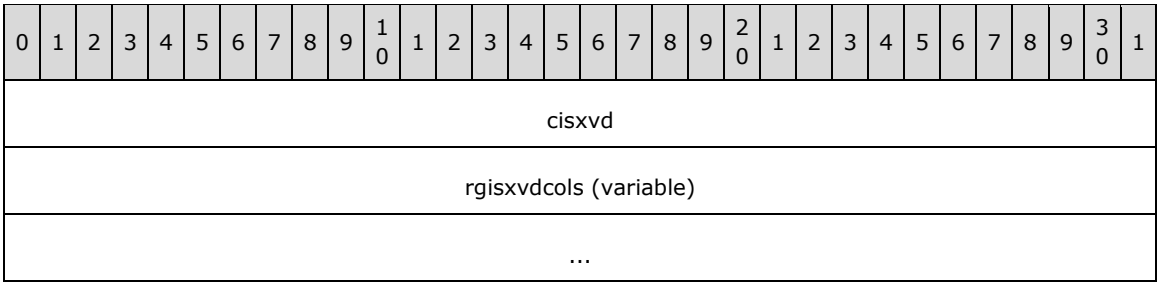
2.4.95 BrtBeginISXVDCols

The **BrtBeginISXVDCols** record specifies the pivot fields (section 2.2.5.3.2) that appear on the **column (1)** axis of this PivotTable view (section 2.2.5.3), and specifies the beginning of an empty collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**.



cisxvd (4 bytes): An unsigned integer that specifies the count of pivot fields (section 2.2.5.3.2), and any instance of the data field (section 2.2.5.3.7.5.2), that appear on the column (1) axis of this PivotTable view (section 2.2.5.3).

rgisxvdcols (variable): An array of **ISXVD** (section 2.5.83) structures that specifies the pivot fields (section 2.2.5.3.2) that appear on the column (1) axis of this PivotTable view and whether the data field (section 2.2.5.3.7.5.2) appears on the column (1) axis. Pivot fields will appear on the column (1) axis in the order they are specified in this array.

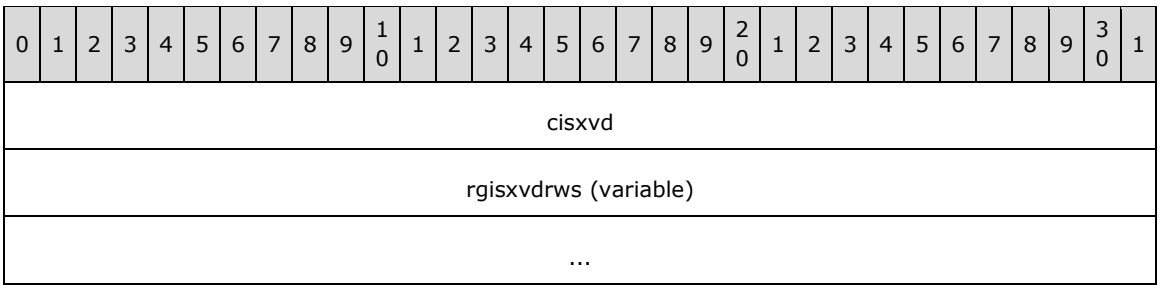
Each item MUST NOT be equal to -1. The count of items in this array MUST be equal to the value in the **cisxvd** field. Each item in this array MUST have a unique value.

If an item in this array has a value equal to -2, the value in the **sxaxis4Data** field of the **BrtBeginSXView** (section 2.4.273) record of this PivotTable view MUST be equal to 0x02.

Any **BrtBeginSXVD** (section 2.4.270) record of a pivot field specified by an item in this array MUST have its **sxaxisCol** attribute equal to 1.

2.4.96 BrtBeginISXVDRws

The **BrtBeginISXVDRws** record specifies the pivot fields (section 2.2.5.3.2) that appear on the **row** axis of this PivotTable view (section 2.2.5.3), and specifies the beginning of an empty collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**.



cisxvd (4 bytes): An unsigned integer that specifies the count of pivot fields, and any instance of the data field (section 2.2.5.3.7.5.2), that appear on the row axis of this PivotTable view.

rgisxvdrws (variable): An array of **ISXVD** (section 2.5.83) structures that specifies the pivot fields that appear on the row axis of this **PivotTable** view and whether the data field appears on the row axis. Pivot fields will appear on the row axis in the order they are specified in this array.

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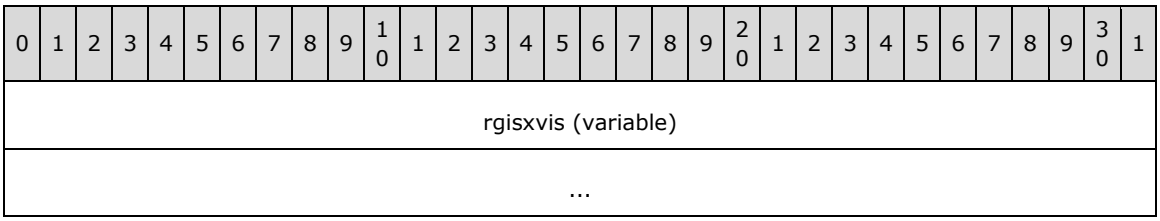
Each item MUST NOT be equal to -1. The count of items in this array MUST be equal to the value in the **cisxvd** field. Each item in this array MUST have a unique value.

If an item in this array has a value equal to -2, the **sxaxis4Data** field of the **BrtBeginSXView** (section 2.4.273) record of this **PivotTable** view MUST be equal to 0x01.

Any **BrtBeginSXVD** (section 2.4.270) record of a pivot field specified by an item in this array MUST have its **sxaxisRw** attribute equal to 1.

2.4.97 BrtBeginISXVIs

The **BrtBeginISXVIs** record specifies the pivot line entries (section 2.2.5.3.8.4) that occur on a pivot line (section 2.2.5.3.8.3) and specifies the beginning of an empty collection of records as defined in the **PivotTable** (section 2.1.7.40) part **ABNF**.



rgisxvis (variable): An array of 4-byte unsigned integers, each of which specifies a pivot line entry (section 2.2.5.3.8.4). The number of elements in this array MUST be equal to the value in the **cisxvis** field of the **BrtBeginSXLI** (section 2.4.249) record that begins this collection. If the value in the **itmtype** field in the **BrtBeginSXLI** record that begins this collection is **PITGRAND** (section 2.5.104), then any pivot line entries specified by this field MUST be ignored.

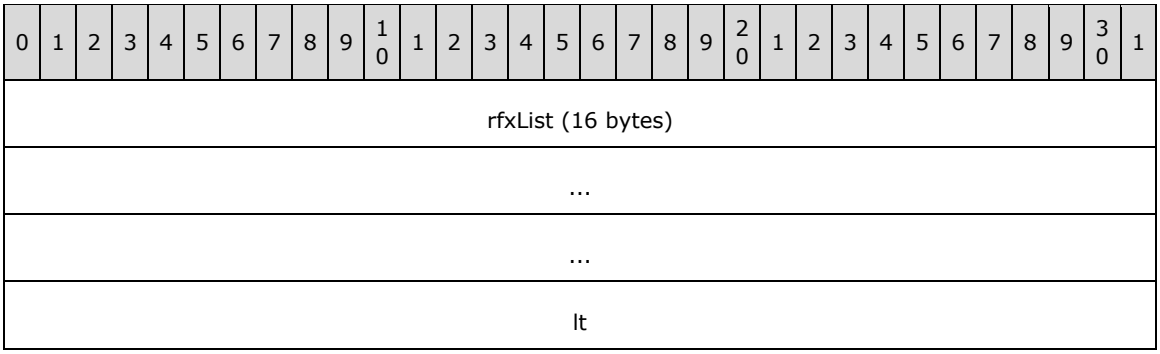
2.4.98 BrtBeginItemUniqueNames

The **BrtBeginItemUniqueNames** record specifies the **MDX unique names** for cache items (section 2.2.5.2.3) in this cache field (section 2.2.5.2.2) and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**.

MUST NOT exist if **fSandbox** of **BrtBeginExtConn15** (section 2.4.78) of the external connection (section 2.2.8) associated with this pivot cache (section 2.2.5.2) is not equal to 1.

2.4.99 BrtBeginList

The **BrtBeginList** record specifies the properties of a **table** and specifies the beginning of a collection of records as defined by the **Table** (section 2.1.7.51) part **ABNF** and the **Single Cell Tables** (section 2.1.7.46) part ABNF. The collection of records specifies a table.



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idList					
crwHeader					
crwTotals					
A	B	C	D	E	reserved
nDxfHeader					
nDxfData					
nDxfAgg					
nDxfBorder					
nDxfHeaderBorder					
nDxfAggBorder					
dwConnID					
stName (variable)					
...					
stDisplayName (variable)					
...					
stComment (variable)					
...					
stStyleHeader (variable)					
...					
stStyleData (variable)					
...					
stStyleAgg (variable)					
...					

rfxList (16 bytes): An **RfX** (section 2.5.117) that specifies the **range** of **cells** the table occupies. The range specified by the **RfX** value MUST NOT overlap with another table or **AutoFilter** on the same **sheet**. The **RfX** height MUST be greater than the sum of the values of the **crwHeader** and **crwTotals** fields. If **fSingleCell** is 1, **rfxList** MUST occupy exactly 1 cell.

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lt (4 bytes): A **ListType** (section 2.5.88) that specifies the table type.

idList (4 bytes): An unsigned integer that specifies the numeric identifier of the table. This value MUST be unique within the containing **workbook**, MUST be greater than or equal to 1 and MUST be less than or equal to 4294967294 (0xFFFFFFFE).

crwHeader (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether the **table header row** is displayed at the top of the table. The possible values for this field are listed in the following table.

Value	Meaning
0x00000000	Table header row is **hidden**.
0x00000001	Table header row is displayed.

crwTotals (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether the table **total row** is displayed at the bottom of the table. The possible values for this field are listed in the following table.

Value	Meaning
0x00000000	Total row is hidden.
0x00000001	Total row is displayed.

A - fShownTotalRow (1 bit): A bit that specifies whether the table total row has ever been displayed for this table.

B - fSingleCell (1 bit): A bit that specifies whether the table is a single cell table. If this value equals 1, then **lt** MUST be equal to **LTXML** (section 2.5.88).

C - fForceInsertToBeVisible (1 bit): A bit that specifies whether the table **insert row** is displayed.

D - fInsertRowInsCells (1 bit): A bit that specifies whether cells in the sheet were automatically inserted when the table insert row was displayed for this table.

E - fPublished (1 bit): A bit that specifies the **publish to server** state of this table.

reserved (27 bits): This value MUST be 0 and MUST be ignored.

nDxfHeader (4 bytes): A **DXFId** (section 2.5.37) that specifies the differential formatting (section 2.2.6.2) applied to the table header row of this table. If **fSingleCell** is 1, the value MUST be 0xFFFFFFFF.

nDxfData (4 bytes): A **DXFId** that specifies the differential formatting applied to the table **data region** of this table. If **fSingleCell** is 1, the value MUST be 0xFFFFFFFF.

nDxfAgg (4 bytes): A **DXFId** that specifies the differential formatting applied to the table total row of this table. If **fSingleCell** is 1, the value MUST be 0xFFFFFFFF.

nDxfBorder (4 bytes): A **DXFId** that specifies the differential formatting applied to the **borders** of the table data region of this table. If **fSingleCell** is 1, the value MUST be 0xFFFFFFFF.

nDxfHeaderBorder (4 bytes): A **DXFId** that specifies the differential formatting applied to the borders of the table header row of this table. If **fSingleCell** is 1, the value MUST be 0xFFFFFFFF.

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nDxfAggBorder (4 bytes): A **DXFId** (section 2.5.37) that specifies the differential formatting (section 2.2.6.2) applied to the borders of the table total row of this table. If **fSingleCell** is 1, the value MUST be 0xFFFFFFFF.

dwConnID (4 bytes): An unsigned integer that specifies the identifier of an external connection (section 2.2.8) used by this table. The value in **dwConnID** MUST be 0 when the value of **lt** is not LTXML. The value MUST be 0 or be equal to the **dwConnID** value in one of the **BrtBeginExtConnection** (section 2.4.79) records in the **BrtBeginExtConnections** (section 2.4.80) collection.

stName (variable): An **XLNullableWideString** (section 2.5.166) that specifies the string identifier of the table used for programmatic purposes. The string MUST be NULL or unique per **Table** (section 2.1.7.51) per sheet, MUST have less than or equal to 255 characters, and MUST be NULL if **fSingleCell** is 1. If this field is NULL, the string identifier used for programmatic purposes is specified by **stDisplayName**.

stDisplayName (variable): An **XLNullableWideString** that specifies the string identifier of the table for use within the displayed string for formulas (section 2.2.2). The value of **stDisplayName** MUST have a maximum length and format specified by **XLNameWideString** (section 2.5.165), MUST be unique per workbook, and MUST NOT have the prefix "_xl". If **fSingleCell** is 1, the string MUST be NULL.

stComment (variable): An **XLNullableWideString** that specifies a **comment** about the table. The string MUST contain less than or equal to 255 characters. If **fSingleCell** is 1, the string MUST be NULL.

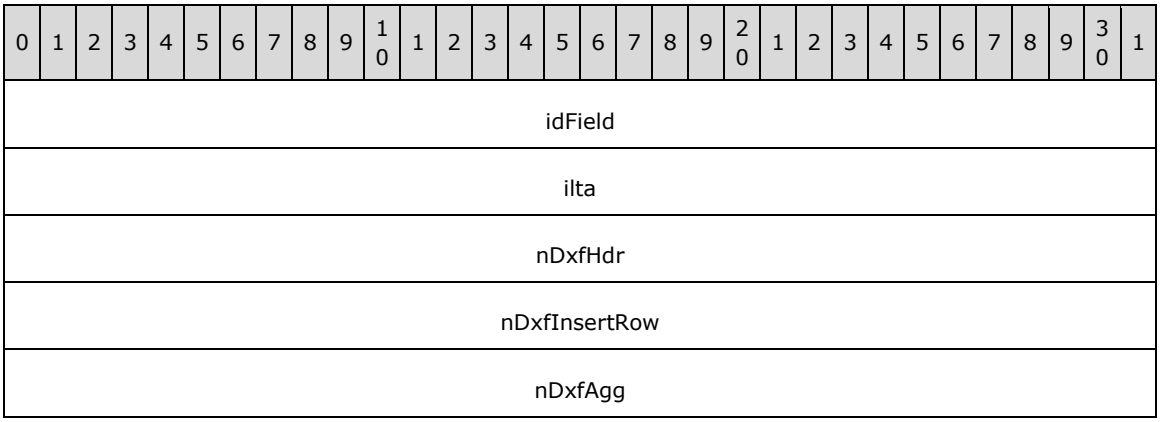
stStyleHeader (variable): A **CellStyleName** (section 2.5.10) that specifies the name of the cell style (section 2.2.6.1.2) that is applied to the table header row of the table. If **fSingleCell** is 1, the value MUST be a NULL string.

stStyleData (variable): A **CellStyleName** that specifies the name of the cell style that is applied to the table data region of the table. If **fSingleCell** is 1, the value MUST be a NULL string.

stStyleAgg (variable): A **CellStyleName** that specifies the name of the cell style that is applied to the table total row of the table. If **fSingleCell** is 1, the value MUST be a NULL string.

2.4.100 BrtBeginListCol

The **BrtBeginListCol** record specifies properties of a **column (1)** in a **table** and specifies the beginning of a collection of records, as defined by the **Table** (section 2.1.7.51) part **ABNF** and the **Single Cell Tables** (section 2.1.7.46) part ABNF. The collection of records specifies a table column (1).



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idqsif
stName (variable)
...
stCaption (variable)
...
stTotal (variable)
...
stStyleHeader (variable)
...
stStyleInsertRow (variable)
...
stStyleAgg (variable)
...

idField (4 bytes): An unsigned integer that specifies the numeric identifier of the table column (1). The value MUST be unique for all **BrtBeginListCol** records following the preceding **BrtBeginList** (section 2.4.99) record. The value MUST be greater than or equal to 1.

ilta (4 bytes): A **ListTotalRowFunction** (section 2.5.87) that specifies the table **total row aggregation function** for this table column (1). If the **crwTotals** field in the **BrtBeginList** (section 2.4.99) record is equal to 1, then the formula (section 2.2.2) specified by the value of **ilta** MUST be equal to the formula of the **cell** intersected by the table total row and this table column (1).

nDxfHdr (4 bytes): A **DXFId** (section 2.5.37) that specifies the differential formatting (section 2.2.6.2) applied to the **table header** of this table column (1). If the **fSingleCell** field or **crwHeader** field of the preceding **BrtBeginList** record is equal to 1, the value MUST be 0xFFFFFFFF.

nDxfInsertRow (4 bytes): A **DXFId** that specifies the differential formatting (section 2.2.6.2) applied to the table **insert row** of this table column (1). If the **fSingleCell** field of the preceding **BrtBeginList** record is equal to 1, the value MUST be 0xFFFFFFFF.

nDxfAgg (4 bytes): A **DXFId** that specifies the differential formatting applied to the table total row of this table column (1). If the **fSingleCell** field of the preceding **BrtBeginList** record is equal to 1, the value MUST be 0xFFFFFFFF.

idqsif (4 bytes): A **QsiFieldId** (section 2.5.111) that specifies the numeric identifier of the **query table** column (1) that corresponds to this column (1). The value MUST be 0 or unique for all **BrtBeginListCol** records following the preceding **BrtBeginList** record. If the **lt** field of the preceding **BrtBeginList** record is equal to **LTEXTDATA**, the value MUST be greater than or equal to 1; otherwise, the value MUST be 0.

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stName (variable): An **XLNullableWideString** (section 2.5.166) that specifies a textual identifier of this table column (1). The string in this field MUST be NULL or unique for all **BrtBeginListCol** records following the preceding **BrtBeginList** (section 2.4.99) record. If the **fSingleCell** field of the preceding **BrtBeginList** record is equal to 1 or the **lt** field of the preceding **BrtBeginList** record is equal to **LTRANGE**, the string MUST be NULL; otherwise, the string length MUST be greater than or equal to 1 and less than or equal to 255.

stCaption (variable): An **XLNullableWideString** that specifies the caption of this table column (1) to be displayed in the **sheet**. The string MUST be NULL or unique for all **BrtBeginListCol** records following the preceding **BrtBeginList** (section 2.4.99) record. If the **fSingleCell** field of the preceding **BrtBeginList** record is equal to 1, the string MUST be NULL; otherwise, the string length MUST be greater than or equal to 1 and less than or equal to 255. If the **crwHeader** field of the preceding **BrtBeginList** record is equal to 1, then the string MUST be equal to the string of the cell intersected by the table header **row** and this table column (1).

stTotal (variable): An **XLNullableWideString** that specifies the text to be displayed in the table total row of this table column (1). The string length MUST be less than or equal to 8189. The string MUST be NULL if **ilta** is equal to ILTA_CUSTOM. If the **crwTotals** field of the preceding **BrtBeginList** record is equal to 1, then the string MUST be equal to the string of the cell intersected by the table total row and this table column (1).

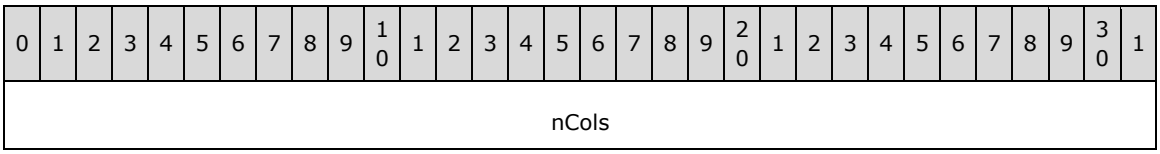
stStyleHeader (variable): A **CellStyleName** (section 2.5.10) that specifies the name of the cell style (section 2.2.6.1.2) that is applied to the table header row of this table column (1). If the **fSingleCell** field or **crwHeader** field of the preceding **BrtBeginList** record is equal to 1, the string MUST be NULL.

stStyleInsertRow (variable): A **CellStyleName** that specifies the name of the cell style that is applied to the table insert row of this table column (1). If the **fSingleCell** field of the preceding **BrtBeginList** record is equal to 1, the string MUST be NULL.

stStyleAgg (variable): A **CellStyleName** that specifies the name of the cell style (section 2.2.6.1.2) that is applied to the total row of this table column (1)<13>. If the **fSingleCell** field of the preceding **BrtBeginList** record is equal to 1, the string MUST be NULL.

2.4.101 BrtBeginListCols

The **BrtBeginListCols** record specifies a count of **table columns (1)** and specifies the beginning of a collection of records, as defined by the **Table** (section 2.1.7.51) part **ABNF** and the **Single Cell Tables** (section 2.1.7.46) part ABNF. The collection of records specifies the set of table columns (1) for a single table.



nCols (4 bytes): A **DCol** that specifies the count of items in the collection of table columns (1).

2.4.102 BrtBeginListParts

The **BrtBeginListParts** record specifies the beginning of a collection of **BrtListPart** (section 2.4.694) records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of **BrtListPart** records specifies **tables** defined in the **workbook**.

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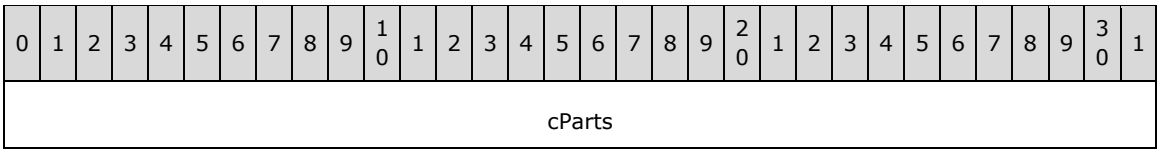
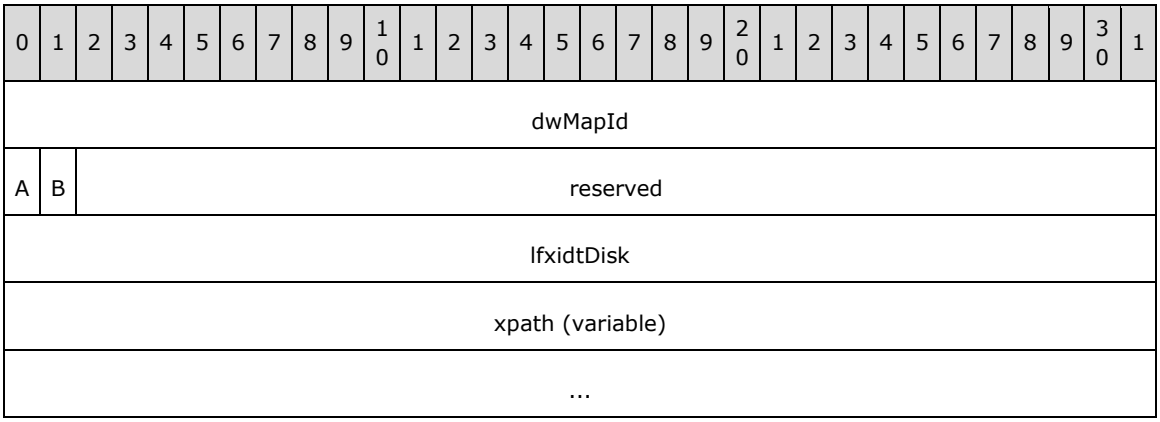


cParts (4 bytes): An unsigned integer that specifies the number of **BrtListPart** records in this collection.

2.4.103 BrtBeginListXmlCPr

The **BrtBeginListXmlCPr** record specifies properties of a **table column's (1) XML map** and specifies the beginning of an empty collection of records as defined by the **Table** (section 2.1.7.51) part **ABNF** and the **Single Cell Tables** (section 2.1.7.46) part ABNF.



dwMapId (4 bytes): An unsigned integer that specifies the XML map associated with this table column (1). The value MUST be equal to the value of the **ID** attribute of a **Map** element contained within the **Custom XML Maps** (section 2.1.7.15) part.

A - unused (1 bit): This value is undefined and MUST be ignored.

B - fCanBeSingle (1 bit): A bit that specifies whether **xpath** resolves to a single **XML node** or a collection of XML nodes. When the **fCanBeSingle** record is contained in a **Table** (section 2.1.7.51) part, this value MUST be a value from the following table.

Value	Meaning
0	Specifies that **xpath** resolves to a collection of XML nodes.
1	Specifies that **xpath** resolves to a single XML node.

When this record is contained in a **Single Cell Tables** (section 2.1.7.46) part, the value MUST be 1.

reserved (30 bits): The value in this field MUST be 0 and MUST be ignored.

lfxidtDisk (4 bytes): An **XmlDataType** (section 2.5.169) that specifies the data type of the XML nodes obtained by applying the **XPath** (specified by the value of **xpath)** to the XML map (specified by the value of **dwMapId**).

xpath (variable): An **XmlMappedXpath** (section 2.5.170) that specifies the XPath of this XML map.

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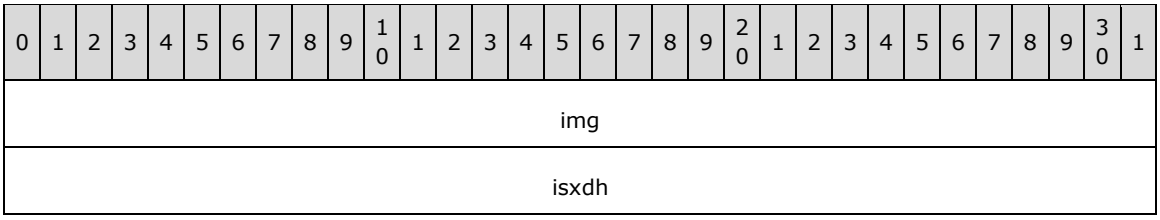
2.4.104 BrtBeginMap

The **BrtBeginMap** record specifies the mapping between **BrtBeginDim** (section 2.4.51) and **BrtBeginMG** (section 2.4.112) records and specifies the beginning of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**.

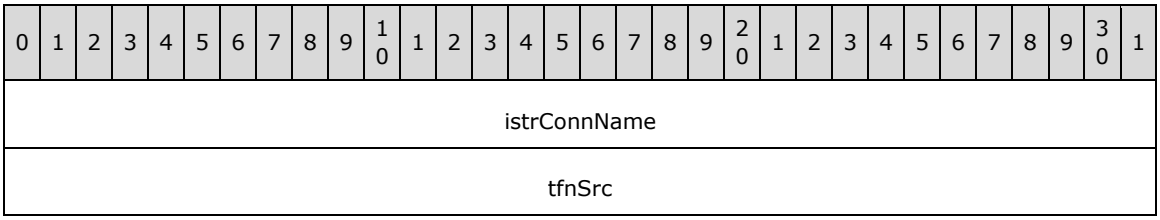


img (4 bytes): An unsigned integer that specifies the zero-based index of a **BrtBeginMG** (section 2.4.112) record that directly follows the **BrtBeginMgs** (section 2.4.114) record in this part. The referenced **BrtBeginMG** (section 2.4.112) record specifies **measure group**.

isxdh (4 bytes): An unsigned integer that specifies the zero-based index of a **BrtBeginDim** (section 2.4.51) that directly follows the **BrtBeginDims** (section 2.4.52) record in this part. The referenced **BrtBeginDim** record specifies **OLAP dimension**.

2.4.105 BrtBeginMdx

The **BrtBeginMdx** record specifies properties of MDX metadata (section 2.2.4.8) and specifies the beginning of a collection of records as defined by the **Metadata** (section 2.1.7.34) part **ABNF**. The collection of records specifies additional properties for MDX metadata.

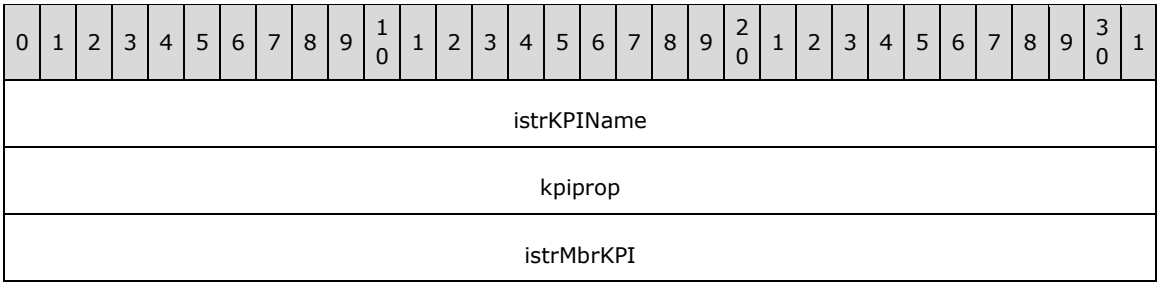


istrConnName (4 bytes): An **Istr** (section 2.5.80) that specifies the connection name.

tfnSrc (4 bytes): A **TagFnMdx** (section 2.5.148) that specifies the type of **cube function** that generated the metadata.

2.4.106 BrtBeginMdxKPI

The **BrtBeginMdxKPI** record specifies the properties of MDX KPI metadata (section 2.2.4.8.4) and specifies the beginning of an empty collection of records as defined by the **Metadata** (section 2.1.7.34) part **ABNF**. The preceding **BrtBeginMdx** (section 2.4.105) record MUST have the value of **tfnSrc** equal to **TFNCUBEKPIPROPERTY**, as specified by **TagFnMdx** (section 2.5.148).



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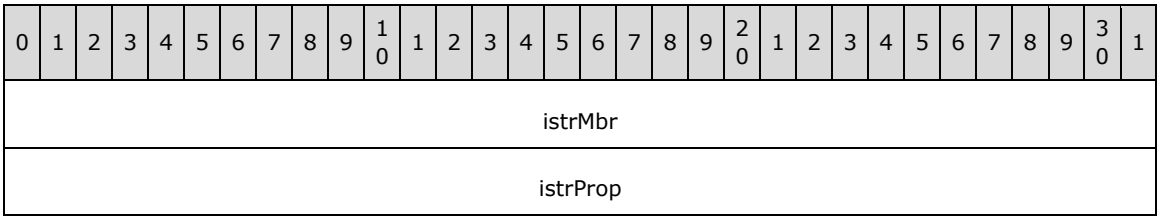
istrKPIName (4 bytes): An **Istr** (section 2.5.80) that specifies the **KPI** name.

kpiprop (4 bytes): A **KPIProp** (section 2.5.84) that specifies the KPI type<14>.

istrMbrKPI (4 bytes): An **Istr** that specifies the **MDX unique name** of a KPI **member**.

2.4.107 BrtBeginMdxMbrProp

The **BrtBeginMdxMbrProp** record specifies the properties of an **OLAP member** and specifies the beginning of an empty collection of records as defined by the **Metadata** (section 2.1.7.34) part **ABNF**. The preceding **BrtBeginMdx** (section 2.4.105) record MUST have **tfnSrc** equal to **TFNCUBEMEMBERPROPERTY**, as specified by **TagFnMdx** (section 2.5.148).

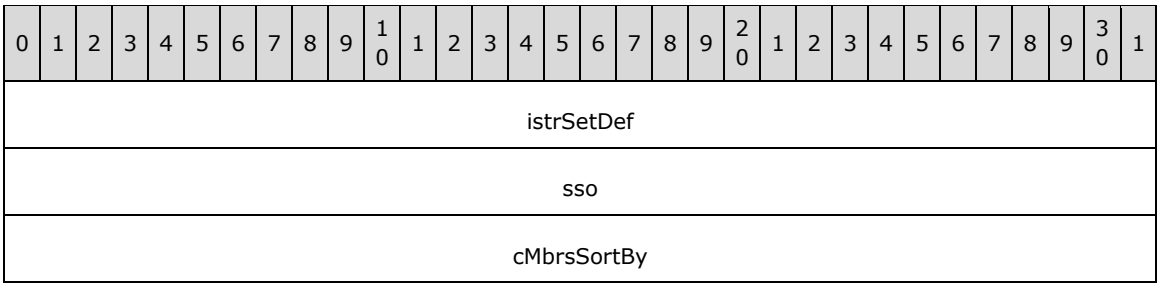


istrMbr (4 bytes): An **Istr** (section 2.5.80) that specifies the **MDX unique name** of the OLAP member.

istrProp (4 bytes): An **Istr** that specifies the MDX unique name of the OLAP member property.

2.4.108 BrtBeginMdxSet

The **BrtBeginMdxSet** record specifies properties of MDX set metadata (section 2.2.4.8.2) and specifies the beginning of a collection of **BrtMdxMbrIstr** (section 2.4.699) records as defined by the **Metadata** (section 2.1.7.34) part **ABNF**. The collection of **BrtMdxMbrIstr** records specifies **MDX unique names** and their properties. The preceding **BrtBeginMdx** (section 2.4.105) record MUST have **tfnSrc** equal to **TFNCUBESET** or **TFNCUBESETCOUNT**, as specified by **TagFnMdx** (section 2.5.148).



istrSetDef (4 bytes): An **Istr** (section 2.5.80) that specifies the set definition.

sso (4 bytes): An **SdSetSortOrder** (section 2.5.131) that specifies the sorting order of the set. If this field is equal to **SSOASC** or **SSODESC**, the **sort order (1)** is specified by the collection of **BrtMdxMbrIstr** (section 2.4.699) records that immediately follow this record.

cMbrsSortBy (4 bytes): A signed integer that specifies the number of coordinates in the **OLAP cube** that the set is sorted on. This number MUST be greater than or equal to 0.

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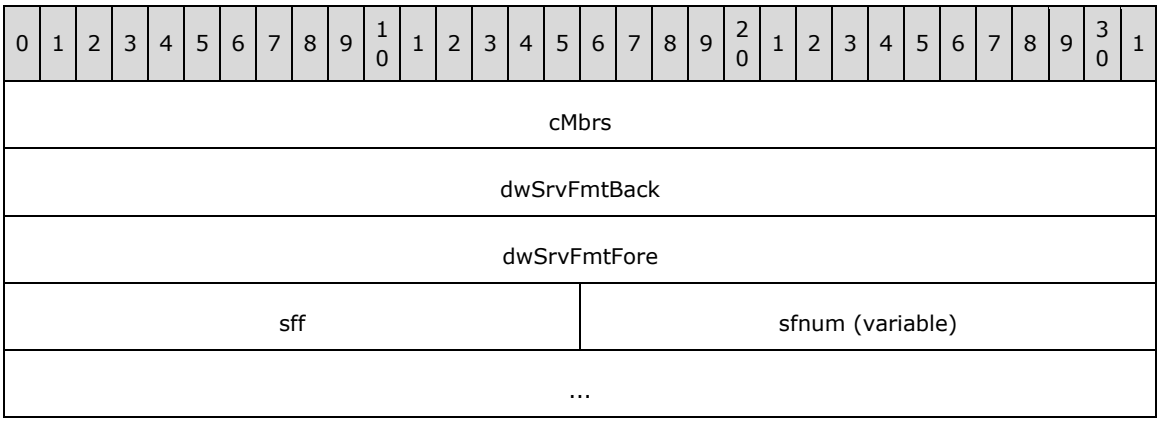
2.4.109 BrtBeginMdxTuple

The **BrtBeginMdxTuple** record specifies formatting properties for MDX tuple metadata (section 2.2.4.8.1) and specifies the beginning of a collection of **BrtMdxMbrIstr** (section 2.4.699) records as defined by the **Metadata** (section 2.1.7.34) part **ABNF**. The collection of **BrtMdxMbrIstr** records specifies **MDX unique names** and their properties. The preceding **BrtBeginMdx** (section 2.4.105) record MUST have **tfnSrc** equal to **TFNCUBEMEMBER**, **TFNCUBEVALUE**, or **TFNCUBERANKEDMEMBER**, as specified by **TagFnMdx** (section 2.5.148).



cMbrs (4 bytes): A signed integer that specifies the number of **member** expressions in the **tuple**. It MUST be greater than or equal to 0.

dwSrvFmtBack (4 bytes): A **SrvFmtCV** (section 2.5.138) that specifies the **background color**. When **sff.fSrvFmtBack** equals 1, the background color is applied.

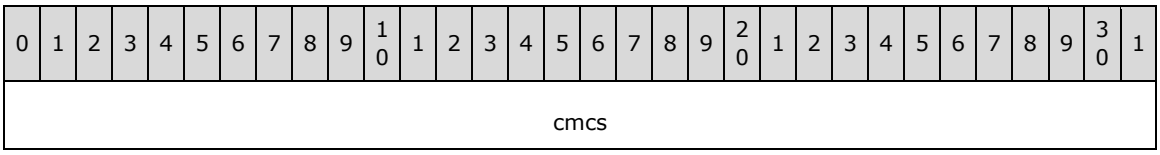
dwSrvFmtFore (4 bytes): A **SrvFmtCV** that specifies the **foreground color**. When **sff.fSrvFmtFore** equals 1, the foreground color is applied.

sff (2 bytes): A **SrvFmtFlags** (section 2.5.140) that specifies the properties of applied server-specified formatting.

sfnum (variable): A **SrvFmtNum** (section 2.5.141) that specifies the number or currency formatting. This field is optional and MUST exist if and only if **sff.fSrvFmtNum** is set to 1.

2.4.110 BrtBeginMergeCells

The **BrtBeginMergeCells** record specifies the beginning of a collection of **BrtMergeCell** (section 2.4.700) records as defined in the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of **BrtMergeCell** records specifies the **merged cells** for the **sheet**.



cmcs (4 bytes): An unsigned integer that specifies the number of merged cells.

2.4.111 BrtBeginMetadata

The **BrtBeginMetadata** record specifies the beginning of a collection of records as defined by the **Metadata** (section 2.1.7.34) part **ABNF**. The collection of records specifies the metadata (section 2.2.4) associated with the book.

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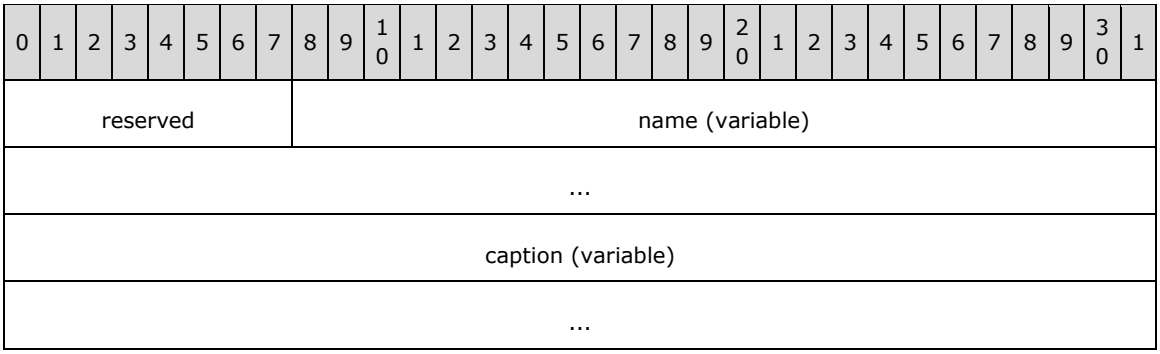
2.4.112 BrtBeginMG

The **BrtBeginMG** record specifies a **measure group** for a pivot cache (section 2.2.5.2) and specifies the beginning of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**.



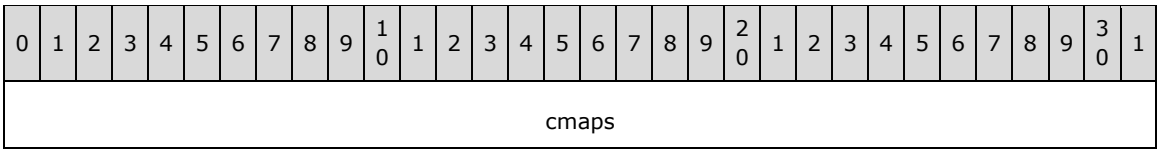
reserved (1 byte): This value MUST be 0 and MUST be ignored.

name (variable): An **XLWideString** (section 2.5.168) value that specifies the name of the measure group. The length of this string MUST be between 1 and 65,535.

caption (variable): An **XLWideString** value that specifies the display name of the measure group. The length of this string MUST be between 1 and 65,535.

2.4.113 BrtBeginMGMaps

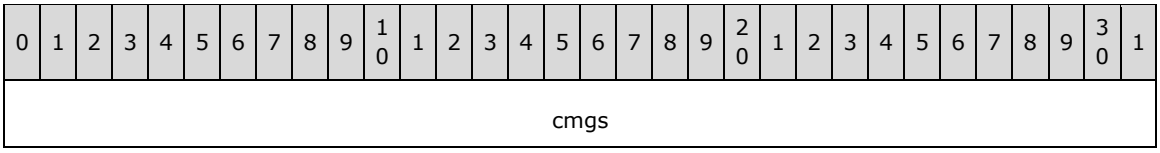
The **BrtBeginMGMaps** record specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the mappings between **OLAP dimensions** and the OLAP **measure groups** that each OLAP dimension is related to.



cmaps (4 bytes): An unsigned integer that specifies the number of mappings between OLAP dimensions and the OLAP measure groups. This value MUST be equal to number of **BrtBeginMap** (section 2.4.104) elements following this record.

2.4.114 BrtBeginMgs

The **BrtBeginMgs** record specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies **PivotTable** (section 2.2.5) **OLAP measure groups**.



cmgs (4 bytes): An unsigned integer that specifies the number of measure groups in the **PivotTable** (section 2.2.5) OLAP measure group collection. MUST be equal to the number of **BrtBeginMG** (section 2.4.112) records following this record.

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2.4.115 brtBeginModelRelationships

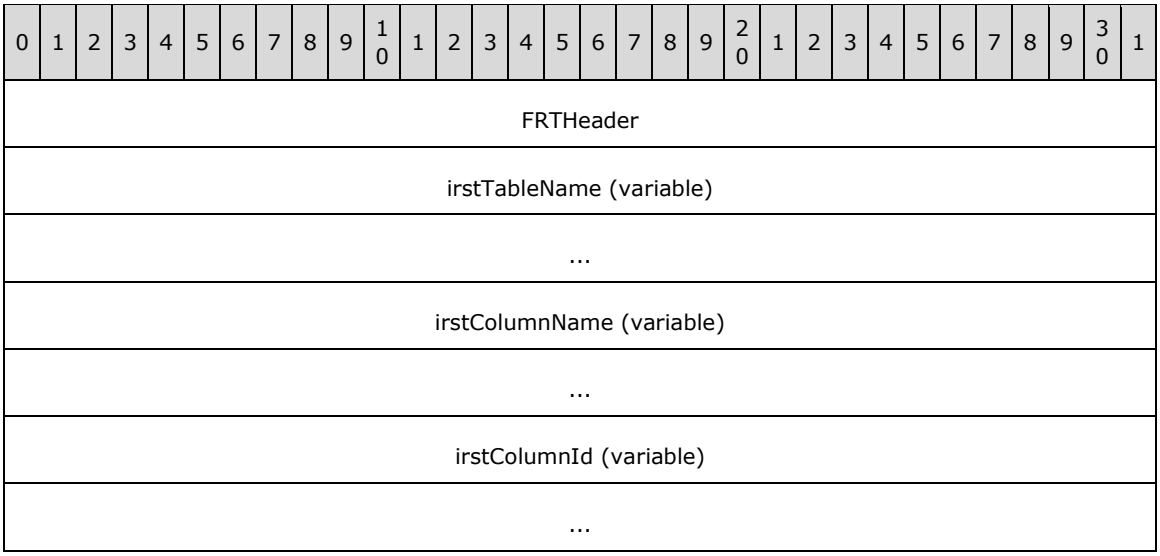
The **BrtBeginModelRelationships** record specifies the beginning of a collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies relationships in a **spreadsheet data model**.

2.4.116 BrtBeginModelTables

The **BrtBeginModelTables** record specifies the beginning of a collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies properties of tables in **spreadsheet data model**.

2.4.117 brtBeginModelTimeGrouping

The **brtBeginModelTimeGrouping** record specifies properties of a single time grouping in the **spreadsheet data model**.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

irstTableName (variable): Name of the spreadsheet data model table for this time grouping.

irstColumnName (variable): Name of the spreadsheet data model column for this time grouping.

irstColumnId (variable): Name of the spreadsheet data model column immutable identifier for this time grouping.

2.4.118 brtBeginModelTimeGroupings

The **brtBeginModelTimeGroupings** record specifies the beginning of a collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies properties of time groupings in the **spreadsheet data model**.

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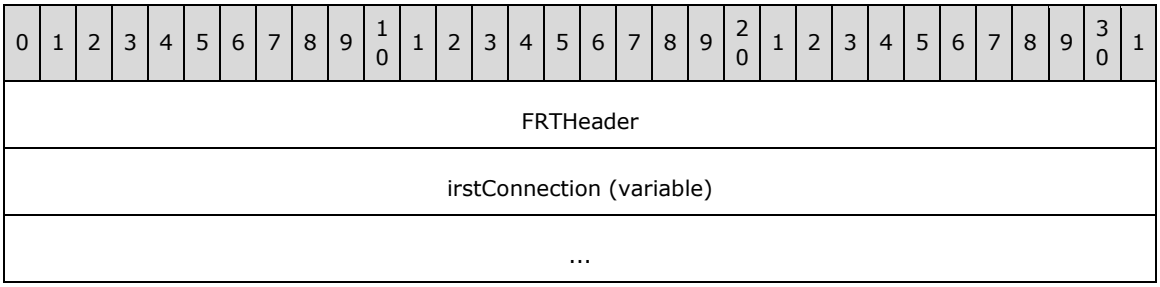
2.4.119 BrtBeginMRUColors

The **BrtBeginMRUColors** record specifies the beginning of a collection of **BrtMRUColor** (section 2.4.704) records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtMRUColor** records specifies the collection of most recently used colors selected by the user for this **workbook**.

2.4.120 BrtBeginOledbPr15

The **BrtBeginOledbPr15** record specifies properties of a **model data source OLE DB connection** (section 2.2.8.9.1) and specifies the beginning of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

irstConnection (variable): An **XLWideString** (section 2.5.168) that specifies the **OLE DB** connection string for this connection.

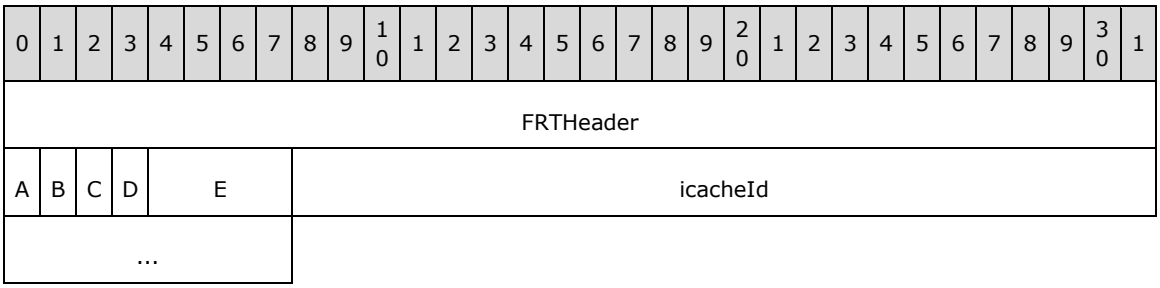
2.4.121 BrtBeginOleObjects

The **BrtBeginOleObjects** record specifies the beginning of a collection of **BrtOleObject** (section 2.4.707) records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**, the **Dialog Sheet** (section 2.1.7.20) part ABNF, and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of **BrtOleObject** records specifies information about **OLE objects** that are embedded in the **workbook**.

2.4.122 BrtBeginPCD14

The **BrtBeginPCD14** record specifies the extended properties of a **PivotCache Definition** (section 2.1.7.38) and specifies the beginning of an empty collection of records as defined by the **PivotCache Definition** part **ABNF**.

At least one of the values in the following fields MUST NOT be 0: **fSlicerData**, **fSrvSupportSubQueryCalcMem**, **fSrvSupportSubQueryNonVisual**, **fSrvSupportAddCalcMems**, **icacheId**.



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FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

A - fSlicerData (1 bit): A bit that specifies whether the containing **OLAP PivotCache Definition** (section 2.1.7.38) part is being referenced by a slicer cache (section 2.2.14.1). This value MUST be 0 if this **PivotCache** (section 2.2.5.2) is non-OLAP.

B - fSrvSupportSubQueryCalcMem (1 bit): A bit that specifies whether the OLAP source data (section 2.2.5.2.1) of the **PivotCache** supports calculated **members** in an **OLAP subselect** for filtering.

C - fSrvSupportSubQueryNonVisual (1 bit): A bit that specifies whether the OLAP source data of the **PivotCache** supports **hidden** pivot items (section 2.2.5.3.3).

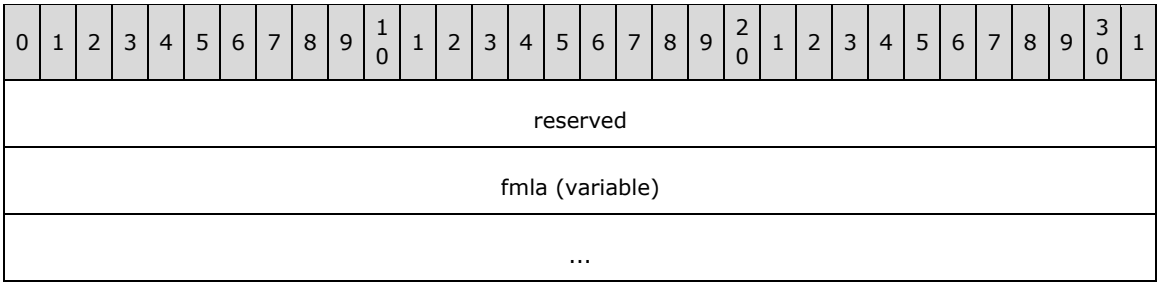
D - fSrvSupportAddCalcMems (1 bit): A bit that specifies whether calculated members are shown for filtering.

E - reserved (4 bits): This value MUST be 0, and MUST be ignored.

icacheId (4 bytes): A signed integer that uniquely identifies this **PivotCache** (section 2.2.5.2). This value MUST be 0 if there is no slicer cache (section 2.2.14.1) that uses this **PivotCache** as a **data source**. This value MUST be greater than or equal to 0.

2.4.123 BrtBeginPCDCalcItem

The **BrtBeginPCDCalcItem** record specifies the formula (section 2.2.2) of a calculated item (section 2.2.5.2.6) within this **PivotCache** (section 2.2.5.2) and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the locations in the PivotTable view (section 2.2.5.3) to which the calculated item applies, and a reference to the cache fields (section 2.2.5.2.2) and cache items (section 2.2.5.2.3) that the formula of the calculated item uses.

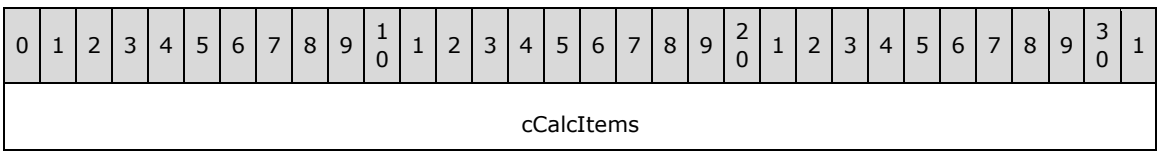


reserved (4 bytes): This value MUST be -1 and MUST be ignored.

fmla (variable): A **PivotParsedFormula** (section 2.5.97.15) that specifies the formula (section 2.2.2) of the calculated item (section 2.2.5.2.6).

2.4.124 BrtBeginPCDCalcItems

The **BrtBeginPCDCalcItems** record specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a collection of calculated items (section 2.2.5.2.6) in the **PivotCache** (section 2.2.5.2).



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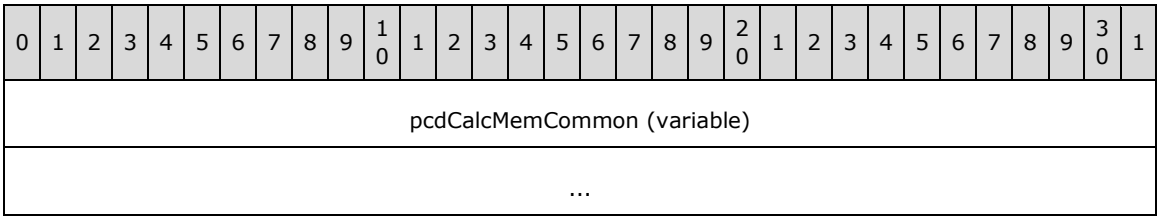
cCalcItems (4 bytes): An unsigned integer that specifies the number of calculated items in the **PivotCache**. This value MUST be equal to the number of **BrtBeginPCDCalcItem** (section 2.4.123) records in this collection.

2.4.125 BrtBeginPCDCalcMem

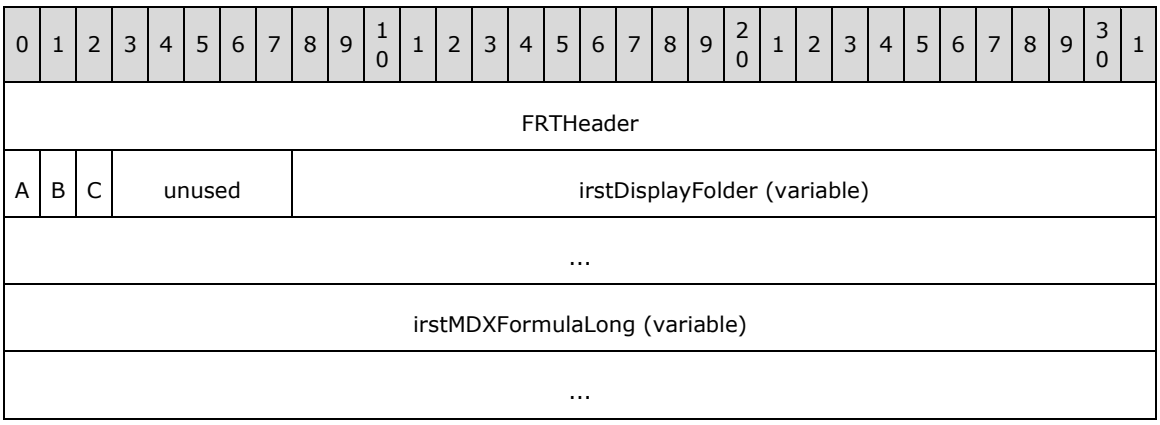
The **BrtBeginPCDCalcMem** record specifies an OLAP calculated **member** or a named set (section 2.2.5.2.7.3) in a **PivotCache** (section 2.2.5.2) and specifies the beginning of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**.



pcdCalcMemCommon (variable): A **PCDCalcMemCommon** (section 2.5.98) that specifies an OLAP calculated member in a **PivotCache**.

2.4.126 BrtBeginPCDCalcMem14

The **BrtBeginPCDCalcMem14** (section 2.4.126) record specifies extended properties of an OLAP calculated **member** specified by **BrtBeginPCDCalcMem** (section 2.4.125) or **BrtBeginPCDCalcMemExt** (section 2.4.127) that immediately precedes this record and specifies the beginning of a collection of records as defined by the **Common Productions** part (section 2.1.8) **ABNF**.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

A - fFlattenHierarchies (1 bit): A bit that specifies whether to display members from different levels of the same cache hierarchy (section 2.2.5.2.7) of this named set (section 2.2.5.2.7.3) in the same pivot field (section 2.2.5). This field MUST be ignored if the **pcdCalcMemCommon.fSet** field in the **BrtBeginPCDCalcMem** or the **BrtBeginPCDCalcMemExt** record that immediately precedes this record is 0. If the **BrtPCDH14** (section 2.4.713) record that corresponds to the named set (section 2.2.5.2.7.3) exists, this value MUST be equal to the value in the **fFlattenHierarchies** field of the **BrtPCDH14** record. The possible values for this field are listed in the following table.

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Value	Meaning
0	Each member from a different level of the same cache hierarchy of this named set is displayed in a separate pivot field (section 2.2.5).
1	All members from different levels of the same cache hierarchy of this named set are displayed in the same pivot field.

B - fDynamicSet (1 bit): A bit that specifies whether this named set is a dynamic **OLAP named set**. This field MUST be ignored if the **pcdCalcMemCommon.fSet** field in the **BrtBeginPCDCalcMem** or **BrtBeginPCDCalcMemExt** record that immediately precedes this record is 0. The possible values for this field are listed in the following table.

Value	Meaning
0	This named set is a static OLAP named set.
1	This named set is a dynamic OLAP named set.

C - fHierarchizeDistinct (1 bit): A bit that specifies whether to automatically order and remove duplicates from this named set. This field MUST be ignored if the **pcdCalcMemCommon.fSet** field in the **BrtBeginPCDCalcMem** or **BrtBeginPCDCalcMemExt** record that immediately precedes this record is 0. If the **BrtPCDH14** record that corresponds to the named set exists, this value MUST be equal to the value in the **fHierarchizeDistinct** field of the **BrtPCDH14** record. The possible values for this field are listed in the following table.

Value	Meaning
0	Do not automatically order and remove duplicates from this named set.
1	Automatically order and remove duplicates from this named set.

unused (5 bits): This field is unused and MUST be ignored.

irstDisplayFolder (variable): An **XLWideString** (section 2.5.168) that specifies the **display folder** of this named set. The length of this value MUST be less than 65,536 characters. This field MUST be ignored if the **pcdCalcMemCommon.fSet** field in the **BrtBeginPCDCalcMem** or **BrtBeginPCDCalcMemExt** record that immediately precedes this record is 0.

irstMDXFormulaLong (variable): An **XLWideString** that specifies the **Multidimensional Expressions (MDX)** of the OLAP calculated member. The length of this value MUST be 0 or it MUST be greater than 32,767 characters and less than 1,073,741,824 characters. If this value is greater than 32,767 characters, the length of the **pcdCalcMemCommon.stMdx** field in the **BrtBeginPCDCalcMem** or **BrtBeginPCDCalcMemExt** record that immediately precedes this record MUST be 1 and the first character of the **pcdCalcMemCommon.stMdx** field MUST be equal to 0x0020.

2.4.127 BrtBeginPCDCalcMemExt

The **BrtBeginPCDCalcMemExt** record specifies an OLAP calculated **member** and specifies the beginning of a collection of records as defined by the Common Productions part **ABNF** (section 2.1.8). The collection of records specifies the OLAP calculated member that is associated with an external connection (section 2.2.8) that is not associated with a **PivotCache** (section 2.2.5.2).

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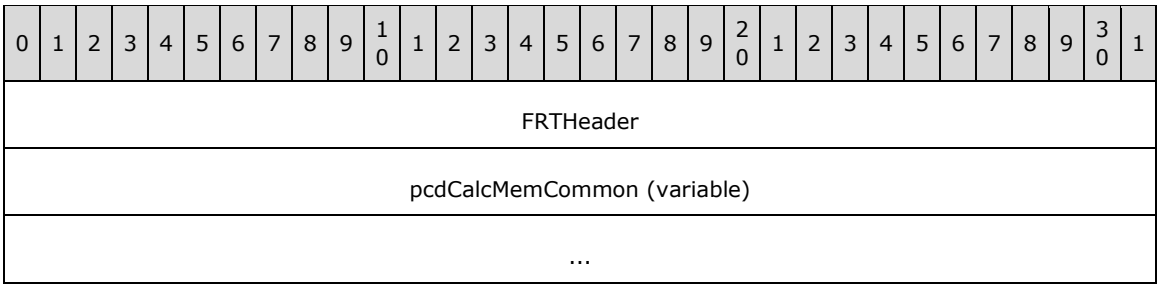
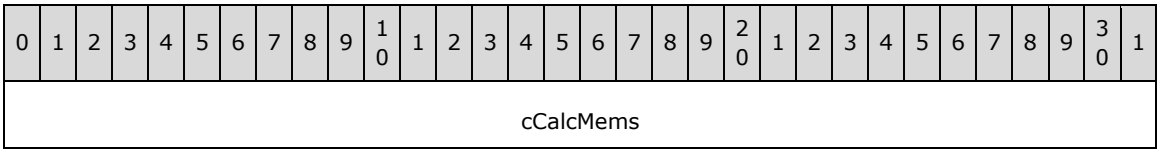


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

pcdCalcMemCommon (variable): A **PCDCalcMemCommon** (section 2.5.98) that specifies an OLAP calculated member.

2.4.128 BrtBeginPCDCalcMems

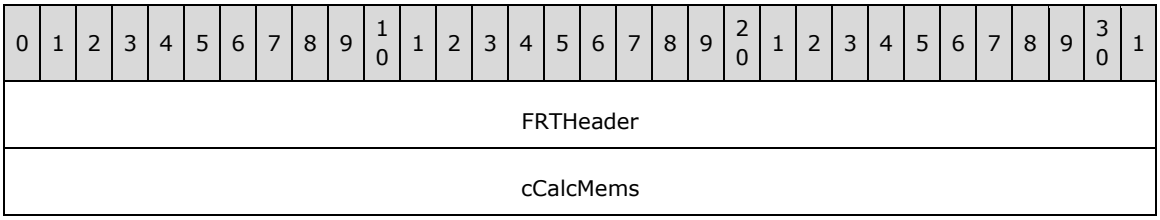
The **BrtBeginPCDCalcMems** record specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the OLAP calculated **members** in a **PivotCache** (section 2.2.5.2).



cCalcMems (4 bytes): An unsigned integer that specifies the number of OLAP calculated members in the **PivotCache**. This value MUST be equal to the number of **BrtBeginPCDCalcMem** (section 2.4.125) records in this collection.

2.4.129 BrtBeginPCDCalcMemsExt

The **BrtBeginPCDCalcMemsExt** record specifies the beginning of a collection of records as defined by the **Common Productions** part **ABNF** (section 2.1.8). The collection of records specifies the OLAP calculated **members** that are associated with an external connection (section 2.2.8) that is not associated with a **PivotCache**.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record information (section 2.1.6) for this record.

cCalcMems (4 bytes): An unsigned integer that specifies the number of OLAP calculated members. This value MUST be equal to the number of **BrtBeginPCDCalcMemExt** records in this collection.

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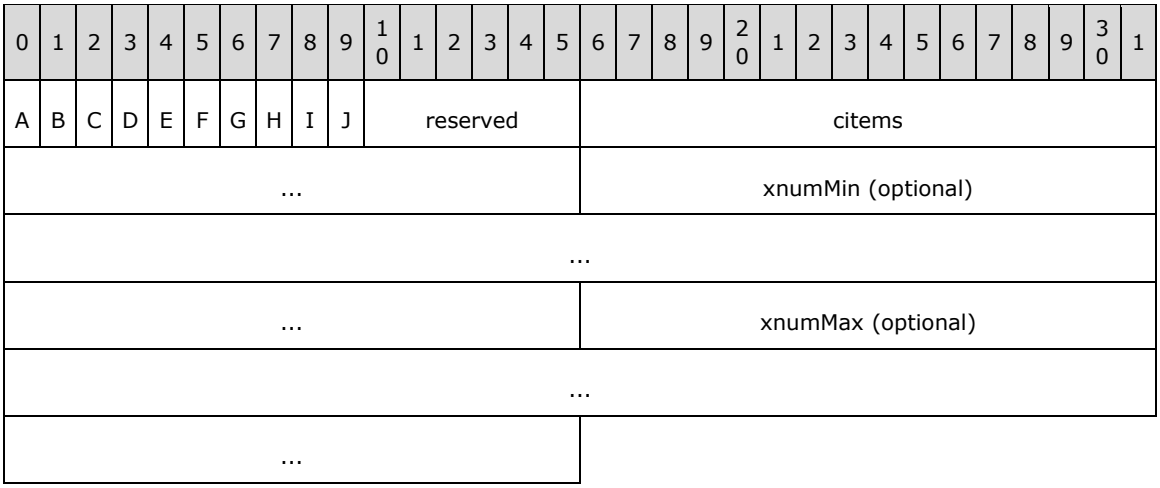
2.4.130 BrtBeginPCDFAtbl

The **BrtBeginPCDFAtbl** record specifies properties of a cache field (section 2.2.5.2.2) and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records following this record specifies a collection of cache items (section 2.2.5.2.3).



A - fTextEtcField (1 bit): A bit that specifies whether this cache field contains at least one cache items (section 2.2.5.2.3) that contains a text, blank, Boolean, or error value. This value MUST be equal to 1 if this collection contains at least one **BrtPCDIMissing** (section 2.4.725), **BrtPCDIString** (section 2.4.727), **BrtPCDIBoolean (**section 2.4.721), **BrtPCDIError** (section 2.4.723), **BrtPCDIAMissing** (section 2.4.718), **BrtPCDIAString** (section 2.4.720), **BrtPCDIABoolean** (section 2.4.715) nor **BrtPCDIAError** (section 2.4.717) record, or a **BrtBeginPCDIRun** (section 2.4.146) record with a **mdSxoper** field equal to 0x0002 or 0x0010.

B - fNonDates (1 bit): A bit that specifies whether this cache field contains at least one cache item that contains a non-date value. This value MUST be equal to 1 if this collection contains at least one **BrtPCDIMissing**, **BrtPCDIString**, **BrtPCDIBoolean**, **BrtPCDINumber** (section 2.4.726), **BrtPCDIError**, **BrtPCDIAMissing**, **BrtPCDIAString**, **BrtPCDIABoolean**, **BrtPCDIANumber** (section 2.4.719) or **BrtPCDIAError** record, or a **BrtBeginPCDIRun** record with a **mdSxoper** field equal to 0x0001, 0x0002, or 0x0010.

C - fDateInField (1 bit): A bit that specifies whether this cache field contains at least one cache item that contains a date value. This value MUST be equal to 1 if this collection contains at least one **BrtPCDIDatetime** (section 2.4.722) or **BrtPCDIADatetime** (section 2.4.716) record, or a **BrtBeginPCDIRun** record with a **mdSxoper** field equal to 0x0020.

D - fHasTextItem (1 bit): A bit that specifies whether this cache field contains a cache item that contains a text, Boolean, or error value. This value MUST be equal to 1 if this collection contains at least one **BrtPCDIString** (section 2.4.727), **BrtPCDIBoolean**, **BrtPCDIError**, **BrtPCDIAString**, **BrtPCDIABoolean** or **BrtPCDIAError** record, or a **BrtBeginPCDIRun** record with a **mdSxoper** field equal to 0x0002 or 0x0010.

E - fHasBlankItem (1 bit): A bit that specifies whether this cache field contains a cache item that contains a blank value. This value MUST be equal to 1 if this collection contains at least one **BrtPCDIMissing** or **BrtPCDIAMissing** record.

F - fMixedTypesIgnoringBlanks (1 bit): A bit that specifies whether this cache field contains cache items of more than one type of value when blank values are ignored.

This field MUST be equal to 1 if any of the following three statements are true:

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- This field contains at least one of the following: a **BrtPCDINumber** record, a **BrtPCDIANumber** record, or a **BrtBeginPCDIRun** record with a **mdSxoper** field that equals 0x0001.

  –And–

  This field contains at least one of the following: a **BrtPCDIString** record, a **BrtPCDIBoolean** record, a **BrtPCDIError** record, a **BrtPCDIAString** record, a **BrtPCDIABoolean** record, a **BrtPCDIAError** record, or a **BrtBeginPCDIRun** record with a **mdSxoper** field that equals 0x0002 or 0x0010.

- This field contains at least one of the following: a **BrtPCDIDatetime** record, a **BrtPCDIADatetime** record, or a **BrtBeginPCDIRun** record with a **mdSxoper** field that equals 0x0020.

  –And–

  This field contains at least one of the following: a **BrtPCDINumber** record, a **BrtPCDIANumber** record, or a **BrtBeginPCDIRun** record with a **mdSxoper** field that equals 0x0001.

- This field contains at least one of the following: a **BrtPCDIDatetime** record, a **BrtPCDIADatetime** record, or a **BrtBeginPCDIRun** record with a **mdSxoper** field that equals 0x0020.

  –And–

  This field contains at least one of the following: a **BrtPCDIString** record, a **BrtPCDIBoolean** record, a **BrtPCDIError** record, a **BrtPCDIAString** record, a **BrtPCDIABoolean** record, a **BrtPCDIAError** record, or a **BrtBeginPCDIRun** record with a **mdSxoper** field that equals 0x0002 or 0x0010.

G - fNumField (1 bit): A bit that specifies whether this cache field contains at least one cache item that contains a numeric value, but contains no cache items that contain date values. This value MUST be equal to 1 if this collection contains at least one **BrtPCDINumber** or **BrtPCDIANumber** record or **BrtBeginPCDIRun** record with a **mdSxoper** field equal to 0x0001, and **fDateInField** is equal to 0.

H - fIntField (1 bit): A bit that specifies whether this cache field contains at least one cache item that contains an integer value, but contains no cache items that contain date values. This value MUST be equal to 1 if this collection contains at least one **BrtPCDINumber** or **BrtPCDIANumber** record or **BrtBeginPCDIRun** record with a **mdSxoper** field equal to 0x0001, and all **xnum** fields of the **BrtPCDINumber** records specify integer values, and all **xnum** fields of the **BrtPCDIANumber** records specify integer values, and all **xnum** fields of the **rgPCDINumber** field of the **BrtBeginPCDIRun** records specify integer values, and **fDateInField** is equal to 0.

I - fNumMinMaxValid (1 bit): A bit that specifies whether **xnumMin** and **xnumMax** exist. This value MUST be equal to 0 if **fDateInField** is equal to 0 and **fNumField** is equal to 0.

J - fHasLongTextItem (1 bit): A bit that specifies whether this cache field contains a cache item that contains a string longer than 255 characters. This value MUST be equal to 1 if this collection contains at least one **BrtPCDIString** record or a **BrtPCDIAString** record with an **st** field greater than 255 characters; or a **BrtBeginPCDIRun** with a **mdsxoper** field equal to 0x0002 and a **rgPCDIString** field containing a **XLWideString** (section 2.5.168) longer than 255 characters.

reserved (6 bits): This value MUST be 0, and MUST be ignored.

citems (4 bytes): An unsigned integer that specifies the number of cache items in this collection as defined by the **PivotCache Definition** part ABNF. This value MUST be less than or equal to 1048576 if the data functionality level (section 2.2.5.1) is greater than or equal to 3; otherwise this value MUST be less than or equal to 32,500.

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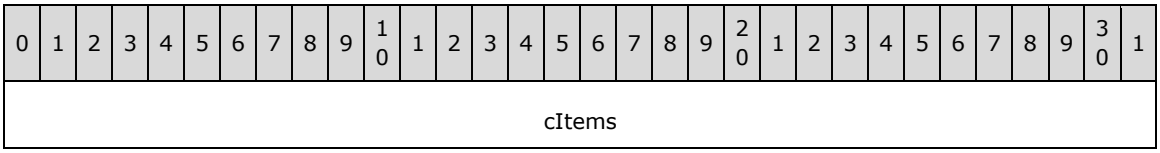
xnumMin (8 bytes): An **Xnum** (section 2.5.171) or **DateAsXnum** (section 2.5.29) that specifies the minimum value of this PivotCache field (section 2.2.5.2). This field MUST exist if and only if **fNumMinMaxValid** is equal to 1. If **fDateInField** is equal to 1 and **fMixedTypesIgnoringBlanks** is equal to 0, this value MUST be a **DateAsXnum** equal to the earliest date specified among all the **BrtPCDIDatetime** records in this collection. If **fNumField** is equal to 1, this value MUST be an **Xnum** equal to the smallest value specified among all the **BrtPCDINumber** records in this collection. Otherwise, **xnumMin** is undefined and MUST be ignored.

xnumMax (8 bytes): An **Xnum** (section 2.5.171) or **DateAsXnum** that specifies the maximum value of this PivotCache field. This field MUST exist if and only if **fNumMinMaxValid** is equal to 1. If **fDateInField** is equal to 1 and **fMixedTypesIgnoringBlanks** is equal to 0, this value MUST be a **DateAsXnum** equal to the latest date specified among all the **BrtPCDIDatetime** records in this collection. If **fNumField** is equal to 1, this value MUST be an **Xnum** equal to the largest value specified amongst all the **BrtPCDINumber** records in this collection. Otherwise, **xnumMax** is undefined and MUST be ignored.

2.4.131 BrtBeginPCDFGDiscrete

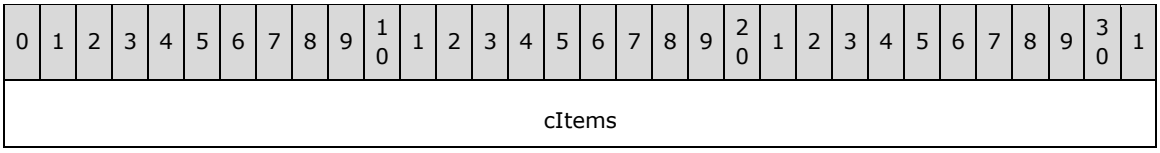
The **BrtBeginPCDFGDiscrete** record specifies the beginning of a collection of **BrtPCDIIndex** (section 2.4.724) records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of **BrtPCDIIndex** records specifies a mapping from a cache item (section 2.2.5.2.3) in the **BrtBeginPCDFAtbl** (section 2.4.130) collection of the base field of this grouping field to a cache item in the **BrtBeginPCDFGItems** (section 2.4.132) collection of the grouping field. The base field and grouping field are specified in section 2.2.5.2.4.



cItems (4 bytes): An unsigned integer that specifies the number of mapping indexes for this grouping field. This value MUST match the number of **BrtPCDIIndex** records in the collection and MUST match the number of cache items in the **BrtBeginPCDFAtbl** collection of the base field of the grouping field.

2.4.132 BrtBeginPCDFGItems

The **BrtBeginPCDFGItems** record specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a collection of cache items for a grouping field (section 2.2.5.2.4).



cItems (4 bytes): An unsigned integer that specifies the number of cache items in this collection. This value MUST be equal to the number cache items in this collection.

2.4.133 BrtBeginPCDFGRange

The **BrtBeginPCDFGRange** record specifies the grouping (section 2.2.5.2.4) properties of a cache field (section 2.2.5.2.2) and specifies the beginning of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**.

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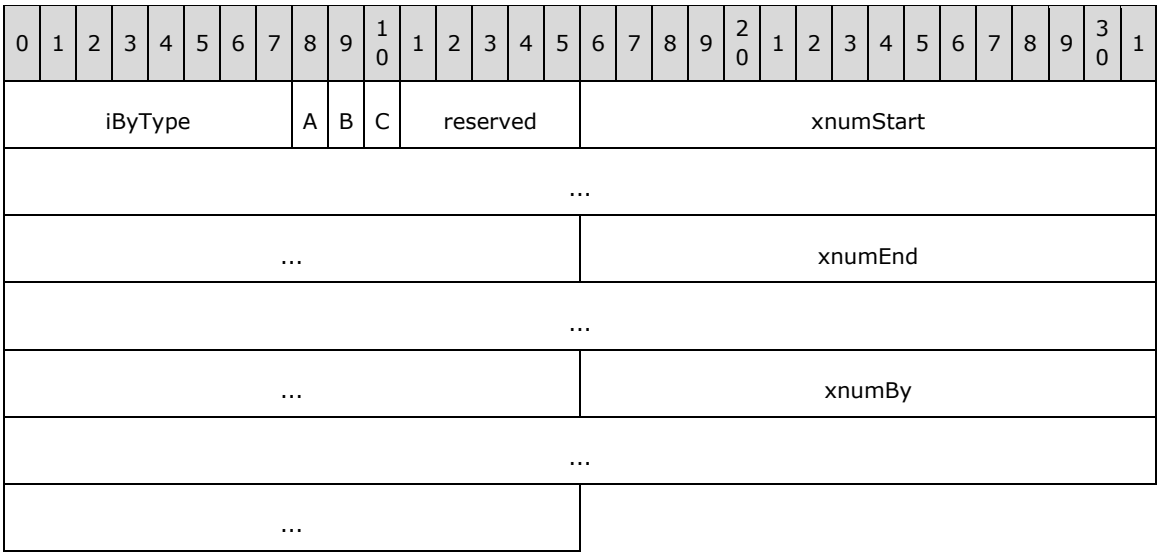

iByType (8 bits): An unsigned integer that specifies the type of grouping. This value MUST be a value from the following table.

iByType	Meaning
0x00	By numeric range.
0x01	By seconds.
0x02	By minutes.
0x03	By hours.
0x04	By days.
0x05	By months.
0x06	By quarters.
0x07	By years.

If the **BrtBeginPCDFGroup** (section 2.4.134) record immediately preceding this record has an **ifdbParent** field that is not equal to -1, the **iByType** field of the **BrtBeginPCDFGRange** record directly following the **BrtBeginPCDFGroup** record that is directly following the **BrtBeginPCDField** (section 2.4.135) record specified by the **ifdbParent** field in the immediately preceding **BrtBeginPCDFGroup** record MUST have a value that is greater than this value.

If the value is greater than 0x00 and the **fSrcField** field of the preceding **BrtBeginPCDField** record is 1, then the **BrtBeginPCDFAtbl** (section 2.4.130) record of this cache field MUST have **fDateInField** field equal to 1 and **fNumField** field equal to 0. Also, the preceding **BrtBeginPCDField** record MUST have **fTextEtcField** equal to 0; otherwise, it MUST have **fMixedTypesIgnoringBlanks** equal to 0 and **fHasBlankItem** equal to 0.

If this value is greater than 0x00, the **BrtBeginPCDFAtbl** record of this cache field MUST have **fHasTextItem** equal to 0 and **fMixedTypesIgnoringBlanks** equal to 0.<15>

A - fAutoStart (1 bit): A bit that specifies whether the source data (section 2.2.5.2.1) is used to set the starting range value. Possible values for this field are listed in the following table.

Value	Meaning
0	The starting range value is set from the value specified in **xnumStart**.
1	The starting range value is set from the source data.

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B - fAutoEnd (1 bit): A bit that specifies whether the source data is used to set the ending range value. Possible values for this field are listed in the following table.

Value	Meaning
0	The ending range value is set from the value specified in **xnumEnd**.
1	The ending range value is set from the source data.

C - fDates (1 bit): A bit that specifies that **xnumStart** and **xnumEnd** are dates rather than numbers. The value in this field MUST be 1 if **iByType** is greater than 0x00, and MUST be 0 otherwise. Possible values for this field are listed in the following table.

Value	Meaning
0	**xnumStart** and **xnumEnd** are numbers.
1	**xnumStart** and **xnumEnd** are dates.

reserved (5 bits): This value MUST be zero and MUST be ignored.

xnumStart (8 bytes): An **Xnum** (section 2.5.171) or **DateAsXnum** (section 2.5.29) that specifies the starting value used for numeric or date grouping when **fAutoStart** is 0. If **fDates** is 1, this value is a **DateAsXnum**, otherwise it is an **Xnum**.

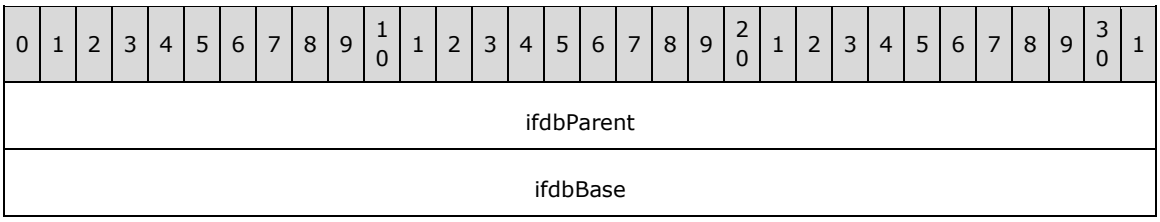
xnumEnd (8 bytes): An **Xnum** or **DateAsXnum** that specifies the ending value used for numeric or date grouping when **fAutoEnd** is 0. If **fDates** is 1, this value is a **DateAsXnum**, otherwise it is an **Xnum**. MUST be greater than or equal to **xnumStart.**

xnumBy (8 bytes): An **Xnum** that specifies the grouping interval for numeric range grouping. Specifies the number of days to group by in date range grouping. This value MUST be greater than zero. If **iByType** is not 0x00, it MUST be an integer less than 32,768.

2.4.134 BrtBeginPCDFGroup

The **BrtBeginPCDFGroup** record specifies the relation of this cache field (section 2.2.5.2.2) and other cache fields with respect to grouping (section 2.2.5.2.4). This record specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. If this cache field is a parent of another grouping cache field as specified in grouping, then the collection of records MUST NOT be empty.

If this collection includes a **BrtBeginPCDFGRange** (section 2.4.133) or **BrtBeginPCDFGDiscrete** (section 2.4.131) record, a collection beginning with a **BrtBeginPCDFGItems** (section 2.4.132) record MUST immediately follow, and it MUST contain at least one item.



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ifdbParent (4 bytes): A signed integer that specifies the cache field that is the grouping parent for the cache field containing this record. Each cache item (section 2.2.5.2.3) in the grouping parent cache field corresponds to a group of cache items in the cache field containing this record. This value MUST be a value from the following table.

Value	Meaning
-1	The cache field containing this record has no grouping parent cache field.
0+	Specifies a cache field index. The referenced instance of the sequence of records that conforms to the **PCDFIELD** rule (defined in section 2.1.7) specifies the grouping parent cache field for the cache field containing this record. The value of **ifdbParent** MUST be less than the count of elements in the **BrtBeginPCDFields** (section 2.4.136) collection that contains the referenced instance of the **PCDFIELD** rule.

If this collection contains a **BrtBeginPCDFGRange** record, the **BrtBeginPCDField** (section 2.4.135) record in the instance of the **PCDFIELD** rule specified by this value MUST be followed by a **BrtBeginPCDFGroup** record, and the collection beginning with that **BrtBeginPCDFGroup** record MUST contain a **BrtBeginPCDFGRange** record; the value in the **ifdbBase** field of that **BrtBeginPCDFGroup** record MUST be equal to **ifdbBase**. If the **iByType** field of the **BrtBeginPCDFGRange** record is 0, **ifdbParent** MUST be -1.

If this collection contains a **BrtBeginPCDFGDiscrete** record, the **BrtBeginPCDField** record in the instance of the **PCDFIELD** rule specified by this value MUST be followed by a **BrtBeginPCDFGroup** record, and the collection beginning with that **BrtBeginPCDFGroup** record MUST contain a **BrtBeginPCDFGDiscrete** record; the value in the **ifdbBase** field of that **BrtBeginPCDFGroup** record MUST be equal to **ifdbBase**.

If this cache field has **fSrcField** field in the **BrtBeginPCDField** record equal to 1 and the **BrtBeginPCDField** record in the instance of the **PCDFIELD** rule specified by this value is followed by **BrtBeginPCDFGDiscrete** record, the value in the **ifdbBase** field of the **BrtBeginPCDFGroup** record preceding that **BrtBeginPCDFGDiscrete** record MUST be equal to this cache field index, as specified by Cache Fields.

ifdbBase (4 bytes): A signed integer that specifies the cache field that is the grouping base for the cache field containing this record. Each cache item in the **PCDFGITEMS** (defined in section 2.1.7.38) collection of this record corresponds to a group of cache items in the **PCDFATBL** (defined in section 2.1.7.38) collection of the grouping base cache field. This value MUST be a value from the following table.

Value	Meaning
-1	The cache field containing this record has no grouping base cache field.
0+	Specifies a cache field index. The referenced instance of the **PCDFIELD** rule specifies the grouping base cache field for the cache field containing this record. The value of **ifdbBase** MUST be less than the count of elements in the **BrtBeginPCDFields** collection that contains the referenced instance of the **PCDFIELD** rule. The **fSrcField** field in the **BrtBeginPCDField** record of the referenced instance of the **PCDFIELD** rule MUST be equal to 1.

2.4.135 BrtBeginPCDField

The **BrtBeginPCDField** record specifies properties of a single cache field (section 2.2.5.2.2) in the **PivotCache** (section 2.2.5.2) and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a single cache field in the **PivotCache**.

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0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	F			G	H	reserved2						ifmt															
...																wTypeSql															
ihdb																															
isxtl																															
cIsxtmps																															
stFldName (variable)																															
...																															
stFldCaption (variable)																															
...																															
fldFmla (variable)																															
...																															
cbRgisxtmp (optional)																															
rgisxtmp (variable)																															
...																															
stMemPropName (variable)																															
...																															

A - fServerBased (1 bit): A bit that specifies whether this cache field is a server-based page field when the corresponding pivot field (section 2.2.5) is on the page axis (section 2.2.5.3.7.1) of the PivotTable view (section 2.2.5.3).

This value applies to an **ODBC** **PivotCache** only. This value MUST NOT be equal to 1 if the value in the **fCantGetUniqueItems** field is equal to 1.

This value MUST be equal to 0 for a cache field in a non-ODBC **PivotCache**.

B - fCantGetUniqueItems (1 bit): A bit that specifies whether a list of unique values from the source data (section 2.2.5.2.1) for the cache field was not available while refreshing the **PivotCache**. This value applies only to a **PivotCache** that uses ODBC and is intended to be used in conjunction with optimization features. For example, the application can optimize memory usage when populating cache records (section 2.2.5.2.10) if it has a list of unique values for a cache field before all the cache records are retrieved from the ODBC connection (section 2.2.8.4). Alternately, the application can determine the appropriate setting of the **fServerBased** field based on this value.

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This value MUST be equal to 0 for fields in a non-ODBC **PivotCache**.

C - fSrcField (1 bit): A bit that specifies whether this cache field corresponds to source data entity, as specified in Cache Fields.

This value MUST be equal to 1 for a cache field in an **OLAP PivotCache**.

This value MUST be equal to 1 for the first **BrtBeginPCDField** record in the sequence of records that conform to the **PCDFIELDS** rule (defined in section 2.1.7.38). All cache fields with this value equal to 0 MUST be at the end of the **PCDFIELDS** rule.

D - fCaption (1 bit): A bit that specifies whether the **stFldCaption** field exists after the fixed-sized portion of the record.

This value MUST be equal to 0 if the value of the **bVerCacheCreated** field of the preceding **BrtBeginPivotCacheDef** (section 2.4.167) record is less than 3.

E - fOlapMemPropField (1 bit): A bit that specifies whether this cache field is associated with an OLAP **member** property.

This value MUST be 0 for a cache field in a non-OLAP **PivotCache**.

F - reserved1 (3 bits): This value MUST be zero, and MUST be ignored.

G - fLoadFmla (1 bit): A bit that specifies whether the **fldFmla** field exists after the fixed-sized portion of the record. This value MUST be 0 for an OLAP **PivotCache** and MUST be equal to 0 if the **fSrcField** field is equal to 1.

H - fLoadPropName (1 bit): A bit that specifies whether the **stMemPropName** field exists after the fixed-sized portion of the record.

This value MUST be 0 if the **fOlapMemPropField** field is equal to 0.

reserved2 (6 bits): This value MUST be zero, and MUST be ignored.

ifmt (4 bytes): A **PivotNumFmtExt** (section 2.5.106) that specifies the **number format** that is used by all source data values that correspond to this cache field.

wTypeSql (2 bytes): A **TypeSql** (section 2.5.151) that specifies the **SQL** data type of the cache field. This value stores an ODBC data type and only applies to an ODBC **PivotCache**. This value is provided by the source database.

ihdb (4 bytes): An unsigned integer that specifies a cache hierarchy index, as specified in section 2.2.5.2.7. The referenced cache hierarchy is associated with this cache field. For an OLAP **PivotCache**, this value MUST be less than the count of instances of the sequence of records that conforms to the **PCDHIERARCHY** rule (defined in section 2.1.7.38) in the **BrtBeginPCDHierarchies** collection (section 2.4.144) . For a non-OLAP **PivotCache**, this value MUST be zero and MUST be ignored.

isxtl (4 bytes): An unsigned integer that specifies the zero-based ordinal of the cache hierarchy **level** that this cache field is associated with. This value is only used for fields in an OLAP **PivotCache**. For a non-OLAP **PivotCache**, this value MUST be zero and MUST be ignored. If the **fOlapMemPropField** field is equal to 0, this value MUST be equal to 0x00007FFF, or it MUST be less than the **cItems** field in the **BrtBeginPCDHFieldsUsage** (section 2.4.137) record of the cache hierarchy this cache field is associated with. If this value is equal to 0x00007FFF, this cache field applies to the whole cache hierarchy specified by **ihdb** rather than to one level of this cache hierarchy. This value MUST be equal to 0x00007FFF if the **fMeasure** field of the **BrtBeginPCDHierarchy** (section 2.4.145) record specified by the **ihdb** field is 1.

cIsxtmps (4 bytes): An unsigned integer that specifies the number of elements in the array specified by **rgisxtmp**; this value MUST be zero for a non-OLAP **PivotCache**.

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This value MUST be less than the number of cache fields in this **PivotCache** as specified by the **cFields** field in the **BrtBeginPCDFields** (section 2.4.136) record preceding this record.

stFldName (variable): An **XLWideString** (section 2.5.168) that specifies the name of the cache field. This value MUST be unique (using case insensitive comparison) in the scope of all cache fields in the current **PivotCache** unless this cache field is a grouping cache field and **fSrcField** is 0. For more information about grouping, see section 2.2.5.2.4.

The length of this string MUST be greater than 0. If the value of the **bVerCacheCreated** field of the preceding **BrtBeginPivotCacheDef** record of this **PivotCache** is less than 3, the length of this string MUST be less than 256 characters; otherwise it MUST be less than 32,768 characters.

stFldCaption (variable): An optional **XLWideString** that specifies the caption of the cache field. This value MUST exist if and only if **fCaption** is equal to 1.

The length of the string MUST be less than 32,768 characters.

fldFmla (variable): A **PivotParsedFormula** (section 2.5.97.15) that specifies the formula (section 2.2.2) for this calculated field (section 2.2.5.2.5) This formula MUST exist if and only if **fLoadFmla** is equal to 1.

cbRgisxtmp (4 bytes): An unsigned integer that specifies the number of bytes used by the **rgisxtmp** field. This value MUST be equal to the following formula:

cIsxtmps * 4

This value exists if and only if the value of **cIsxtmps** is greater than 0.

rgisxtmp (variable): An array of 4-byte unsigned integers. Each element in the array specifies a cache field index. Each referenced cache field is a member property cache field, which is associated with this cache field. The **isxtl** field of the **BrtBeginPCDField** record of the referenced cache field MUST be equal to 0x00007FFF or equal to **isxtl**. The **fOlapMemPropField** field of the **BrtBeginPCDField** record of the referenced cache field MUST be equal to 1. The **ihdb** field of the **BrtBeginPCDField** record of the referenced cache field MUST be equal to **ihdb**. This field MUST exist if and only if **cIsxtmps** is greater than 0.

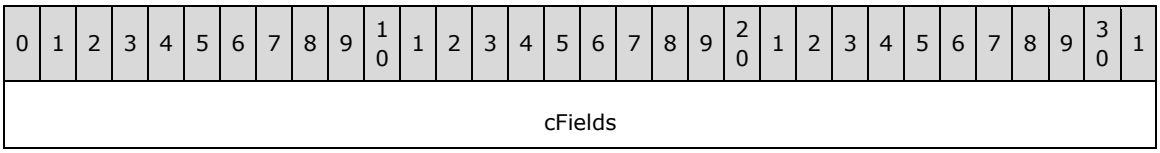
The value of each element in the array MUST be less than the number of cache fields in this **PivotCache** as specified by the **cFields** field in the **BrtBeginPCDFields** record preceding this record.

stMemPropName (variable): An optional **XLWideString** that specifies the name of the member property this cache field associated with. This value MUST exist if and only if the **fLoadPropName** field is equal to 1.

The length of the string MUST be greater than 0 and less than 32,768 characters.

2.4.136 BrtBeginPCDFields

The **BrtBeginPCDFields** record specifies a count of cache fields and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a collection of cache fields in the **PivotCache** (section 2.2.5.2).



cFields (4 bytes): An unsigned integer that specifies the number of cache fields in the **PivotCache** (section 2.2.5.2). This value MUST be equal to the number of **BrtBeginPCDField** (section

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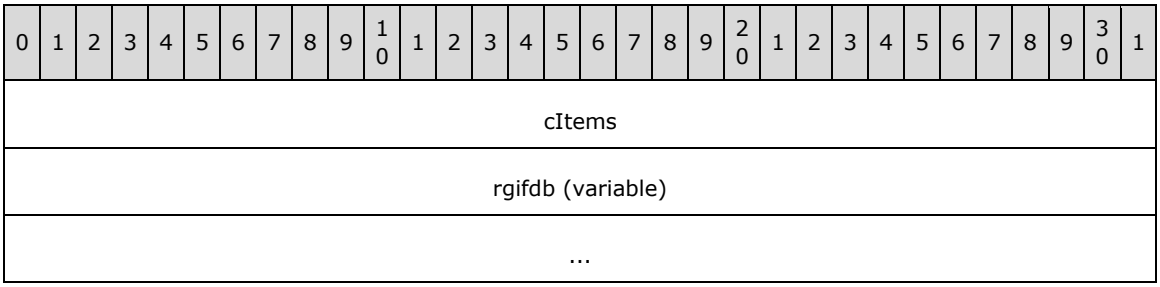
2.4.135) records in this collection. If value of **bVerCacheCreated** field in the **BrtBeginPivotCacheDef** (section 2.4.167) record is less than 3, this value MUST be less than 1,025, otherwise it MUST be less than 16,385. If this is an **OLAP PivotCache**, this value MUST be greater than or equal to 0, otherwise it MUST be greater than 0.

2.4.137 BrtBeginPCDHFieldsUsage

The **BrtBeginPCDHFieldsUsage** record specifies the cache fields (section 2.2.5.2.2) in the **PivotCache** that are associated with the cache hierarchy (section 2.2.5.2.7) that contains this record, and specifies the beginning of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**.



cItems (4 bytes): An unsigned integer that specifies the number of elements in **rgifdb**. This value MUST match the number of elements in **rgifdb**. This value MUST be 1 if the **fMeasure** field of the preceding **BrtBeginPCDHierarchy** (section 2.4.145) record is equal to 1.

rgifdb (variable): An array of 4-byte signed integers that specifies cache fields (section 2.2.5.2.2) that are associated with the cache hierarchy that contains this record. Each element in the array MUST be a value from the following table.

Value	Meaning
-1	The zero-based ordinal of the **level** specified by the zero-based index of this element in **rgifdb** is not used by this cache hierarchy and is not associated with any cache field. This element with index 0 MUST be -1 if the **fOnlyOneField** field of the preceding **BrtBeginPCDHierarchy** (section 2.4.145) record is equal to 0 and the **stAllUnq** field of the preceding **BrtBeginPCDHierarchy** record exists and contains at least one character.
A value greater than or equal to zero	This array element specifies a cache field index. The referenced cache field is associated with the zero-based ordinal of the level specified by the zero-based index of this element in **rgifdb**. The **ihdb** field of the **BrtBeginPCDField** (section 2.4.135) record of the specified cache field MUST reference the cache hierarchy this record is within. If the **fOnlyOneField** field of the preceding **BrtBeginPCDHierarchy** record is equal to 0, then the **isxtl** field of the **BrtBeginPCDField** record of the specified cache field MUST be equal to the zero-based index of this element in **rgifdb**.

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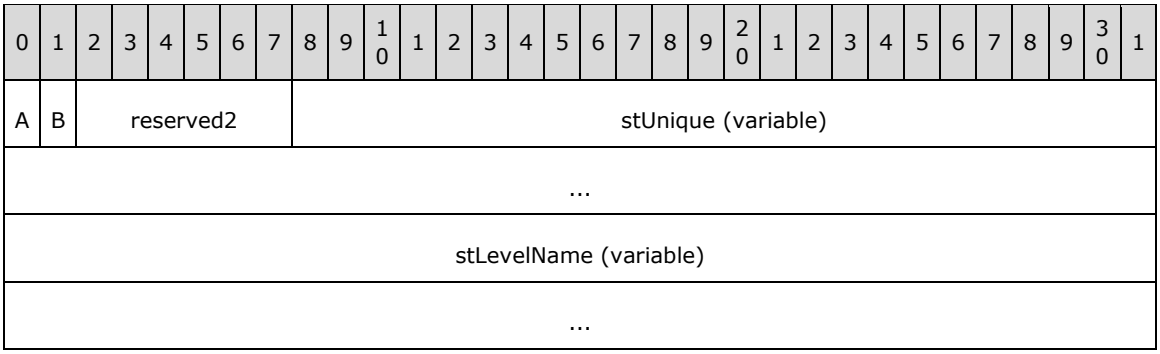
2.4.138 BrtBeginPCDHGLevel

The **BrtBeginPCDHGLevel** record specifies properties of an **OLAP** grouping level, as specified in OLAP Grouping (section 2.2.5.2.8), and the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies an OLAP grouping level in a **PivotCache**, as specified in OLAP Grouping (section 2.2.5.2.8).



A - fGroupLevel (1 bit): A bit that specifies whether this is a user-defined group level. This value MUST be a value from the following table.

Value	Meaning
0	The record specifies a group level that corresponds to the source **cube** level.
1	The record specifies a user-defined group level.

B - reserved1 (1 bit): This value MUST be zero, and MUST be ignored.

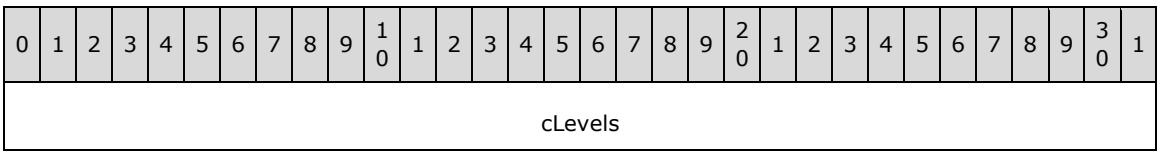
reserved2 (6 bits): This value MUST be zero, and MUST be ignored.

stUnique (variable): An **XLWideString** (section 2.5.168) that specifies the **MDX unique name** of this grouping level. If the **bVerCacheCreated** field of the **BrtBeginPivotCacheDef** (section 2.4.167) record is greater than or equal to 3, then the length of this value MUST be less than 32,768 characters; otherwise it MUST be less than 256 characters.

stLevelName (variable): An **XLWideString** that specifies the caption of this grouping level. If the **bVerCacheCreated** field of the **BrtBeginPivotCacheDef** record is greater than or equal to 3, then the length of this value MUST be less than 32,768 characters, otherwise it MUST be less than 256 characters.

2.4.139 BrtBeginPCDHGLevels

The **BrtBeginPCDHGLevels** record specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a collection of **OLAP** grouping levels, as specified in section 2.2.5.2.8.



cLevels (4 bytes): An unsigned integer that specifies the number of OLAP Grouping levels in the **PivotCache**. This value MUST be equal to the number of **BrtBeginPCDHGLevel** (section 2.4.138) records in the collection.

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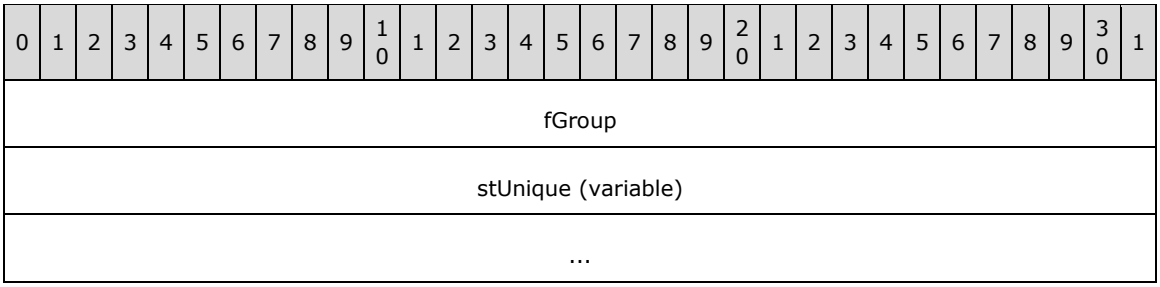
2.4.140 BrtBeginPCDHGLGMember

The **BrtBeginPCDHGLGMember** record specifies an **OLAP member** or name of a group in the subsequent **OLAP level** that is part of the associated **OLAP** grouping (section 2.2.5.2.8), and specifies the beginning of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**.



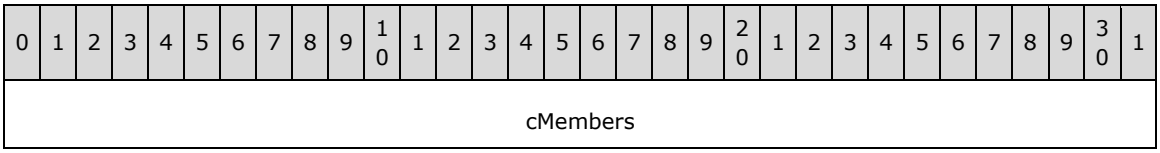
fGroup (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether this record specifies the name of a group in the subsequent OLAP level. The possible values for this field are listed in the following table.

Value	Meaning
0x00000000	This record specifies an OLAP member.
0x00000001	This record specifies the name of a group in the subsequent OLAP level.

stUnique (variable): An **XLWideString** (section 2.5.168) that specifies the unique name of an OLAP member or name of a group in the subsequent OLAP level of the OLAP grouping (section 2.2.5.2.8) that contains this record. If the value of **fGroup** is 0, this is a **MDX unique name** of an OLAP member. If the value of **fGroup** is 1, this is a group name and it MUST match the **stName** field in one of the **BrtBeginPCDHGLGroup** (section 2.4.142) records of the **PCDHGLGROUPS** rule (defined in section 2.1.7.38) in the subsequent OLAP level that is part of the associated OLAP grouping. The length of this value MUST be greater than zero. If the **bVerCacheCreated** field of the preceding **BrtBeginPivotCacheDef** (section 2.4.167) record is greater than or equal to 3, then the length of this value MUST be less than 32,768 characters, otherwise it MUST be less than 256 characters.

2.4.141 BrtBeginPCDHGLGMembers

The **BrtBeginPCDHGLGMembers** (section 2.4.140) record specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. This collection of records specifies the **OLAP members** that are part of an **OLAP** grouping (section 2.2.5.2.8).



cMembers (4 bytes): An unsigned integer that specifies the number of OLAP members in this OLAP grouping. This value MUST be equal to the number of **BrtBeginPCDHGLGMember** records in the collection.

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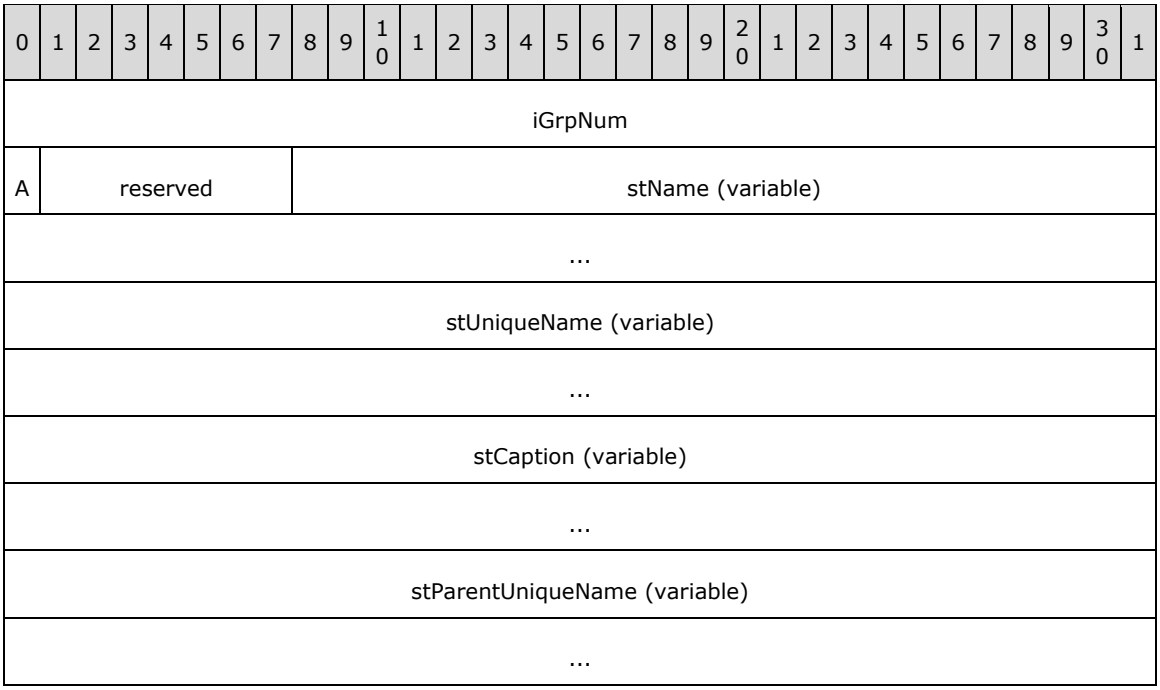
2.4.142 BrtBeginPCDHGLGroup

The **BrtBeginPCDHGLGroup** record specifies an **OLAP** group, as specified in OLAP Grouping (section 2.2.5.2.8), and specifies the beginning of a collection as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the **OLAP members** that make up the group specified by this record.



iGrpNum (4 bytes): A signed integer that specifies the unique identifier of this group within the level of the **OLAP hierarchy**. This value MUST be greater than zero.

A - fLoadParent (1 bit): A bit that specifies whether **stParentUniqueName** exists after the fixed-size portion of the record.

reserved (7 bits): This value MUST be zero, and MUST be ignored.

stName (variable): An **XLWideString** (section 2.5.168) that specifies the name of this group. The length of this string MUST be greater than zero. If the **bVerCacheCreated** field of the preceding **BrtBeginPivotCacheDef** (section 2.4.167) record is greater than or equal to 3, then the length of this string MUST be less than 32,768 characters; otherwise it MUST be less than 256 characters.

stUniqueName (variable): An **XLWideString** that specifies the **MDX unique name** of the OLAP member in the parent grouping level, as specified in OLAP Grouping, associated with the group specified by this record. The length of this string MUST be greater than zero. If the **bVerCacheCreated** field of the preceding **BrtBeginPivotCacheDef** record is greater than or equal to 3, then the length of this string MUST be less than 32,768 characters; otherwise it MUST be less than 256 characters.

stCaption (variable): An **XLWideString** that specifies the caption of this group. The length of this string MUST be greater than zero. If the **bVerCacheCreated** field of the preceding **BrtBeginPivotCacheDef** record is greater than or equal to 3, then the length of this string MUST be less than 32,768 characters, otherwise it MUST be less than 256 characters.

stParentUniqueName (variable): An optional **XLWideString** that specifies an MDX unique name of the OLAP member that is the parent of the **members** of this group in the OLAP **cube**. If the **bVerCacheCreated** field of the preceding **BrtBeginPivotCacheDef** record is greater than or

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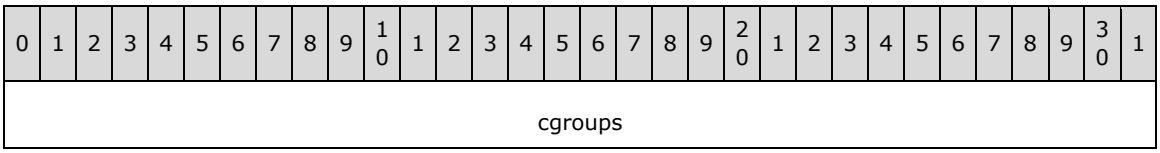
equal to 3, then the length of this string MUST be less than 32,768 characters; otherwise it MUST be less than 256 characters. MUST exist if and only if **fLoadParent** is 1. If this value is not specified, it means that the members of this group have no parent in the OLAP cube.

2.4.143 BrtBeginPCDHGLGroups

The **BrtBeginPCDHGLGroups** record specifies the beginning of a collection of records, as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies groups, as specified in **OLAP** Grouping (section 2.2.5.2.8), within the preceding cache hierarchy (section 2.2.5.2.7).



cgroups (4 bytes): An unsigned integer that specifies the number of groups within the preceding cache hierarchy. This value MUST match the number of **BrtBeginPCDHGLGroup** (section 2.4.142) records in the collection.

2.4.144 BrtBeginPCDHierarchies

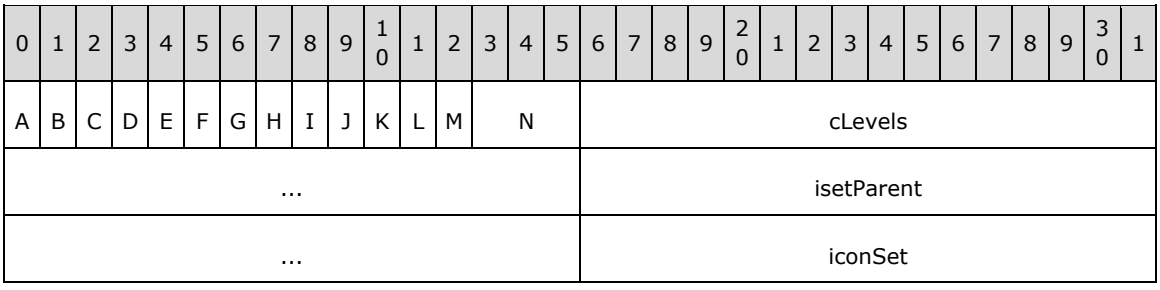
The **BrtBeginPCDHierarchies** record specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a collection of cache hierarchies (section 2.2.5.2.7) in the **PivotCache**. This value MUST exist if and only if this is an **OLAP** **PivotCache**.

cHier (4 bytes): An unsigned integer that specifies the number of cache hierarchies in the **PivotCache**. This value MUST be equal to the number of **BrtBeginPCDHierarchy** (section 2.4.145) records in this collection.

2.4.145 BrtBeginPCDHierarchy

The **BrtBeginPCDHierarchy** record specifies properties of a cache hierarchy (section 2.2.5.2.7) and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a cache hierarchy in the **PivotCache** (section 2.2.5.2).

No more than one of the following fields of this record MUST be 1: **fMeasure**, **fSet**, **fMeasureHierarchy** and **fTimeHierarchy**.



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...	O	P	Q	R	S	T	U	wAttributeMemberValueTy
...	stUnique (variable)							
...								
stCaption (variable)								
...								
stDimUnq (variable)								
...								
stDefaultUnq (variable)								
...								
stAllUnq (variable)								
...								
stAllDisp (variable)								
...								
stDispFld (variable)								
...								
stMeasGrp (variable)								
...								

A - fMeasure (1 bit): A bit that specifies whether this cache hierarchy is a measure (section 2.2.5.2.7.1).

If this value is 1, the **fMeasure** field of at least one of the **BrtBeginDim** (section 2.4.51) records in the **BrtBeginDims** collection MUST be equal to 1. If this value is 0, the **BrtBeginDim** record where the **stUnique** field case-insensitively matches the **stDimUnq** field in this record MUST NOT have **fMeasure** equal to 1.

This value MUST be 0 if **fUnbalancedRealKnown** is 1 and **fUnbalancedReal** is 1.

This value MUST be 0 if **fUnbalancedGroupKnown** is 1 and **fUnbalancedGroup** is 1.

This value MUST be 0 if **fAttributeHierarchy** is 1 or **fKeyAttributeHierarchy** is 1.

This value MUST be 0 if **fSet**, **fMeasureHierarchy** or **fTimeHierarchy** is 1.

B - fSet (1 bit): A bit that specifies whether this cache hierarchy is a named set (section 2.2.5.2.7.3). This value MUST be 0 if **fUnbalancedRealKnown** is 1 and **fUnbalancedReal** is 1, or if **fUnbalancedGroupKnown** is 1 and **fUnbalancedGroup** is 1. This value MUST be 0 if

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fAttributeHierarchy is 1 or **fKeyAttributeHierarchy** is 1. This value MUST be 0 if **fMeasure**, **fMeasureHierarchy**, or **fTimeHierarchy** is 1.

C - fAttributeHierarchy (1 bit): A bit that specifies whether this cache hierarchy is an **attribute hierarchy**.

D - fMeasureHierarchy (1 bit): A bit that specifies whether this cache hierarchy is the measure's **OLAP hierarchy**. This value MUST be 0 if **fMeasure**, **fSet**, or **fTimeHierarchy** is 1.

E - fOnlyOneField (1 bit): A bit that specifies whether this cache hierarchy is associated with only one cache field (section 2.2.5.2.2). This value MUST be 1 if fMeasure is 1.

F - fTimeHierarchy (1 bit): A bit that specifies whether this cache hierarchy is a **time hierarchy**. This value MUST be 1 if **fAttributeMemberValueTypeKnown** is 1 and **wAttributeMemberValueType** is equal to 0x0007. This value MUST be 0 if **fMeasure**, **fSet** or **fMeasureHierarchy** is 1.

G - fKeyAttributeHierarchy (1 bit): A bit that specifies whether this cache hierarchy is a key attribute hierarchy. This value MUST be 1 if **fAttributeMemberValueTypeKnown** is 1.

H - fAttributeMemberValueTypeKnown (1 bit): A bit that specifies whether **wAttributeMemberValueType** contains the data type of an attribute. The possible values for this field are listed in the following table.

Value	Meaning
0	The value of the **wAttributeMemberValueType** field is ignored.
1	The **wAttributeMemberValueType** field contains the data type of an attribute.

I - fUnbalancedRealKnown (1 bit): A bit that specifies whether it is known if this cache hierarchy is an unbalanced OLAP hierarchy when no **OLAP** grouping (section 2.2.5.2.8) has been applied. The possible values for this field are listed in the following table.

Value	Meaning
0	The value of **fUnbalancedReal** is ignored.
1	**fUnbalancedReal** specifies whether this cache hierarchy is an unbalanced OLAP hierarchy.

J - fUnbalancedReal (1 bit): A bit that specifies whether this cache hierarchy is an unbalanced OLAP hierarchy when no OLAP grouping has been applied. MUST be ignored if **fUnbalancedRealKnown** is 0.

K - fUnbalancedGroupKnown (1 bit): A bit that specifies whether it is known if this cache hierarchy is an unbalanced OLAP hierarchy when OLAP grouping has been applied to any **OLAP members** belonging to this **PivotCache**. The possible values for this field are listed in the following table.

Value	Meaning
0	The value of **fUnbalancedGroup** is ignored.
1	The value of **fUnbalancedGroup** specifies whether this cache hierarchy is an unbalanced OLAP hierarchy when OLAP members belonging to this **PivotCache** have been grouped.

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L - fUnbalancedGroup (1 bit): A bit that specifies whether this cache hierarchy is an unbalanced OLAP hierarchy when OLAP members belonging to this **PivotCache** have been grouped. This value MUST be ignored if **fUnbalancedGroupKnown** is 0.

M - fHidden (1 bit): A bit that specifies whether this cache hierarchy is **hidden**.

N - reserved1 (3 bits): This value MUST be zero, and MUST be ignored.

cLevels (4 bytes): An unsigned integer that specifies the number of **OLAP levels** associated with the OLAP hierarchy associated with this cache hierarchy.

isetParent (4 bytes): A signed integer that specifies the cache hierarchy that all the OLAP members of this cache hierarchy belong to. This value MUST be ignored if **fSet** is 0. This value MUST be less than the number of **BrtBeginPCDHierarchy** records in the **BrtBeginPCDHierarchies** collection (section 2.4.144). This value MUST be a value from the following table.

Value	Meaning
-1	The cache hierarchy that the OLAP members of this cache hierarchy belong to is unknown or does not exist in the **PivotCache**.
A value greater than or equal to zero	Specifies a cache hierarchy index that specifies the cache hierarchy that all the OLAP members of this cache hierarchy belong to.

iconSet (4 bytes): A **KPISets** (section 2.5.85) that specifies the **icon set** to use to visualize a **key performance indicator (KPI)** trend or status expression. This value MUST NOT be equal to 0xFFFFFFFF.

O - fLoadDimUnq (1 bit): A bit that specifies whether **stDimUnq** exists.

P - fLoadDefaultUnq (1 bit): A bit that specifies whether **stDefaultUnq** exists.

Q - fLoadAllUnq (1 bit): A bit that specifies whether **stAllUnq** exists.

R - fLoadAllDisp (1 bit): A bit that specifies whether **stAllDisp** exists.

S - fLoadDispFld (1 bit): A bit that specifies whether **stDispFld** exists.

T - fLoadMeasGrp (1 bit): A bit that specifies whether **stMeasGrp** exists. This value MUST be 0 if **fMeasure** is 0.

U - reserved2 (2 bits): This value MUST be zero, and MUST be ignored.

wAttributeMemberValueType (2 bytes): An unsigned integer that specifies the data type of an OLAP **dimension** attribute returned by the OLAP provider. If the attribute is 0x0007, the attribute is treated as a date attribute; otherwise, it is not treated as a date attribute.

stUnique (variable): An **XLWideString** (section 2.5.168) that specifies the **MDX unique name** of this cache hierarchy. If the **bVerCacheCreated** field of the **BrtBeginPivotCacheDef** record is greater than or equal to 3, then the length of this value MUST be less than 32,768 characters; otherwise, it MUST be less than 256 characters.

stCaption (variable): An **XLWideString** that specifies a display name of this cache hierarchy. The length of this value MUST be greater than or equal to zero. If the **bVerCacheCreated** field of the

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BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this value MUST be less than 32,768 characters; otherwise, it MUST be less than 256 characters.

stDimUnq (variable): An optional **XLWideString** that specifies a unique name of the OLAP dimension to which this cache hierarchy belongs. If the **bVerCacheCreated** field of the **BrtBeginPivotCacheDef** record is greater than or equal to 3, then the length of this value MUST be less than 32,768 characters; otherwise, it MUST be less than 256 characters. This value MUST be specified if **fSet** is 0 and **fMeasure** is 0 and **fHidden** is 0. This value MUST match **stUnique** (using a case-insensitive comparison) in **BrtBeginDim** record in the **BrtBeginDims** collection. This value MUST exist if and only if **fLoadDimUnq** is 1.

stDefaultUnq (variable): An optional **XLWideString** that specifies the MDX unique name of the default OLAP member of this cache hierarchy. If the **bVerCacheCreated** field of the **BrtBeginPivotCacheDef** record is greater than or equal to 3, then the length of this value MUST be less than 32,768 characters; otherwise, it MUST be less than 256 characters. This value MUST exist if and only if **fLoadDefaultUnq** is 1.

stAllUnq (variable): An optional **XLWideString** that specifies the unique name of the **ALL member** of this cache hierarchy. If the **bVerCacheCreated** field of the **BrtBeginPivotCacheDef** record is greater than or equal to 3, then the length of this value MUST be less than 32,768 characters; otherwise, it MUST be less than 256 characters. This value MUST exist if and only if **fLoadAllUnq** is 1.

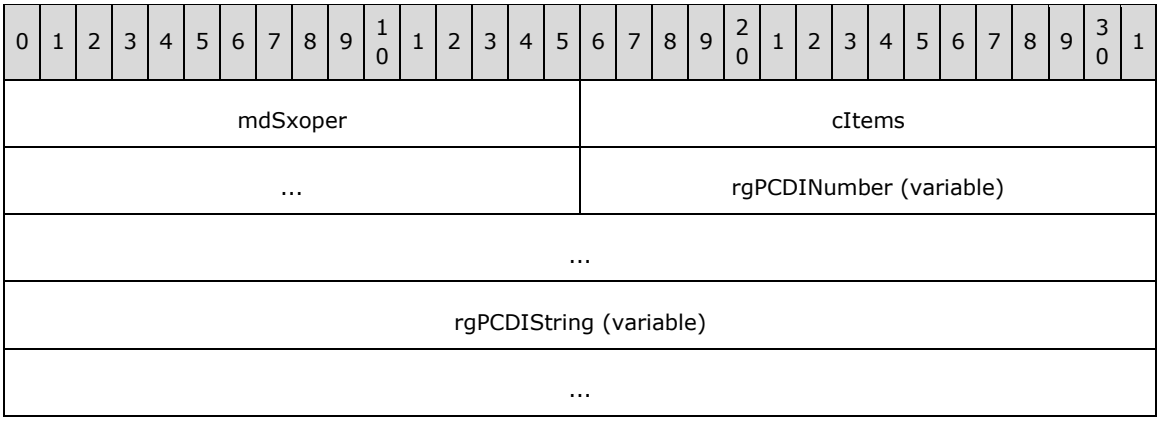
stAllDisp (variable): An optional **XLWideString** that specifies the display name of the ALL member of this cache hierarchy. If the **bVerCacheCreated** field of the **BrtBeginPivotCacheDef** record is greater than or equal to 3, then the length of this value MUST be less than 32768 characters; otherwise, it MUST be less than 256 characters. This value MUST exist if and only if **fLoadAllDisp** is 1.

stDispFld (variable): An optional **XLWideString** that specifies the **display folder** of this cache hierarchy. The length of this value MUST be less than 65,536 characters. This value MUST exist if and only if **fLoadDispFld** is 1.

stMeasGrp (variable): An optional **XLWideString** that specifies the name of the measure (section 2.2.5.2.7.1) group to which this cache hierarchy belongs. The length of this value MUST be less than 65,536 characters. This value MUST exist if and only if **fLoadMeasGrp** is 1.

2.4.146 BrtBeginPCDIRun

The **BrtBeginPCDIRun** record specifies a sequence of cache items (section 2.2.5.2.3) all of the same data type and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**.



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rgPCDIError (variable)
...
rgPCDIDatetime (variable)
...

mdSxoper (2 bytes): An unsigned integer that specifies which field is used to store cache items. This value MUST be a value from the following table:

Value	Meaning
0x0001	Specifies that the **rgPCDINumber** field exists.
0x0002	Specifies that the **rgPCDIString** field exists.
0x0010	Specifies that the **rgPCDIError** field exists.
0x0020	Specifies that the **rgPCDIDateTime** field exists.

cItems (4 bytes): An unsigned integer that specifies the number of cache items in the array specified by the field used to store cache items, as specified by **mdSxoper**.

rgPCDINumber (variable): An array of **Xnum** (section 2.5.171) that specifies the values of the cache items. This value MUST exist if and only if **mdSxoper** equals 0x0001. The number of elements in the array MUST be equal to **citems**.

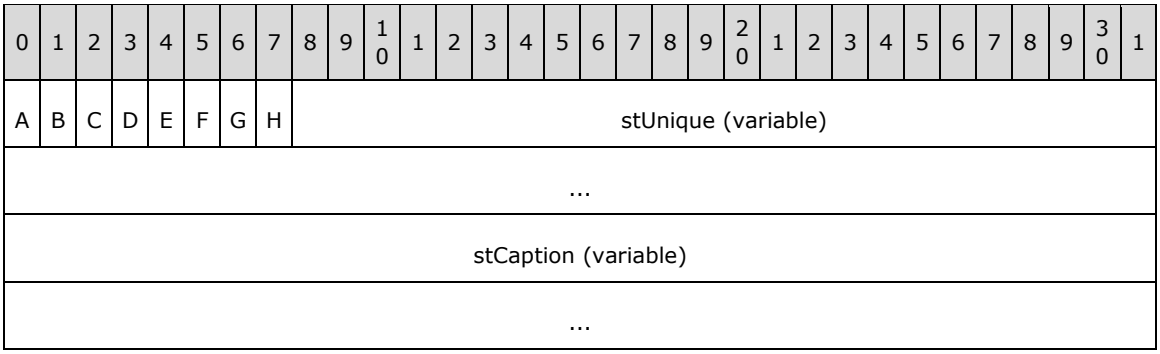
rgPCDIString (variable): An array of **XLWideString** (section 2.5.168) that specifies the values of the cache items. This value MUST exist if and only if **mdSxoper** equals 0x0002. The number of elements in the array MUST be equal to **citems**.

rgPCDIError (variable): An array of **BErr** (section 2.5.97.2) that specifies the values of the cache items. This value MUST exist if and only if **mdSxoper** equals 0x0010. The number of elements in the array MUST be equal to **citems**.

rgPCDIDatetime (variable): An array of **PCDIDateTime** (section 2.5.100) that specifies the values of the cache items. This value MUST exist if and only if **mdSxoper** equals 0x0020. The number of elements in the array MUST be equal to **citems**.

2.4.147 BrtBeginPCDKPI

The **BrtBeginPCDKPI** record specifies an **OLAP** key performance indicator (**KPI**) and the beginning of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**.



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stDispFolder (variable)
...
stMeasGrp (variable)
...
stParent (variable)
...
stValue (variable)
...
stGoal (variable)
...
stStatus (variable)
...
stTrend (variable)
...
stWeight (variable)
...
stCurTimeMbr (variable)
...

A - fLoadDispFld (1 bit): A bit that specifies whether **stDispFolder** exists after the fixed-size portion of the record.

B - fLoadMeasGrp (1 bit): A bit that specifies whether **stMeasGrp** exists after the fixed-size portion of the record.

C - fLoadParent (1 bit): A bit that specifies whether **stParent** exists after the fixed-size portion of the record.

D - fLoadGoal (1 bit): A bit that specifies whether **stGoal** exists after the fixed-size portion of the record.

E - fLoadStatus (1 bit): A bit that specifies whether **stStatus** is saved after the fixed-size portion of the record.

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F - fLoadTrend (1 bit): A bit that specifies whether **stTrend** exists after the fixed-size portion of the record.

G - fLoadWeight (1 bit): A bit that specifies whether **stWeight** exists after the fixed-size portion of the record.

H - fLoadCurTimeMbr (1 bit): A bit that specifies whether **stCurTimeMbr** exists after the fixed-size portion of the record.

stUnique (variable): An **XLWideString** (section 2.5.168) that specifies the **MDX unique name** of this KPI. The length of this string MUST be greater than zero. If the **bVerCacheCreated** of the preceding **BrtBeginPivotCacheDef** (section 2.4.167) record is greater than or equal to 3, then the length of this string MUST be less than 32,768 characters; otherwise, it MUST be less than 256 characters.

stCaption (variable): An **XLWideString** that specifies the display name of this KPI. The length of this string MUST be greater than zero and MUST be less than 32,768 characters.

stDispFolder (variable): An optional **XLWideString** that specifies the **display folder** of this KPI. The length of this string MUST be less than 65,536 characters. This value MUST exist if and only if **fLoadDispFld** is 1.

stMeasGrp (variable): An optional **XLWideString** that specifies the name of the **measure group** to which this KPI belongs. The length of this string MUST be less than 65,536 characters. This value MUST exist if and only if **fLoadMeasGrp** is 1.

stParent (variable): An optional **XLWideString** that specifies the MDX unique name of the parent KPI for this KPI. If not empty, MUST match the **stUnique** field in the **BrtBeginPCDKPI** record that specifies the parent KPI. The length of this string MUST be less than 65,536 characters. This value MUST exist if and only if **fLoadParent** is 1.

stValue (variable): An **XLWideString** that specifies the MDX unique name of the measure (section 2.2.5.2.7.1) used for the value component of this KPI. The length of this string MUST be greater than zero. If the **bVerCacheCreated** field of the preceding **BrtBeginPivotCacheDef** record is greater than or equal to 3, then the length of this string MUST be less than 32,768 characters; otherwise, the length of this string MUST be less than 256 characters.

This value MUST be equal to the **stUnique** value of one of the **BrtBeginPCDHierarchy** (section 2.4.145) records in the **BrtBeginPCDHierarchies** collection (section 2.4.144) following the **BrtBeginPivotCacheDef** record preceding this record. The matching **BrtBeginPCDHierarchy** record MUST have **fMeasure** equal to 1.

stGoal (variable): An optional **XLWideString** that specifies MDX unique name of the measure used for the goal component of this KPI. If the **bVerCacheCreated** field of the preceding **BrtBeginPivotCacheDef** record is greater than or equal to 3, then the length of this string MUST be less than 32,768 characters; otherwise, the length of this string MUST be less than 256 characters.

This value MUST be equal to the **stUnique** value of one of the **BrtBeginPCDHierarchy** records in the **BrtBeginPCDHierarchies** collection following the **BrtBeginPivotCacheDef** record preceding this record. The matching **BrtBeginPCDHierarchy** record MUST have **fMeasure** equal to 1. This value MUST exist if and only if **fLoadGoal** is 1.

stStatus (variable): An optional **XLWideString** that specifies the MDX unique name of the measure used for the status component of this KPI. If the **bVerCacheCreated** field of the preceding **BrtBeginPivotCacheDef** record is greater than or equal to 3, then the length of this string MUST be less than 32,768 characters; otherwise, the length of this string MUST be less than 256 characters.

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MUST be equal to the **stUnique** value of one of the **BrtBeginPCDHierarchy** records in the **BrtBeginPCDHierarchies** collection following the **BrtBeginPivotCacheDef** record preceding this record. The matching **BrtBeginPCDHierarchy** record MUST have **fMeasure** equal to 1. This value MUST exist if and only if **fLoadStatus** is 1.

stTrend (variable): An optional **XLWideString** that specifies the MDX unique name of the measure used for the trend component of this KPI. If the **bVerCacheCreated** field of the preceding **BrtBeginPivotCacheDef** record is greater than or equal to 3, then the length of this string MUST be less than 32,768 characters; otherwise, the length of this string MUST be less than 256 characters.

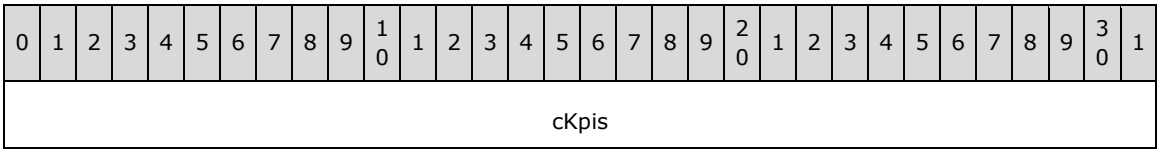
This value MUST be equal to the **stUnique** value of one of the **BrtBeginPCDHierarchy** records in the **BrtBeginPCDHierarchies** collection following the **BrtBeginPivotCacheDef** record preceding this record. The matching **BrtBeginPCDHierarchy** record MUST have **fMeasure** equal to 1. This value MUST exist if and only if **fLoadTrend** is 1.

stWeight (variable): An optional **XLWideString** that specifies the **MDX expression** used for the weight component of this KPI. If the **bVerCacheCreated** field of the preceding **BrtBeginPivotCacheDef** record is greater than or equal to 3, then the length of this string MUST be less than 32,768 characters; otherwise, the length of this string MUST be less than 256 characters. This value MUST exist if and only if **fLoadWeight** is 1.<16>

stCurTimeMbr (variable): An optional **XLWideString** that specifies the MDX unique name of the current time **member** for this KPI. If the **bVerCacheCreated** field of the preceding **BrtBeginPivotCacheDef** record is greater than or equal to 3, then the length of this string MUST be less than 32,768 characters; otherwise, the length of this string MUST be less than 256 characters. This value MUST exist if and only if **fLoadCurTimeMbr** is 1.<17>

2.4.148 BrtBeginPCDKPIs

The **BrtBeginPCDKPIs** record specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the KPIs (section 2.2.5.2.7.2) in a **PivotCache** (section 2.2.5.2).



cKpis (4 bytes): An unsigned integer that specifies the number of KPIs (section 2.2.5.2.7.2) in the **PivotCache**. This value MUST be equal to the number of **BrtBeginPCDKPI** (section 2.4.147) records in this collection.

2.4.149 BrtBeginPCDSConsol

The **BrtBeginPCDSConsol** record specifies properties of a multiple consolidation ranges (section 2.2.5.2.1.1) **PivotCache** (section 2.2.5.2) and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the source data (section 2.2.5.2.1) **ranges** for a multiple consolidation ranges (section 2.2.5.2.1.1) **PivotCache**. The source data ranges are specified by the **BrtBeginPCDSCSet** (section 2.4.153) records in this collection. This record MUST exist if and only if the **isrctype** field of the preceding **BrtBeginPCDSource** (section 2.4.165) record is 2.

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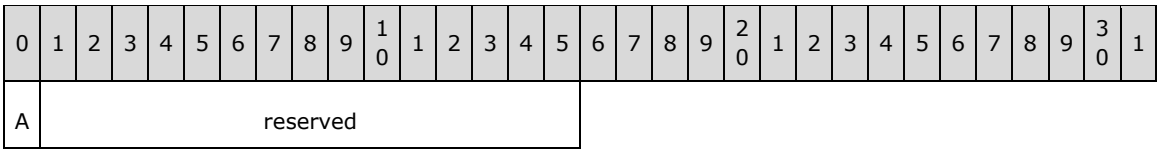


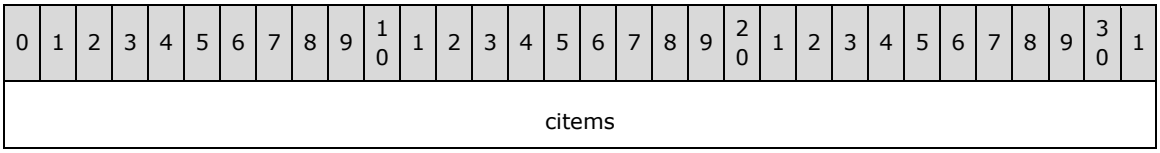
A - fAutoPage (1 bit): A bit that specifies whether there is one automatically created cache field (section 2.2.5.2.2) with cache items (section 2.2.5.2.3) qualifying each source data range of the multiple consolidation ranges **PivotCache**. This value MUST be a value from the following table:

Value	Meaning
0	The cache fields that qualify the source data ranges are not automatically created, and the number of **BrtBeginPCDSCPage** (section 2.4.150) records in this collection MUST be greater than or equal to 0 and less than or equal to 4.
1	There is one automatically created cache field with cache items qualifying each source data range of the multiple consolidation ranges **PivotCache**. Each cache item qualifies one source data range. The number of **BrtBeginPCDSCPage** records in this collection MUST be exactly 1.

reserved (15 bits): This value MUST be 0 and MUST be ignored.

2.4.150 BrtBeginPCDSCPage

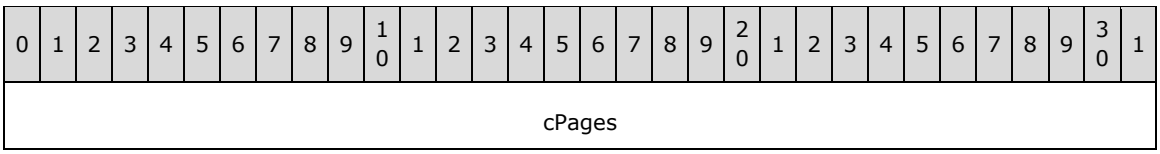
The **BrtBeginPCDSCPage** record specifies a count of **BrtBeginPCDSCPItem** (section 2.4.152) records and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies values that correspond to cache items of a cache field (section 2.2.5.2.2) for a multiple consolidation ranges (section 2.2.5.2.1.1) **PivotCache**.



citems (4 bytes): An unsigned integer that specifies the number of **BrtBeginPCDSCPItem** records in this collection. This value MUST be equal to the number of **BrtBeginPCDSCPItem** records in this collection.

2.4.151 BrtBeginPCDSCPages

The **BrtBeginPCDSCPages** record specifies a count of **BrtBeginPCDSCPage** records (section 2.4.150) and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies information for optional cache fields (section 2.2.5.2.2) in the **PivotCache**, as specified by multiple consolidation ranges (section 2.2.5.2.1.1).



cPages (4 bytes): An unsigned integer that specifies the number of optional cache fields in the **PivotCache**, as specified by Multiple Consolidation Ranges. This value MUST be equal to the number of **BrtBeginPCDSCPage** records in the collection. This value MUST be less than or equal to 4.

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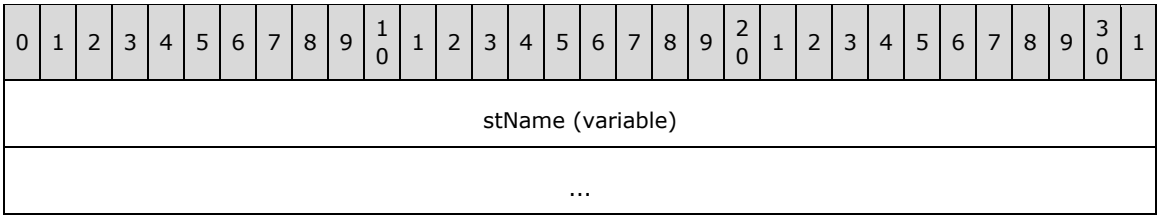
2.4.152 BrtBeginPCDSCPItem

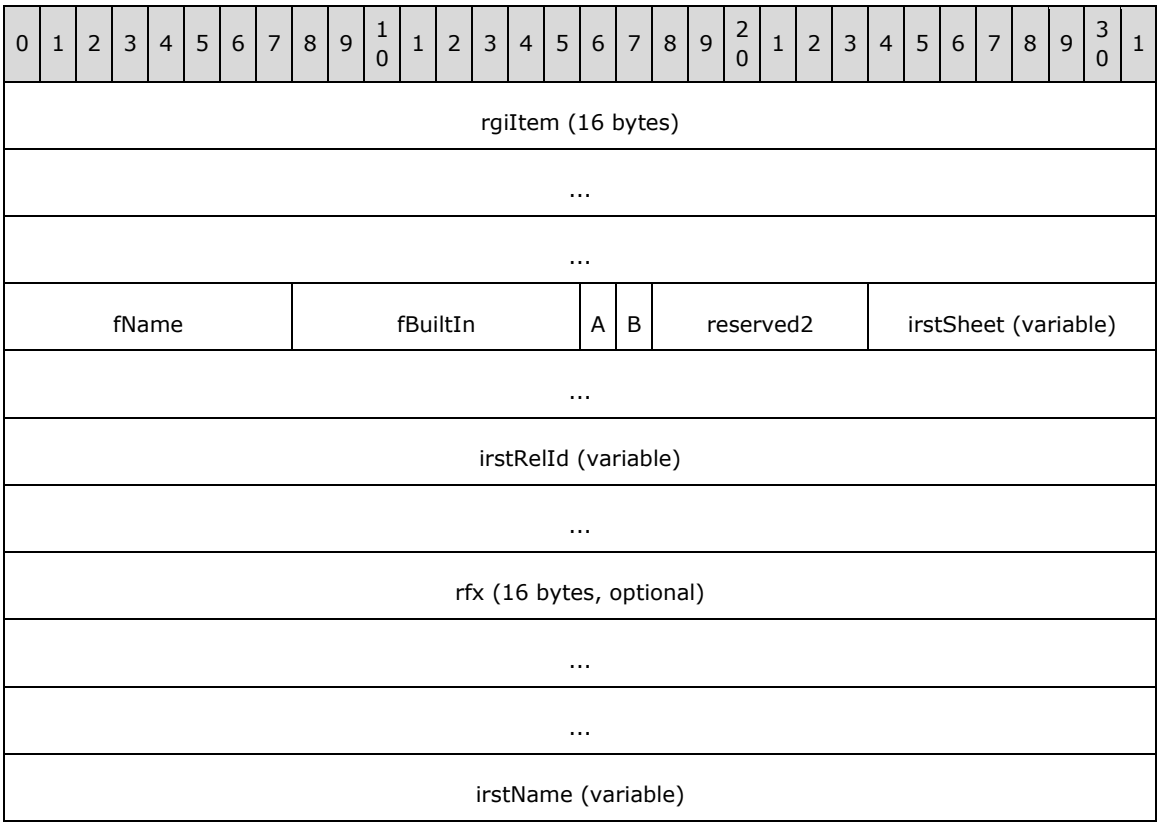
The **BrtBeginPCDSCPItem** record specifies a value that corresponds to a cache item (section 2.2.5.2.3) (as specified by multiple consolidation ranges (section 2.2.5.2.1.1), and specifies the beginning of an empty collection of records (defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**).



stName (variable): An **XLWideString** (section 2.5.168) that specifies the value that is used for creating a cache item in an optional cache field (section 2.2.5.2.2) for a multiple consolidation ranges **PivotCache**, as specified by Multiple Consolidation Ranges. The length of this string MUST be greater than or equal to 1 character and less than or equal to 255 characters. This value MUST be unique case-insensitive within this collection of **BrtBeginPCDSCPItem** records.

2.4.153 BrtBeginPCDSCSet

The **BrtBeginPCDSCSet** record specifies properties of a **range** of the source data (section 2.2.5.2.1) for a multiple consolidation ranges (section 2.2.5.2.1.1) **PivotCache** (section 2.2.5.2) and specifies the beginning of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The range is either in this **workbook** or another workbook.



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...

rgiItem (16 bytes): An array of 4-byte unsigned integers. Each element of the array specifies an index to a value for a cache item (section 2.2.5.2.3) of a cache field (section 2.2.5.2.2) for a multiple consolidation ranges (section 2.2.5.2.1.1) **PivotCache** associated with this range. Each element of the array specifies a zero-based index to a **BrtBeginPCDSCPItem** (section 2.4.152) record in the **BrtBeginPCDSCPage** collection following the **BrtBeginPCDSConsol** (section 2.4.153) collection that precedes this record.

The first element in this array corresponds to the first **BrtBeginPCDSCPage** collection in the **BrtBeginPCDSCPages** (section 2.4.151) collection following the **BrtBeginPCDSConsol** collection that precedes this record.

The second element in this array corresponds to the second **BrtBeginPCDSCPage** collection (section 2.4.150) in the **BrtBeginPCDSCPages** collection following the **BrtBeginPCDSConsol** collection that precedes this record.

The third element in this array corresponds to the third **BrtBeginPCDSCPage** collection in the **BrtBeginPCDSCPages** collection following the **BrtBeginPCDSConsol** collection that precedes this record.

The fourth element in this array corresponds to the fourth **BrtBeginPCDSCPage** collection in the **BrtBeginPCDSCPages** collection following the **BrtBeginPCDSConsol** collection that precedes this record.

If the number of **BrtBeginPCDSCPage** collections in the **BrtBeginPCDSCPages** collection is less than four, the value for each array element that does not have a corresponding **BrtBeginPCDSCPage** collection MUST be 0xFFFFFFFF. If the **BrtBeginPCDSCPage** collection corresponding to an array element has no following **BrtBeginPCDSCPItem** (section 2.4.152) records, the value of that array element MUST be 0xFFFFFFFF. The value of each array element MUST be either greater than or equal to 0 and less than the number of **BrtBeginPCDSCPItem** records in the **BrtBeginPCDSCPage** collection following the **BrtBeginPCDSConsol** collection that precedes this record, or MUST be 0xFFFFFFFF if no **BrtBeginPCDSCPItem** record is specified. For more details, see section 2.2.5.2.1.1.

fName (1 byte): A **Boolean** (section 2.5.97.3) that specifies whether the range is specified by **irstName** or **rfx**. This value MUST be a value from the following table:

Value	Meaning
0x00	The range is specified by **rfx**. The **irstName** field MUST NOT be present. The **rfx** field MUST be present. The value of **fLoadSheet** MUST be 1.
0x01	The range is specified by **irstName**. The **irstName** field MUST be present. The **rfx** field MUST NOT be present.

fBuiltIn (1 byte): A **Boolean** that specifies whether the **defined name** specified by the **irstName** field refers to a **built-in name** or a user-defined name. This value MUST be a value from the following table:

Value	Meaning
0x00	**irstName** specifies a user-defined name.
0x01	**irstName** specifies a built-in name.

If the value of **fName** is 0x00, this value MUST be 0x00.

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A - fLoadRelId (1 bit): A bit that specifies whether **irstRelId** exists.

B - fLoadSheet (1 bit): A bit that specifies whether **irstSheet** exists.

reserved2 (6 bits): This value MUST be zero, and MUST be ignored.

irstSheet (variable): An **XLWideString** (section 2.5.168) that specifies the name of the **sheet** in which the range is located. The length of the string MUST be greater than or equal to 1, and less than or equal to 31. This field MUST exist when **fLoadSheet** is equal to 1, and MUST NOT exist when **fLoadSheet** is equal to 0.

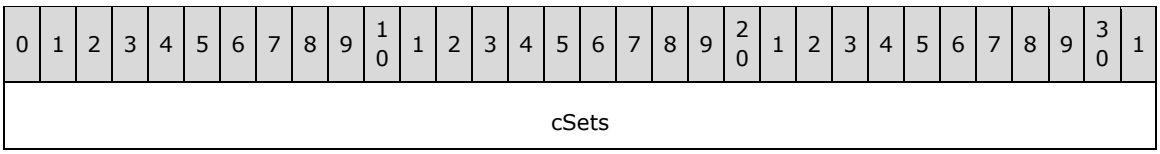
irstRelId (variable): A **RelID** (section 2.5.114) that specifies a path to another workbook that contains the range. This field MUST exist when **fLoadRelId** is equal to 1, and MUST NOT exist when **fLoadRelId** is equal to 0.

rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies a range that is part of the source data for a multiple consolidation ranges (section 2.2.5.2.1.1) **PivotCache**. This field MUST exist when **fName** is equal to 0, and MUST NOT exist when **fName** is equal to 1.

irstName (variable): An **XLWideString** that specifies the defined name that is part of the source data for a multiple consolidation ranges **PivotCache**. The length of this string MUST be greater than or equal to 1, and less than or equal to 255. This field MUST exist when **fName** is equal to 1, and MUST NOT exist when **fName** is equal to 0.

2.4.154 BrtBeginPCDSCSets

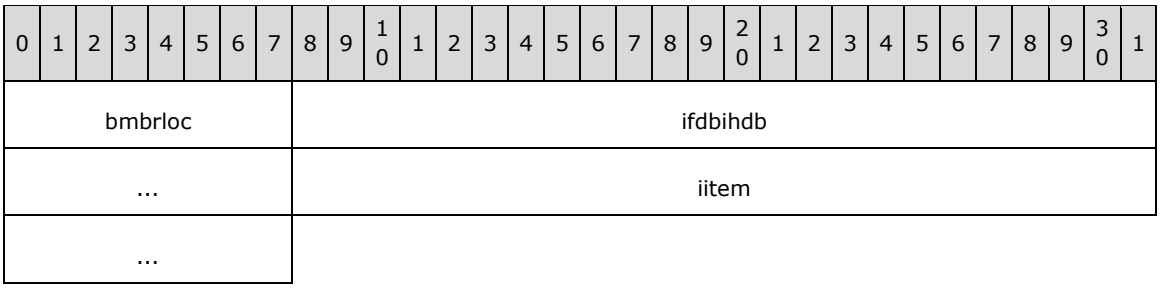
The **BrtBeginPCDSCSets** record specifies a count of **ranges** used as source data for a multiple consolidation ranges (section 2.2.5.2.1.1) **PivotCache** (section 2.2.5.2) and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies ranges used as source data for a multiple consolidation ranges **PivotCache**.



cSets (4 bytes): An unsigned integer that specifies the number of ranges used as source data for a multiple consolidation ranges (section 2.2.5.2.1.1) **PivotCache**. This value MUST be equal to the number of **BrtBeginPCDSCSet** (section 2.4.153) records in this collection.

2.4.155 BrtBeginPCDSDTCEMember

The **BrtBeginPCDSDTCEMember** record specifies properties of the tuple cache entry (as specified in section 2.2.5.2.11), and the beginning of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. A tuple cache entry specifies either a reference to an **OLAP member** or a reference to a tuple cache set.



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bmbrloc (1 byte): An unsigned integer that specifies the meaning of **iitem**. This value MUST be a value from the following table.

Value	Meaning
0x01	iitem specifies a cache item (section 2.2.5.2.3).
0x02	iitem specifies the default OLAP member, the **ALL** OLAP member or a tuple cache set.

ifdbihdb (4 bytes): An unsigned integer that specifies a zero-based index whose meaning is determined by the value of **bmbrloc**, as specified in the following table.

Value of bmbrloc	Meaning
0x01	The **ifdbihdb** field is a cache field (section 2.2.5.2.2) index, as specified by Cache Fields, that specifies the cache field for this tuple cache entry. The **ifdbihdb** field MUST be greater than or equal to 0 and less than the count of cache fields in the tuple cache.
0x02	The **ifdbihdb** field is a cache hierarchy index (section 2.2.5.2.7) that specifies the cache hierarchy for this tuple cache entry. The **ifdbihdb** field MUST be greater than or equal to 0 and less than the count of cache hierarchies in the tuple cache.

iitem (4 bytes): A signed integer whose meaning is determined by the value of **bmbrloc**, as specified in the following table.

Value of bmbrloc	Meaning
0x01	The **iitem** field is a cache item index that specifies the cache item of the cache field specified by the **ifdbihdb** field. The value of the cache item specifies the unique name of the OLAP member that this record refers to. The **iitem** field MUST be greater than or equal to 0 and less than the count of cache items for the cache field.
0x02	If **iitem** is -1, then this tuple cache entry is the reference to the default OLAP member of the cache hierarchy specified by the **ifdbihdb** field. If **iitem** is -2, then this tuple cache entry is the reference to the ALL OLAP member of the cache hierarchy specified by **ifdbihdb** field. Otherwise, **iitem** is a zero-based index of a tuple cache set in the **PCDSDTCSETS** collection (defined in section 2.1.7.38) of this tuple cache that specifies a tuple cache set that this record refers to. The **iitem** field MUST be one of the following values: -2,-1, or greater than or equal to 0 and less than the count of tuple cache sets in the **PCDSDTCSETS** collection of this tuple cache.

2.4.156 BrtBeginPCDSDTCEMembers

The **BrtBeginPCDSDTCEMembers** record specifies the beginning of a collection of **BrtBeginPCDSDTCEMember** records (section 2.4.155) as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a collection of tuple cache entries (section 2.2.5.2.11).

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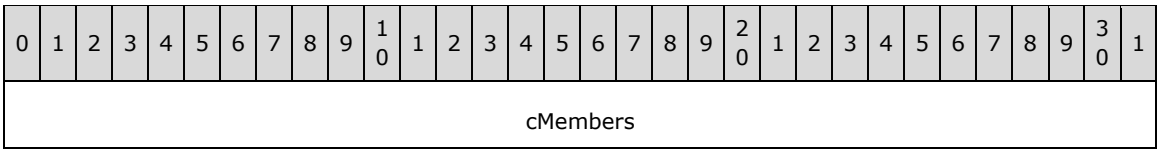
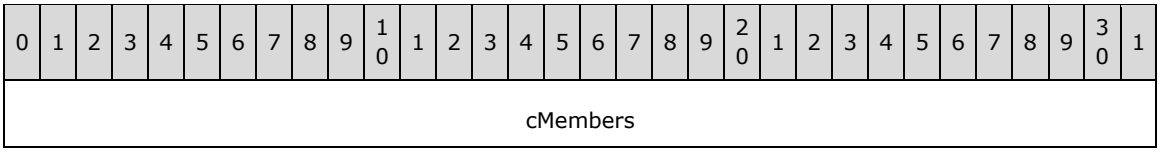


cMembers (4 bytes): An unsigned integer that specifies the number of tuple cache entries, as specified by tuple cache. This value MUST be equal to the number of **BrtBeginPCDSDTCEMember** records in the collection.

2.4.157 BrtBeginPCDSDTCEMembersSortBy

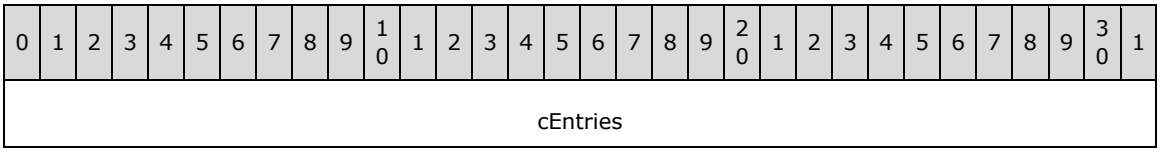
The **BrtBeginPCDSDTCEMembersSortBy** record specifies the beginning of a collection of **BrtBeginPCDSDTCEMember** records (section 2.4.155). The collection of records specifies a collection of tuple cache entries (section 2.2.5.2.11), used to **sort** a tuple cache set.



cMembers (4 bytes): An unsigned integer that specifies the number of tuple cache entries, as specified by (section 2.2.5.2.11), in the collection of tuple cache entries that is used to sort the tuple cache set. This value MUST be equal to the number of **BrtBeginPCDSDTCEMember** (section 2.4.155) records in this collection.

2.4.158 BrtBeginPCDSDTCEntries

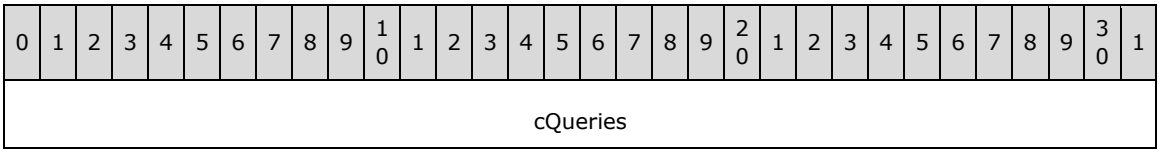
The **BrtBeginPCDSDTCEntries** record specifies the number of cached **cube** values, as specified in section 2.2.5.2.11, and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a cache of cube values; each of the values is optionally followed by a collection of tuple cache entries used in the value calculation.



cEntries (4 bytes): An unsigned integer that specifies the number of cached cube values, as specified in a section 2.2.5.2.11. This value MUST be equal to the total number of records (**BrtPCDIMissing** / **BrtPCDINumber** / **BrtPCDIError** / **BrtPCDIString**) in the collection.

2.4.159 BrtBeginPCDSDTCQueries

The **BrtBeginPCDSDTCQueries** record specifies the beginning of a collection of **BrtBeginPCDSDTCQuery** (section 2.4.160) records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records is part of the Tuple Cache and specifies cached **MDX expressions** that evaluate to a collection of tuple cache entries, specified by section 2.2.5.2.11.



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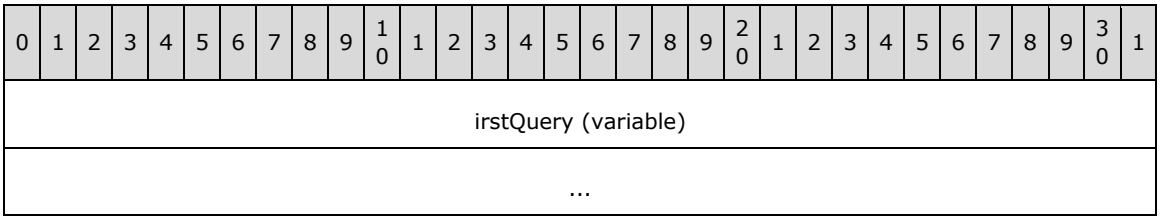
cQueries (4 bytes): An unsigned integer that specifies the number of cached MDX expressions that evaluates to a collection of tuple cache entries, as specified by tuple cache, in this collection. This value MUST be equal to the number of **BrtBeginPCDSDTCQuery** records in the collection.

2.4.160 BrtBeginPCDSDTCQuery

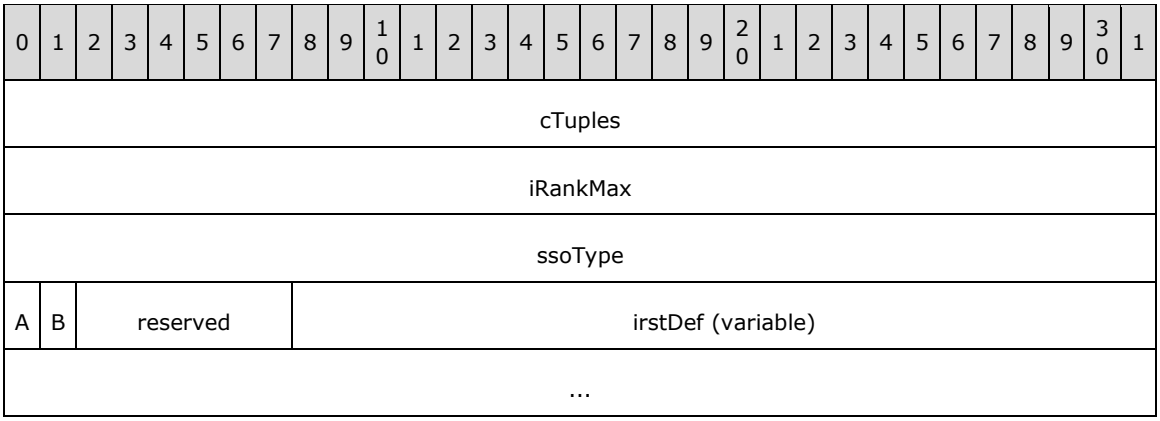
The **BrtBeginPCDSDTCQuery** record specifies the **MDX expression** that is used to evaluate the tuple cache entries, as specified in section 2.2.5.2.11, and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. This record is optionally followed by a **BrtBeginPCDSDTCEMembers** collection (section 2.4.156) that specifies the cached **cube members** in the tuple cache entry that the MDX expression evaluates to.



irstQuery (variable): An **XLWideString** (section 2.5.168) that specifies the MDX expression that is used to evaluate the tuple cache entries. The length of this string MUST be less than 65,536 characters.

2.4.161 BrtBeginPCDSDTCSet

The **BRTBeginPCDSDTCSet** record specifies the properties of a tuple cache set, as specified in section 2.2.5.2.11, and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection specifies a tuple cache set in the tuple cache. The collection can include the **PCDSDTCEMEMBERSSORTBY** collection (defined in section 2.1.7.38) to specify the tuple cache entries used to sort the tuple cache set. The **PCDSDTCEMEMBERSSORTBY** collection (defined in section 2.1.7.38) is present when **fLoadSortTuple** is 1.



cTuples (4 bytes): An unsigned integer that specifies the number of **OLAP tuples** in the tuple cache set. This value MUST be less than 0x80000000, or MUST be 0xFFFFFFFF when the number of OLAP tuples in the tuple cache set is unknown.

iRankMax (4 bytes): An unsigned integer that specifies the number of **BrtBeginPCDSDTCEMembers** collections (section 2.4.156) of tuple cache entries that this tuple cache set currently contains. This value MUST be greater than 0x00000000 and less than or equal to 0x00100000. This value MUST be less than or equal to **cTuples**. This value MUST be ignored if **fQueryFailed** is 1.

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ssoType (4 bytes): An **SdSetSortOrder** (section 2.5.131) that specifies the **sort order (2)** of the tuple cache entries in the tuple cache set. If this field is equal to **SSOASC** or **SSODESC**, the tuples which specify the sort order (2) are specified by the sequence of records that conforms to the **PCDSDTCEMEMBERSSORTBY** rule (defined in section 2.1.7.38) following this record in the sequence of records that conforms to the **PCDSDTCSET** rule (defined in section 2.1.7.38).

A - fQueryFailed (1 bit): A bit that specifies whether the querying on this tuple cache set failed. A value of 1 specifies that **MDX query** execution has not finished successfully.

B - fLoadSortTuple (1 bit): A bit that specifies whether tuple cache entries used to sort the tuple cache set exist in the file. This value MUST be 1 if and only if **ssoType** is equal to **SSOASC** (0x00000001) or **SSODESC** (0x00000002).

reserved (6 bits): This value MUST be zero and MUST be ignored.

irstDef (variable): An **XLWideString** (section 2.5.168) that specifies the **MDX expression** that was used to evaluate this tuple cache set. The length of this string MUST be less than 65,536 characters.

2.4.162 BrtBeginPCDSDTCSets

The **BrtBeginPCDSDTCSets** record specifies the beginning of a collection of **BrtBeginPCDSDTCSet** (section 2.4.161) records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of **BrtBeginPCDSDTCSet** records specifies the collection of tuple cache sets (section 2.2.5.2.11), in the **PivotCache** (section 2.2.5.2).

cSets (4 bytes): An unsigned integer that specifies the number of tuple cache sets in the **PivotCache**. This value MUST be equal to the number of **BrtBeginPCDSDTCSet** records in the collection.

2.4.163 BrtBeginPCDSDTupleCache

The **BrtBeginPCDSDTupleCache** record specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a tuple cache (section 2.2.5.2.11) within the **PivotCache** (section 2.2.5.2). Relevant information retrieved from the **OLAP** server as a result of using **cube functions** in a **sheet** is cached in the tuple cache. By using this cached information, client applications can avoid un-necessary communication with the OLAP server.

This record MUST exist if and only if the value of the **fSheetData** field on the **BrtBeginPivotCacheDef** (section 2.4.167) record associated with this tuple cache is 1.

2.4.164 BrtBeginPcdSFCIEntries

The **BrtBeginPcdSFCIEntries** record specifies the beginning of a collection of **BrtPCDSFCIEntry** (section 2.4.728) records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of **BrtPCDSFCIEntry** records specifies the **number formats** provided by an **OLAP** server for **cube** values.

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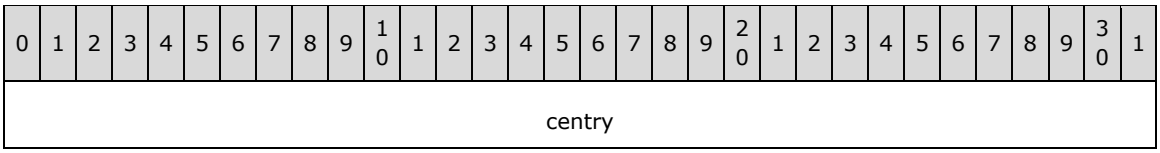
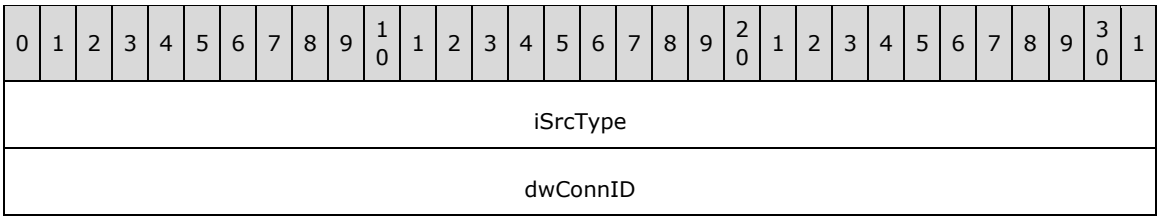


centry (4 bytes): An unsigned integer that specifies the count of **BrtPCDSFCIEntry** (section 2.4.728) records in this collection.

2.4.165 BrtBeginPCDSource

The **BrtBeginPCDSource** record specifies the properties of **PivotCache** (section 2.2.5.2) source data (section 2.2.5.2.1) and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies properties of the source data of a **PivotCache** (section 2.2.5.2).



iSrcType (4 bytes): An unsigned integer that specifies the **PivotCache** source data type. This value MUST be a value from the following table.

Value	Meaning
0x00000000	**Sheet** source data.
0x00000001	External source data.
0x00000002	Multiple consolidation range (section 2.2.5.2.1.1) source data.
0x00000003	Scenario source data.

If this value is 0x00000000, the collection MUST contain the **BrtBeginPCDSRange** (section 2.4.166) record; the source data is specified by the **range** or **namedRange** field in the **BrtBeginPCDSRange** record in this collection.

If this value is 0x00000002, the collection MUST contain the **BrtBeginPCDSConsol** (section 2.4.149) record; the source data is specified by the **BrtBeginPCDSConsol** collection in this collection.

dwConnID (4 bytes): An unsigned integer that specifies the unique identifier of the external connection (section 2.2.8). This value MUST be ignored if **iSrcType** is not 0x00000001. If **iSrcType** is 0x00000001, it MUST be greater than 0x00000000 and it MUST match a **dwConnID** value in one of the **BrtBeginExtConnection** (section 2.4.79) records in the **External Data Connections** (section 2.1.7.24) part.

2.4.166 BrtBeginPCDSRange

The **BrtBeginPCDSRange** record specifies the properties of the source data (section 2.2.5.2.1) for a **PivotCache** (section 2.2.5.2) contained in the **workbook** and specifies beginning of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies source data for a **PivotCache** contained in the workbook. The workbook

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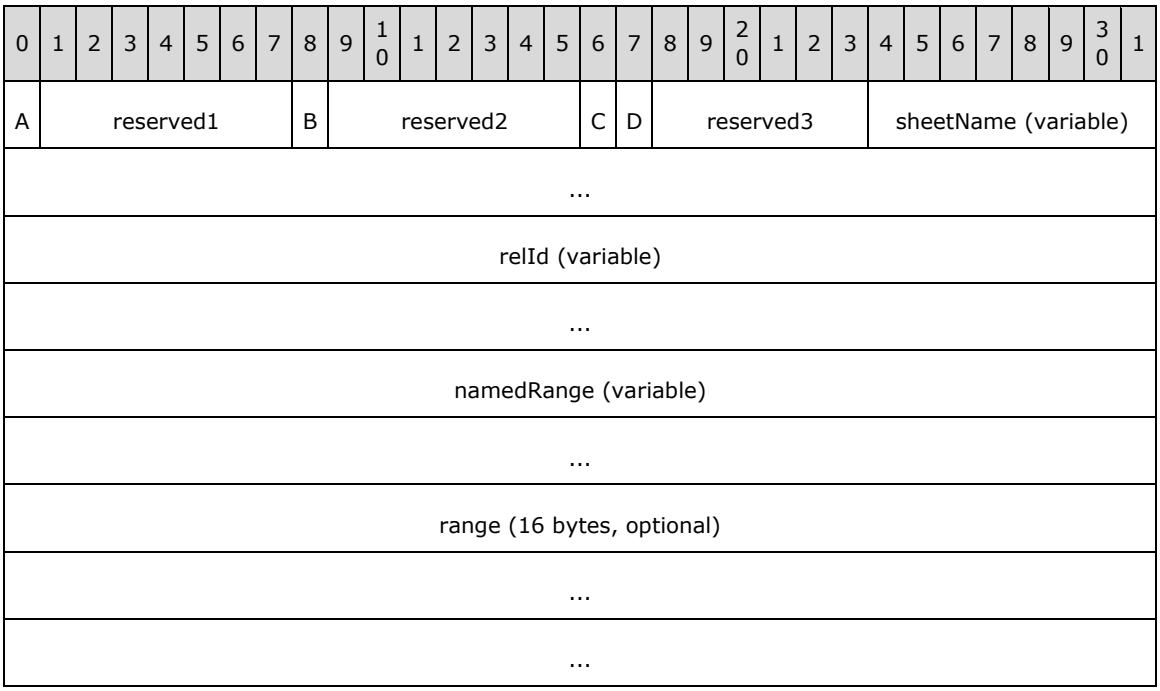
that contains the source data can be this workbook, or an external workbook (section 2.1.10). The location of the source data within the workbook is specified as a **defined name**, or as a **range**.



A - fName (1 bit): A bit that specifies that the source data is specified by a defined name. If this value is 1, the location of this **data source** inside a workbook is specified by **namedRange**; otherwise, it is specified by **range**.

reserved1 (7 bits): This value MUST be zero and MUST be ignored.

B - fBuiltIn (1 bit): A bit that specifies that the defined name specified by **namedRange** is a **built-in name**. If the value of **fName** is 0, this value MUST be 0.

reserved2 (7 bits): This value MUST be zero and MUST be ignored.

C - fLoadRelId (1 bit): A bit that specifies that the source data is in an external workbook. If this value is 1, the path to the external workbook is specified by **RelID** (section 2.5.114).

D - fLoadSheet (1 bit): A bit that specifies that the source data is scoped to a single **sheet**. If **fName** is 0 then the value of this bit SHOULD be 1.<18>

reserved3 (6 bits): This value MUST be zero and MUST be ignored.

sheetName (variable): An **XLWideString** (section 2.5.168) that specifies the name of the sheet to which the source data is scoped. This field exists if and only if the value of **fLoadSheet** is 1. This string MUST comply with the restrictions specified for the **strName** field in **BrtBundleSh** (section 2.4.311).

relId (variable): A **RelID** that specifies a relationship that specifies a path to an external workbook that contains the source data. This field exists if and only if the value of **fLoadRelId** is 1.

namedRange (variable): An **XLNameWideString** (section 2.5.165) that specifies the defined name that is the source data. This field exists if and only if the value of **fName** is 1.

range (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the range that is the source data. This field exists if and only if the value of **fName** is 0.

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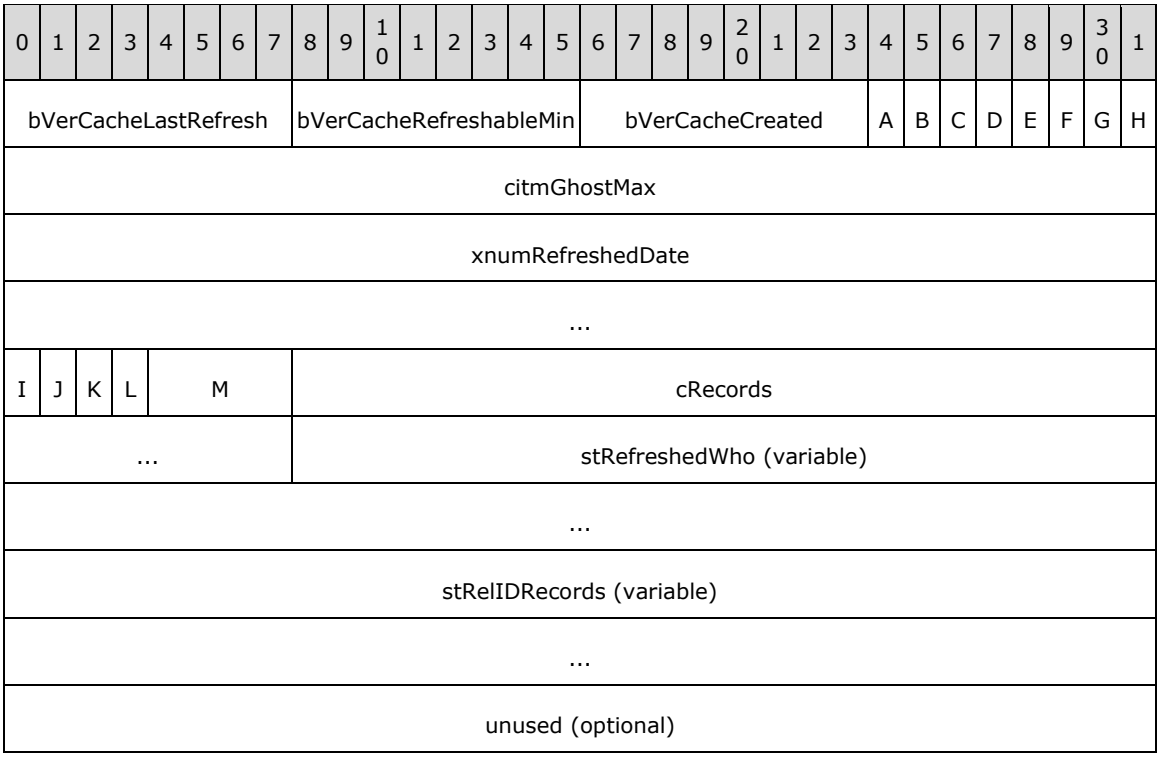
2.4.167 BrtBeginPivotCacheDef

The **BrtBeginPivotCacheDef** record specifies properties of a **PivotCache** (section 2.2.5.2) and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a **PivotCache**.



bVerCacheLastRefresh (1 byte): A **DataFunctionalityLevel** (section 2.5.28) that specifies the data functionality level (section 2.2.5.1) that the **PivotCache** was last refreshed with.

This value MUST NOT be less than **bVerCacheRefreshableMin** value.

bVerCacheRefreshableMin (1 byte): A **DataFunctionalityLevel** that specifies the lowest data functionality level that the application is required to support to **refresh** the **PivotCache**. For more details, see section 2.2.5.1.

bVerCacheCreated (1 byte): A **DataFunctionalityLevel** that specifies the data functionality level that the **PivotCache** was created with. For more details, see section 2.2.5.1.

A - fSaveData (1 bit): A bit that specifies whether the cache records (section 2.2.5.2.10) exist. This value MUST be equal to 0 for **OLAP PivotCaches**.

B - fInvalid (1 bit): A bit that specifies whether the cache records of this **PivotCache** are in an invalid state, in which case they MUST be ignored.

C - fRefreshOnLoad (1 bit): A bit that specifies whether the **PivotCache** is refreshed on load.

D - fOptimizeCache (1 bit): A bit that specifies whether the application applies optimizations to the **PivotCache** to reduce memory usage. This value MUST be equal to 0 for non-external and non-**ODBC** source data (section 2.2.5.2.1).

E - fEnableRefresh (1 bit): A bit that specifies whether refresh of the **PivotCache** is enabled.

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F - fBackgroundQuery (1 bit): A bit that specifies whether to refresh this **PivotCache** asynchronously. This value MUST be equal to 0 if the **iSrcType** field in the associated **BrtBeginPCDSource** (section 2.4.165) record is not equal to 0x00000001.

G - fUpgradeOnRefresh (1 bit): A bit that specifies whether the data functionality level of this **PivotCache** has to be upgraded to 3 during the next refresh. This value MUST be zero if the data functionality level of this **PivotCache** is greater than or equal to 3.

H - fSheetData (1 bit): A bit that specifies whether the **PivotCache** is used to store information for **cube functions**. This value MUST be equal to 0 for non-OLAP **PivotCaches**. If the value is equal to 1, this **PivotCache** MUST NOT be associated with any PivotTable as specified in section 2.2.5.3.1.

citmGhostMax (4 bytes): A signed integer that specifies the number of unused cache items (section 2.2.5.2.3) to allow before discarding unused cache items on the next refresh. This value MUST be greater than -2 and less than 1048577. If this value is equal to 0, all unused cache items are discarded on the next refresh. If this value is equal to -1, the number of unused cache items retained by the application is optimized to balance memory usage on the system and future usage of cache items.

xnumRefreshedDate (8 bytes): A **DateAsXnum** (section 2.5.29) that specifies the date when the **PivotCache** was last refreshed.

I - fLoadRefreshedWho (1 bit): A bit that specifies whether the **stRefreshedWho** field exists.

J - fLoadRelIDRecords (1 bit): A bit that specifies whether the **stRelIDRecords** field exists. This value MUST be equal to 1 if **fSaveData** is equal to 1 and **fInvalid** is equal to 0.

K - fSupportSubquery (1 bit): A bit that specifies whether the source data of the **PivotCache** supports **OLAP subselect**.

L - fSupportAttribDrill (1 bit): A bit that specifies whether the source data of the **PivotCache** supports **attribute drilldown**.

M - reserved (4 bits): This value MUST be zero, and MUST be ignored.

cRecords (4 bytes): An unsigned integer that specifies the number of cache records in the **PivotCache**. If **fSaveData** is equal to 0, this value is undefined and MUST be ignored.

stRefreshedWho (variable): An optional **XLWideString** (section 2.5.168) that specifies the name of the user who last refreshed the **PivotCache**. This value MUST exist if and only if **fLoadRefreshedWho** is equal to 1. The length of this value MUST be less than 256 characters. The name is an application-specific setting that is not necessarily related to the **User Names** (section 2.1.7.55) part ABNF.

stRelIDRecords (variable): An optional **RelID** that specifies the unique identifier that corresponds to the related **PivotCache Records** (section 2.1.7.39) part. This value MUST exist and MUST be non-empty if and only if **fLoadRelIDRecords** is equal to 1.

unused (4 bytes): This value is undefined and MUST be ignored. This field MUST exist if and only if **fLoadRefreshedWho** is equal to 0.

2.4.168 BrtBeginPivotCacheID

The **BrtBeginPivotCacheID** record specifies the relationship between a **PivotCache** (section 2.2.5.2) identifier and its associated **PivotCache Definition** (section 2.1.7.38). For more information, see section 2.2.5.3.1.

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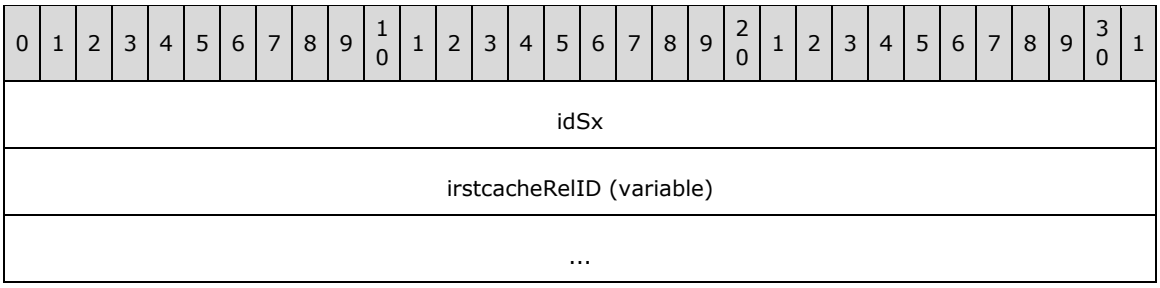


idSx (4 bytes): An unsigned integer that specifies the identifier for the **PivotCache Definition** specified by **irstcacheRelID**. This value MUST be unique in the collection of **BrtBeginPivotCacheID** (section 2.4.168) records directly following the immediately preceding **BrtBeginPivotCacheIDs** (section 2.4.169) collection.

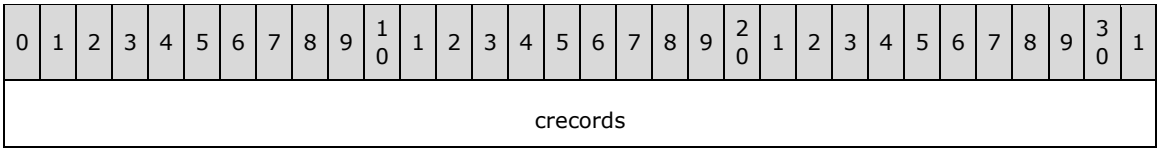
irstcacheRelID (variable): A **RelID** that specifies a **PivotCache Definition**.

2.4.169 BrtBeginPivotCacheIDs

The **BrtBeginPivotCacheIDs** record specifies the beginning of a collection of **PivotCache** identifier records as defined by the **workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies the **PivotCache** identifiers for the **workbook**.

2.4.170 BrtBeginPivotCacheRecords

The **BrtBeginPivotCacheRecords** record specifies the beginning of a collection of records as defined by the **PivotCache Records** (section 2.1.7.39) part **ABNF**. The collection of records specifies the cache records (section 2.2.5.2.10) for a **PivotCache** (section 2.2.5.2).



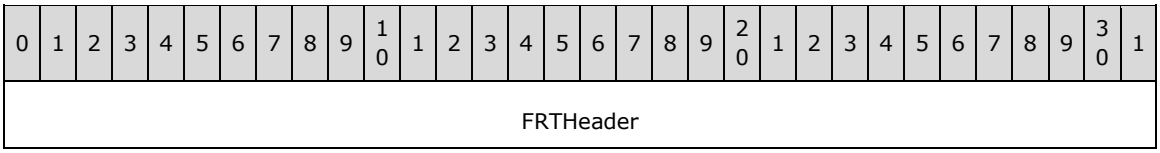
crecords (4 bytes): An unsigned integer that specifies the number of cache records in the **PivotCache**. This value MUST be equal to the number of **BrtPCRRecord** (section 2.4.729) and **BrtPCRRecordDt** (section 2.4.730) records in the collection.

2.4.171 BrtBeginPivotTableRefs

The **BrtBeginPivotTableRefs** record specifies the beginning of a collection of **PivotTable** identifier records as defined by the **Workbook** (section 2.1.7.61) part **ABNF** rules. The collection of records specifies the Non-Worksheet PivotTables (section 2.2.5.5) in the **Workbook**.

2.4.172 BrtBeginPivotTableUISettings

The **BrtBeginPivotTableUISettings** record specifies the beginning of a collection of records as defined in the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies settings for the **PivotTable field list**.



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A	B	reserved2	stPpmConnectionName (variable)
...			

FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record

A - reserved1 (2 bits): MUST be 0. MUST be ignored.

B - fRelNeededHidden (1 bit): A bit that specifies whether user closed the relationship warning for this **PivotTable**.

reserved2 (5 bits): MUST be 0. MUST be ignored.

stPpmConnectionName (variable): An **XLWideString** (section 2.5.168) that contains the name of the model data source connection (section 2.2.8.9) associated with this PivotTable.

2.4.173 BrtBeginPName

The **BrtBeginPName** record specifies information used for a calculated field (section 2.2.5.2.5) or calculated item (section 2.2.5.2.6) and specifies the beginning of a collection of records as specified by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. When used for a calculated field, this record specifies a reference to a cache field (section 2.2.5.2.2) used in a calculated field formulas (section 2.2.2), and the specified collection of records MUST be empty. When used for a calculated item, this record specifies a reference to a pivot item (section 2.2.5.3.3) used in calculated item formulas, and the specified collection of records MUST NOT be empty.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ifdb																															
ifn								A	reserved																						

ifdb (4 bytes): An unsigned integer that specifies a zero-based index to a cache field used in a calculated field formula. When this record is used for a calculated item, this field MUST be equal to -1.

ifn (8 bits): An unsigned integer that specifies an **aggregation function** that is used to aggregate the data items (section 2.2.5.3.7.5.1) in a pivot field. This value MUST be a value from the following table.

Value	Meaning
0	"SUM"
1	"COUNTA"
2	"AVG"
3	"MAX"
4	"MIN"
5	"PRODUCT"
6	"COUNT"
7	"STDEV"
8	"STDEVP"
9	"VAR"
10	"VARP"
255	Aggregation function not specified.

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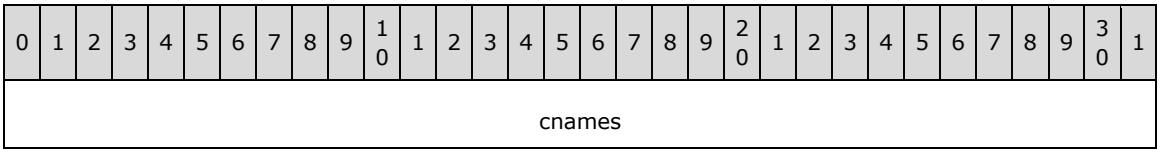
A - fErrName (1 bit): A bit that specifies whether the cache field specified by the **ifdb** field was found in the pivot cache (section 2.2.5.2) after the PivotTable view (section 2.2.5.3) was calculated. If the cache field record was not found, then this bit MUST be equal to 1.

reserved (7 bits): This value MUST be zero, and MUST be ignored.

2.4.174 BrtBeginPNames

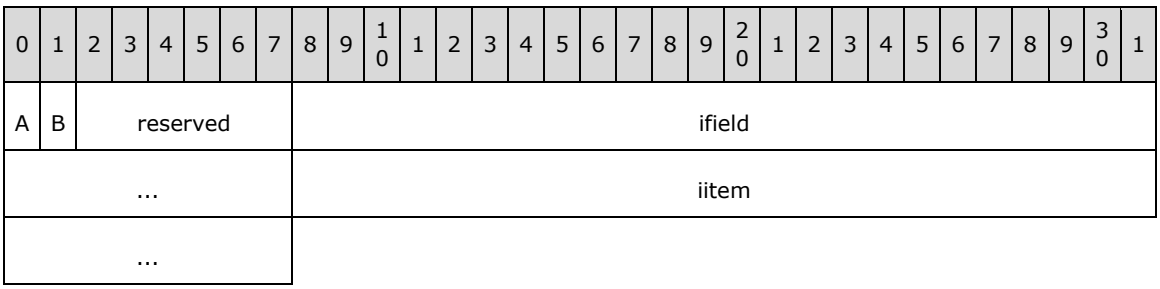
The **BrtBeginPNames** record specifies a count of **BrtBeginPName** (section 2.4.173) records and specifies the beginning of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a collection of references to cache fields (section 2.2.5.2.2) used in a calculated field (section 2.2.5.2.5) formula (section 2.2.2) or pivot items (section 2.2.5.3.3) used in a calculated item (section 2.2.5.2.6) formula (section 2.2.2).



cnames (4 bytes): An unsigned integer that specifies the number of cache field or pivot item references in this collection. The value of **cnames** MUST be equal to the number of **BrtBeginPName** records in this collection.

2.4.175 BrtBeginPNPair

The **BrtBeginPNPair** record specifies a reference to a pivot item (section 2.2.5.3.3). This record is used in a calculated item (section 2.2.5.2.6) formula (section 2.2.2), and specifies the beginning of an empty collection as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**.



A - fPhysical (1 bit): A bit that specifies whether **iitem** specifies a cache item (section 2.2.5.2.3) index. The possible values for this field are listed in the following table.

Value	Meaning
0	**iitem** specifies a cache item index.
1	**iitem** does not specify a cache item index.

B - fRelative (1 bit): A bit that specifies whether the item is referred to by relative position rather than absolute position. If **fPhysical** is 0, **fRelative** MUST be 0, and MUST be ignored. If **fPhysical** is 1, **fRelative** MUST be a value from the following table.

Value	Meaning
0	Absolute position.
1	Position relative to the calculated item referring to this item.

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reserved (6 bits): This value MUST be zero, and MUST be ignored.

ifield (4 bytes): An unsigned integer that is a cache field (section 2.2.5.2.2) index. This index specifies a cache field which contains the cache item associated with the pivot item specified by **iitem**.

iitem (4 bytes): A signed integer that specifies a pivot item of the **PivotTable** view (section 2.2.5.3) associated with this record as specified in section 2.2.5.3.1. This pivot item is used in a calculated item formula (section 2.2.2). If more than one **PivotTable** view is associated with this record, **iitem** specifies a pivot item for each such **PivotTable** view.

If the value of **fPhysical** is 0, **iitem** is a cache item index, and specifies the pivot item associated with that cache item.

Otherwise if the value of **fRelative** is 0 or if no pivot item in the **visible** item collection has a pivot item index smaller than the pivot item index of the current pivot item, **iitem** is a visible item index. Otherwise, the pivot item specified by **iitem** is the pivot item whose visible item index equals the value of **iitem** + 1 + the largest visible item index whose associated pivot item has a pivot item index smaller than the pivot item index of the current pivot item. If this value is less than 0 or greater than or equal to the number of elements in the visible item collection, no pivot item is specified.

The current pivot item is the pivot item in the current pivot field (section 2.2.5.3.2) that corresponds to the calculated item that contains this record.

The current pivot field is the pivot field of the **PivotTable** view associated with the cache field specified by **ifield**.

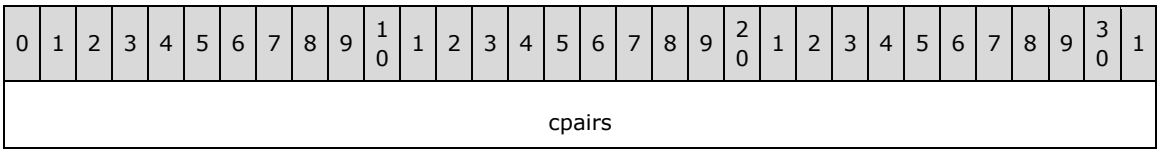
The visible item collection is the ordered collection of all pivot items (section 2.2.5.3.3) specified by the sequence of records that conforms to the **SXVIS** rule (defined in section 2.1.7.40) associated with the current pivot field that satisfy the following criteria:

- The value of the **fHidden** field of the **BrtBeginSXVI** (section 2.4.272) record associated with the pivot item is 0.
- The value of the **fMissing** field of the **BrtBeginSXVI** record associated with the pivot item is 0 or the value of the **fShowAllItems** field of the **BrtBeginSXVD** record associated with the current pivot field is 1.
- The value of the **itmtype** field of the **BrtBeginSXVI** record associated with the pivot item is **PITDATA** (defined in section 2.5.104).

A visible item index is specified to be the zero-based index of a pivot item in the visible item collection.

2.4.176 BrtBeginPNPairs

The **BrtBeginPNPairs** record specifies the beginning of a collection of **BrtBeginPNPair** (section 2.4.175) records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a reference to a pivot item (section 2.2.5.3.3), which is used in a calculated item (section 2.2.5.2.6) formula (section 2.2.2).



cpairs (4 bytes): This value MUST be 1, and MUST be ignored.

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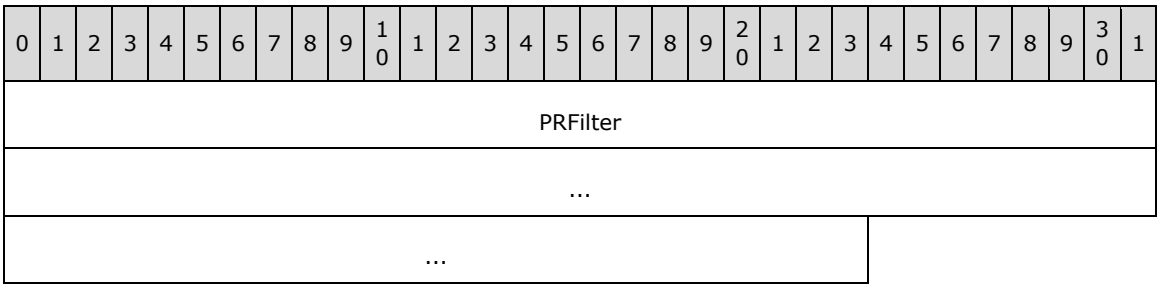
2.4.177 BrtBeginPRFilter

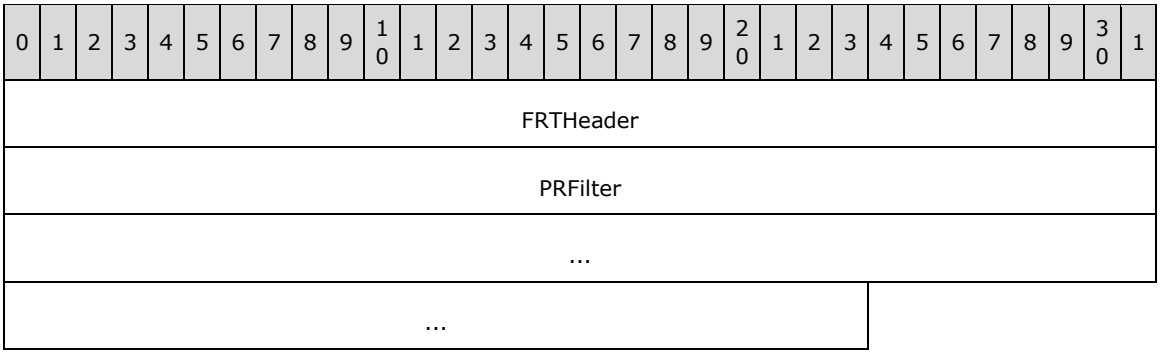
The **BrtBeginPRFilter** record specifies information about the set of pivot items (section 2.2.5.3.3), data items (section 2.2.5.3.7.5.1), or cache items (section 2.2.5.2.3) associated with a pivot field (section 2.2.5.3.2), the data field (section 2.2.5.3.7.5.2), or a cache field (section 2.2.5.2.2) that specifies a **filter** for a **PivotTable** rule (section 2.2.5.3.9) and specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**, **PivotCache Definition** (section 2.1.7.38) part ABNF, and **Worksheet** part ABNF (section 2.1.7.62). The collection of records specifies the set of pivot items, data items, or cache items (section 2.2.5.2.3) included in the filter. When this record is in a **Worksheet** part or in a **PivotCache Definition** part, see **BrtBeginPRule** (section 2.4.183) for details of how the **PivotTable** view (section 2.2.5.3) for a **PivotTable** rule containing this filter is specified. More information about this record's function is available in the **PivotTable** rule section.



PRFilter (11 bytes): A **PRFILTER** (section 2.1.8) that specifies information about the set of pivot items, data items, or cache items associated with a pivot field, the data field, or a cache field that specifies a filter for a **PivotTable** rule.

2.4.178 BrtBeginPRFilter14

The **BrtBeginPRFilter14** record specifies information about the set of pivot items (section 2.2.5.3.3), data items (section 2.2.5.3.7.5.1) associated with a pivot field, or a data field that specifies a **filter** for a **PivotTable** rule (section 2.2.5.3.9) and specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the set of pivot items, or data items included in the filter. More information about this record's function is available in the **PivotTable** rule section.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

PRFilter (11 bytes): A **PRFILTER** (section 2.1.8) that specifies information about the set of pivot items, or data items (section 2.2.5.3.7.5.1) associated with a pivot field, or a data field that specifies a filter for a **PivotTable** rule (section 2.2.5.3.9).

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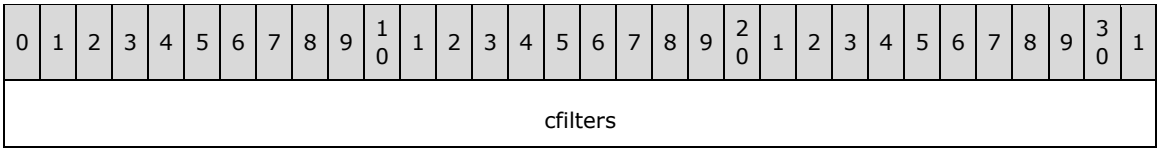
2.4.179 BrtBeginPRFilters

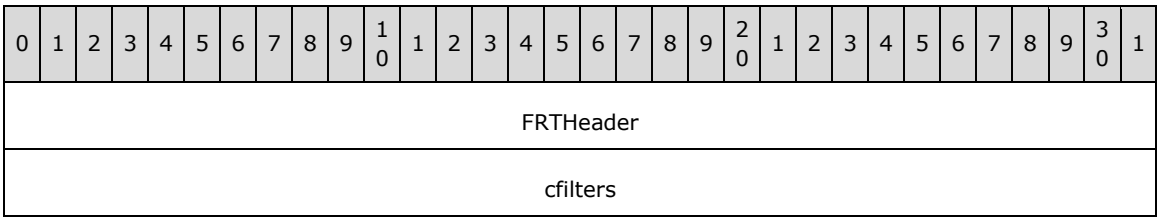
The **BrtBeginPRFilters** record specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**, **PivotCache Definition** (section 2.1.7.38) part ABNF, and **Worksheet** part ABNF (section 2.1.7.62). The collection of records specifies the **selected** pivot fields (section 2.2.5) and the selected pivot items (section 2.2.5.3.3) within those pivot fields.



cfilters (4 bytes): An unsigned integer that specifies the number **BrtBeginPRFilter** records in this collection.

2.4.180 BrtBeginPRFilters14

The **BrtBeginPRFilters14** record specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the **selected** pivot fields (section 2.2.5) and the selected pivot items (section 2.2.5.3.3) within those pivot fields.

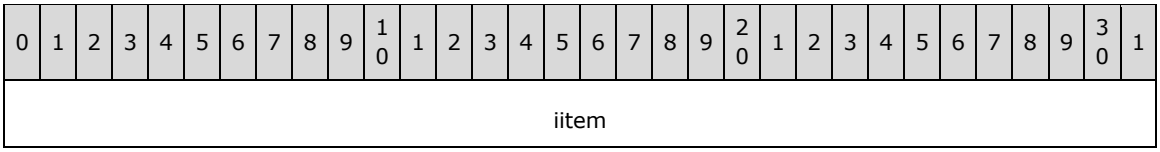


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

cfilters (4 bytes): An unsigned integer that specifies the number **BrtBeginPRFilter14** (section 2.4.178) records in this collection.

2.4.181 BrtBeginPRFItem

The **BrtBeginPRFItem** record specifies a zero-based index to a pivot item (section 2.2.5.3.3) or a cache item (section 2.2.5.2.3) for a **PivotTable** rule (section 2.2.5.3.9), and specifies the beginning of an empty collection of records as defined by the **Common Productions** part **ABNF** (section 2.1.8).



iitem (4 bytes): An unsigned integer that specifies a data item (section 2.2.5.3.7.5.1), pivot item, or cache item. For the **BrtBeginPRFilter** record (section 2.4.177) in the sequence of records that conforms to the **PRFILTER** rule (section 2.1.8) and containing this record, the following rules define what this value specifies:

- If the **PRFilter.isxvd** field in the **BrtBeginPRFilter** specifies the data field (section 2.2.5.3.7.5.2), then **iitem** is a data item index.
- If the **PRFilter.isxvd** field in the **BrtBeginPRFilter** specifies a pivot field, then **iitem** is a pivot item index.

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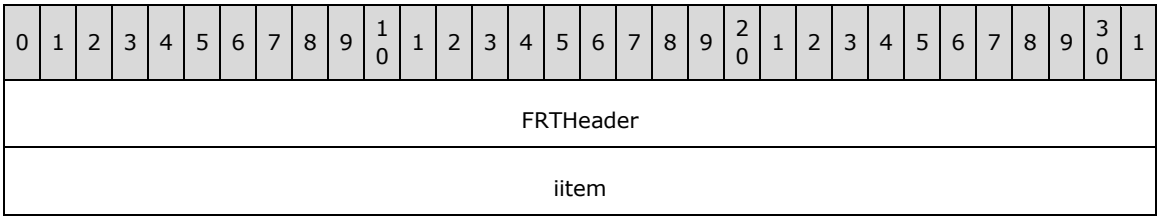
- If the **PRFilter.isxvd** field in the **BrtBeginPRFilter** specifies a cache field (section 2.2.5.2.2), then **iitem** is a cache item index.

2.4.182 BrtBeginPRFItem14

The **BrtBeginPRFItem14** record specifies a zero-based index to a pivot item (section 2.2.5.3.3) or data item (section 2.2.5.3.7.5.1) for a **PivotTable** rule (section 2.2.5.3.9), and specifies the beginning of an empty collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**.



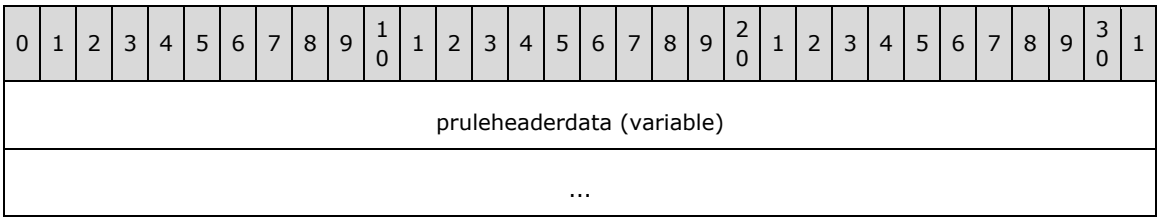
FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

iitem (4 bytes): An unsigned integer that specifies a data item or pivot item. For the **BrtBeginPRFilter14** record (section 2.4.178) record in the sequence of records that conforms to the **PRFILTER14** rule (defined in section 2.1.7.40) and containing this record, the following rules define what this value specifies:

- If the **PRFilter.isxvd** field in the preceding **BrtBeginPRFilter14** specifies the data field (section 2.2.5.3.7.5.2), then **iitem** is a data item index.
- If the **PRFilter.isxvd** field in the preceding **BrtBeginPRFilter14** specifies a pivot field (section 2.2.5.3.2), then **iitem is a** pivot item index.

2.4.183 BrtBeginPRule

The **BrtBeginPRule** record specifies the details for a **PivotTable** rule (section 2.2.5.3.9) for a **PivotTable** view (section 2.2.5.3) or **PivotCache** (section 2.2.5.2) and specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**, **PivotCache Definition** (section 2.1.7.38) part ABNF, and **Worksheet** part ABNF (section 2.1.7.62). The collection of records specifies a **PivotTable** rule. When this record is in a **Worksheet** part, the **PivotTable** view for this **PivotTable** rule is specified by the **BrtBeginSxSelect** (section 2.4.258) record that immediately precedes this record. When this record is in a **PivotCache Definition** part, it specifies a **PivotTable** rule used for a calculated item (section 2.2.5.2.6) calculation and the **PivotTable** views associated with this record are specified in section 2.2.5.3.1.



pruleheaderdata (variable): A **PRuleHeaderData** (section 2.5.110) that specifies information about this **PivotTable** rule.

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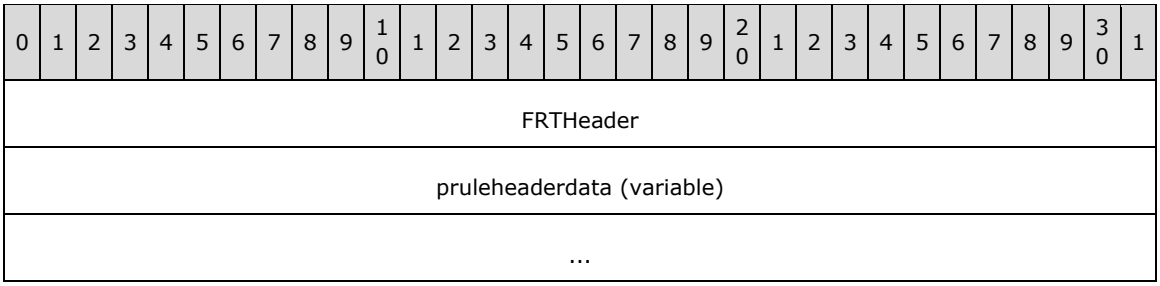
2.4.184 BrtBeginPRule14

The **BrtBeginPRule14** record specifies the details for a **PivotTable** rule (section 2.2.5.3.9) for a **PivotTable** view (section 2.2.5.3) and specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a **PivotTable** rule.

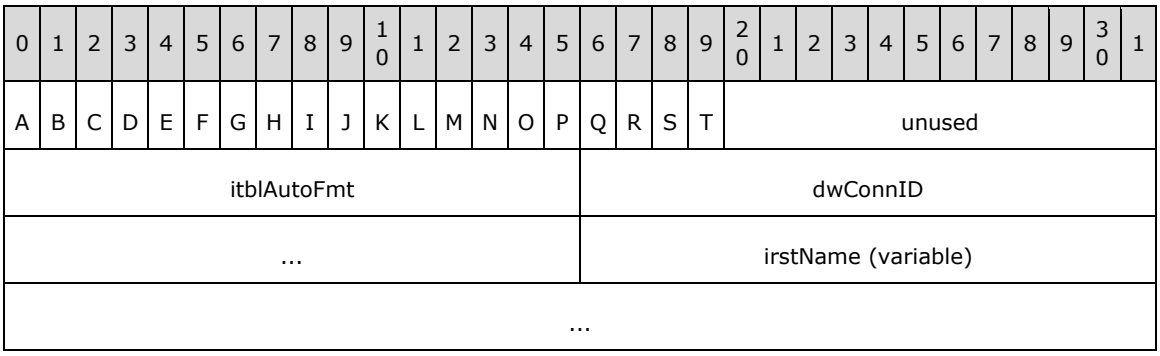


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

pruleheaderdata (variable): A **PRuleHeaderData** (section 2.5.110) that specifies information about this **PivotTable** rule.

2.4.185 BrtBeginQSI

The **BrtBeginQSI** record specifies properties of a **query table** and specifies the beginning of a collection of records as defined by the **Query Table** (section 2.1.7.42) part **ABNF**. The collection of records specifies a query table.



A - fTitles (1 bit): A bit that specifies whether the first **row** of the query table contains **column (1)** titles.

B - fRowNums (1 bit): A bit that specifies whether the first column (1) of the query table displays row numbers.

C - fDisableRefresh (1 bit): A bit that specifies whether the query table can be refreshed. The possible values for this field are listed in the following table.

Value	Meaning
0x0	The query table can be refreshed.
0x1	The query table cannot be refreshed.

D - fAsync (1 bit): A bit that specifies whether the query table refreshes data asynchronously. This value MUST be set to 1 if **fNewAsync** field is set to 1.

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E - fNewAsync (1 bit): A bit that specifies whether data has been refreshed for this query table. This value MUST be set to 0 if **fAsync** field is set to 0. The possible values for this field are listed in the following table.

Value	Meaning
0	The first background data **refresh** was finished at the time the file was saved.
1	The first background data refresh was not finished at the time the file was saved.

F - fAutoRefresh (1 bit): A bit that specifies whether the query table refreshes its data automatically when the document is opened.

G - fShrink (1 bit): A bit that specifies the behavior when dealing with a variable number of rows of data in the query table between refresh operations. If **fOverwrite** is 1, this value MUST be 0. This value MUST be a value from the following table.

Value	Meaning
0	Unused **cells** are to be cleared.
1	Unused cells are to be deleted.

H - fOverwrite (1 bit): A bit that specifies the behavior when dealing with a variable number of rows of data in the query table between refresh operations. If **fShrink** is 1, this value MUST be 0. This value MUST be a value from the following table.

Value	Meaning
0	Insert new cells for new data.
1	Overwrite existing cells for new data.

I - fFill (1 bit): A bit that specifies whether formula (section 2.2.2) in columns (1) adjacent to the query table are filled down whenever the query table is refreshed.

J - fSaveData (1 bit): A bit that specifies whether the query table preserves all of its data in the **sheet** when the document is saved. This value MUST be a value from the following table.

Value	Meaning
0	Data in the query table will not be saved.
1	Data in the query table will be saved.

K - fDisableEdit (1 bit): A bit that specifies whether the cell content in the query table is editable. The possible values for this field are listed in the following table.

Value	Meaning
0	Content is editable.
1	Content is **locked**.

L - fPreserveFmt (1 bit): A bit that specifies whether the application will preserve formatting in the query table and copy this formatting to new rows of data added to the query table.

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M - fAutoFit (1 bit): A bit that specifies whether column (1) widths are automatically adjusted on refresh to fit the data retrieved.

N - fDummyList (1 bit): A bit that specifies whether this query table has not been fully formed and populated with data.

O - ibitAtrNum (1 bit): A bit that specifies whether numeric cell data is formatted according to the **style** specified in **itblAutoFmt** field.

P - ibitAtrFnt (1 bit): A bit that specifies whether cell text is formatted according to the style specified in **itblAutoFmt** field.

Q - ibitAtrAlc (1 bit): A bit that specifies whether cell text alignment is set according to the style specified in **itblAutoFmt** field.

R - ibitAtrBdr (1 bit): A bit that specifies whether **border** is set according to the style specified in **itblAutoFmt** field.

S - ibitAtrPat (1 bit): A bit that specifies whether the cell background is formatted according to the style specified in **itblAutoFmt** field.

T - ibitAtrProt (1 bit): A bit that specifies whether the cell is **protected** according to the style specified in **itblAutoFmt** field.

unused (12 bits): This value is undefined and MUST be ignored.

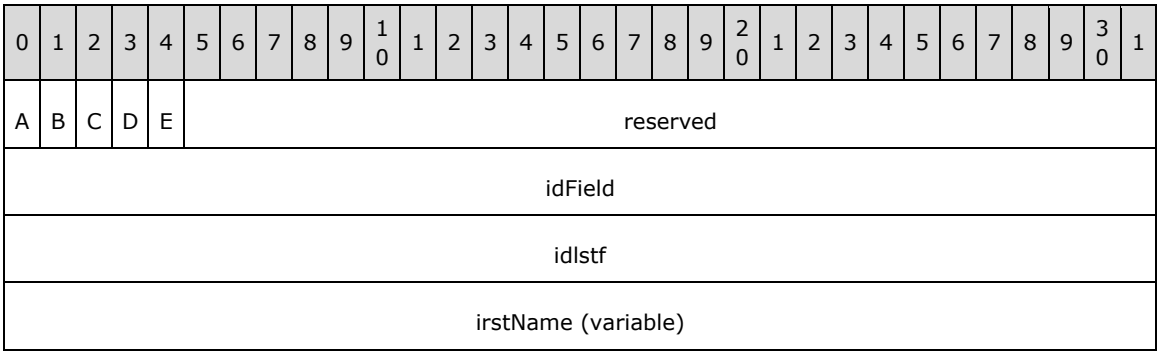
itblAutoFmt (2 bytes): An **AutoFormatID** (section 2.5.3) that specifies the **AutoFormat** to be applied to the query table. This value MUST be less than or equal to 0x0014.

dwConnID (4 bytes): An unsigned integer that specifies the identifier number of the external connection (section 2.2.8) to use to refresh data in the query table. This value MUST be greater than 0 and MUST be equal to **dwConnID** in one of the **BrtBeginExtConnection** (section 2.4.79) records in the **External Data Connections** (section 2.1.7.24) part.

irstName (variable): An **XLWideString** (section 2.5.168) that specifies the unique name of this query table. Within this **workbook** (section 2.1.7.61), there MUST be a **defined name** as specified by a **BrtName** (section 2.4.705) record with its **fHidden** field equal to 1 and its **name** field matching this field's value and its **formula**.**rgce** field only containing a PtgArea3d (section 2.5.97.19) referencing the **range** of cells for the query table fields. Spaces within **irstName** are converted to underscores for the purposes of this comparison.

2.4.186 BrtBeginQSIF

The **BrtBeginQSIF** record specifies properties of a single field of a **query table** and specifies the beginning of an empty collection of records as defined by the **Query Table** (section 2.1.7.42) part **ABNF**.



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...

A - fUserIns (1 bit): A bit that specifies whether this field is a user-defined field or comes from the external connection (section 2.2.8). User-defined fields are preserved during data **refresh** operations.

B - fFillDown (1 bit): A bit that specifies whether the formula (section 2.2.2) in this field is filled down on data refresh. A value of 1 specifies that formulas is filled down. If this value is 1, **fUserIns** MUST be equal to 1.

C - fRowNums (1 bit): A bit that specifies whether this field contains **row** numbers for the records returned. A value of 1 indicates that the field will contain row numbers. If this value is 1, **fUserIns** MUST be equal to 0.

D - fClipped (1 bit): A bit that specifies whether this field is currently clipped and is not **visible** in the **sheet**. A value of 1 specifies that this field is clipped. If this value is equal to 1, **fUserIns** MUST be equal to 0.

E - fIrstName (1 bit): A bit that specifies whether this record contains **irstName**.

reserved (27 bits): This value MUST be zero and MUST be ignored.

idField (4 bytes): A **QsiFieldId** (section 2.5.111) that specifies the unique identifier of this query table field. This value MUST be unique within this query table.

idlstf (4 bytes): An unsigned integer that specifies the identifier of the **table** field if this query table field is attached to a table object rather than a **range** in the sheet. This value MUST be equal to 0 if the query table field is not attached to a table field; otherwise this value MUST be equal to the **idField** field on a **BrtBeginListCol** (section 2.4.100) record within the table associated with this query table and this record's **idField** field MUST be equal to the **idqsif** of that **BrtBeginListCol** record.

irstName (variable): An **XLWideString** (section 2.5.168) specifying the name of this query table field. If **fIrstName** is equal to 0, **irstName** MUST NOT be present. If **fIrstName** is equal to 1, **irstName** MUST be present. This string MUST be less than or equal to 255 characters in length.

2.4.187 BrtBeginQSIFs

This record specifies the number of **columns (1)** in this **query table** and specifies the beginning of a collection of records as defined by the **Query Table** (section 2.1.7.42) part **ABNF**. The collection of records specifies the query table fields in this query table.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
nCols																															

nCols (4 bytes): A **DCol** (section 2.5.31) that specifies the number of columns (1) contained in this query table. This value MUST be equal to the number of **BrtBeginQSIF** (section 2.4.186) records in this collection.

2.4.188 BrtBeginQSIR

The **BrtBeginQSIR** record specifies properties of **query table** data **refresh** operations and specifies the beginning of a collection of records as defined by the **Query Table** (section 2.1.7.42) part **ABNF**. The collection of records specifies information about the query table data refresh.

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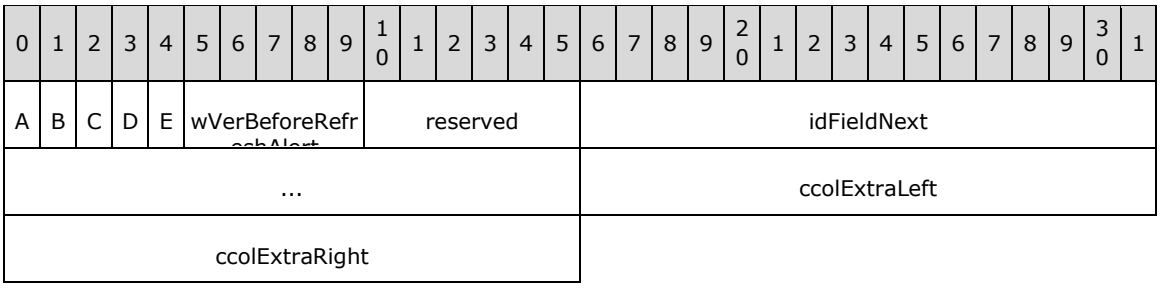


A - fPersist (1 bit): A bit that specifies whether the layout will be preserved for this query table across data refresh operations.

B - fPersistSort (1 bit): A bit that specifies whether sorting will be preserved for this query table across data refresh operations. This value MUST be equal to **fPersist**.

C - fPersistAutoFilter (1 bit): A bit that specifies whether **AutoFilters** will be preserved for this query table across data refresh operations. This value MUST be equal to **fPersist.**

D - fIdWrapped (1 bit): A bit that specifies whether the **idFieldNext** value cannot be unique amongst **PivotTable** (section 2.1.7.40) field identifiers for this query table. A value of 1 specifies that **PivotTable** field identifiers need to be checked for uniqueness before assignment to avoid duplicates.

E - fTitlesOld (1 bit): A bit that specifies whether the query table had a **header row** the last time it was refreshed.

wVerBeforeRefreshAlert (5 bits): An unsigned integer that specifies the minimum version of the application that is expected to correctly refresh the data in the query table. If the application version is smaller than this number, the user will be alerted before any refresh operation is performed.

reserved (6 bits): This value MUST be zero and MUST be ignored.

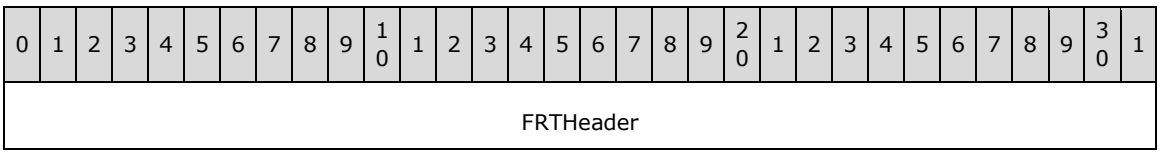
idFieldNext (4 bytes): An unsigned integer that specifies the next unique query table field identifier available for use in this query table. This value MUST be less than or equal to 65,535.

ccolExtraLeft (2 bytes): A **DColShort** (section 2.5.32) that specifies the number of **columns (1)** included at the beginning of the query table that are not bound to **external data**. This number MUST be less than 16,384.

ccolExtraRight (2 bytes): A **DColShort** that specifies the number of columns (1) included at the end of the query table that are not bound to external data. This number MUST be less than 16,384.

2.4.189 BrtBeginRichFilterColumn

The **BrtBeginRichFilterColumn** record specifies the beginning of a collection of records that specifies an **AutoFilter column (1)** associated with **rich values** as defined by the **Common Productions** (section 2.1.8) part **ABNF**.



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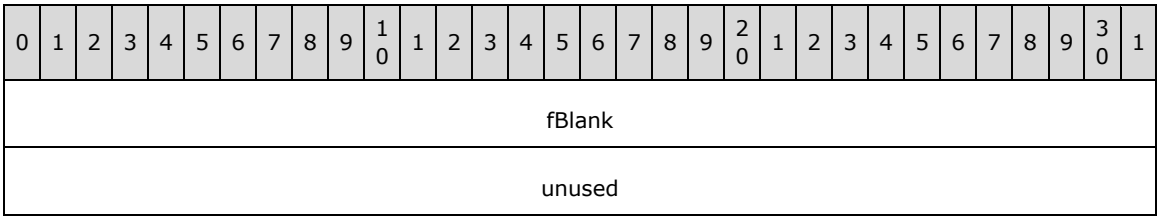
FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

2.4.190 BrtBeginRichFilters

The **BrtBeginRichFilters** record specifies the beginning of a collection of records that specifies information about the **filter** that applies to **rich values**, as defined by the **Common Productions** (section 2.1.8) part **ABNF**.

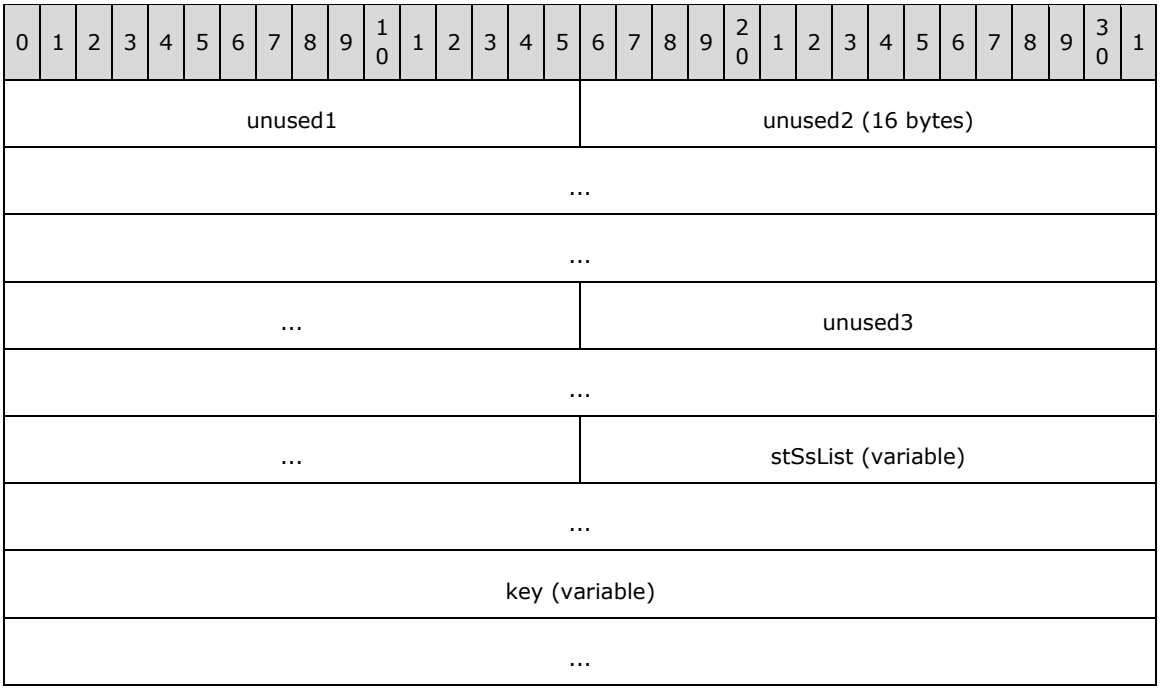


fBlank (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether to display blank values.

unused (4 bytes): This value is undefined and MUST be ignored.

2.4.191 BrtBeginRichSortCondition

The **BrtBeginRichSortCondition** record specifies a **sort condition** associated with **rich values**, and associated **row** or **column (1)** to which the sort condition applies, as defined by the **Common Productions** (section 2.1.8) part **ABNF**.



unused1 (2 bytes): This value is undefined and MUST be ignored.

unused2 (16 bytes): This value is undefined and MUST be ignored.

unused3 (8 bytes): This value is undefined and MUST be ignored.

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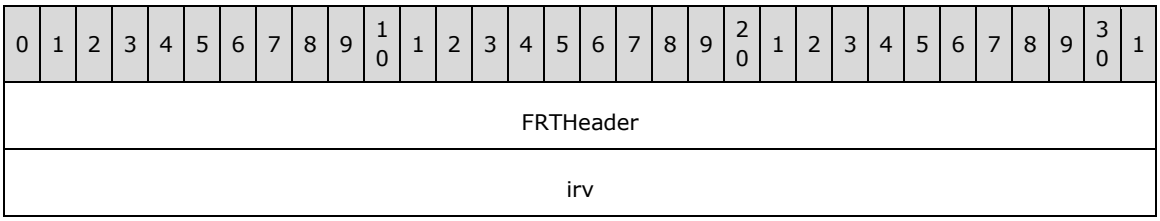
stSsList (variable): An **XLNullableWideString** (section 2.5.166) that specifies a comma-delimited list of strings that specifies a custom **sort order (2)**. The order of strings in the list specifies the sort order (2). When a **cell value** matches a string in the list, it is sorted ahead of the cell values that match a later string in the list, and so on for each **cell** in the **range**.

key (variable): An **XLWideString** (section 2.5.168) that specifies the key of the property. The length of the string MUST be greater than or equal to 1 character and less than or equal to 255 characters.

2.4.192 BrtBeginRichValueBlock

The **BrtBeginRichValueBlock** record specifies the beginning of an empty collection of records that specifies information about **rich values**, as defined by the **Metadata** (section 2.1.7.34) part **ABNF**.

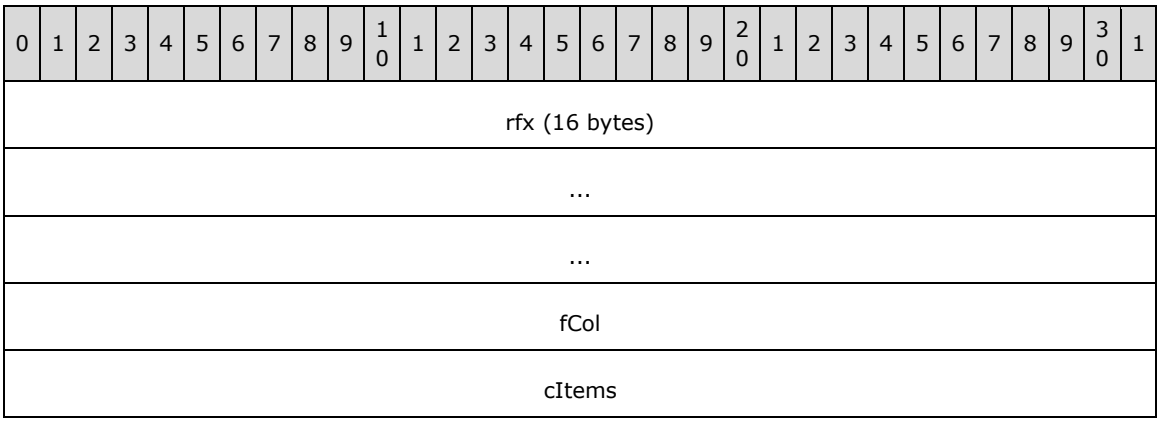


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the Future Record (section 2.1.6) information for this record.

irv (4 bytes): An unsigned integer that specifies the identifier for the [MS-XLSX] section 2.6.175. This is a zero-based index.

2.4.193 BrtBeginRRSort

The **BrtBeginRRSort** record specifies sort map (section 2.2.12.10) properties and specifies the beginning of a collection of records as defined by the **Sort Map** (section 2.1.7.49) part **ABNF**. The collection of **BrtRRSortItem** (section 2.4.762) records specifies the sort map properties of the specified **cell range**. For a given sort map, there MUST be at most two of these records. If there are two records, one MUST have the **fCol** bit set, and the other MUST NOT have the **fCol** bit set.



rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the **row** and **column (1)** bounds of the sort map.

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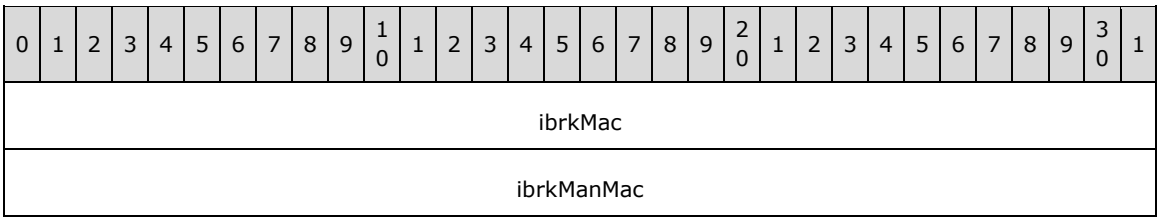
fCol (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether this sort map refers to a column (1) or row sort map. This value MUST be 0 or 1. If the value is 0, then this record specifies a row sort map; otherwise this record specifies a column (1) sort map.

cItems (4 bytes): An unsigned integer that specifies the number of **BrtRRSortItem** (section 2.4.762) records. This value MUST be equal to the number of **BrtRRSortItem** records between this record and the next **BrtEndRRSort** (section 2.4.541) record. This value MUST be greater than 0 and MUST be less than or equal to 0x0FFFFFFF.

2.4.194 BrtBeginRwBrk

The **BrtBeginRwBrk** record specifies horizontal **page break** properties and specifies the beginning of a collection of **BrtBrk** (section 2.4.310) records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62) and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of **BrtBrk** records specifies horizontal page breaks.

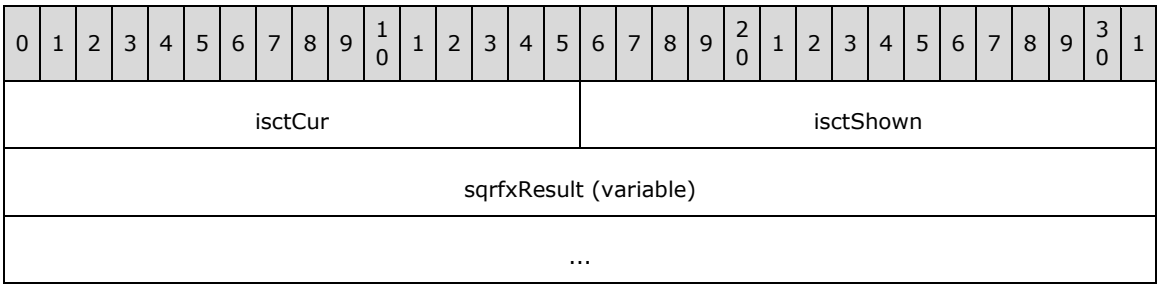


ibrkMac (4 bytes): An unsigned integer that specifies the number of horizontal page breaks in the **workbook**. This value MUST be less than or equal to 1,023.

ibrkManMac (4 bytes): An unsigned integer that specifies the number of manual horizontal page breaks that occur at locations specified by the user. This value MUST be equal to **ibrkMac**.

2.4.195 BrtBeginScenMan

The **BrtBeginScenMan** record specifies the properties of a **Scenario Manager** and specifies the beginning of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies the Scenario Manager for the **sheet**.



isctCur (2 bytes): An unsigned integer that specifies a zero-based index to a **BrtBeginSct** (section 2.4.196) record in the collection of **BrtBeginSct** records directly following this record. The referenced **BrtBeginSct** specifies the current **scenario selected**. If this value is 0xFFFF, this indicates that no scenario is currently selected; otherwise, this value MUST be less than the total number of **BrtBeginSct** records in this collection.

isctShown (2 bytes): An unsigned integer that specifies a zero-based index to a **BrtBeginSct** record in the collection of **BrtBeginSct** records directly following this record. The referenced **BrtBeginSct** specifies the last shown scenario. If this value is 0xFFFF, this indicates that no scenario has been shown; otherwise this value MUST be less than the total number of **BrtBeginSct** records in this collection.

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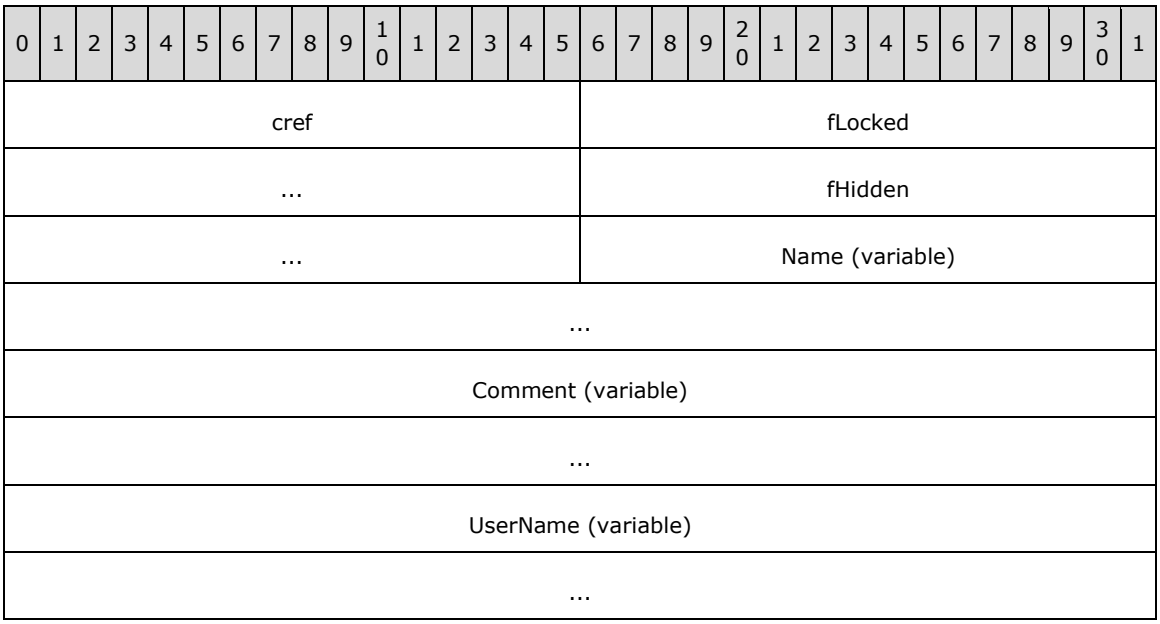
sqrfxResult (variable): An **UncheckedSqRfX** (section 2.5.155) that specifies the **cell** or cells which are results for the scenarios. If no result cells have been indicated then **sqrfxResult.crfx** MUST be set to 0xFFFFFFFF; otherwise **sqrfxResult.crfx** MUST be less than or equal to 0x00000020 (32) and the **range** defined by **sqrfxResult** MUST NOT contain more than 32 cells.

2.4.196 BrtBeginSct

The **BrtBeginSct** record specifies properties of a **scenario** and specifies the beginning of a collection of **BrtSlc** (section 2.4.771) records as specified in the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of **BrtSlc** records specifies the **cells** that are included in the scenario.



cref (2 bytes): An unsigned integer that specifies the count of **BrtSlc** records in the collection. This number MUST be greater than or equal to 1, MUST be equal to the count of cells in the scenario, and MUST be less than or equal to 32.

fLocked (4 bytes): A **Boolean** (section 2.5.97.3) that specifies if the scenario is **locked** for editing when the **sheet** is **protected**. MUST be a value from the following table.

Value	Meaning
0x00000000	The scenario is not locked.
0x00000001	The scenario is locked.

If the sheet is protected and the **fScenarios** field in the **BrtSheetProtectionIso** (section 2.4.769) or **BrtSheetProtection** (section 2.4.768) record for this sheet is set to 1, then this setting is ignored.

fHidden (4 bytes): A **Boolean** that specifies if the scenario is **hidden** when the sheet is protected and the **fScenarios** field in the **BrtFileSharingIso** (section 2.4.666) or **BrtSheetProtection** record for this sheet is set to 0. This value MUST be a value from the following table.

Value	Meaning
0x00000000	The scenario is not hidden.
0x00000001	The scenario is hidden.

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If the scenario is marked as hidden but the **fScenarios** field in the **BrtSheetProtectionIso** (section 2.4.769) or **BrtSheetProtection** record for this sheet is set to 1, then this setting is ignored.

Name (variable): An **XLWideString** (section 2.5.168) that specifies the name of the scenario. This value MUST be unique across all **BrtBeginSct** in the **Worksheet** part, and MUST contain less than 256 characters.

Comment (variable): An **XLWideString** that specifies the **comment** for this scenario. This value MUST contain less than 256 characters. <19>

UserName (variable): An **XLWideString** that specifies the name of the user who last modified this scenario. This value MUST contain more than 1 character and less than 55 characters.

2.4.197 BrtBeginSheet

The **BrtBeginSheet** record specifies the beginning of a collection of records as defined by the **Chart Sheet** (section 2.1.7.7) part **ABNF**, **Dialog Sheet** (section 2.1.7.20) part ABNF, **Macro Sheet** part ABNF, and **Worksheet** part ABNF (section 2.1.7.62). The collection of records specifies properties of the **sheet**.

2.4.198 BrtBeginSheetData

The **BrtBeginSheetData** record specifies the beginning of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62) and **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies the cell table (section 2.2.1) data for a **sheet**.

2.4.199 BrtBeginSingleCells

The **BrtBeginSingleCells** record specifies the beginning of a collection of records as defined by the **Single Cell Tables** (section 2.1.7.46) part **ABNF**. The collection of records specifies **XML maps** to single **cells**.

2.4.200 BrtBeginSlicer

The **BrtBeginSlicer** record specifies a slicer view (section 2.2.14.2) in this **worksheet** and specifies the beginning of an empty collection of records as defined by the **Slicers** (section 2.2.14) part **ABNF**.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>D</td><td colspan="4">unused</td><td colspan="28">dwStartSlicerItem</td></tr>
<tr><td colspan="8">...</td><td colspan="28">dwColumnCount</td></tr>
<tr><td colspan="8">...</td><td colspan="28">dwLevel</td></tr>
<tr><td colspan="8">...</td><td colspan="28">dxRowHeight</td></tr>
<tr><td colspan="8">...</td><td colspan="28">stName (variable)</td></tr>
<tr><td colspan="36">...</td></tr>
<tr><td colspan="36">stSlicerCacheName (variable)</td></tr>
</table>

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...
stCaption (variable)
...
stStyle (variable)
...

A - fCaptionVisible (1 bit): A bit that specifies if the caption is displayed.

B - fHasCaption (1 bit): A bit that specifies whether the **stCaption** field exists.

C - fHasStyle (1 bit): A bit that specifies whether the **stStyle** field exists.

D - fLockedPosition (1 bit): A bit that specifies if the slicer view is **locked**.

unused (4 bits): This value is undefined, and MUST be ignored.

dwStartSlicerItem (4 bytes): An unsigned integer that specifies the zero-based index of the first slicer item (section 2.2.14.1.4.1) displayed by the slicer view.

dwColumnCount (4 bytes): An unsigned integer that specifies the number of **columns (1)** in the slicer view. This value MUST be greater than or equal to 1 and less than or equal to 20,000.

dwLevel (4 bytes): An unsigned integer that specifies the **OLAP level** of the **OLAP hierarchy** of the slicer source data (section 2.2.14.1.1) used by the slicer view.

If the slicer source data is **OLAP**, then the value MUST be greater than or equal to 0 and MUST be less than **cLevels** of the **BrtBeginPCDHierarchy** (section 2.4.145) record specified by the **BrtBeginSlicerCacheDef** record specified by **stSlicerCacheName**. If the OLAP hierarchy has the **OLAP All level**, then the value MUST be other than 0.

This value MUST be 0 if the slicer source data is non-OLAP.

dxRowHeight (4 bytes): An unsigned integer that specifies the **row** height of the slicer view in **EMUs**.

stName (variable): An **XLWideString** (section 2.5.168) that specifies the name of the slicer view. This value MUST be a unique case insensitive name within scope of the **workbook**. The length of this value MUST be greater than or equal to 1 character and less than or equal to 32,767 characters.

stSlicerCacheName (variable): An **XLWideString** that specifies the name of the slicer cache (section 2.2.14.1). There MUST be a **BrtBeginSlicerCacheDef** (section 2.4.202) record within this workbook with the **stName** field equal to the value of this field.

stCaption (variable): An **XLWideString** that specifies the caption of the slicer view. This value MUST exist if and only if **fHasCaption** is equal to 1. If this string exists, the length MUST be greater than or equal to 1 character.

stStyle (variable): An **XLWideString** that specifies the slicer style (section 2.2.6.3.1) of the slicer view. This value MUST exist if and only if **fHasStyle** is equal to 1. If this field exists, this string MUST match the **stName** of a **BrtBeginSlicerStyle** (section 2.4.217) record within the workbook, or MUST be equal to one of the built-in slicer style names listed in the following table.

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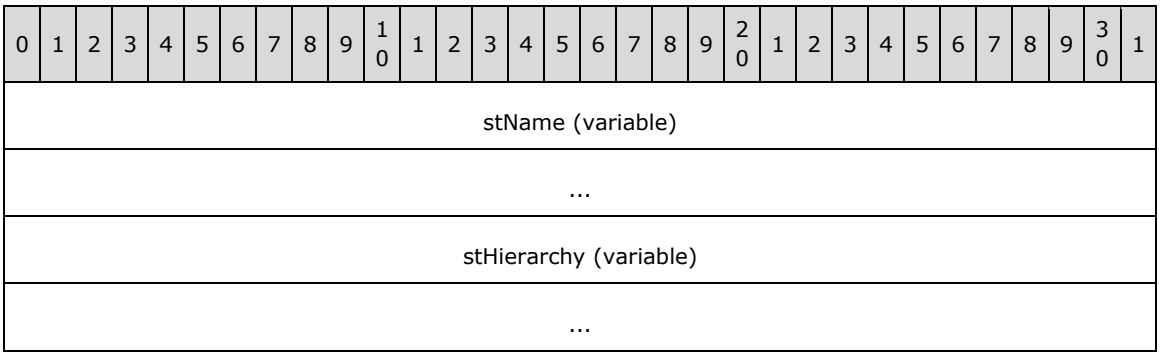
Built-In Slicer Style Names
SlicerStyleLight1
SlicerStyleLight2
SlicerStyleLight3
SlicerStyleLight4
SlicerStyleLight5
SlicerStyleLight6
SlicerStyleOther1
SlicerStyleOther2
SlicerStyleDark1
SlicerStyleDark2
SlicerStyleDark3
SlicerStyleDark4
SlicerStyleDark5
SlicerStyleDark6

2.4.201 BrtBeginSlicerCache

The **BrtBeginSlicerCache** record specifies the beginning of a collection of records as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies a slicer cache (section 2.2.14.1).

2.4.202 BrtBeginSlicerCacheDef

The **BrtBeginSlicerCacheDef** record specifies properties of a slicer cache (section 2.2.14.1) and specifies the beginning of a collection of records as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies a slicer cache.



stName (variable): An **XLNameWideString** (section 2.5.165) that specifies the name of the slicer cache. This value MUST be a unique case insensitive name within the scope of **defined names**.

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The length of this value MUST be greater than or equal to 1 character and less than or equal to 255 characters.

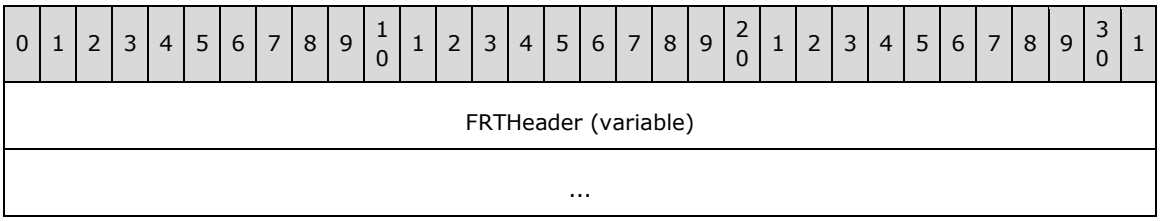
stHierarchy (variable): An **XLWideString** (section 2.5.168) that specifies the cache field (section 2.2.5.2.2) or **MDX unique name** used by the slicer cache.

If the slicer source data (section 2.2.14.1.1) is non-**OLAP**, then the value of this field MUST be equal to the value of the **stFldName** field in one of the **BrtBeginPCDField** (section 2.4.135) records within the associated **PivotCache** (section 2.2.5.2), as specified in section 2.2.14.1.2, and specifies a cache field. Field **fServerBased** in **BrtBeginPCDField** MUST be 0. The **fFilterInclusive** fields of the **BrtBeginSXVD** records (section 2.4.270) of all included pivot fields (section 2.2.5) MUST be equal.

If the slicer source data is OLAP, then the value MUST be equal to the value of the **stUnique** field in one of the **BrtBeginPCDHierarchy** (section 2.4.145) records within the associated OLAP **PivotCache**, as specified in section 2.2.5.3.1, and specifies an MDX unique name. The **fFilterInclusive** field of the associated **BrtBeginSXTH** (section 2.4.261), as specified in section 2.2.5.3.4, MUST be 1. The following fields of the **BrtBeginPCDHierarchy** record MUST be 0: **fMeasure**, **fSet**, and **fMeasureHierarchy**.

2.4.203 BrtBeginSlicerCacheID

The **BrtBeginSlicerCacheID** record specifies a reference to a slicer cache (section 2.2.14.1) in this **workbook** and specifies the beginning of an empty collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**.



FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the future record (section 2.1.6) information for this record.

The **FRTHeader** fields MUST have the values listed in the following table.

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	0
FRTHeader.fFormula	0
FRTHeader.fRelID	1

The **FRTHeader.RelID** specifies a relationship (section 2.1.3) that specifies a slicer cache part in this workbook.

2.4.204 BrtBeginSlicerCacheIDs

The **BrtBeginSlicerCacheIDs** record specifies the beginning of a collection of slicer cache identifier records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies the slicer cache identifiers for the **workbook**.

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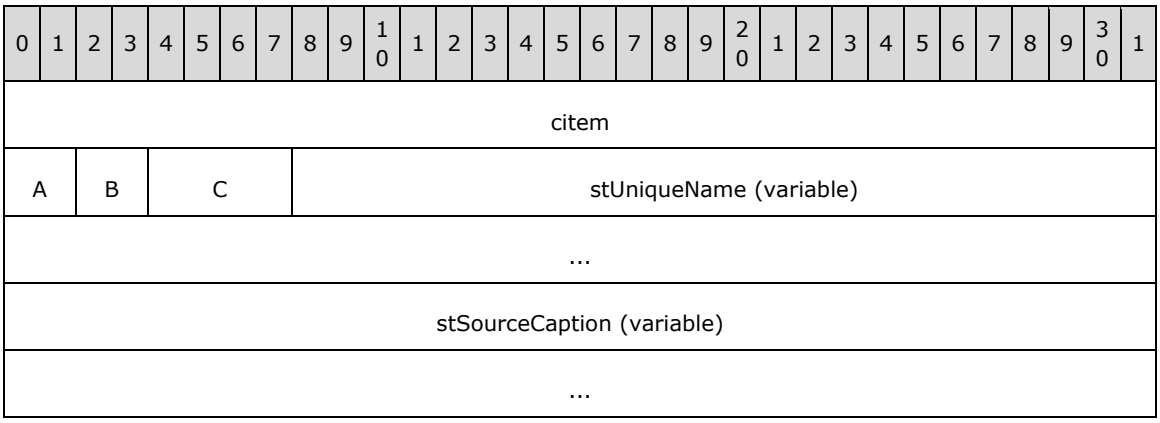
2.4.205 BrtBeginSlicerCacheLevelData

The **BrtBeginSlicerCacheLevelData** record specifies properties of an **OLAP level** in the **OLAP hierarchy** specified by this slicer cache (section 2.2.14.1), and specifies the beginning of a collection of records and collections as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies **OLAP members** that are cached for this OLAP level within the OLAP hierarchy specified by this slicer cache.



citem (4 bytes): An unsigned integer that specifies the total number of OLAP members in the **OLAP** slicer source data (section 2.2.14.1.1) in this OLAP level within the OLAP hierarchy specified by this slicer cache.

A - fSortOrder (2 bits): An unsigned integer that specifies how the OLAP members in this OLAP level are sorted in the slicer view (section 2.2.14.2). This value MUST be a value from the following table.

Value	Meaning
0x0	The OLAP members are sorted in original order as determined by the OLAP slicer source data.
0x1	The OLAP members are sorted in ascending alphabetical order.
0x2	The OLAP members are sorted in descending alphabetical order.

B - fCrossFilter (2 bits): An unsigned integer that specifies how the OLAP members in this OLAP level that are used in slicer cross filtering (section 2.2.14.1.5) are displayed. This value MUST be a value from the following table.

Value	Meaning
0x0	The table style element (section 2.2.6.2.2) of the slicer style (section 2.2.6.3.1) for OLAP members with no data is not applied to OLAP members with no data, and OLAP members with no data are not sorted separately in the list of OLAP members in the slicer view.

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Value	Meaning
0x1	The table style element of the slicer style for OLAP members with no data is applied to OLAP members with no data, and OLAP members with no data are sorted at the bottom in the list of OLAP members in the slicer view.
0x2	The table style element of the slicer style for OLAP members with no data is applied to OLAP members with no data, and OLAP members with no data are not sorted separately in the list of OLAP members in the slicer view.

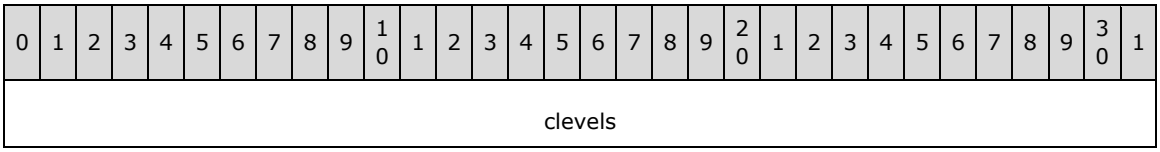
C - reserved (4 bits): This value MUST be zero, and MUST be ignored.

stUniqueName (variable): An **XLWideString** (section 2.5.168) that specifies the **MDX unique name** of this OLAP level within the OLAP hierarchy specified by this slicer cache. The length of this string MUST be at least 1 character and MUST NOT exceed 32,767 characters.

stSourceCaption (variable): An **XLNullableWideString** (section 2.5.166) that specifies the caption of the OLAP level specified by this element within the OLAP hierarchy specified by this slicer cache. The length of this string MUST NOT exceed 65,535 characters.

2.4.206 BrtBeginSlicerCacheLevelsData

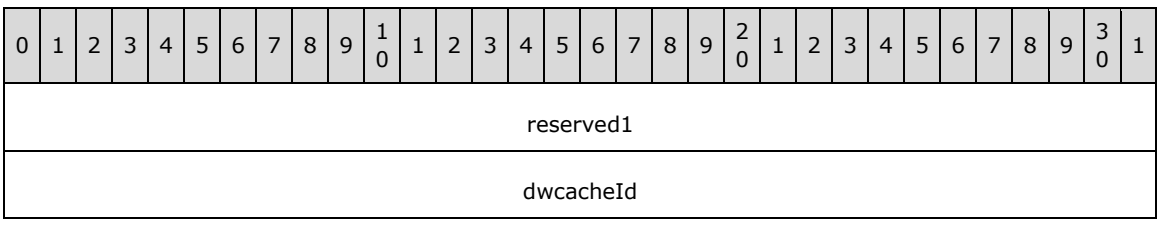
The **BrtBeginSlicerCacheLevelsData** record specifies the beginning of a collection of records and collections as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies **OLAP levels** of the **OLAP hierarchy** specified by this slicer cache (section 2.2.14.1).



clevels (4 bytes): An unsigned integer that specifies the number of OLAP levels of the OLAP hierarchy specified by this slicer cache. This value MUST match the number of **BrtBeginSlicerCacheLevelData** (section 2.4.205) records in this collection.

2.4.207 BrtBeginSlicerCacheNative

The **BrtBeginSlicerCacheNative** record specifies the beginning of a collection of records as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies non-OLAP slicer items (section 2.2.14.1.4.1) that are cached within this slicer cache (section 2.2.14.1).



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A	B	C	D	E

reserved1 (4 bytes): MUST be 0, and MUST be ignored.

dwcacheId (4 bytes): An integer that that specifies the associated non-**OLAP** **PivotCache** (section 2.2.5.2). MUST match the **icacheId** field of the **BrtBeginPCD2.4.117** (section 2.4.122) record of an existing **PivotCache**.

A - fSortOrder (2 bits): An unsigned integer that specifies how the non-OLAP slicer items are sorted in the slicer view (section 2.2.14.2). This value MUST be a value from the following table.

Value	Meaning
0x1	The non-OLAP slicer items are sorted in ascending order.
0x2	The non-OLAP slicer items are sorted in descending order.

B - fCrossFilter (2 bits): An unsigned integer that specifies how the non-OLAP slicer items that are used in slicer cross filtering (section 2.2.14.1.5) are displayed. This value MUST be a value from the following table.

Value	Meaning
0x0	The table style element (section 2.2.6.2.2) of the slicer style (section 2.2.6.3.1) for non-OLAP slicer items without data is not applied to non-OLAP slicer items without data, and non-OLAP slicer items without data are not sorted separately in the list of non-OLAP slicer items in the slicer view.
0x1	The table style element of the slicer style for non-OLAP slicer items without data is applied to non-OLAP slicer items without data, and non-OLAP slicer items without data are sorted at the bottom in the list of non-OLAP slicer items in the slicer view.
0x2	The table style element of the slicer style for non-OLAP slicer items without data is applied to non-OLAP slicer items without data, and non-OLAP slicer items without data are not sorted separately in the list of non-OLAP slicer items in the slicer view.

C - fSortUsingCustomLists (1 bit): A bit that specifies whether **custom lists** are used when sorting the non-OLAP slicer items.

D - fShowAllItems (1 bit): A bit that specifies whether unused non-OLAP cache items (section 2.2.5.2.3) in the associated **PivotCache** (section 2.2.5.2) are displayed. See Cache Items for more details on unused cache items.

E - reserved2 (2 bits): This value MUST be zero, and MUST be ignored.

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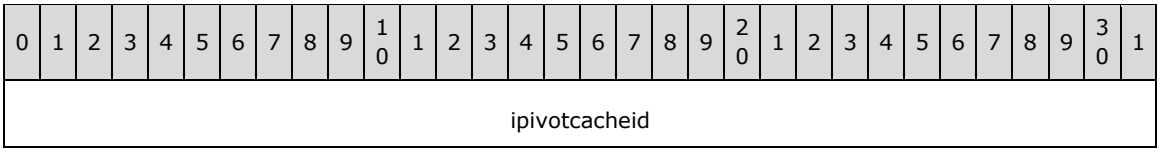
2.4.208 BrtBeginSlicerCacheOlapImpl

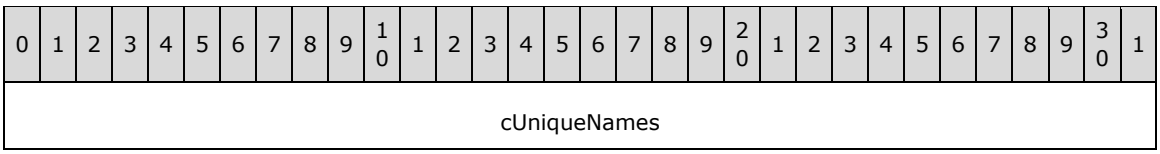
The **BrtBeginSlicerCacheOlapImpl** record specifies the beginning of a collection of records and collections as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies the associated **OLAP PivotCache**. See section 2.2.14.1.2 for more details.



ipivotcacheid (4 bytes): An unsigned integer that specifies the associated OLAP **PivotCache**. This value MUST match the **icacheId** field of **BrtBeginPCD2.4.117** (section 2.4.122) record of existing **PivotCache**.

2.4.209 BrtBeginSlicerCacheSelections

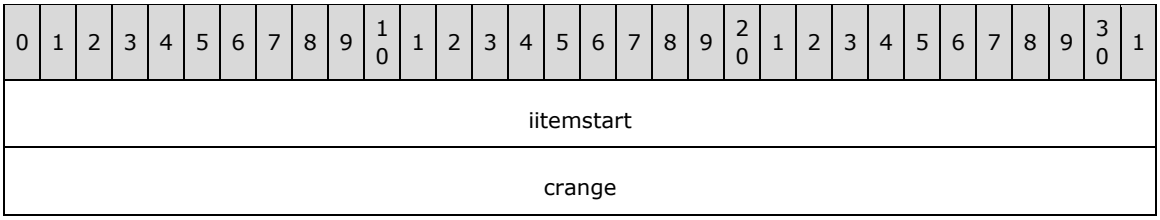
The **BrtBeginSlicerCacheSelections** record specifies the beginning of a collection of records as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies the **OLAP members** from the slicer cache (section 2.2.14.1) that are **selected**.



cUniqueNames (4 bytes): An unsigned integer that specifies how many OLAP members are selected on the **Slicer Cache** (section 2.1.7.47) part ABNF. This value MUST be equal to the number of **BrtSlicerCacheSelection** (section 2.4.777) **BrtSlicerCacheSelection** records in this collection.

2.4.210 BrtBeginSlicerCacheSiRange

The **BrtBeginSlicerCacheSiRange** record specifies the beginning of a collection of records as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies OLAP slicer items (section 2.2.14.1.4.1) for the **OLAP level** specified by the **BrtBeginSlicerCacheLevelData** (section 2.4.205) record that precedes this record that are part of this range.



iitemstart (4 bytes): An unsigned integer that specifies the zero-based index of an **OLAP member** on this OLAP level for the first OLAP slicer item in this range. See (section 2.2.14.1.4.1) for more information. The order of OLAP members is determined by the current **sort order (1)** and current slicer cross filtering (section 2.2.14.1.5) setting applied to all OLAP members on this OLAP level. The value of the starting position MUST be 0 or MUST be a multiple of 1000.

crange (4 bytes): An unsigned integer that specifies the number of OLAP slicer items that are specified by the **BrtSlicerCacheOlapItem** (section 2.4.775) records in this collection. The number of

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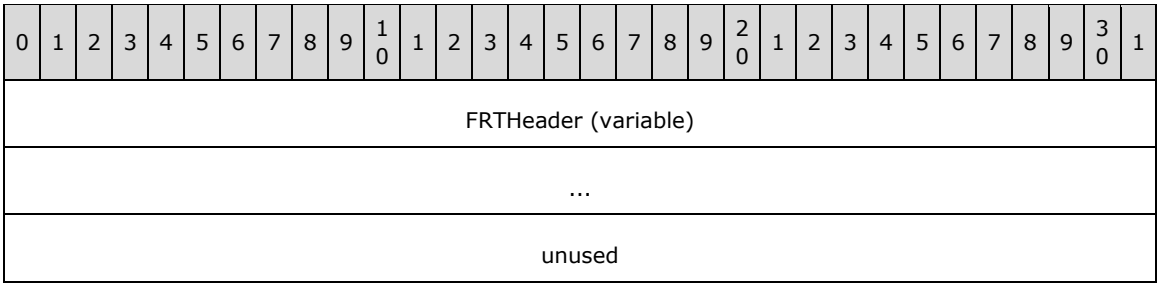
OLAP slicer items MUST be equal to the number of **BrtSlicerCacheOlapItem** records in this collection.

2.4.211 BrtBeginSlicerCacheSiRanges

The **BrtBeginSlicerCacheSiRanges** record specifies the beginning of a collection of records and collections as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. This collection specifies **OLAP members** in the **OLAP level** specified by the **BrtBeginSlicerCacheLevelData** (section 2.4.205) that precedes this collection.

2.4.212 BrtBeginSlicerCachesPivotCacheID

The **BrtBeginSlicerCachesPivotCacheID** record specifies a reference to a **PivotCache** (section 2.2.5.2) used by a slicer cache (section 2.2.14.1) with **OLAP slicer source data** (section 2.2.14.1.1) and specifies the beginning of an empty collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**.



FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the future record (section 2.1.6) information for this record.

The **FRTHeader** fields MUST have the values listed in the following table.

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	0
FRTHeader.fFormula	0
FRTHeader.fRelID	1

The **FRTHeader.RelID** specifies a relationship (section 2.1.3) that specifies a **PivotCache** part containing a **PivotCache** used by a slicer cache with OLAP **slicer source data**.

unused (4 bytes): This value is undefined, and MUST be ignored.

2.4.213 BrtBeginSlicerCachesPivotCacheIDs

The **BrtBeginSlicerCachesPivotCacheIDs** record specifies the beginning of a collection of **PivotCache** identifier records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies the **PivotCaches** used by slicer caches (section 2.2.14.1) with **OLAP** slicer source data (section 2.2.14.1.1).

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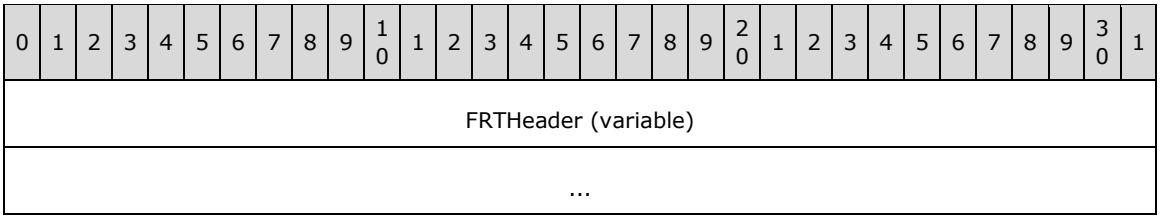
2.4.214 BrtBeginSlicerEx

The **BrtBeginSlicerEx** record specifies a relationship (section 2.1.3) identifier of the part that contains the slicers (section 2.2.14) in this **worksheet** and specifies the beginning of an empty collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62).



FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the future record (section 2.1.6) information for this record.

The **FRTHeader** fields MUST have the values listed in the following table.

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	0
FRTHeader.fFormula	0
FRTHeader.fRelID	1

The **FRTHeader.RelID** specifies a relationship identifier of the part that contains the slicers (section 2.2.14) in this worksheet.

2.4.215 BrtBeginSlicers

The **BrtBeginSlicers** record specifies the beginning of a collection of **BrtBeginSlicer** (section 2.4.200) records as defined by the **Slicers** (section 2.2.14) part **ABNF**. The collection of **BrtBeginSlicer** records specifies all slicer views (section 2.2.14.2) in the **worksheet**.

2.4.216 BrtBeginSlicersEx

The **BrtBeginSlicersEx** record specifies the beginning of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies the Slicers (section 2.2.14) part identifier for the **worksheet**.

2.4.217 BrtBeginSlicerStyle

The **BrtBeginSlicerStyle** record specifies which table style (section 2.2.6.3) is the basis for this slicer style (section 2.2.6.3.1) and specifies the beginning of a collection of records and collections as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of records specifies the table style elements (section 2.2.6.2.2) of the slicer style that are specific to slicers (section 2.2.14). Together with the base table style, this collection specifies a user-defined slicer style.

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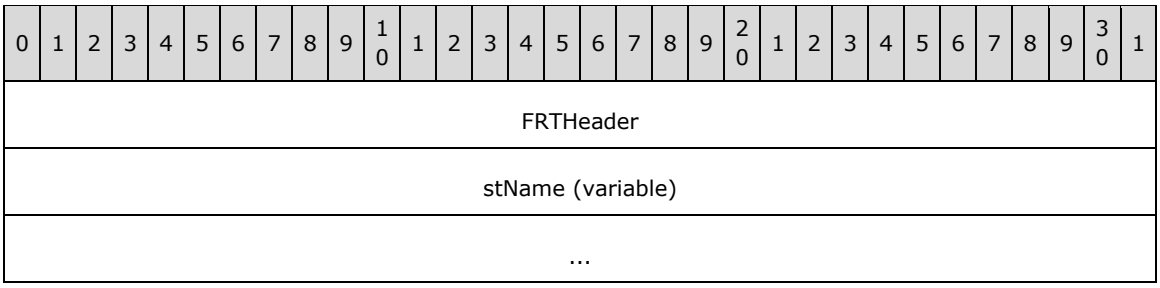


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

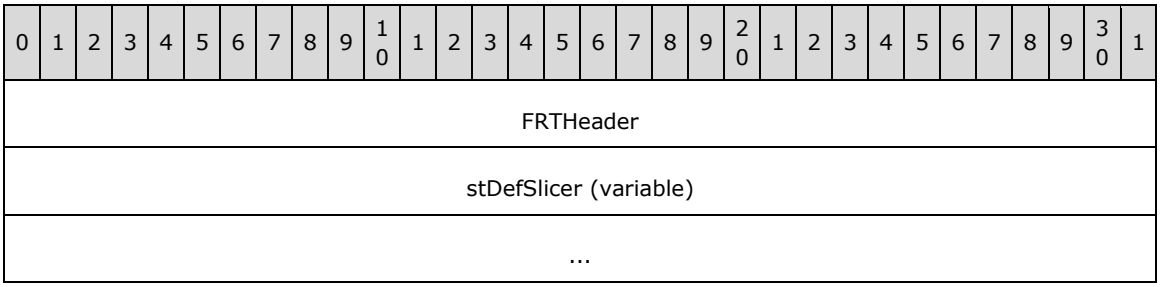
stName (variable): An **XLNullableWideString** (section 2.5.166) that specifies the name of the user-defined table style that this slicer style is based upon. The length of the string MUST be greater than or equal to 1 character and less than or equal to 255 characters. This string MUST be unique within the **BrtBeginSlicerStyle** (section 2.4.217) records in the **Styles** part ABNF. This string MUST match the **strName** field of a **BrtBeginTableStyle** (section 2.4.278) record in the **Styles** part. In the **BrtBeginTableStyle** record with a **strName** field that matches this string, the **fIsPivot** field MUST be equal to 0 and the **fIsTable** field MUST be equal to 0.

2.4.218 BrtBeginSlicerStyleElements

The **BrtBeginSlicerStyleElements** record specifies the beginning of a collection of records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of records specifies the table style elements (section 2.2.6.2.2) of a slicer style (section 2.2.6.3.1) that are specific to slicers (section 2.2.14).

2.4.219 BrtBeginSlicerStyles

The **BrtBeginSlicerStyles** record specifies the default slicer style to apply to slicers (section 2.2.14) and specifies the beginning of a collection of records and collections as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of records specifies user-defined slicer styles.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

stDefSlicer (variable): An **XLWideString** (section 2.5.168) that specifies the name of the default slicer style to apply to slicers (section 2.2.14). The length of the string MUST be greater than or equal to 1 character and less than or equal to 255 characters.

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2.4.220 BrtBeginSmartTags

The **BrtBeginSmartTags** record specifies the beginning of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies the **smart tag** properties of this **sheet**.<20>

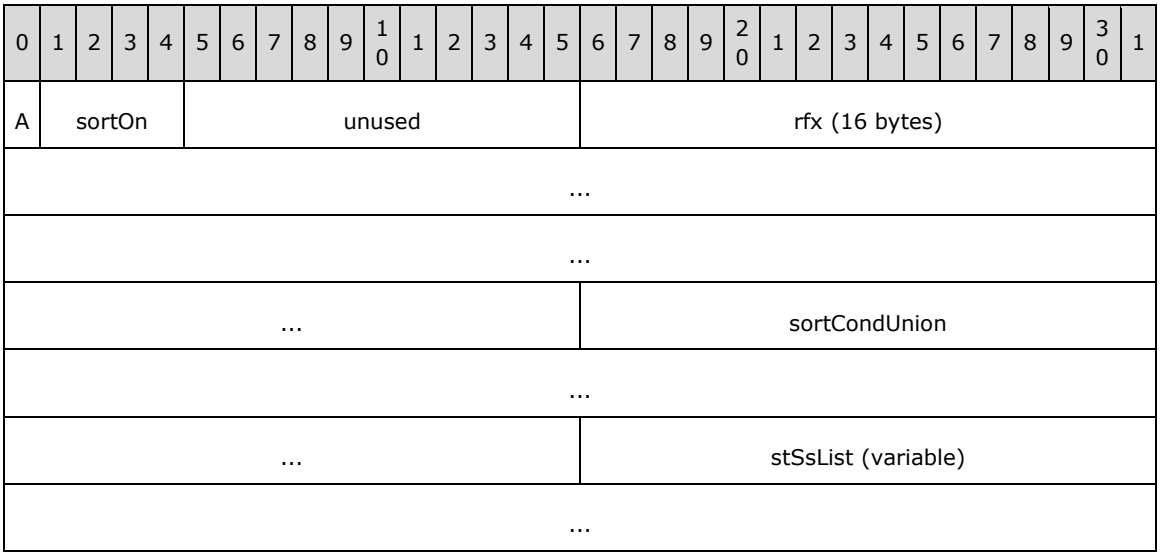
The **BrtBeginSmartTags** record is only present when the **fEmbedFactoids** field in the **BrtWbFactoid** (section 2.4.835) record is set to 0.

2.4.221 BrtBeginSmartTagTypes

The **BrtBeginSmartTagTypes** record specifies the beginning of a collection of **BrtSmartTagType** (section 2.4.779) records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of **BrtSmartTagType** records specifies the properties for a **smart tag** type that contains the identification information for the smart tag.<21>

2.4.222 BrtBeginSortCond

The **BrtBeginSortCond** record specifies a **sort condition** and associated **row** or **column (1)** to which the sort condition applies, and specifies the beginning of an empty collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62), the **Macro Sheet** (section 2.1.7.32) part ABNF, the **Table** (section 2.1.7.51) part ABNF, and the **Query Table** (section 2.1.7.42) part ABNF.



A - fSortDes (1 bit): A bit that specifies the direction of the **sort**. Possible values for this field are listed in the following table.

Value	Meaning
0	If **sortOn** is 0x0, sort in ascending order. If **sortOn** is 0x1 or 0x2, **cells** in which the cell color/cell font color occurs as specified by **sortCondUnion** are ordered at the top of the **range**. If **sortOn** is 0x3, cells in which the **icon** occurs as specified by **sortCondUnion** are ordered at the top of the range.
1	If **sortOn** is 0x0, sort in descending order. If **sortOn** is 0x1 or 0x2, cells in which the cell color/cell font color occurs as specified by **sortCondUnion** are ordered at the bottom of the range. If **sortOn** is 0x3, cells in which the icon occurs as specified by **sortCondUnion** are ordered at the bottom of the range.

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sortOn (4 bits): An unsigned integer that specifies how the cells in a range are sorted. This value MUST be one of the values listed in the following table.

Value	Meaning
0x0	Sort by the **cell value**
0x1	Sort by the cell color
0x2	Sort by the cell font color
0x3	Sort by the cell icon

unused (11 bits): This value undefined and MUST be ignored.

rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the row or column (1) to which this sort condition applies. If **fCol** equals 0 in the **BrtBeginSortState** (section 2.4.224) that precedes this record as defined in the **Worksheet** part ABNF, the **Macro Sheet** part ABNF, the **Table** (section 2.1.7.51) part ABNF, and the **Query Table** part ABNF, then this value specifies the column (1) to which this sort condition applies and **rfx.colFirst** MUST be equal to **rfx.colLast**. If **fCol** equals 1 in the **BrtBeginSortState** that precedes this record as defined in the **Worksheet** part ABNF, the **Macro Sheet** part ABNF, the **Table** part ABNF, and the **Query Table** part ABNF, then this value specifies the row to which this sort condition applies and **rfx.rwFirst** MUST be equal to **rfx.rwLast**. This value MUST be contained within the **rfx** in the **BrtBeginSortState** that precedes this record as defined in the **Worksheet** part ABNF, the **Macro Sheet** part ABNF, the **Table** part ABNF, and the **Query Table** part ABNF.

sortCondUnion (8 bytes): A structure that specifies the conditional data to be evaluated. The data type of this structure depends on the value of the **sortOn** field, according to the following table.

Value of sortOn	Type and meaning of sortCondUnion
0x0	Unused. This value is undefined and MUST be ignored.
0x1, 0x2	A 4-byte unsigned integer that specifies the zero-based index of a **BrtDXF** (section 2.4.354) record in the collection of all records directly following **BrtBeginDXFs** (section 2.4.57). The referenced **BrtDXF** specifies the differential formatting (section 2.2.6.2) to use for the sort. The latter 4-byte field MUST be 0, and MUST be ignored.
0x3	A **CFFlag** that specifies the icon and **icon set** to use for the sort.

stSsList (variable): An **XLNullableWideString** (section 2.5.166) that specifies a comma-delimited list of strings that specifies a custom **sort order (2)**. The order of strings in the list specifies the sort order (2). When a cell value matches a string in the list, it is sorted ahead of the cell values that match a later string in the list, and so on for each cell in the range. This value MUST be ignored if **sortOn** is not equal to 0x0.

2.4.223 BrtBeginSortCond14

The **BrtBeginSortCond14** record specifies a **sort condition** to apply to a **range** and specifies the beginning of an empty collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62), the **Macro Sheet** (section 2.1.7.32) part ABNF, the **Table** (section 2.1.7.51) part ABNF, and the **Query Table** (section 2.1.7.42) part ABNF. This record is equivalent to **BrtBeginSortCond** (section 2.4.222) but allows for specification of additional **icon sets** to use for the sort.

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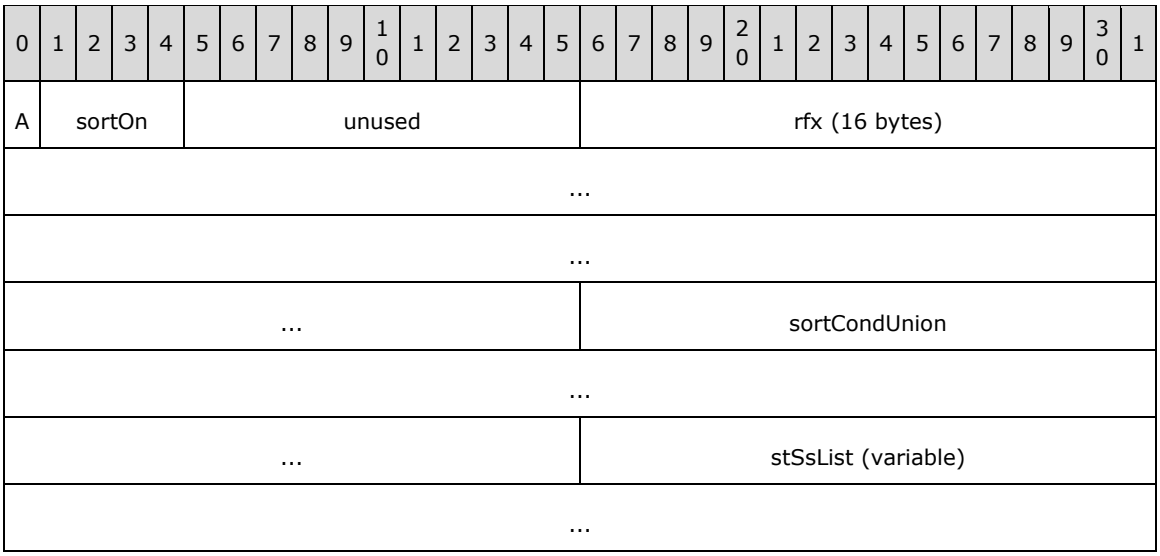

A - fSortDes (1 bit): A bit that specifies the direction of the **sort**. Possible values for this field are listed in the following table.

Value	Meaning
0	If **sortOn** is 0x0, sort in ascending order. If **sortOn** is 0x1 or 0x2, **cells** in which the cell color/cell font color occurs as specified by **sortCondUnion** are ordered at the top of the range. If **sortOn** is 0x3, cells in which the **icon** occurs as specified by **sortCondUnion** are ordered at the top of the range.
1	If **sortOn** is 0x0, sort in descending order. If **sortOn** is 0x1 or 0x2, cells in which the cell color/cell font color occurs as specified by **sortCondUnion** are ordered at the bottom of the range. If **sortOn** is 0x3, cells in which the icon occurs as specified by **sortCondUnion** are ordered at the bottom of the range.

sortOn (4 bits): An unsigned integer that specifies how the cells in a range are sorted. This value MUST be one of the values in the following table.

Value	Meaning
0x0	Sort by the **cell value**
0x1	Sort by the cell color
0x2	Sort by the cell font color
0x3	Sort by the cell icon

unused (11 bits): This value undefined and MUST be ignored.

rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the **row** or **column (1)** to which this sort condition applies. If **fCol** equals 0 in the **BrtBeginSortState** (section 2.4.224) that precedes this record as defined in the **Worksheet** part ABNF, the **Macro Sheet** part ABNF, the **Table** part ABNF, and the **Query Table** (section 2.1.7.42) part ABNF, then this value specifies the column (1) to which this sort condition applies and **rfx.colFirst** MUST be equal to **rfx.colLast**. If **fCol** equals 1 in the **BrtBeginSortState** that precedes this record as defined in the **Worksheet** part ABNF, the **Macro Sheet** part ABNF, the **Table** part ABNF, and the **Query Table** part ABNF, then this value specifies the row to which this sort condition applies and **rfx.rwFirst** MUST be

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equal to **rfx.rwLast**. This value MUST be contained within the **rfx** in the **BrtBeginSortState** that precedes this record as defined in the **Worksheet** part ABNF, the **Macro Sheet** part ABNF, the **Table** part ABNF, and the **Query Table** part ABNF.

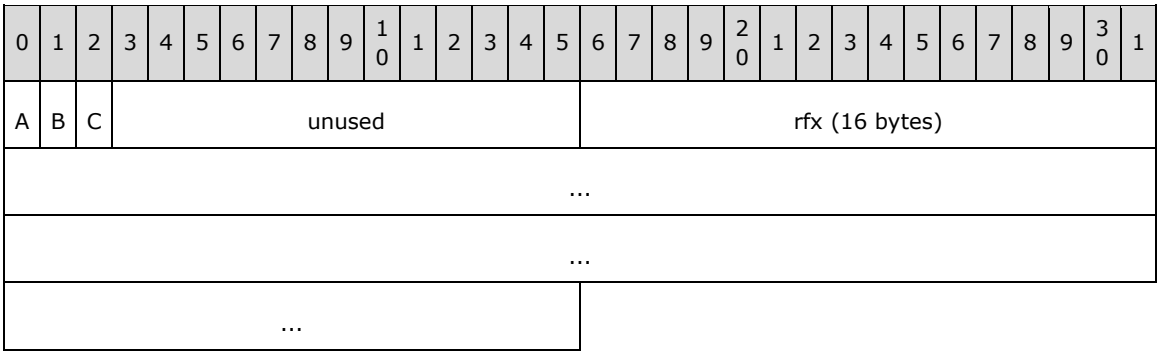
sortCondUnion (8 bytes): A structure that specifies the conditional data to be evaluated. The data type of this structure depends on the value of the **sortOn** field, according to the following table.

Value of sortOn	Type and meaning of sortCondUnion
0x0	Unused. This value is undefined and MUST be ignored.
0x1, 0x2	A 4-byte unsigned integer that specifies the zero-based index of a **BrtDXF** (section 2.4.354) record in the collection of all records directly following **BrtBeginDXFs** (section 2.4.57). The referenced **BrtDXF** specifies the differential formatting (section 2.2.6.2) to use for the sort. The latter 4-byte field MUST be 0, and MUST be ignored.
0x3	A **CFFlag14** (section 2.5.13) that specifies the icon and icon set to use for the sort.

stSsList (variable): An **XLNullableWideString** (section 2.5.166) that specifies a comma-delimited list of strings that specifies a custom **sort order (2)**. The order of strings in the list specifies the sort order (2). When a cell value matches a string in the list, it is sorted ahead of the cell values that match a later string in the list, and so on for each cell in the range. This value MUST be ignored if **sortOn** is not equal to 0x0.

2.4.224 BrtBeginSortState

The **BrtBeginSortState** record specifies **sort** properties and specifies the beginning of a collection of records as specified by the **Worksheet** part **ABNF** (section 2.1.7.62), the **Macro Sheet** (section 2.1.7.32) part ABNF, the **Table** (section 2.1.7.51) part ABNF, and the **Query Table** (section 2.1.7.42) part ABNF. The collection of records specifies the different **sort conditions** that apply to a **range**.



A - fCol (1 bit): A bit that specifies whether to sort by **rows** or **columns (1)**. If **AutoFilter** is applied to the range, then **fCol** MUST be ignored. Possible values for this field are listed in the following table.

Value	Meaning
0	Sort by rows
1	Sort by columns (1)

B - fCaseSensitive (1 bit): A bit that specifies whether the sort is case-sensitive.

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C - fAltMethod (1 bit): A bit that specifies whether to use a sorting method other than character order such as **stroke order** or **Mandarin phonetic symbols**. Possible values for this field are listed in the following table.

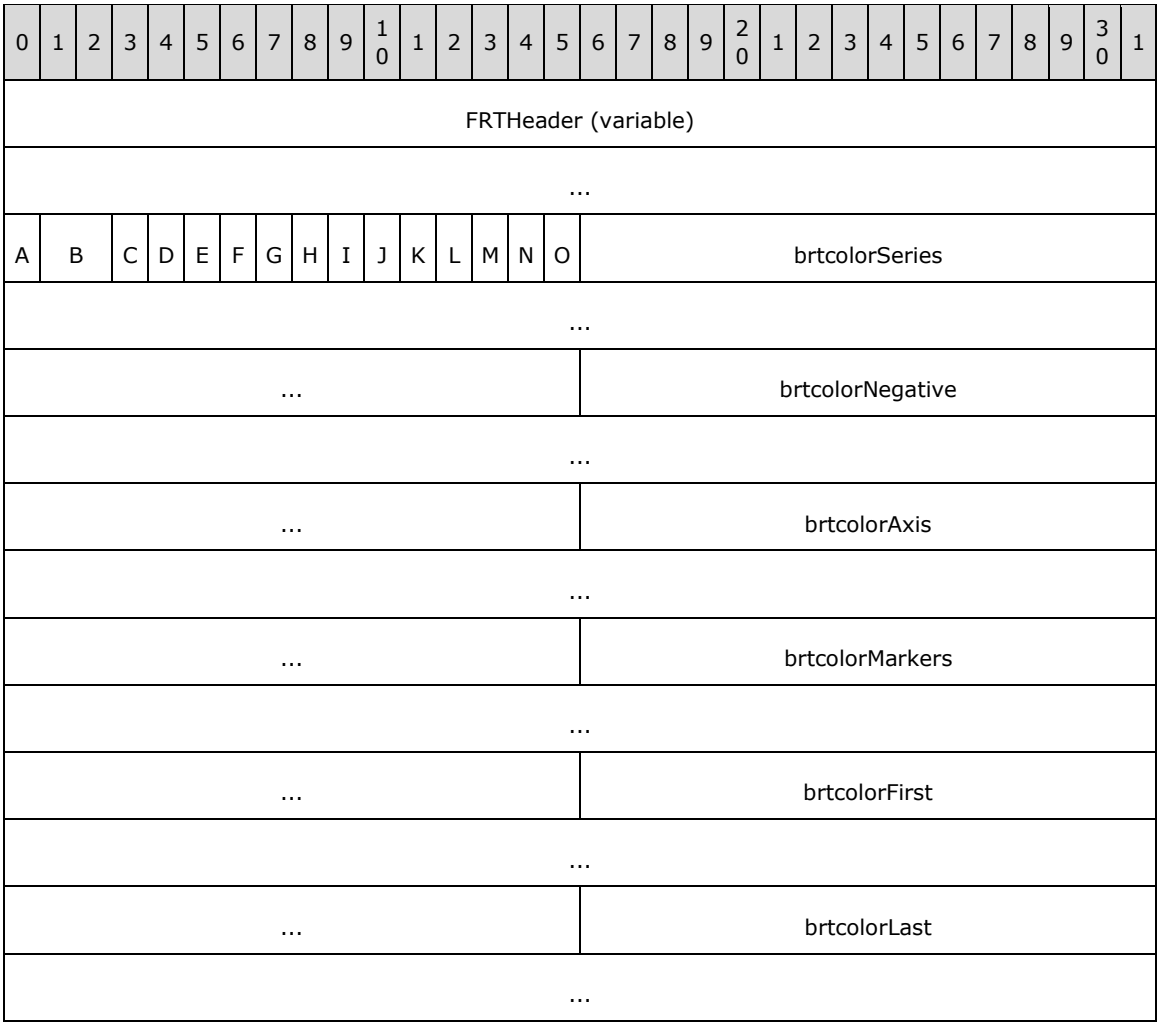
Value	Meaning
0	Sort using character order.
1	Sort using a method other than character order.

unused (13 bits): This value is undefined and MUST be ignored.

rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the range to sort.

2.4.225 BrtBeginSparklineGroup

The **BrtBeginSparklineGroup** record specifies **sparkline** group information and specifies the beginning of a collection of records and collections as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies the properties for this sparkline group.



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...	brtcolorHigh
...	
...	brtcolorLow
...	
...	dManualMax
...	
...	dManualMin
...	
...	dLineWeight
...	
...	isltype
...	

FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the date **range** for the sparkline group.

The **FRTHeader** fields MUST have the values listed in the following table.

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	0
FRTHeader.fFormulas	0 or 1
FRTHeader.fRelID	0

If **FRTHeader.fFormulas** equals 1, then **cformula** of the **FRTHeader.rgFormulas** MUST be equal to 1 and the **formula** of the single **FRTFormula** (section 2.5.58) comprising the **array** of the **FRTHeader.rgFormulas** MUST contain only one **Ptg** (section 2.5.97.16) structure, and that **Ptg** structure MUST be either **PtgName** (section 2.5.97.60), **PtgNameX** (section 2.5.97.61), **PtgRef3d** (section 2.5.97.69), or **PtgArea3d** (section 2.5.97.19). If the **Ptg** structure is a **PtgRef3d** or **PtgArea3d**, then the **ixti** of the **PtgRef3d** or **PtgArea3d** MUST specify an **Xti** (section 2.5.172) that MUST have **firstSheet** greater than or equal to zero, and MUST have **lastSheet** equal to **firstSheet**. If the **Ptg** structure is a **PtgArea3d**, then the **area** of the **PtgArea3d** MUST either have **rowFirst** equal to **rowLast** and **columnFirst.fRwRel** equal to **columnLast.fRwRel**, or **columnFirst.col** equal to **columnLast.col** and **columnFirst.fColRel** equal to **columnLast.fColRel**.

A - fDateAxis (1 bit): A bit that specifies whether this sparkline group uses a date axis.

Value of fDateAxis	Meaning
0	No date axis is specified for this sparkline group.
1	A date axis is specified by **FRTHeader** for this sparkline group.

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B - fShowEmptyCellAsZero (2 bits): An unsigned integer that specifies how empty **cells** are plotted. This value MUST be a value from the following table.

Value of fShowEmptyCellAsZero	Meaning
0x0	Empty cells are plotted as zero.
0x1	Empty cells are not plotted.
0x2	Empty cells are plotted as interpolated.

C - fMarkers (1 bit): A bit that specifies whether **data markers** are displayed for each sparkline in this sparkline group.

D - fHigh (1 bit): A bit that specifies whether the **data points** with the highest value are formatted differently for each sparkline in this sparkline group.

E - fLow (1 bit): A bit that specifies whether the data points with the lowest value are formatted differently for each sparkline in this sparkline group.

F - fFirst (1 bit): A bit that specifies whether the first data point is formatted differently for each sparkline in this sparkline group.

G - fLast (1 bit): A bit that specifies whether the last data point is formatted differently for each sparkline in this sparkline group.

H - fNegative (1 bit): A bit that specifies whether the negative data points are formatted differently for each sparkline in this sparkline group.

I - fAxis (1 bit): A bit that specifies whether the horizontal axis is displayed for each sparkline in this sparkline group.

J - fDisplayHidden (1 bit): A bit that specifies whether data in hidden cells are plotted for the sparklines in this sparkline group.

K - fIndividualAutoMax (1 bit): A bit that specifies whether the vertical axis maximum for each sparkline in this sparkline group is calculated automatically such that the data point with the maximum value can be displayed in the **plot area**. This value MUST be 0 if **fGroupAutoMax** equals 1.

L - fIndividualAutoMin (1 bit): A bit that specifies whether the vertical axis minimum for each sparkline in this sparkline group is calculated automatically such that the data point with the minimum value can be displayed in the plot area. This value MUST be 0 if **fGroupAutoMin** equals 1.

M - fGroupAutoMax (1 bit): A bit that specifies whether the vertical axis maximum is shared across all sparklines in this sparkline group and is calculated automatically such that the data point with the maximum value can be displayed in the plot area. This value MUST be 0 if **fIndividualAutoMax** equals 1.

N - fGroupAutoMin (1 bit): A bit that specifies whether the vertical axis minimum is shared across all sparklines in this sparkline group and is calculated automatically such that the data point with the minimum value can be displayed in the plot area. This value MUST be 0 if **fIndividualAutoMin** equals 1.

O - fRTL (1 bit): A bit that specifies whether each sparkline in the sparkline group is displayed in a **right-to-left** manner.

brtcolorSeries (8 bytes): A **BrtColor** (section 2.4.332) that specifies the color for each sparkline in this sparkline group. The **xColorType** of this **BrtColor** MUST NOT equal 0x00.

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brtcolorNegative (8 bytes): A **BrtColor** that specifies the color of the negative data points for each sparkline in this sparkline group. The **xColorType** of this **BrtColor** MUST NOT equal 0x00.

brtcolorAxis (8 bytes): A **BrtColor** that specifies the color of the horizontal axis for each sparkline in this sparkline group. The **xColorType** of this **BrtColor** MUST NOT equal 0x00.

brtcolorMarkers (8 bytes): A **BrtColor** that specifies the color of the data markers for each sparkline in this sparkline group. The **xColorType** of this **BrtColor** MUST NOT equal 0x00.

brtcolorFirst (8 bytes): A **BrtColor** that specifies the color of the first data point for each sparkline in this sparkline group. The **xColorType** of this **BrtColor** MUST NOT equal 0x00.

brtcolorLast (8 bytes): A **BrtColor** that specifies the color of the last data point for each sparkline in this sparkline group. The **xColorType** of this **BrtColor** MUST NOT equal 0x00.

brtcolorHigh (8 bytes): A **BrtColor** that specifies the color of the highest data point for each sparkline in this sparkline group. The **xColorType** of this **BrtColor** MUST NOT equal 0x00.

brtcolorLow (8 bytes): A **BrtColor** that specifies the color of the lowest data point for each sparkline in this sparkline group. The **xColorType** of this **BrtColor** MUST NOT equal 0x00.

dManualMax (8 bytes): An **Xnum** (section 2.5.171) that specifies the maximum for the vertical axis that is shared across all sparklines in this sparkline group. This value MUST be zero if either **fIndividualAutoMax** or **fGroupAutoMax** equal 1.

dManualMin (8 bytes): An **Xnum** that specifies the minimum for the vertical axis that is shared across all sparklines in this sparkline group. This value MUST be zero if either **fIndividualAutoMin** or **fGroupAutoMin** equal 1.

dLineWeight (8 bytes): An **Xnum** that specifies the line weight for each sparkline in the sparkline group, where the line weight is measured in points. This value MUST be greater than or equal to zero, and MUST be less than or equal to 1584.

isltype (4 bytes): An unsigned integer that specifies the type of the sparkline group. This value MUST be one of the following values.

Value of isltype	Meaning
0x00000000	Line sparklines
0x00000001	**Column (2)** sparklines
0x00000002	100% stacked column (2) sparklines

2.4.226 BrtBeginSparklineGroups

The **BrtBeginSparklineGroups** record specifies the beginning of a collection of records and collections as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies the groups of **sparklines** on the **sheet**.

2.4.227 BrtBeginSparklines

The **BrtBeginSparklines** record specifies the beginning of a collection of **BrtSparkline** records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of **BrtSparkline** records specifies properties for individual **sparklines**.

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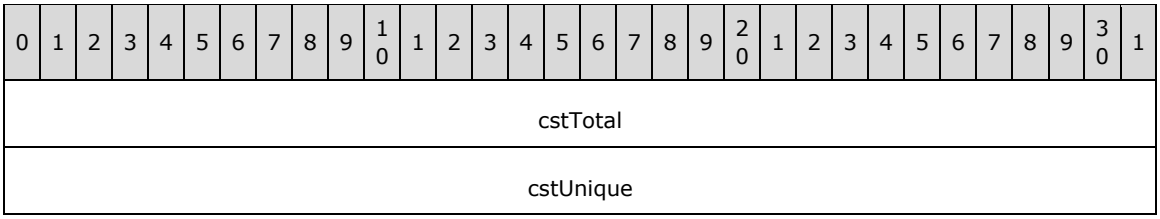
2.4.228 BrtBeginSst

The **BrtBeginSst** record specifies properties of a shared string table and specifies the beginning of a collection of **BrtSSTItem** (section 2.4.781) records as defined by the **Shared Strings (**section 2.1.7.45) part **ABNF**. The collection of **BrtSSTItem** records specifies a shared string table. **cstUnique** MUST be less than or equal to **cstTotal**.

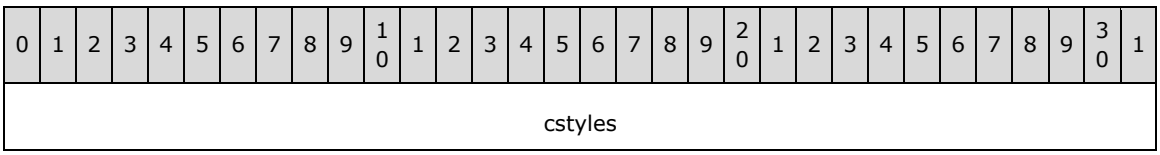


cstTotal (4 bytes): An unsigned integer that specifies the number of references in the **workbook** (section 2.1.7.61) to items in the **BrtSSTItem** collection. This value MUST be less than or equal to 0x7FFFFFFF.

cstUnique (4 bytes): An unsigned integer that specifies the number of records in the **BrtSSTItem** collection. This value MUST be less than or equal to 0x7FFFFFFF.

2.4.229 BrtBeginStyles

The **BrtBeginStyles** record specifies a count of **BrtStyle** (section 2.4.783) records and specifies the beginning of a collection of **BrtStyle** records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtStyle** records specifies all cell styles (section 2.2.6.1.2) in the **workbook** (section 2.1.7.61). The collection MUST contain at least 1 and no more than 0xFF96 **BrtStyle** records.



cstyles (4 bytes): An unsigned integer that specifies the number of **BrtStyle** records in the collection. This value MUST be at least 1 and no more than 0xFF96.

2.4.230 BrtBeginStyleSheet

The **BrtBeginStyleSheet** record specifies the beginning of a collection of records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of records specifies style (section 2.2.6) information for a **workbook**.

2.4.231 BrtBeginStyleSheetExt14

The **BrtBeginStyleSheetExt14** record specifies the beginning of a collection of records and collections as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection specifies additional style (section 2.2.6) information for the **workbook**.

2.4.232 BrtBeginSupBook

The **BrtBeginSupBook** record specifies the properties of an external link (section 2.2.7.4) and specifies the beginning of a collection of records as defined by the **External Link** (section 2.1.7.25) part **ABNF**. The collection of records specifies information about the external link.

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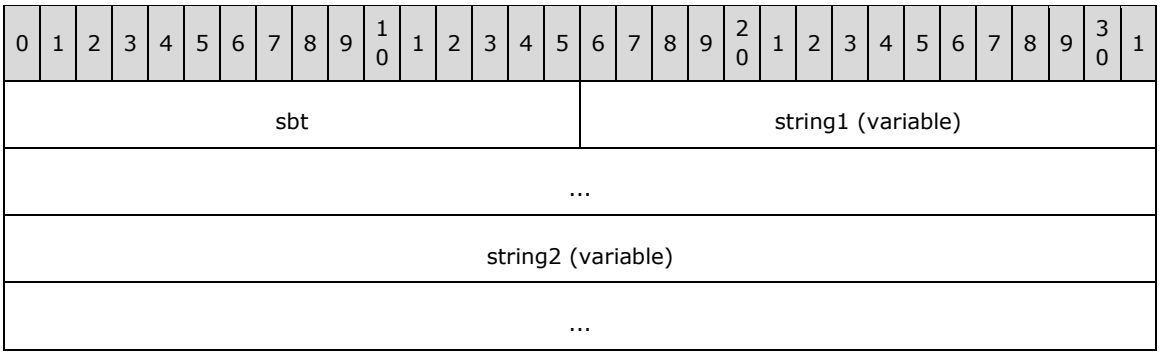


sbt (2 bytes): An **ExternalReferenceType** (section 2.5.43) that specifies the type of the external link.

string1 (variable): The type and meaning of this field is dependent on the value of **sbt**, and is specified in the following table.

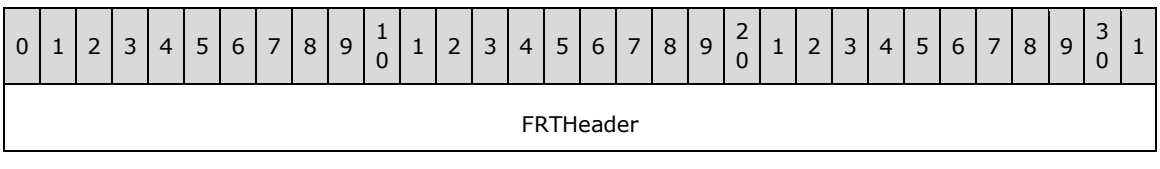
Value of sbt	Meaning of string1
Workbook (section 2.1.7.61)	A **RelID** (section 2.5.114) that specifies an external workbook (section 2.1.10). This value MUST NOT be a NULL string.
DDE (see section 2.5.43)	An **XLWideString** that specifies the name of a **Dynamic Data Exchange (DDE)** server.
OLE (see section 2.5.43)	A **RelID** that specifies an **OLE data source** file. This value MUST NOT be a NULL string.

string2 (variable): The type and meaning of this field is dependent on the value of **sbt**, and is specified in the following table.

Value of sbt	Meaning of string2
Workbook (section 2.1.7.61)	An **XLNullableWideString** (section 2.5.166) that is not used. The value of this field MUST be a NULL string.
DDE	An **XLWideString** that specifies the name of a Dynamic Data Exchange (DDE) topic.
OLE	An **XLWideString** that specifies the **ProgID** of the object class associated with the OLE data source file.

2.4.233 BrtBeginSXChange

The **BrtBeginSXChange** record specifies the value used for **PivotTable** What-if Analysis (section 2.2.5.3.10) calculation and the allocation method for how to apply the value, and specifies the beginning of a collection of records and collections as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a collection of **MDX unique names** that identifies the original value in the **OLAP** source data (section 2.2.5.2.1) that was changed.



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reserved	sxma
...	irstWeight (variable)
...	
xnum	
...	

FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

reserved (1 byte): This value MUST be 2, and MUST be ignored.

sxma (4 bytes): An **SXMA** (section 2.5.147) that specifies the allocation method, used by PivotTable What-if Analysis, to change the value in the OLAP source data.

irstWeight (variable): An **XLWideString** (section 2.5.168) that specifies the **OLAP weight expression** for PivotTable What-if Analysis. If the value of **sxma** is **WEIGHTED_ALLOCATION** (see section 2.5.147) or **WEIGHTED_INCREMENT** (see section 2.5.147), the string MUST be greater than or equal to zero and less than or equal to 65,535 characters in length. If the value of **sxma** is **EQUAL_ALLOCATION** (see section 2.5.147) or **EQUAL_INCREMENT** (see section 2.5.147), the string length MUST be zero.

xnum (8 bytes): An **Xnum** (section 2.5.171) that specifies the numerical value that replaces the original value in the OLAP source data for PivotTable What-if Analysis.

2.4.234 BrtBeginSXChanges

The **BrtBeginSXChanges** record specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the values used for PivotTable What-if Analysis calculations and the allocation methods for how to apply the values, and specifies the collections of **MDX unique names** that identify the original values in the **OLAP** source data that were changed.

2.4.235 BrtBeginSXCondFmt

The **BrtBeginSXCondFmt** record specifies the scope, type and priority of **conditional formatting** applied to this PivotTable view (section 2.2.5.3), as specified by the preceding **BrtBeginSXView** (section 2.4.273) record, and specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies details about where this conditional formatting applies in the PivotTable view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
sxcondfmtScope																															
sxcondfmtType																															
ipriority																															

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sxcondfmtScope (4 bytes): An unsigned integer that specifies the scope of this PivotTable view conditional formatting. This value MUST be a value from the following table.

Name	Value	Description
SXCONDFMTSELECTIONSCOPE	0x00000000	This conditional formatting is applied to the **cells** (as specified by the **PIVOTRULES** (section 2.1.7.40) of this collection).
SXCONDFMTDATASCOPE	0x00000001	This conditional formatting is applied to all cells (as specified by the **PIVOTRULES** of this collection) that display values for the data item (section 2.2.5.3.7.5.1).
SXCONDFMTFIELDSCOPE	0x00000002	This conditional formatting is applied to all cells (as specified by the **PIVOTRULES** of this collection) that display values for the pivot field (section 2.2.5.3.2) intersections.

The value of **sxcondfmtScope** MUST be **SXCONDFMTFIELDSCOPE** if **sxcondfmtType** value is **SXCONDFMTTOP10R** or **SXCONDFMTTOP10C**.

If the value of this field is **SXCONDFMTDATASCOPE** or **SXCONDFMTFIELDSCOPE** there MUST be only one **PIVOTRULE** within **PIVOTRULES** of this **SXCONDFMT** (section 2.1.7.40) as specified in the **PivotTable** (section 2.1.7.40) part ABNF.

sxcondfmtType (4 bytes): An unsigned integer that specifies the type of this PivotTable view conditional formatting. This value MUST be a value from the following table:

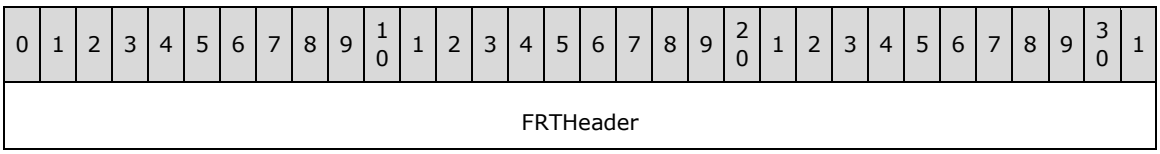
Name	Value	Description
SXCONDFMTTOP10NIL	0x00000000	Top N or Bottom N conditional formatting is not evaluated.
SXCONDFMTTOP10A	0x00000001	Top N or Bottom N conditional formatting is evaluated across the entire scope **range**.
SXCONDFMTTOP10R	0x00000002	Top N or Bottom N conditional formatting is evaluated for each **row**.
SXCONDFMTTOP10C	0x00000003	Top N or Bottom N conditional formatting is evaluated for each **column (1)**.

The value of this field MUST be **SXCONDFMTTOP10NIL** or **SXCONDFMTTOP10A** if **sxcondfmtScope** value is **SXCONDFMTSELECTIONSCOPE** or **SXCONDFMTDATASCOPE**.

ipriority (4 bytes): An unsigned integer that specifies the priority of the PivotTable view conditional formatting. This value MUST be greater than or equal to 1. The **sheet** where this PivotTable view is located MUST have a **BrtBeginConditionalFormatting** (section 2.4.33) collection with the **fPivot** field equal to 1, and there MUST be a **BrtBeginCFRule** (section 2.4.22) item in that collection with the **ipri** field equal to the value of this field.

2.4.236 BrtBeginSXCondFmt14

The **BrtBeginSXCondFmt14** record specifies the scope, type and priority of **conditional formatting** applied to this PivotTable view, as specified by the preceding **BrtBeginSXView** (section 2.4.273) record, and specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies details about where this conditional formatting applies in the PivotTable view. This record is equivalent to **BrtBeginSXCondFmt** (section 2.4.235) but allows to specify a **GUID** for the associated **BrtBeginCFRule14** (section 2.4.23) record.



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guid (16 bytes)
...
...
sxcondfmtScope
reserved
ipriority

FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record information (section 2.1.6) for this record.

guid (16 bytes): A GUID as specified by [MS-DTYP], section 2.3.4, that specifies a particular **BrtBeginCFRule14** (section 2.4.23) in the collection of **BrtBeginCFRule14** records as defined by the **PivotTable** (section 2.1.7.40) part ABNF. There MUST exist a **BrtBeginCFRule14** with a **guid** field with the same value as this value, and it MUST be the same **BrtBeginCFRule14** specified by **ipriority**.

sxcondfmtScope (4 bytes): An unsigned integer that specifies the scope of this **PivotTable** view (section 2.2.5.3) conditional formatting. This value MUST be a value from the following table:

Name	Value	Description
SXCONDFMTSELECTIONSCOPE	0x00000000	This conditional formatting is applied to the **cells** (as specified by the records of the **PIVOTRULES14** rule (defined in section 2.1.7.40) of this collection).
SXCONDFMTDATASCOPE	0x00000001	This conditional formatting is applied to all cells (as specified by the records of the **PIVOTRULES14** rule of this collection) that display values for the data item (section 2.2.5.3.7.5.1).
SXCONDFMTFIELDSCOPE	0x00000002	This conditional formatting is applied to all cells (as specified by the records of the **PIVOTRULES14** rule of this collection) that display values for the pivot field (section 2.2.5.3.2) intersections.

reserved (4 bytes): This value MUST be zero and MUST be ignored.

ipriority (4 bytes): An unsigned integer that specifies the priority of the PivotTable view (section 2.2.5.3) conditional formatting. This value MUST be greater than or equal to 1. The **sheet** where this PivotTable view is located MUST have a **BrtBeginConditionalFormatting14** (section 2.4.34) collection with the **fPivot** field equal to 1, and there MUST be a **BrtBeginCFRule14** (section 2.4.23) item in that collection with the **ipri** field equal to the value of this field.

2.4.237 BrtBeginSXCondFmts

The **BrtBeginSXCondFmts** record specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies conditional formats that apply to this PivotTable.

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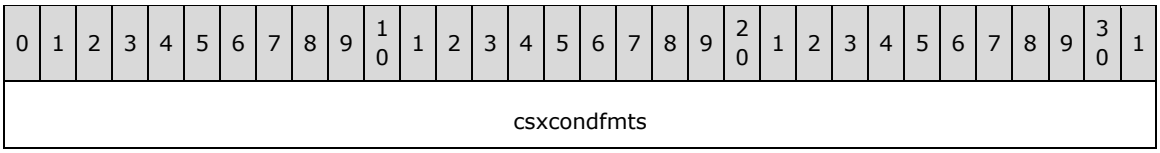
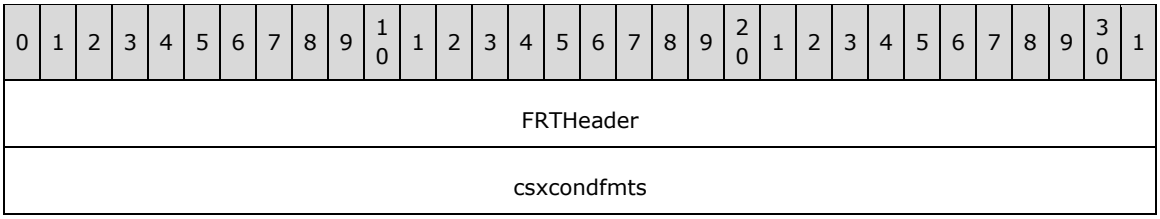


csxcondfmts (4 bytes): An unsigned integer that specifies the number of conditional formats that apply to this **PivotTable** (section 2.1.7.40). This value MUST be the same as the number of **BrtBeginSXCondFmt** (section 2.4.235) records in this collection.

2.4.238 BrtBeginSXCondFmts14

The **BrtBeginSXCondFmts14** record specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies conditional formats that apply to this PivotTable.

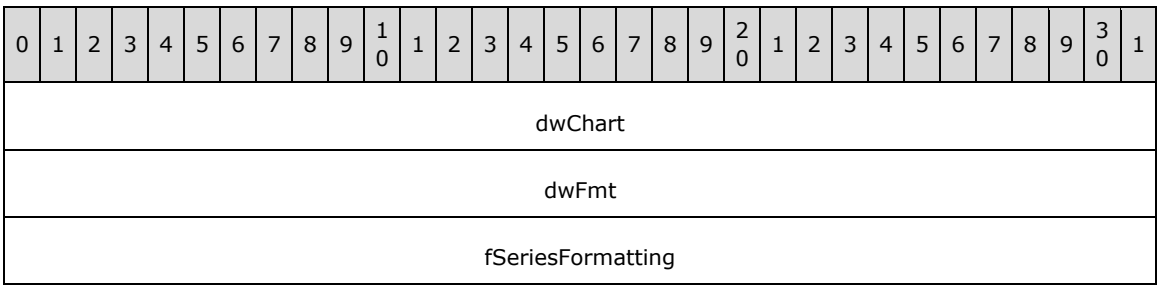


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

csxcondfmts (4 bytes): An unsigned integer that specifies the number of conditional formats that are specified by **BrtBeginSXCondFmt14** (section 2.4.236) records in this collection. This value MUST be equal to the number of **BrtBeginSXCondFmt14** records in this collection.

2.4.239 BrtBeginSXCrtFormat

The **BrtBeginSXCrtFormat** record specifies details for a **PivotChart** (section 2.2.3.2) format and specifies the beginning of a collection records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection specifies a reference to a **PivotTable** rule (section 2.2.5.3.9) that specifies where in the **PivotChart** the formatting is applied.



dwChart (4 bytes): An unsigned integer that specifies the **PivotChart** to which this format applies. The **PivotChart** is specified by a **chart** part (section 2.2.3.1). The associated **chart** part contains a **fmtId** element, as defined in [ISO/IEC29500-1:2016], section 21.2.2.70, with a **val** attribute. The attribute **val** MUST have a value equal to the value of this field.

dwFmt (4 bytes): An unsigned integer that specifies a zero-based index to a **pivotFmt** element, as defined in [ISO/IEC29500-1:2016], section 21.2.2.142, in the **pivotFmts** collection, as defined in [ISO/IEC29500-1:2016], section 21.2.1.143, in the **chart** part specified by **dwChart**. This value MUST be less than the number of **pivotFmt** elements in that collection.

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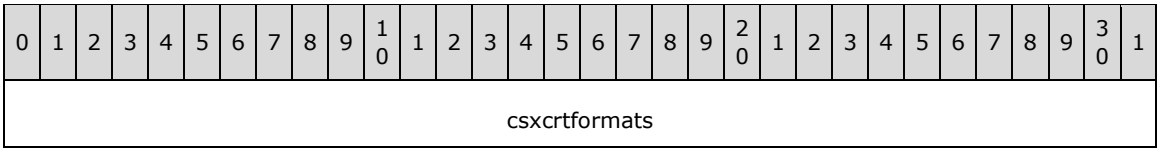
fSeriesFormatting (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether this format applies to a data series or a **data point**. Possible values for this field are listed in the following table.

Value	Meaning
0x00000000	Specifies that this format applies to a data point.
0x00000001	Specifies that this format applies to a data series.

A data series is specified by a **ser** element that is a child of one of the chart elements from the list of valid child elements of the **plotArea** element, as defined in [ISO/IEC29500-4:2016], section 21.2.2.145, in the **chart** part specified by **dwChart**. A data point is specified by the **dPt** element, as defined in [ISO/IEC29500-1:2016], section 21.2.2.52.

2.4.240 BrtBeginSXCrtFormats

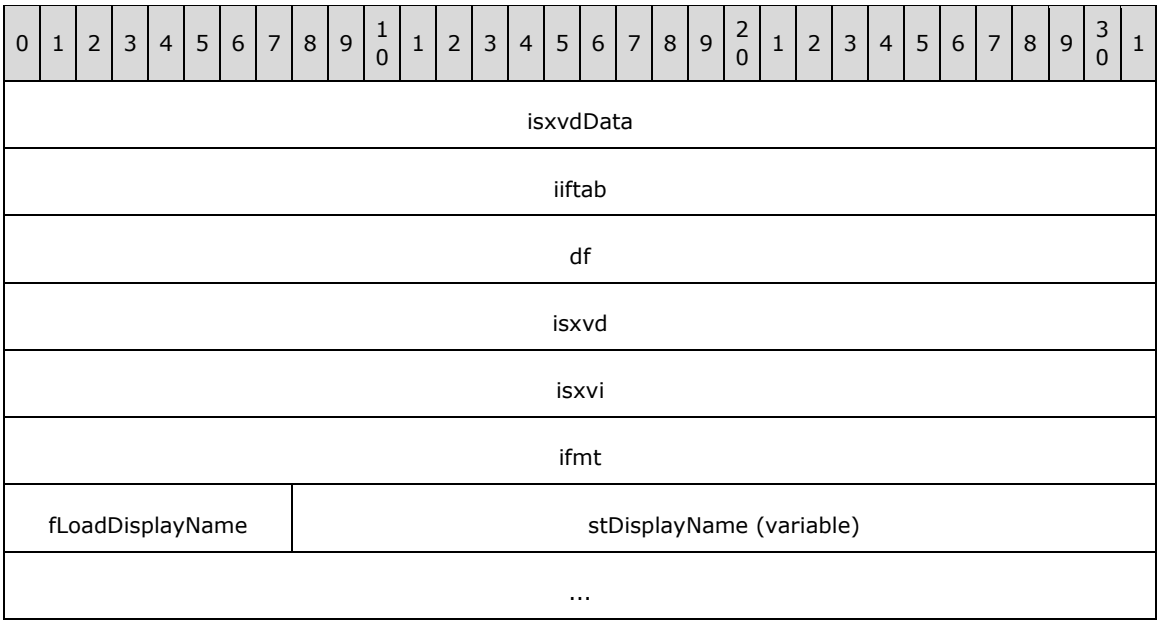
The **BrtBeginSXCrtFormats** record specifies references to **PivotChart** (section 2.2.3.2) formats and specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies references to **PivotChart** formats.



csxcrtformats (4 bytes): An unsigned integer that specifies the number of references to **PivotChart** formats. This value MUST match the number of **BrtBeginSXCrtFormat** (section 2.4.239) records in this collection.

2.4.241 BrtBeginSXDI

The **BrtBeginSXDI** record specifies a data item (section 2.2.5.3.7.5.1) that summarizes data in a **PivotTable** (section 2.1.7.40) and specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. Data items (section 2.2.5.3.7.5.1) use summary functions to combine values from the underlying source data (section 2.2.5.2.1).



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isxvdData (4 bytes): An **ISXVD** (section 2.5.83) that specifies the pivot field (section 2.2.5.3.2) that this data item summarizes. This value MUST NOT equal -1 or -2.

If the **PivotTable** view (section 2.2.5.3) is a non-**OLAP** **PivotTable** view, the values in the source data associated with the associated cache field (section 2.2.5.2.2) of the referenced pivot field are aggregated as specified in this record.

If the **PivotTable** view is an OLAP **PivotTable** view, the associated pivot hierarchy (section 2.2.5.3.4) of the referenced pivot field specifies the OLAP **measure** for this data item and the **iiftab** field is ignored. The associated pivot hierarchy is determined as specified in section 2.2.5.3.4.

The **sxaxisData** field of the referenced **BrtBeginSXVD** record (section 2.4.270) MUST be equal to 1.

iiftab (4 bytes): A **DataConsolidationFunction** (section 2.5.27) that specifies the aggregation function that applies to this data item. The valid values of this field are specified by the **DataConsolidationFunction** enumeration.

df (4 bytes): A **ShowDataAs** (section 2.5.133) that specifies the data format for this data item. This value MUST be less than or equal to 0x00000008.

isxvd (4 bytes): An **ISXVD** (section 2.5.83) that specifies the pivot field the calculations specified by the **df** field are based on. When **df** is greater than 0x00000000 and less than 0x00000005, this value MUST NOT equal -1 or -2. When **df** is 0x00000000 or greater than or equal to 0x00000005, this field is ignored.

isxvi (4 bytes): An unsigned integer that specifies which pivot item (section 2.2.5.3.3) the calculations specified by the **df** field are based on. When **df** is greater than 0x00000000 and less than 0x00000004, this field MUST be a value from the following table.

Value	Meaning
0x00000000 to 0x00100000	Specifies the pivot item index in the pivot field specified by **isxvd**, as specified in section 2.2.5.3.3. The referenced **BrtBeginSXVI** (section 2.4.272) record specifies the pivot item this calculation is based on.
0x001000FC	The calculation is based on the previous pivot item.
0x001000FD	The calculation is based on the next pivot item.

When **df** is 0x00000000 or greater than or equal to 0x00000004 this field is ignored.

ifmt (4 bytes): A **PivotNumFmt** (section 2.5.105) that specifies the format applied to this data item.

fLoadDisplayName (1 byte): A **Boolean** (section 2.5.97.3) that specifies whether the **stDisplayName** field exists after the fixed size portion of the record. This value MUST be a value from the following table.

Value	Meaning
0x00	**stDisplayName** does not exist.
0x01	**stDisplayName** exists.

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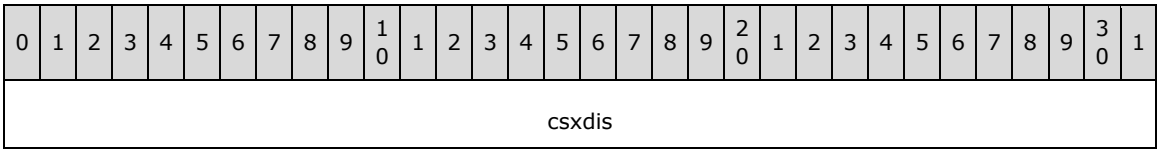
stDisplayName (variable): An optional **XLWideString** (section 2.5.168) that specifies the name of the data item. If the value of the **bVerSxMacro** field defined in the associated **BrtBeginSXView** (section 2.4.273) record is less than 3, the length of this value MUST be less than 256 characters; otherwise it MUST be less than 32,768 characters. This value MUST exist if and only if **fLoadDisplayName** is 0x01.

2.4.242 BrtBeginSXDIs

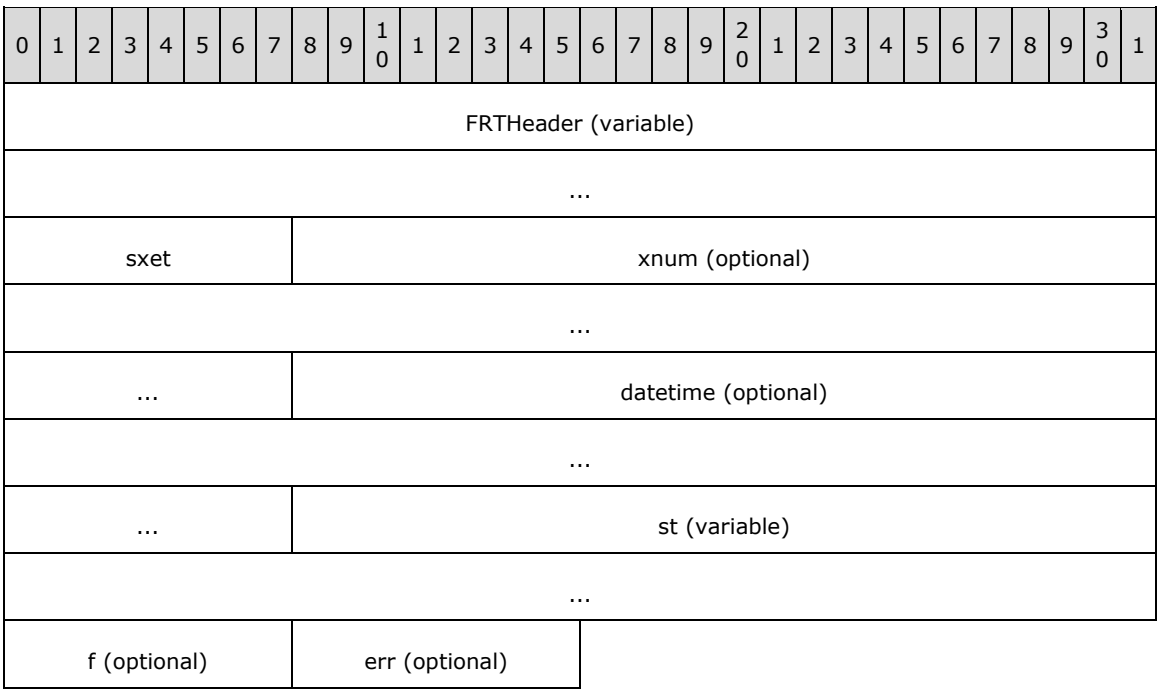
The **BrtBeginSXDIs** record specifies the beginning of a collection of records, as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**, that specifies the data items (section 2.2.5.3.7.5.1) that appear on the data axis (section 2.2.5.3.7.5) of this PivotTable view (section 2.2.5.3).



csxdis (4 bytes): An unsigned integer that specifies the number of data items on the data axis of this PivotTable view. This value MUST be equal to the number of **BrtBeginSXDI** (section 2.4.241) records in this collection.

2.4.243 BrtBeginSXEdit

The **BrtBeginSXEdit** record specifies the user input, related to **PivotTable** What-if Analysis (section 2.2.5.3.10), in a single **cell** of the **PivotTable** data area (section 2.2.5.3.8.1.4), and specifies the beginning of a collection of records and collections as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a collection of **MDX unique names** that identifies the value in the **OLAP** source data (section 2.2.5.2.1), and specifies a **PivotTable** rule (section 2.2.5.3.9) that can be used to identify the cell in the **PivotTable** data area (section 2.2.5.3.8.1.4).



FRTHeader (variable): An optional **FRTHeader** (section 2.5.60) that specifies the future record (section 2.1.6) information for this record.

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This field exists if and only if the size of this record is greater than 4 bytes. The **FRTHeader** fields in the following table MUST be equal to their respective values in the table:

Field	Value
fRef	0
fSqref	0
fFormula	0 or 1
fRelID	0

If **FRTHeader.rgFormulas** exists, **FRTHeader.rgFormulas.cformula** MUST be equal to 0x00000001 and the **reserved** field of the **FRTFormula** (section 2.5.58) structure in the first element of the array **FRTHeader.rgFormulas.array** MUST be equal to 0x00000002.

The length of **FRTHeader.blob** MUST be zero.

sxet (1 byte): An **SXET** (section 2.5.146) that specifies the value type of the user input in the PivotTable data area. MUST be equal to **SXET_FMLA** if and only if **FRTHeader.fFormula** is equal to 1. If the record size is less than 4, **sxet** MUST be equal to **SXET_BOOL** or **SXET_ERROR**. If the record size is greater than 4, **sxet** MUST be equal to **SXET_NUM**, **SXET_DATETIME** or **SXET_FMLA**.

xnum (8 bytes): An **Xnum** (section 2.5.171) that specifies the numerical value that replaces the original **cell value** in PivotTable data area by user input. This value MUST exist if and only if **sxet** is equal to **SXET_NUM**.

datetime (8 bytes): An **PCDIDateTime** (section 2.5.100) that specifies a date-time value that replaces the original cell value in PivotTable data area by user input. This value MUST exist if and only if **sxet** is equal to **SXET_DATETIME**.

st (variable): An **XLWideString** (section 2.5.168) that specifies a string value that replaces the original cell value in PivotTable data area by user input. This value MUST exist if and only if **sxet** is equal to **SXET_STRING** (section 2.5.146). The length of the string MUST be greater than 0 and MUST be less than 32,768 characters.

f (1 byte): A **Boolean** (section 2.5.97.3) that specifies a Boolean value that replaces the original cell value in PivotTable data area by user input. This value MUST exist if and only if **sxet** is equal to **SXET_BOOL**.

err (1 byte): A **BErr** (section 2.5.97.2) that specifies an error that replaces the original cell value in PivotTable data area by user input. This value MUST exist if and only if **sxet** is equal to **SXET_ERROR**.

2.4.244 BrtBeginSXEdits

The **BrtBeginSXEdits** record specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies user inputs, related to **PivotTable** What-if Analysis (section 2.2.5.3.10), in single cells of the **PivotTable** data area (section 2.2.5.3.8.1.4), and specifies the collections of **MDX unique names** that identify the values in the **OLAP** source data (section 2.2.5.2.1). In addition, the collection specifies the **PivotTable** rules (section 2.2.5.3.9) that can be used to identify the **cells** in the **PivotTable** data area.

2.4.245 BrtBeginSXFILTER

The **BrtBeginSXFILTER** record specifies properties of an advanced filter (section 2.2.5.3.6.1) and specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a PivotTable (section 2.2.5) advanced filter.

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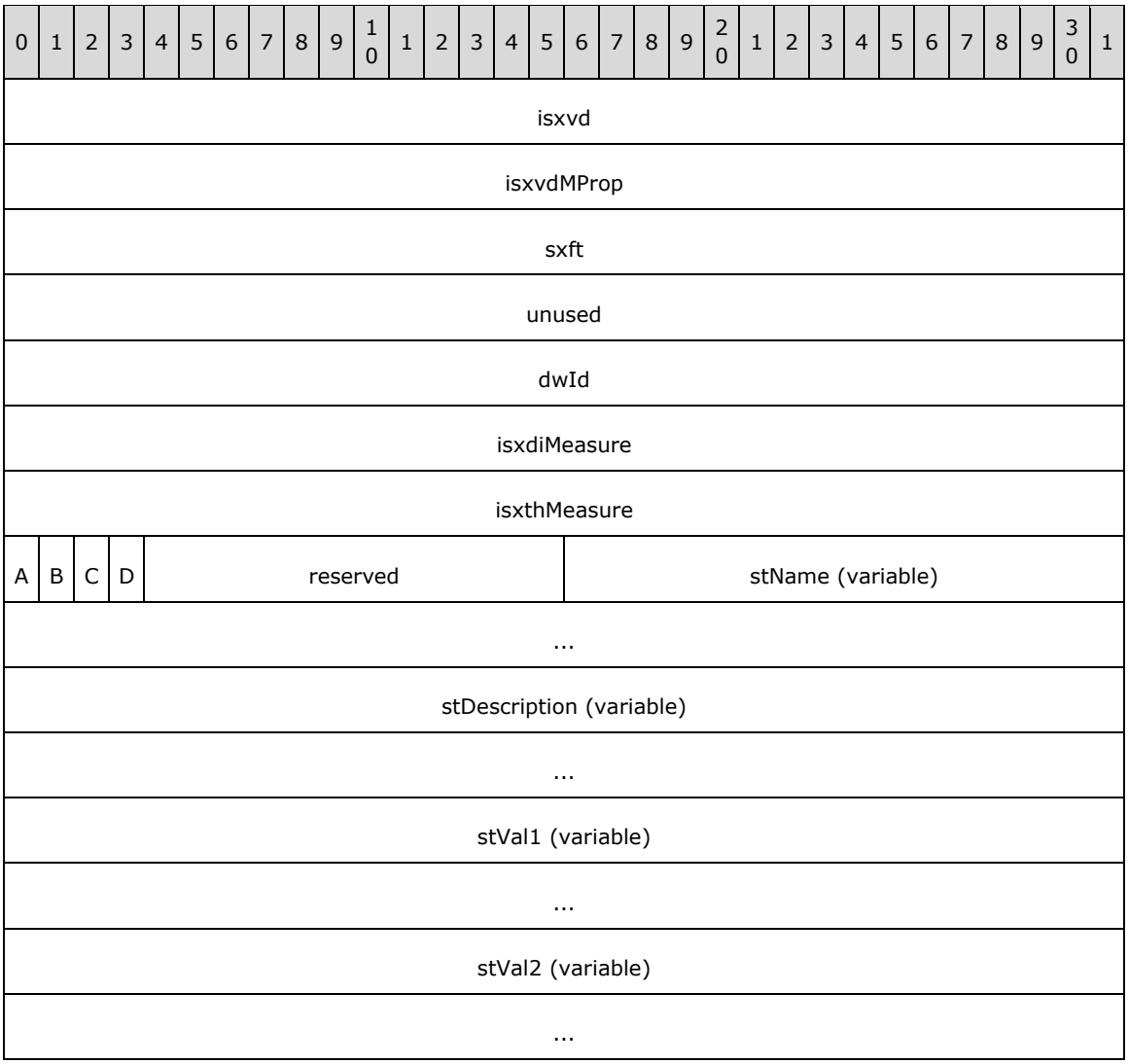

isxvd (4 bytes): An **ISXVD** (section 2.5.83) that specifies the pivot field (section 2.2.5.3.2) to which this advanced filter applies. This value MUST NOT be equal to -1 or -2.

isxvdMProp (4 bytes): An **ISXVD** that specifies the pivot field specifying the **member** property on which this advanced filter is based. This value is only used by label filters (section 2.2.5.3.6.1.1). If this advanced filter is a label filter, as specified by **sxft**, and this advanced filter is based on a member property, then this value MUST be greater than or equal to 0. Otherwise, it MUST be -1 and MUST be ignored.

sxft (4 bytes): A **PivotFilterType** (section 2.5.103) that specifies the type of this advanced filter.

unused (4 bytes): This value is undefined and MUST be ignored.

dwId (4 bytes): An unsigned integer that specifies the unique identifier of this advanced filter.

isxdiMeasure (4 bytes): An **ISXDI** (section 2.5.81) that specifies the data item (section 2.2.5.3.7.5.1) on which this value filter (section 2.2.5.3.6.1.3) is based. If this advanced filter is a value filter, as specified by **sxft**, and this advanced filter is associated with a non-**OLAP** **PivotTable** (section 2.1.7.40), then this value MUST be greater than or equal to 0. Otherwise, it MUST be -1 and MUST be ignored.

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isxthMeasure (4 bytes): An **ISXTH** (section 2.5.82) that specifies the pivot hierarchy (section 2.2.5.3.4) used by this advanced filter. The pivot hierarchy this value specifies MUST have an associated cache hierarchy (section 2.2.5.2.7) with the **fMeasure** field equal to 1. If this advanced filter is a value filter, as specified by **sxft**, and this advanced filter is associated with an OLAP **PivotTable** (section 2.1.7.40), then this value MUST be greater than or equal to 0. Otherwise, it MUST be -1 and MUST be ignored.

A - fLoadName (1 bit): A bit that specifies whether **stName** exists.

B - fLoadDescription (1 bit): A bit that specifies whether **stDescription** exists.

C - fLoadVal1 (1 bit): A bit that specifies whether **stVal1** exists. This value MUST be 1 if and only if this advanced filter is a label filter (section 2.2.5.3.6.1.1), as specified by **sxft**.

D - fLoadVal2 (1 bit): A bit that specifies whether **stVal2** exists. This value MUST be 1 if and only if this advanced filter is of type "is between" or "is not between", as specified by **sxft**.

reserved (12 bits): This value MUST be zero, and MUST be ignored.

stName (variable): An optional **XLWideString** (section 2.5.168) that specifies the name of this filter. The length of this value MUST be less than 65,536. This value MUST exist if and only if **fLoadName** is equal to 1.

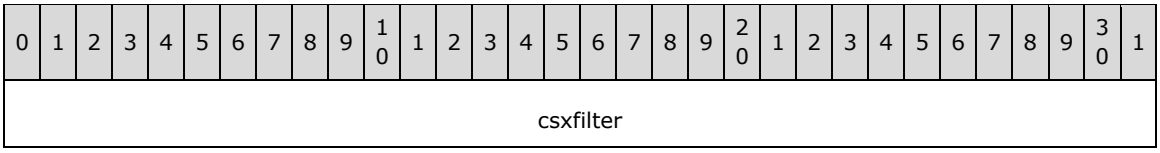
stDescription (variable): An optional **XLWideString** that specifies the description of this advanced filter. The length of this value MUST be less than 65,536. This value MUST exist if and only if **fLoadDescription** is equal to 1.

stVal1 (variable): An optional **XLWideString** that specifies the first string value used by label filters. The length of this value MUST be less than 65,536. This value MUST exist if and only if **fLoadVal1** is equal to 1.

stVal2 (variable): An optional **XLWideString** that specifies the second string value used by label filters. The length of this value MUST be less than 65,536. This value MUST exist if and only if **fLoadVal2** is equal to 1.

2.4.246 BrtBeginSXFilters

The **BrtBeginSXFilters** record specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a collection of advanced filters (section 2.2.5.3.6.1) that apply to this PivotTable view (section 2.2.5.3).



csxfilter (4 bytes): An unsigned integer that specifies the number of advanced filters that apply to this PivotTable view. This value MUST be equal to the number of **BrtBeginSXFILTER** (section 2.4.245) records in this collection.

2.4.247 BrtBeginSXFormat

The **BrtBeginSXFormat** record specifies differential formatting (section 2.2.6.2) applied to the **PivotTable** view and specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the differential formatting applied to the **PivotTable** view area identified by the **PivotTable** rule (section 2.2.5.3.9) as specified by the collection of records beginning with the following **BrtBeginPRule** (section 2.4.183) record.

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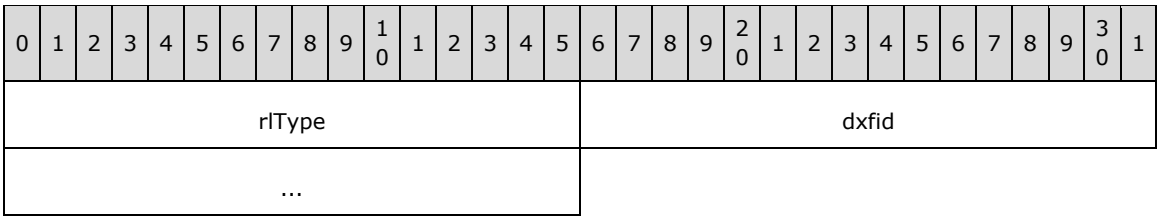


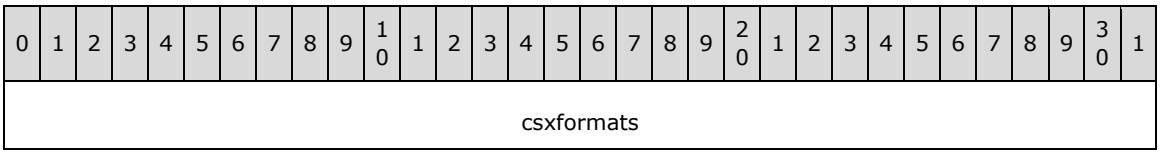
rlType (2 bytes): A **Boolean** (section 2.5.97.3) that specifies whether the specified differential formatting is applied to the **PivotTable** view area identified by the **PivotTable** rule as specified by the following **BrtBeginPRule** record. This value MUST be a value from the following table.

Value	Meaning
0x0000	The differential formatting is cleared from the **PivotTable** view area.
0x0001	The differential formatting is applied to the **PivotTable** view area.

dxfid (4 bytes): A **DXFId** (section 2.5.37) that specifies the differential formatting applied to this **PivotTable** view area identified by the **PivotTable** rule as specified by the following **BrtBeginPRule** record. If **rlType** is equal to 0x0000, the value of **dxfid** MUST be equal to 0xFFFFFFFF.

2.4.248 BrtBeginSXFormats

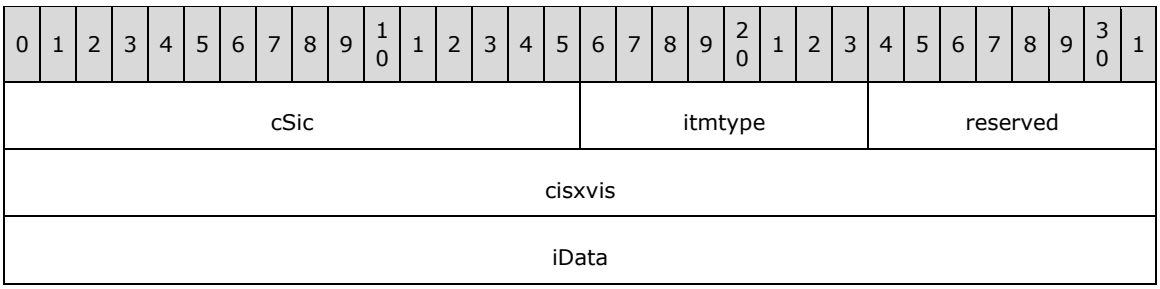
The **BrtBeginSXFormats** record specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a collection of formats that apply to this PivotTable view (section 2.2.5.3).



csxformats (4 bytes): An unsigned integer that specifies the number of formats that apply to this PivotTable view. This value MUST be equal to the number of **BrtBeginSXFormat** (section 2.4.247) records for this PivotTable view.

2.4.249 BrtBeginSXLI

The **BrtBeginSXLI** (section 2.4.249) record specifies properties of a pivot line (section 2.2.5.3.8.3) and specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a pivot line in a PivotTable view (section 2.2.5.3).



cSic (2 bytes): An unsigned integer that specifies the number of pivot line entries (section 2.2.5.3.8.4) to reuse from the previous pivot line (as specified by the **BrtBeginISXVIs** (section

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2.4.97) record in the previous **SXLI** collection) within the **SXLIRWS** or **SXLICOLS** collection that contains this record (for PivotTable definitions, see section 2.1.7.40).

itmtype (1 byte): A **PivotItemType** (section 2.5.104) that specifies the type of this pivot line.

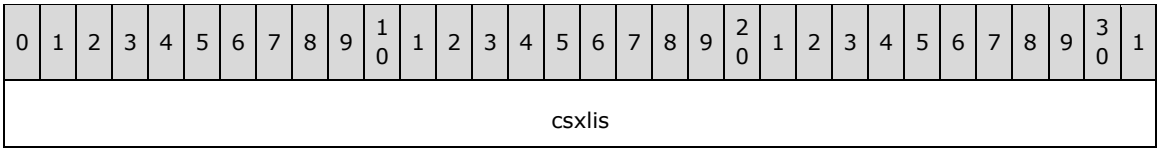
reserved (1 byte): This value MUST be 0, and MUST be ignored.

cisxvis (4 bytes): An unsigned integer that specifies the count of pivot line entries specified by the **BrtBeginISXVIs** record contained in this **SXLI** (for definition, see section 2.1.7.40) collection. This value MUST be equal to the count of elements in the **rgisxvis** array in the **BrtBeginISXVIs** record. The pivot line entries used in this pivot line will be those reused from the previous pivot line, as specified by **cSic**, in addition to those specified by the **BrtBeginISXVIs** record.

iData (4 bytes): An **ISXDI** (section 2.5.81) that specifies the data item (section 2.2.5.3.7.5.1) to use for this pivot line. If the data field (section 2.2.5.3.7.5.2) is on the **row** axis or **column (1)** axis using this pivot line, this value MUST NOT equal -1. Otherwise, this value MUST be 0 and MUST be ignored.

2.4.250 BrtBeginSXLICols

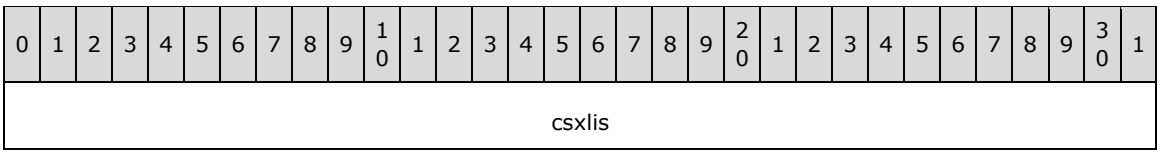
The **BrtBeginSXLICols** record specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the pivot lines (section 2.2.5.3.8.3) that appear on the **column (1)** area of the PivotTable view (section 2.2.5.3). For details about the column (1) area, see Location and Body (section 2.2.5.3.8.1).



csxlis (4 bytes): An unsigned integer that specifies the number of pivot lines that appear on the column (1) area of the PivotTable view. For details about the column (1) area, see Location and Body (section 2.2.5.3.8.1). This value MUST be equal to the number of **BrtBeginSXLI** (section 2.4.249 records in this collection.

2.4.251 BrtBeginSXLIRws

The **BrtBeginSXLIRws** record specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the pivot lines that appear on the **row** area of the PivotTable view. For details about the row area, see Location and Body (section 2.2.5.3.8.1).



csxlis (4 bytes): An unsigned integer that specifies the number of pivot lines that appear on the row area of the PivotTable view. For details about the row area, see Location and Body (section 2.2.5.3.8.1). This value MUST be equal to the number of **BrtBeginSXLI** (section 2.4.249 records in this collection.

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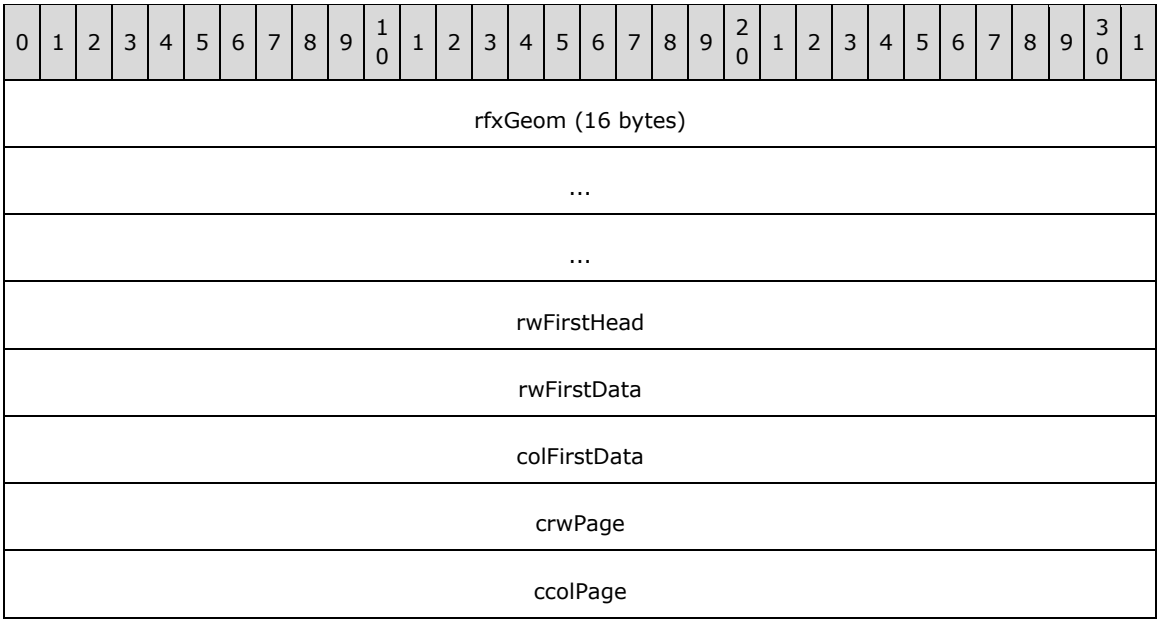
2.4.252 BrtBeginSXLocation

The **BrtBeginSXLocation** record specifies the location of a PivotTable view (section 2.2.5.3) in a **sheet**, and specifies the beginning of an empty collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**.



rfxGeom (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the location of the PivotTable view body in a sheet. For more details about the PivotTable view body, see Location and Body (section 2.2.5.3.8.1).

rwFirstHead (4 bytes): An **UncheckedRw** (section 2.5.154) that specifies first **row** in a **PivotTable** report body that contains pivot item (section 2.2.5.3.3) captions, data item (section 2.2.5.3.7.5.1) captions, or data values. For more details about the PivotTable view body, see Location and Body (section 2.2.5.3.8.1). If no row area and no **column (1)** area exists, this value MUST be equal to **rfxGeom**.**rwFirst** + 1, and MUST be ignored. The value of this field MUST be less than or equal to **rwFirstData**.

rwFirstData (4 bytes): An **UncheckedRw** that specifies the location of the topmost row of the PivotTable view body**,** where cells containing values of data items will appear. For more details about the PivotTable view body, see Location and Body (section 2.2.5.3.8.1).

colFirstData (4 bytes): An **UncheckedCol** that specifies the location of the first column (1) of the PivotTable view body, where cells containing values of data items will appear. For more details about the PivotTable view body, see Location and Body (section 2.2.5.3.8.1).

crwPage (4 bytes): A **DRw** (section 2.5.34) that specifies the number of rows with **cells** containing data for pivot fields (section 2.2.5) on the page axis (section 2.2.5.3.7.1) of the PivotTable view.

ccolPage (4 bytes): A **DCol** (section 2.5.31) that specifies the number of columns (1) with cells containing data for pivot fields on the page axis of the PivotTable view.

2.4.253 BrtBeginSXPI

The **BrtBeginSXPI** record specifies properties of a pivot field (section 2.2.5.3.2) or pivot hierarchy (section 2.2.5.3.4) on the page axis (section 2.2.5.3.7.1) of the PivotTable view (section 2.2.5.3) and specifies the beginning of an empty collection of records as defined by the **PivotTable** (section

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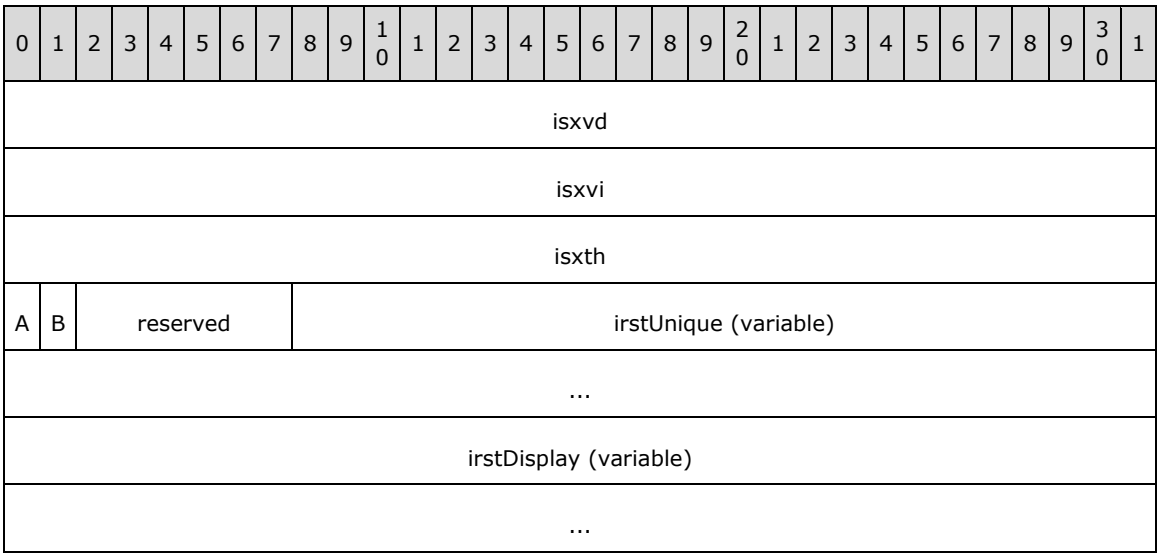
2.1.7.40) part **ABNF**. The collection of records specifies a pivot field or pivot hierarchy (section 2.2.5.3.4) on the page axis (section 2.2.5.3.7.1) of the PivotTable view.



isxvd (4 bytes): An **ISXVD** (section 2.5.83) that specifies a pivot field that is displayed on the page axis area of the **PivotTable** view. This value MUST NOT equal -1 or -2. The value of the **sxaxisPage** of the **sxaxis** field of the referenced **BrtBeginSXVD** record (section 2.4.270) MUST be equal to 1.

isxvi (4 bytes): An unsigned integer that specifies the pivot item (section 2.2.5.3.3) included in the **filter** for this pivot field. This value MUST be a value from the following table.

Value	Meaning
0x00000000 to 0x00100000	Specifies a pivot item index, as specified in section 2.2.5.3.3, for the pivot item included in the filter, as specified by Non-OLAP Page Filtering (section 2.2.5.3.7.1.1).
0x001000FE	Specifies that pivot items are included as specified in sections 2.2.5.3.7.1.1 (Non-OLAP Page Filtering) and section 2.2.5.3.7.1.2 (OLAP Page Filtering).

If this field is not equal to 0x001000FE, then the **fEnableMultiplePageItems** field in the **BrtBeginSXVD** record of the pivot field specified by **isxvd** MUST be equal to 0. If the **fEnableMultiplePageItems** field in the **BrtBeginSXVD** record of the pivot field specified by **isxvd** is equal to 1, this field MUST be equal to 0x001000FE. If this is an **OLAP PivotTable** view, this field MUST be equal to 0x001000FE.

isxth (4 bytes): An **ISXTH** (section 2.5.82) that specifies the pivot hierarchy to which the pivot field specified by isxvd belongs. If this PivotTable is an OLAP PivotTable, this field MUST NOT be equal to -1 or -2. If this **PivotTable** is not an OLAP PivotTable, this value MUST be ignored.

A - fUnique (1 bit): A bit that specifies whether **irstUnique** is present after the fixed-length portion of this record. This value MUST be equal to 0 for PivotTables that are not OLAP PivotTables.

B - fDisplay (1 bit): A bit that specifies whether **irstDisplay** is present after the fixed-length portion of this record. This value MUST be equal to 0 for PivotTables that are not OLAP PivotTables.

reserved (6 bits): This value MUST be zero, and MUST be ignored.

irstUnique (variable): An **XLWideString** (section 2.5.168) that specifies the **MDX unique name** of an **OLAP member**. If the **fEnableMultiplePageItems** field on the **BrtBeginSXTH** (section

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2.4.261) record specified by this record's **isxth** field is equal to 0, the OLAP member specified by this field is included in the manual filter (section 2.2.5.3.5).

If the **irstUnique** field is present and the **bVerCacheCreated** field on the **BrtBeginPivotCacheDef** (section 2.4.167) record associated with this PivotTable view is less than 3, then this string MUST be less than or equal to 255 characters in length. If the **bVerCacheCreated** field of that **BrtBeginPivotCacheDef** record associated with this PivotTable view is greater than or equal to 3, then this string MUST be less than or equal to 32,767 characters in length.

If the **fUnique** field is 1, this **irstUnique** field MUST be present. If the **fUnique** field is 0, this **irstUnique** field MUST NOT be present. If the **fEnableMultiplePageItems** field on the **BrtBeginSXTH** record specified by this record's **isxth** field is equal to 1, this field MUST be ignored.

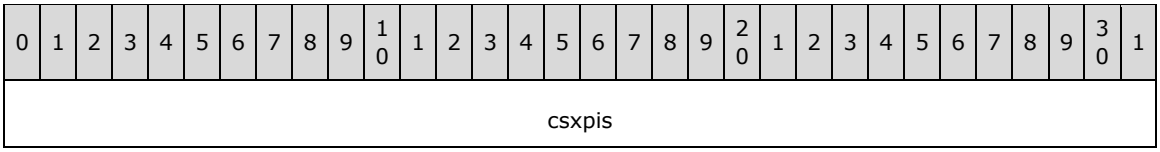
irstDisplay (variable): An **XLWideString** that specifies the caption of the OLAP member specified by this record's **irstUnique** field when the **fEnableMultiplePageItems** field on the **BrtBeginSXTH** record specified by this record's **isxth** field is equal to 0.

If the **irstDisplay** field is present and the **bVerCacheCreated** field on the **BrtBeginPivotCacheDef** record associated with this PivotTable view is less than 3, then this string MUST be less than or equal to 255 characters in length. If the **bVerCacheCreated** field of that **BrtBeginPivotCacheDef** record associated with this PivotTable view is greater than or equal to 3, then this string MUST be less than or equal to 32,767 characters in length.

If the **fDisplay** field is 1, this **irstDisplay** field MUST be present. If the **fDisplay** field is 0, this **irstDisplay** field MUST NOT be present. If the **fEnableMultiplePageItems** field on the **BrtBeginSXTH** record specified by this record's **isxth** field is equal to 1, this field MUST be ignored.

2.4.254 BrtBeginSXPIs

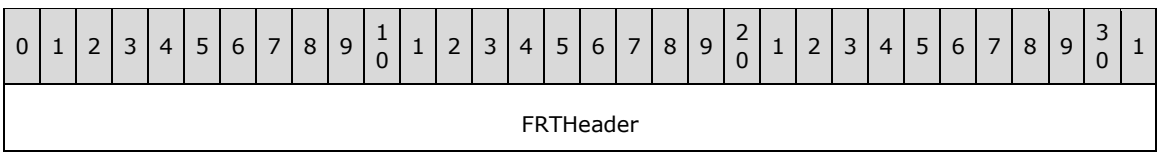
The **BrtBeginSXPIs** record specifies the beginning of a collection of records as defined in the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the pivot fields (section 2.2.5) on the page axis (section 2.2.5.3.7.1) of the **PivotTable** view (section 2.2.5.3). If this record exists, the number of **BrtBeginSXVD** records (section 2.4.270) in this **PivotTable** view MUST be greater than 0.



csxpis (4 bytes): An unsigned integer that specifies the count of pivot fields on the page axis. This value MUST be equal to the number of **BrtBeginSXPI** (section 2.4.253) records in this collection.

2.4.255 BrtBeginSxRow

The **BrtBeginSxRow** record specifies the beginning of a collection of records as defined by the PIVOTROWS15 rule in the **PivotTable** (section 2.1.7.40) part **ABNF** rules. The collection of records specifies **PivotValueCell** (section 2.2.5.6.1) data units and forms a single **row** of **PivotValues** (section 2.2.5.6) in a Non-Worksheet PivotTable (section 2.2.5.5).



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csxvcells

FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) structure that specifies the future record (section 2.1.6) information for this record.

csxvcells (4 bytes): An unsigned integer that specifies the number of **PivotValueCell** data units in this collection. This value MUST be equal to the number of **PIVOTVALUECELL15** (section 2.1.7.40) rules that appear in the **PIVOTROWS15** (section 2.1.7.40) rule specified by the **PivotTable** (section 2.1.7.40) part ABNF rules.

2.4.256 BrtBeginSXRules

The **BrtBeginSXRules** record specifies the beginning of a collection of records as defined in the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a collection of **PivotTable** rule (section 2.2.5.3.9).

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
csxrules																															

csxrules (4 bytes): An unsigned integer that specifies the number of **PivotTable** rules in this collection. This value MUST be equal to the number of **BrtBeginPRule** (section 2.4.183) records in this collection.

2.4.257 BrtBeginSXRules14

The **BrtBeginSXRules14** record specifies the beginning of a collection of records as defined in the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a collection of **PivotTable** rules (section 2.2.5.3.9).

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
FRTHeader																															
csxrules																															

FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

csxrules (4 bytes): An unsigned integer that specifies the number of **PivotTable** rules in this collection. This value MUST be equal to the number of **BrtBeginPRule14** (section 2.4.184) records in this collection.

2.4.258 BrtBeginSxSelect

The **BrtBeginSxSelect** record specifies the **selection** properties of a **PivotTable** view and specifies the beginning of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies a **PivotTable** rule (section 2.2.5.3.9) used to identify **cells** of the selection. This record MUST be ignored if **irstRelID** is NULL or points to an invalid **PivotTable** (section 2.1.7.40) part.

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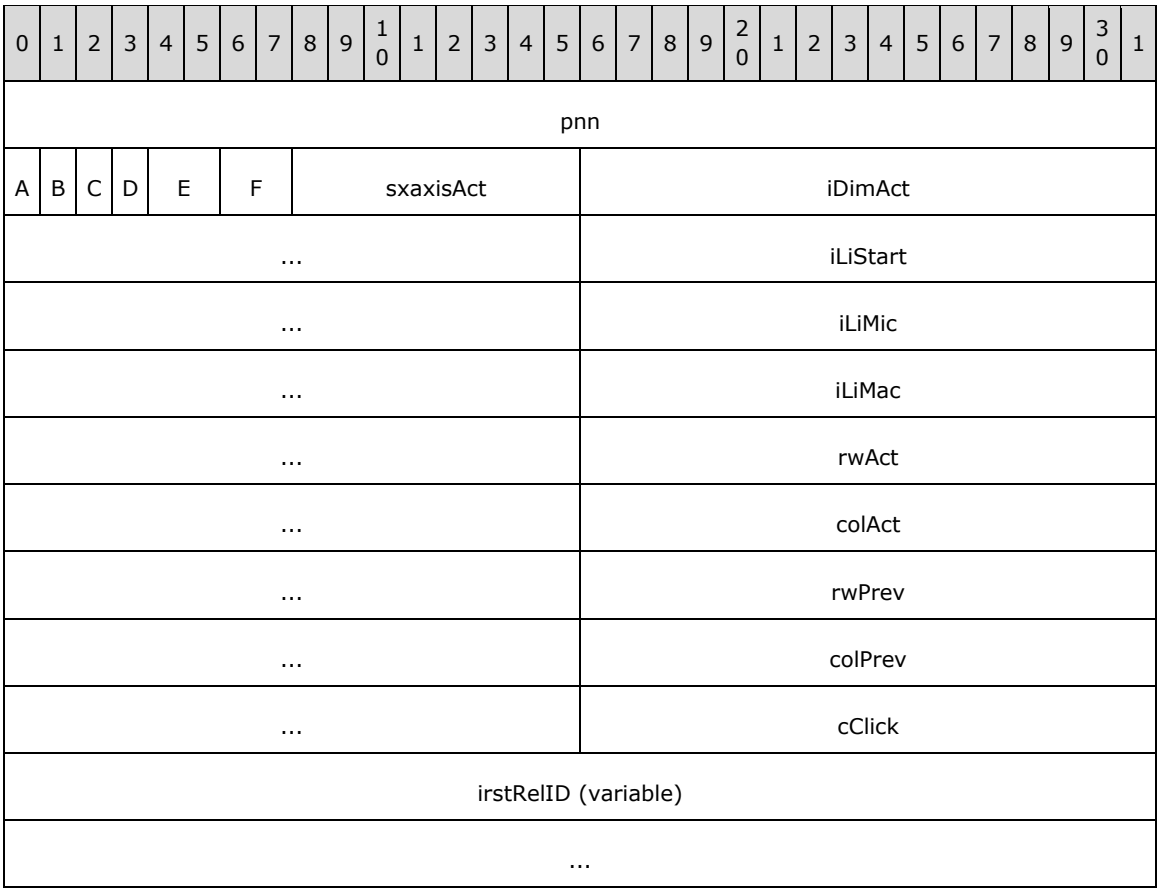

pnn (4 bytes): A **Pnn** (section 2.5.107) that specifies the window **pane** that contains the selection in the PivotTable view<22>.

A - fLabelOnly (1 bit): A bit that specifies whether only cells in the page area (section 2.2.5.3.8.1.3), **row** area, or **column (1)** area are included in this selection. This value MUST be equal to 0 if the **fDataOnly** field is 1.

B - fDataOnly (1 bit): A bit that specifies whether only cells in the data area (section 2.2.5.3.8.1.4) are included in this selection. This value MUST be equal to 0 if the **fLabelOnly** field is 1.

C - fToggleDataHeader (1 bit): A bit that specifies whether the PivotTable view selection toggle is enabled. The selection toggle enables a method for the user to select values, labels, or both values and labels.

D - fExtendable (1 bit): A bit that specifies whether the selection can be extended with additional selections.

E - fSelectionClick (2 bits): This value MUST be 0, and MUST be ignored.

F - reserved (2 bits): This value MUST be 0, and MUST be ignored.

sxaxisAct (1 byte): An unsigned integer that specifies the area of the PivotTable view in which the **active cell** of the selection lies. This value MUST be a value from the following table.

Value	Meaning
0x00	The area of the PivotTable view in which the active cell of the selection lies is not specified.
0x01	The row area of the PivotTable view specified by **irstRelID** contains the active cell of the selection.

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Value	Meaning
0x02	The column (1) area of the PivotTable view specified by **irstRelID** contains the active cell of the selection.
0x04	The page area of the PivotTable view specified by **irstRelID** contains the active cell of the selection <23>.

iDimAct (4 bytes): An unsigned integer that specifies the zero-based position within the PivotTable axis (section 2.2.5.3.7) of the pivot field (section 2.2.5.3.2) in which the active cell of the selection lies. If each of **sxaxisAct.sxaxisRw**, **sxaxisAct.sxaxisCol**, **sxaxisAct.sxaxisPage**, **sxaxisAct.sxaxisData** is 0 then this value MUST be 0. If **sxaxisAct.sxaxisRw** is 1, then this value MUST be less than the value of the **cisxvd** field of the **BrtBeginISXVDRws** (section 2.4.96) record of the **PivotTable** part specified by **irstRelID**. If **sxaxisAct.sxaxisCol** is 1, then this value MUST be less than the value of the **cisxvd** field of the **BrtBeginISXVDCols** (section 2.4.95) record. If **sxaxisAct**.**sxaxisPage** is 1, then this value MUST be 0.

iLiStart (4 bytes): An unsigned integer that specifies the pivot line (section 2.2.5.3.8.3) where the selection operation started. The value of this field MUST be greater than or equal to **iLiMic** and less than or equal to **iLiMac**.

If **sxaxisAct.sxaxisRw** is 1, then this value specifies a zero-based index into the collection of **SXLI** (section 2.1.7.40) rules following the **BrtBeginSXLIRws** (section 2.4.251) record in the **PivotTable** part specified by **irstRelID**. If **sxaxisAct.sxaxisCol** is 1, then this value specifies a zero-based index into the collection of **SXLI** rules following the **BrtBeginSXLICols** (section 2.4.250) record in the **PivotTable** part specified by **irstRelID.** If **sxaxisAct.sxaxisPage** is 1, then the value MUST be 0.

iLiMic (4 bytes): An unsigned integer that specifies the minimum pivot line the selection contains.

If **sxaxisAct.sxaxisRw** is 1, then this value specifies a zero-based index into the collection of **SXLI** (section 2.1.7.40) rules following the **BrtBeginSXLIRws** record in the **PivotTable** part specified by **irstRelID** and MUST be less than or equal to the value of the **csxlis** field of the **BrtBeginSXLIRws** record. If **sxaxisAct.sxaxisCol** is 1, then this value specifies a zero-based index into the collection of **SXLI** rules following the **BrtBeginSXLICols** record in the PivotTable part specified by **irstRelID** and MUST be less than or equal to the value of the **csxlis** field of the **BrtBeginSXLICols** record. If **sxaxisAct.sxaxisPage** is 1, then the value MUST be 0.

iLiMac (4 bytes): An unsigned integer that specifies the maximum pivot line the selection contains.

If **sxaxisAct.sxaxisRw** is 1, then this value specifies a zero-based index into the collection of **SXLI** (section 2.1.7.40) rules following the **BrtBeginSXLIRws** record in the **PivotTable** part specified by **irstRelID** and MUST be less than or equal to the value of the **csxlis** field of the **BrtBeginSXLIRws** record. If **sxaxisAct.sxaxisCol** is 1, then this value specifies a zero-based index into the collection of **SXLI** rules following the **BrtBeginSXLICols** record in the PivotTable part specified by **irstRelID** and MUST be less than or equal to the value of the **csxlis** field of the **BrtBeginSXLICols** record. If **sxaxisAct.sxaxisPage** is 1, then the value MUST be 0.

rwAct (4 bytes): An **UncheckedRw** (section 2.5.154) that specifies the row of the active cell the selection contains. If **sxaxisAct**.**sxaxisRw** is 1, then this value MUST be within the row area. If **sxaxisAct**.**sxaxisCol** is 1, then this value MUST be within the column (1) area. If **sxaxisAct**.**sxaxisPage** is 1, then this value MUST be within the page area.

colAct (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies the column (1) of the active cell the selection contains. If **sxaxisAct**.**sxaxisRw** is 1, then this value MUST be within the row area. If **sxaxisAct**.**sxaxisCol** is 1, then this value MUST be within the column (1) area. If **sxaxisAct**.**sxaxisPage** is 1, then this value MUST be within the page area.

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rwPrev (4 bytes): An **UncheckedRw** that specifies the row that is clicked to begin the selection.

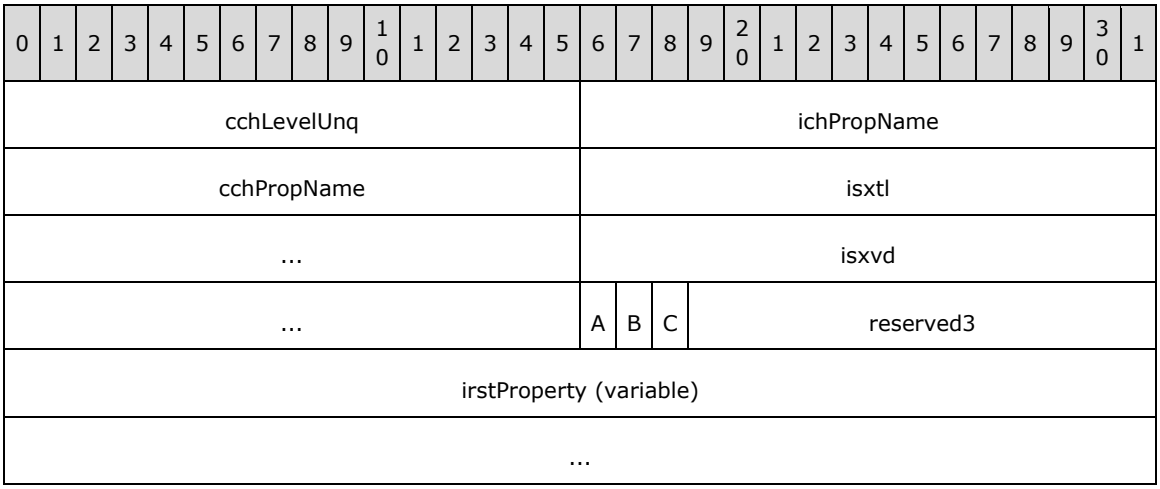
colPrev (4 bytes): An **UncheckedCol** that specifies the column (1) that is clicked to begin the selection.

cClick (2 bytes): An unsigned integer that specifies the number of clicks to make this selection. The value MUST be greater than or equal to 1. The value cycles through 1 to *N*, where *N* is the number of different ways the selection can be extended.

irstRelID (variable): An **XLNullableWideString** (section 2.5.166) that specifies the relationship identifier to the PivotTable view that the selection applies to.

2.4.259 BrtBeginSXTDMP

The **BrtBeginSXTDMP** record specifies properties of a **member** property and specifies the beginning of an empty collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**.



cchLevelUnq (2 bytes): An unsigned integer that specifies the length of the **MDX unique name** of the associated **OLAP level** represented by the cache hierarchy (section 2.2.5.2.7) that is associated with this pivot hierarchy (section 2.2.5.3.4). This MDX unique name comes before the member property name in **irstProperty**.

For example, if the value of **irstProperty** equals "[Store].[Store Name].[Store Manager]", **cchLevelUnq** equals 20. This refers to "[Store].[Store Name]".

ichPropName (2 bytes): An unsigned integer that specifies the zero-based position of the character where the member property name portion begins in **irstProperty**. This value MUST be equal to the value as specified by the following formula.

ichPropName = **cchLevelUnq** + 2

For example, if the value of **irstProperty** equals "[Store].[Store Name].[Store Manager]", **ichPropName** equals 22. This refers to the starting character of "Store Manager".

cchPropName (2 bytes): An unsigned integer that specifies the length of the member property name portion of **irstProperty**. This value MUST be equal to the value as specified by the following formula, where 'n' is the length of **irstProperty**.

cchPropName = n – **ichPropName** – 1

For example, if the value of **irstProperty** equals "[Store].[Store Name].[Store Manager]", **cchPropName** equals 13. This refers to the length of "Store Manager".

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isxtl (4 bytes): An unsigned integer that specifies the zero-based ordinal of the associated OLAP level represented by the cache hierarchy that is associated with this pivot hierarchy. If this value is equal to 32,767, this specifies that this member property will apply to all levels. If this value is not equal to 32,767 and **isxvd** is not equal to -1, then this value MUST be equal to the **isxtl** field of the **BrtBeginPCDField** (section 2.4.135) record of the cache field (section 2.2.5.2.2) associated with the pivot field specified by **isxvd**.

isxvd (4 bytes): An **ISXVD** (section 2.5.83) that specifies the pivot field that this member property is associated with. This value MUST NOT be equal to -2.

If this value is not equal to -1, the **fOlapMemPropField** of the **BrtBeginPCDField** record of the cache field associated with the pivot field specified by this field MUST be 1. If this value is not equal to -1, **irstProperty** MUST be equal to the **stFldName** field of the **BrtBeginPCDField** record of the cache field associated with the pivot field specified by this field.

If this value is equal to -1, **irstProperty** MUST NOT equal the **stFldName** of any **BrtBeginPCDField** records on the **PivotCache** (section 2.2.5.2) associated with this PivotTable view.

A - fDisplayInReport (1 bit): A bit that specifies whether to show this member property value in a PivotTable **cell**.

B - reserved1 (1 bit): This value MUST be zero, and MUST be ignored.

C - reserved2 (1 bit): This value MUST be zero, and MUST be ignored.

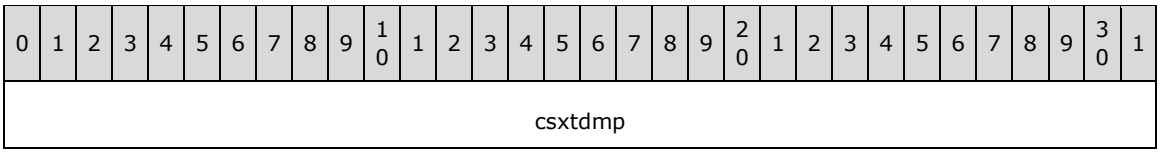
reserved3 (13 bits): This value MUST be zero, and MUST be ignored.

irstProperty (variable): An **XLWideString** (section 2.5.168) that specifies the MDX unique name of this member property.

2.4.260 BrtBeginSXTDMPS

The **BrtBeginSXTDMPS** record specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies **member** properties in this pivot hierarchy (section 2.2.5.3.4).

If the **bVerSxMacro** of the **BrtBeginSXView** (section 2.4.273) is less than 0x03, **BrtSXTDMPOrder** (section 2.4.803) records MUST NOT be present in this collection. If the **bVerSxMacro** of the **BrtBeginSXView** is greater than or equal to 0x03, **BrtBeginSXTDMP** (section 2.4.259) records MUST NOT be present in this collection.



csxtdmp (4 bytes): An unsigned integer that specifies the count of member properties in this pivot hierarchy. This value MUST be equal to the number of **SXTDMP** (section 2.1.7.40) collections specifying member properties in this collection.

2.4.261 BrtBeginSXTH

The **BrtBeginSXTH** record specifies properties of a pivot hierarchy (section 2.2.5.3.4) and specifies a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a pivot hierarchy.

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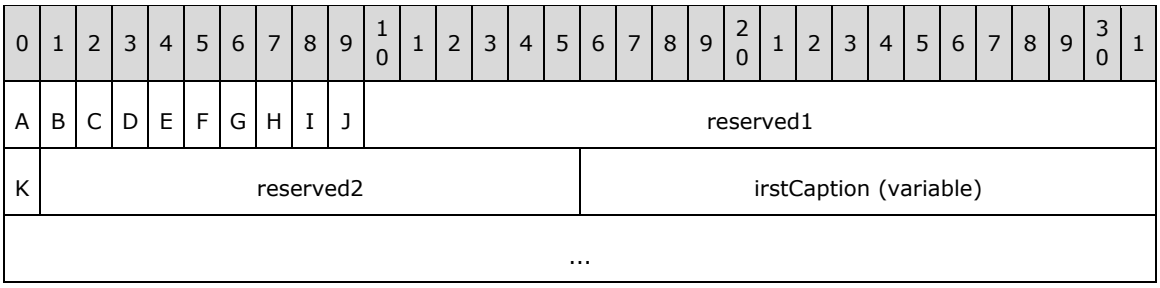

A - fOutlineMode (1 bit): A bit that specifies whether the pivot fields (section 2.2.5) representing the levels of this pivot hierarchy have the **fOutline** field of the **BrtBeginSXVD** record (section 2.4.270) set to 1 when the pivot fields are first created. See section 2.2.5.3.7.4.2 for more information.

B - fEnableMultiplePageItems (1 bit): A bit that specifies whether multiple **OLAP members** can be selected when the pivot hierarchy is on the page axis (section 2.2.5.3.7.1) of the PivotTable view (section 2.2.5.3).

C - fSubtotalAtTop (1 bit): A bit that specifies whether the pivot fields representing the levels of this pivot hierarchy have the **fSubtotalAtTop** field of the **BrtBeginSxvd** record set to 1 when the pivot fields are first created. See Subtotaling (section 2.2.5.3.7.4.2) for more information.

D - fDontShowFList (1 bit): A bit that specifies whether this pivot hierarchy is hidden in the pivot field list, a mechanism for adding and removing pivot fields and pivot hierarchies from the PivotTable view.

E - fDragToRow (1 bit): A bit that specifies whether this pivot hierarchy can be placed on the **row** axis of the PivotTable view. Possible values for this field and their meanings are listed in the following table.

Value	Meaning
0	Specifies that this pivot hierarchy cannot be placed on the row axis of the PivotTable view.
1	Specifies that this pivot hierarchy can be placed on the row axis of the PivotTable view. If this field is equal to 1, the **fMeasure** field on the **BrtBeginPCDHierarchy** (section 2.4.145) record of the associated cache hierarchy (section 2.2.5.2.7) MUST be 0.

F - fDragToColumn (1 bit): A bit that specifies whether this pivot hierarchy can be placed on the **column (1)** axis of the PivotTable view. Possible values for this field and their meanings are listed in the following table.

Value	Meaning
0	Specifies that this pivot hierarchy cannot be placed on the column (1) axis of the PivotTable view.
1	Specifies that this pivot hierarchy can be placed on the column (1) axis of the PivotTable view. If this field is equal to 1, the **fMeasure** field of the **BrtBeginPCDHierarchy** record of the associated cache hierarchy MUST be 0.

G - fDragToPage (1 bit): A bit that specifies whether this pivot hierarchy can be placed on the page axis (section 2.2.5.3.7.1) of the PivotTable view. Possible values for this field and their meanings are listed in the following table.

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Value	Meaning
0	Specifies that this pivot hierarchy cannot be placed on the page axis of the PivotTable view.
1	Specifies that this pivot hierarchy can be placed on the page axis of the PivotTable view. If this field is equal to 1, the **fMeasure** field in the **BrtBeginPCDHierarchy** record of the associated cache hierarchy MUST be 0.

H - fDragToHide (1 bit): A bit that specifies whether this pivot hierarchy can be removed from the PivotTable view.

I - fDragToData (1 bit): A bit that specifies whether this pivot hierarchy can be placed on the data axis (section 2.2.5.3.7.5) of the PivotTable view. Possible values for this field and their meanings are listed in the following table.

Value	Meaning
0	Specifies that this pivot hierarchy cannot be placed on the data axis of the PivotTable view.
1	Specifies that this pivot hierarchy can be placed on the data axis of the PivotTable view. If this field is equal to 1, the **fMeasure** field on the **BrtBeginPCDHierarchy** record of the associated cache hierarchy MUST be 1.

J - fFilterInclusive (1 bit): A bit that specifies whether manual filters (section 2.2.5.3.5) applied to this pivot hierarchy are inclusive or exclusive. This value MUST be a value from the following table.

Value	Meaning
0	OLAP members specified in the manual filter are excluded from the PivotTable view along with their descendants.
1	OLAP members specified in the manual filter are included from the PivotTable view along with their ascendants and descendants.

For more information, see section 2.2.5.3.5.2.

reserved1 (22 bits): This value MUST be zero, and MUST be ignored.

K - fLoadCap (1 bit): A bit that specifies whether an **irstCaption** is included in this record.

reserved2 (15 bits): This value MUST be zero, and MUST be ignored.

irstCaption (variable): An **XLWideString** (section 2.5.168) that specifies the user-defined caption of this pivot hierarchy. This value MUST exist if **fLoadCap** is 1. This value MUST NOT exist if **fLoadCap** is 0. This value MUST be less than or equal to 32,767 characters in length.

2.4.262 BrtBeginSXTHItem

This **BrtBeginSXTHItem** record specifies the **MDX unique name** of an **OLAP member** to be included or excluded in PivotTable view manual filtering (section 2.2.5.3.5) and specifies the beginning of an empty collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**.

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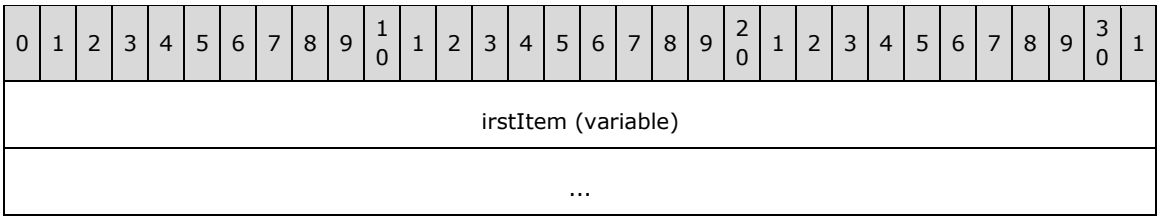
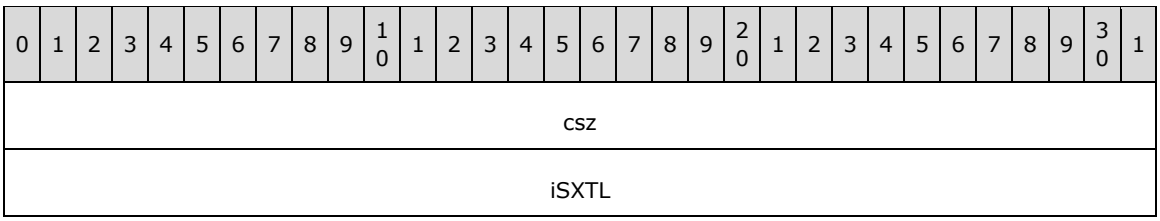


irstItem (variable): An **XLWideString** that specifies the MDX unique name of an OLAP member to be included or excluded in PivotTable view OLAP manual filters (section 2.2.5.3.5.2).

2.4.263 BrtBeginSXTHItems

The **BrtBeginSXTHItems** record specifies the count of **OLAP members** that are included or excluded in **PivotTable** manual filtering (section 2.2.5.3.5) and specifies the beginning of a collection of records as specified by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the OLAP members that are included or excluded in **PivotTable** manual filtering.



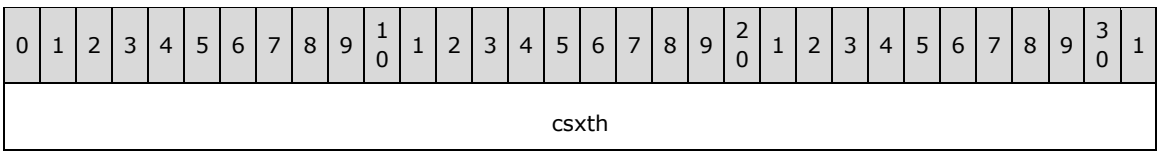
csz (4 bytes): An unsigned integer that specifies the count of **MDX unique names** of OLAP members that are included or excluded in PivotTable OLAP manual filters (section 2.2.5.3.5.2). This value MUST be equal to the number of **BrtBeginSXTHItem** (section 2.4.262) records in this collection.

iSXTL (4 bytes): A signed integer that specifies the zero-based ordinal of the **level** associated with the **BrtBeginSXTHItem** records in this collection. A value of -1 specifies that the **BrtBeginSXTHItem** records in this collection can be from any pivot field (section 2.2.5.3.2) of the corresponding pivot hierarchy (section 2.2.5.3.4) as specified by the preceding **BrtBeginSXTH** (section 2.4.261) collection.

If the data functionality level (section 2.2.5.1) of this PivotTable view (section 2.2.5.3) is greater than or equal to 3, or this pivot hierarchy is not on the page axis (section 2.2.5.3.7.1), this value MUST be greater than or equal to 0. If the data functionality level of this PivotTable view is less than 3 and this pivot hierarchy is on the page axis, this value MUST be equal to -1.

2.4.264 BrtBeginSXTHs

The **BrtBeginSXTHs** record specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies pivot hierarchies of the PivotTable view (section 2.2.5.3).



csxth (4 bytes): An unsigned integer that specifies the number of **BrtBeginSXTH** (section 2.4.261) records within this collection. This value MUST be equal to the number of **BrtBeginSXTH** records. This value MUST be equal to the number of **BrtBeginPCDHierarchy** (section 2.4.145) records

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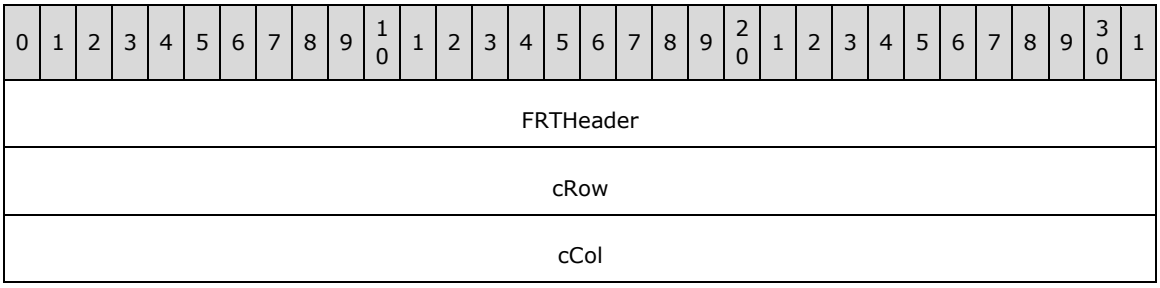
plus the number of **BrtBeginPCDKPI** records (section 2.4.147) of the associated **PivotCache** (section 2.2.5.2).

2.4.265 BrtBeginSXTupleSet

The **BrtBeginSXTupleSet** record specifies the beginning of a collection of records and collections as defined by the Common Productions **ABNF** (section 2.1.8). The collection of records specifies an **OLAP named set.**



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

cRow (4 bytes): An unsigned integer that specifies the number of **BrtBeginSXTupleSetRow** (section 2.4.268) records within this collection. This value MUST be greater than or equal to 1. The result of **cRow** * **cCol** MUST be less than or equal to 3000.

cCol (4 bytes): An unsigned integer that specifies the number of **BrtSXTupleSetHeaderItem** (section 2.4.806) records within this collection. This value MUST be greater than or equal to 1. The result of **cRow** * **cCol** MUST be less than or equal to 3000.

2.4.266 BrtBeginSXTupleSetData

The **BrtBeginSXTupleSetData** record specifies the beginning of a collection of records as defined by the Common Productions **ABNF** (section 2.1.8). The collection of records specifies the **MDX tuples** within the associated **OLAP named set.** The value of the **cRow** field in the **BrtBeginSXTupleSet** (section 2.4.265) record that immediately precedes this record MUST be equal to the number of **BrtBeginSXTupleSetRow** records between this **BrtBeginSXTupleSetData** record and the **BrtEndSXTupleSetData** record that immediately follows this record.

2.4.267 BrtBeginSXTupleSetHeader

The **BrtBeginSXTupleSetHeader** record specifies the beginning of a collection of records as defined by the Common Productions **ABNF** (section 2.1.8). The collection of records specifies the **MDX unique names** of the **OLAP hierarchies** and the MDX unique names of the **OLAP levels** of the **OLAP named set**. The value of the **cCol** field in the **BrtBeginSXTupleSet** record that immediately precedes this record MUST be equal to the number of **BrtSXTupleSetHeaderItem** records between this **BrtBeginSXTupleSetHeader** record and the **BrtEndSXTupleSetHeader** record that immediately follows this record.

2.4.268 BrtBeginSXTupleSetRow

The **BrtBeginSXTupleSetRow** record specifies the beginning of a collection of records as defined by the Common Productions **ABNF** (section 2.1.8). The collection of records specifies an **MDX tuple** within the **OLAP named set**. The value of the **cRow** field in the **BrtBeginSXTupleSet** record that immediately precedes this record MUST be equal to the number of **BrtBeginSXTupleSetRow** records

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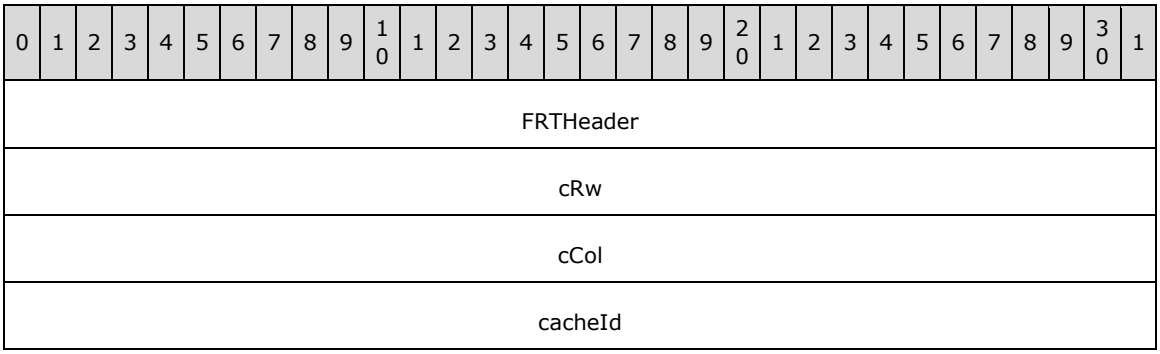
between the **BrtBeginSXTupleSetData** record that immediately precedes this record and the **BrtEndSXTupleSetData** record that immediately follows this record. The value of the **cCol** field in the **BrtBeginSXTupleSet** record that immediately precedes this record MUST be equal to the number of **BrtSXTupleSetRowItem** records between this **BrtBeginSXTupleSetRow** record and the **BrtEndSXTupleSetRow** record that immediately follows this record.

2.4.269 BrtBeginSxvcells

The **BrtBeginSxvcells** record specifies the beginning of a collection of records, as defined by the **PivotTable** (section 2.1.7.40) part **ABNF** rules. The collection of records specifies a **PivotValues** (section 2.2.5.6) collection in a Non-Worksheet PivotTable (section 2.2.5.5).



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) structure that specifies the future record (section 2.1.6) information for this record.

cRw (4 bytes): An unsigned integer that specifies the number of **BrtBeginSxRow** (section 2.4.255) records in this collection. This value MUST be equal to the number of **BrtBeginSxRow** (section 2.4.255) and **BrtEndSxRow** (section 2.4.603) record pairs that appear between this **BrtBeginSxvcells** record and the next **BrtEndSxvcells** (section 2.4.617) record.

cCol (4 bytes): An unsigned integer that specifies the number of **PivotValueCell** data units in this collection. This value MUST be equal to the number of **PIVOTVALUECELL15** (section 2.1.7.40) rules that appear in the **PIVOTROWS15** (section 2.1.7.40) rule specified by the **PivotTable** (section 2.1.7.40) part ABNF rules. The value MUST be equal to the value of the **csxvcells** field of each of the **BrtBeginSxRow** (section 2.4.255) records that appear between this **BrtBeginSxvcells** record and the next **BrtEndSxvcells** (section 2.4.617).

cacheId (4 bytes): An unsigned integer attribute that specifies the **OLAP** **PivotCache** (section 2.2.5.2) associated with the **PivotTable** (section 2.1.7.40) associated with this record.

The **PivotCache Definition** (section 2.1.7.38) associated with the **PivotTable** that is associated with this record MUST be extended by a **BrtBeginPCD14** (section 2.4.122) and a **BrtEndPCD14** record as specified in the **PivotCache Definition** part ABNF. The **icacheId** field of the **BrtBeginPCD14** record MUST be equal to this field. The **fSlicerData** field of the **BrtBeginPCD14** record MUST be 0.

The **PivotCache Definition** (section 2.1.7.38) associated with the **PivotTable** that is associated with this record MUST be extended by a **BrtPivotCacheIdVersion** (section 2.4.733) record as specified in the **PivotCache Definition** part ABNF.

2.4.270 BrtBeginSXVD

The **BrtBeginSXVD** record specifies pivot field (section 2.2.5.3.2) properties and specifies the beginning of a collection of records as defined in the **PivotTable** (section 2.1.7.40) part **ABNF**. This collection of records specifies a pivot field on the **PivotTable** view (section 2.2.5.3).

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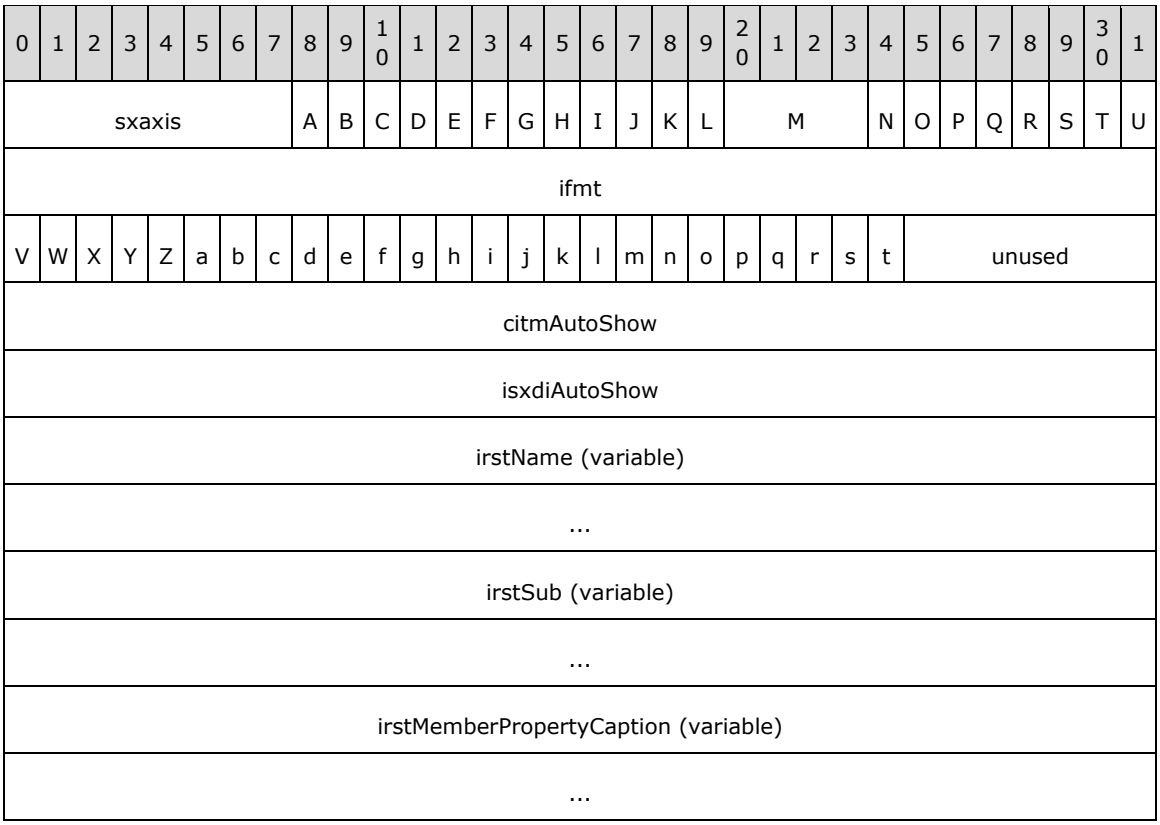

sxaxis (1 byte): An **SXAxis** (section 2.5.145) that specifies the axis or axes this field is present on. For more details, see section 2.2.5.3.7.

If **sxaxis.sxaxisData** is equal to 1, then there MUST be a **BrtBeginSXDI** (section 2.4.241) record in the same PivotTable view as this record with an **isxvdData** field that references this record. If **sxaxis.sxaxisData** is equal to 1 and this is an **OLAP** PivotTable, then the **BrtBeginPCDHierarchy** (section 2.4.145) record associated with this record MUST have its **fMeasure** field equal to 1.

If **sxaxis.sxaxisRw** is equal to 1 and this is a non-OLAP PivotTable, then the **BrtBeginISXVDRws** (section 2.4.96) collection in the same PivotTable view as this record MUST have a value within its **rgisxvdrws** field that references this record. If **sxaxis.sxAxisRw** is equal to 1, **sxaxis.sxaxisCol** and **sxaxis.sxaxisPage** MUST be equal to 0. If **sxaxis.sxAxisRw** is equal to 1 and this is an OLAP PivotTable, then the **BrtBeginPCDHierarchy** record associated with this record MUST have its **fMeasure** field equal to 0.

If **sxaxis.sxaxisCol** is equal to 1 and this is a non-OLAP PivotTable, then the **BrtBeginISXVDCols** (section 2.4.95) in the same PivotTable view as this record MUST have a value within its **rgisxvdcols** that references this record. If **sxaxis.sxAxisCol** is equal to 1, **sxaxis.sxaxisRw** and **sxaxis.sxaxisPage** MUST be equal to 0. If **sxaxis.sxAxisCol** is equal to 1 and this is an OLAP PivotTable, then the **BrtBeginPCDHierarchy** record associated with this record MUST have its **fMeasure** field equal to 0.

If **sxaxis.sxaxisPage** is equal to 1, then there MUST be a **BrtBeginSXPI** (section 2.4.253) record in the same PivotTable view as this record with an **isxvd** that references this record. If **sxaxis.sxAxisPage** is equal to 1, **sxaxis.sxaxisRw** and **sxaxis.sxaxisCol** MUST be equal to 0. If **sxaxis.sxAxisPage** is equal to 1 and this is an OLAP PivotTable, then the **BrtBeginPCDHierarchy** record associated with this record MUST have its **fMeasure** field equal to 0.

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A - fDefault (1 bit): A bit that specifies whether the default subtotal is displayed for this pivot field. The default subtotal is separately determined for each data item (section 2.2.5.3.7.5.1) (as specified by the **iiftab** field in the **BrtBeginSXDI** record) in this PivotTable view. If this value is equal to 1, a **BrtBeginSXVI** (section 2.4.272) with an **itmType** field equal to **PITDEFAULT** (section 2.5.104) MUST exist within this collection. If this value is equal to 0, a **BrtBeginSXVI** with an **itmType** field equal to **PITDEFAULT** MUST NOT exist within this collection. For more information, see section 2.2.5.3.7.4.2.

B - fSum (1 bit): A bit that specifies whether subtotals using the sum aggregate function are displayed for this pivot field. If this value is equal to 1, a **BrtBeginSXVI** with an **itmType** field equal to **PITSUM** (section 2.5.104) MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a **BrtBeginSXVI** with an **itmType** field equal to **PITSUM** MUST NOT exist within this collection. MUST be 0 for OLAP PivotTables. For more information, see section 2.2.5.3.7.4.2.

C - fCounta (1 bit): A bit that specifies whether subtotals using the count aggregate function are displayed for this pivot field. If this value is equal to 1, a **BrtBeginSXVI** with an **itmType** field equal to **PITCOUNTA** (section 2.5.104) MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a **BrtBeginSXVI** with an **itmType** field equal to **PITCOUNTA** MUST NOT exist within this collection. MUST be 0 for OLAP PivotTables. For more information, see section 2.2.5.3.7.4.2.

D - fAverage (1 bit): A bit that specifies whether subtotals using the average aggregate function are displayed for this pivot field. If this value is equal to 1, a **BrtBeginSXVI** with an **itmType** field equal to **PITAVG** (section 2.5.104) MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a **BrtBeginSXVI** with an **itmType** field equal to **PITAVG** MUST NOT exist within this collection. This value MUST be 0 for OLAP PivotTables. For more information, see section 2.2.5.3.7.4.2.

E - fMax (1 bit): A bit that specifies whether subtotals using the maximum aggregate function are displayed for this pivot field. If this value is equal to 1, a **BrtBeginSXVI** with an **itmType** field equal to **PITMAX** MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a **BrtBeginSXVI** with an **itmType** field equal to **PITMAX** (section 2.5.104) MUST NOT exist within this collection. This value MUST be 0 for OLAP PivotTables. For more information, see section 2.2.5.3.7.4.2.

F - fMin (1 bit): A bit that specifies whether subtotals using the minimum aggregate function are displayed for this pivot field. If this value is equal to 1, a **BrtBeginSXVI** with an **itmType** field equal to **PITMIN** MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a **BrtBeginSXVI** with an **itmType** field equal to **PITMIN** MUST NOT exist within this collection. This value MUST be 0 for OLAP PivotTables. For more information, see section 2.2.5.3.7.4.2.

G - fProduct (1 bit): A bit that specifies whether subtotals using the product aggregate function are displayed for this pivot field. If this value is equal to 1, a **BrtBeginSXVI** with an **itmType** field equal to **PITPRODUCT** (section 2.5.104) MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a **BrtBeginSXVI** with an **itmType** field equal to **PITPRODUCT** MUST NOT exist within this collection. This value MUST be 0 for OLAP PivotTables. For more information, see section 2.2.5.3.7.4.2.

H - fCount (1 bit): A bit that specifies whether subtotals using the count number aggregate function are displayed for this pivot field. If this value is equal to 1, a **BrtBeginSXVI** with an **itmType** field equal to **PITCOUNT** (section 2.5.104) MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a **BrtBeginSXVI** with an **itmType** field equal to **PITCOUNT** MUST NOT exist within this collection. This value MUST be 0 for OLAP PivotTables. For more information, see section 2.2.5.3.7.4.2.

I - fStdev (1 bit): A bit that specifies whether subtotals using the standard deviation aggregate function are displayed for this pivot field. If this value is equal to 1, a **BrtBeginSXVI** with an

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itmType field equal to **PITSTDDEV** (section 2.5.104) MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a **BrtBeginSXVI** with an **itmType** field equal to **PITSTDDEV** MUST NOT exist within this collection. This value MUST be 0 for OLAP PivotTables. For more information, see section 2.2.5.3.7.4.2.

J - fStdevp (1 bit): A bit that specifies whether subtotals using the standard deviation population aggregate function are displayed for this pivot field. If this value is equal to 1, a **BrtBeginSXVI** with an **itmType** field equal to **PITSTDDEVP** (section 2.5.104) MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a **BrtBeginSXVI** with an **itmType** field equal to **PITSTDDEVP** MUST NOT exist within this collection. This value MUST be 0 for OLAP PivotTables. For more information, see section 2.2.5.3.7.4.2.

K - fVar (1 bit): A bit that specifies whether subtotals using the variance aggregate function are displayed for this pivot field. If this value is equal to 1, a **BrtBeginSXVI** with an **itmType** field equal to **PITVAR** (section 2.5.104) MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a **BrtBeginSXVI** with an **itmType** field equal to **PITVAR** MUST NOT exist within this collection. This value MUST be 0 for OLAP PivotTables. For more information, see section 2.2.5.3.7.4.2.

L - fVarp (1 bit): A bit that specifies whether subtotals using the variance population aggregate function are displayed for this pivot field. If this value is equal to 1, a **BrtBeginSXVI** with an **itmType** field equal to **PITVARP** (section 2.5.104) MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a **BrtBeginSXVI** with an **itmType** field equal to **PITVARP** MUST NOT exist within this collection. This value MUST be 0 for OLAP PivotTables. For more information, see section 2.2.5.3.7.4.2.

M - reserved1 (4 bits): This value MUST be 0, and MUST be ignored.

N - fDrilledLevel (1 bit): A bit that specifies whether all pivot items (section 2.2.5.3.3) in this pivot field are expanded. This value MUST be 0 and MUST be ignored for non-OLAP PivotTables. For more details, section 2.2.5.3.7.4.1.

O - fHideDD (1 bit): A bit that specifies whether drop-down buttons (mechanisms for applying manual filters (section 2.2.5.3.5), advanced filters (section 2.2.5.3.6.1), and sorting options) are shown in **cells** where pivot field labels are displayed (for more details, see section 2.2.5.3.8.3.

P - fHiddenLvl (1 bit): A bit that specifies whether this pivot field is not shown in the PivotTable view. This value MUST be equal to 0 for non-OLAP PivotTables.

Q - fUseMemPropCaption (1 bit): A bit that specifies whether this record contains an **irstMemberPropertyCaption** field. This value MUST be equal to 0 for non-OLAP PivotTables. This value MUST be equal to 0 if the **bVerSxMacro** field on the immediately preceding **BrtBeginSXView** (section 2.4.273) record is less than 3.

R - fCompact (1 bit): A bit that specifies whether this pivot field is in **compact axis** mode. For more details, see section 2.2.5.3.8.3.

S - fDisplayName (1 bit): A bit that specifies whether the **irstName** field exists.

T - fDisplaySub (1 bit): A bit that specifies whether the **irstSub** field exists.

U - fTensorSort (1 bit): A bit that specifies whether pivot items of this pivot field are displayed in the order retrieved from the source data. This value MUST be equal to 0 for non-OLAP PivotTables. For more details, see section 2.2.5.

ifmt (4 bytes): A **PivotNumFmtExt** (section 2.5.106) that specifies the **number format** applied to the pivot items in this pivot field.

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V - fDragToRow (1 bit): A bit that specifies whether this pivot field can be placed on the **row** axis. This value MUST be ignored for an OLAP PivotTable view. This value MUST be a value from the following table.

Value	Meaning
0	Specifies that the user will be prevented from placing this pivot field on the row axis.
1	Specifies that the user will not be prevented from placing this pivot field on the row axis.

W - fDragToColumn (1 bit): A bit that specifies whether this pivot field can be placed on the **column (1)** axis. This value MUST be ignored for an OLAP PivotTable view. This value MUST be a value from the following table.

Value	Meaning
0	Specifies that the user will be prevented from placing this pivot field on the column (1) axis.
1	Specifies that the user will not be prevented from placing this pivot field on the column (1) axis.

X - fDragToPage (1 bit): A bit that specifies whether this pivot field can be placed on the page axis (section 2.2.5.3.7.1). This value MUST be ignored for an OLAP PivotTable view. This value MUST be a value from the following table.

Value	Meaning
0	Specifies that the user will be prevented from placing this pivot field on the page axis.
1	Specifies that the user will not be prevented from placing this pivot field on the page axis.

Y - fDragToHide (1 bit): A bit that specifies whether this pivot field can be removed from the PivotTable view. This value MUST be ignored for an OLAP PivotTable view. This value MUST be a value from the following table.

Value	Meaning
0	Specifies that the user will be prevented from removing this pivot field from the PivotTable view.
1	Specifies that the user will not be prevented from removing this pivot field from the PivotTable view.

Z - fDragToData (1 bit): A bit that specifies whether this pivot field can be placed on the data axis (section 2.2.5.3.7.5). This value MUST be ignored for an OLAP PivotTable view. This value MUST be a value from the following table.

Value	Meaning
0	Specifies that the user will be prevented from placing this pivot field on the data axis.
1	Specifies that the user will not be prevented from placing this pivot field on the data axis.

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a - fShowAllItems (1 bit): A bit that specifies whether to show all pivot items for this pivot field, including pivot items that do not currently exist in the source data. This value MUST be 0 for an OLAP PivotTable view. For more information, see Nesting (section 2.2.5.3.7.4). This value MUST be a value from the following table.

Value	Meaning
0	Specifies that all pivot items are not displayed.
1	Specifies that all pivot items are displayed.

b - fOutline (1 bit): A bit that specifies whether this pivot field is in **outline** form. For more details, see sections 2.2.5.3.8 and 2.2.5.3.7.4.2.

c - fInsertBlankRow (1 bit): A bit that specifies whether to insert a blank row after each pivot item (section 2.2.5.3.3).

d - fSubtotalAtTop (1 bit): A bit that specifies whether subtotals are displayed at the top of the group when **fOutline** is equal to 1. For more details, see sections 2.2.5.3.8 and 2.2.5.3.7.4.2.

e - fServerBased (1 bit): A bit that specifies whether this pivot field is server-based when on the page axis. For more details, see section 2.2.5.2.1.

This value MUST be 1 if and only if the **fServerBased** field of the **BrtBeginPCDField** (section 2.4.135) that specifies the cache field (section 2.2.5.2.2) associated with this pivot field is 1. If this value is 1, the **BrtBeginPivotCacheDef** (section 2.4.167) collection that specifies the **PivotCache** (section 2.2.5.2) associated with this **PivotTable** (section 2.1.7.40) MUST have a **BrtBeginPCDSource** (section 2.4.165) record with a **isrctype** field equal to 1. This value MUST be 0 for PivotTables not based on **ODBC** source data.

f - reserved2 (1 bit): This value MUST be 0, and MUST be ignored.

g - fPageBreaksBetweenItems (1 bit): A bit that specifies whether a **page break** will be inserted after each pivot item when the PivotTable is printed.

h - fAutoSort (1 bit): A bit that specifies whether fAutoSort (for definition, see section 2.2.5.3.2.1) is applied to this pivot field.

i - fAscendSort (1 bit): A bit that specifies whether an autosort (for definition, see section 2.2.5.3.2.1) applied to this pivot field will **sort** in ascending order. This value MUST be a value from the following table.

Value	Meaning
0	Sort in ascending order.
1	Sort in descending order.

j - fAutoShow (1 bit): A bit that specifies whether an **AutoShow filter** is applied to this pivot field. For more details, see section (section 2.2.5.3.6.2).

k - fTopAutoShow (1 bit): A bit that specifies whether an AutoShow filter applied to this pivot field will show the top-ranked or bottom-ranked values. For more details, see Simple Filters (section 2.2.5.3.6.2). This value MUST be a value from the following table.

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Value	Meaning
0	An AutoShow filter applied to this pivot field will show the bottom-ranked values.
1	An AutoShow filter applied to this pivot field will show the top-ranked values.

l - fHideNewItems (1 bit): A bit that specifies whether new pivot items that appear after a **refresh** are **hidden** by default. This value MUST be equal to 0 for non-OLAP PivotTables. Possible values for this field are listed in the following table.

Value	Meaning
0	New pivot items will be shown by default.
1	New pivot items will be hidden by default.

m - fHasAdvFilter (1 bit): A bit that specifies whether this pivot field has a value filter (section 2.2.5.3.6.1.3) applied to it.

n - fFilterInclusive (1 bit): A bit that specifies manual filter behavior. For non-OLAP PivotTables, this bit specifies whether new items will be excluded in manual filtering by default. For OLAP PivotTables, this bit specifies whether a manual filter applied to this pivot field specifies pivot items that are included or excluded. If this pivot field is associated with a pivot hierarchy, this value MUST equal the **fFilterInclusive** field on the **BrtBeginSXTH** (section 2.4.261) record of the pivot hierarchy that this pivot field is associated with. For OLAP PivotTables, see section 2.2.5.3.5.2 for more details.

o - fEnableMultiplePageItems (1 bit): A bit that specifies whether this pivot field can have multiple pivot items **selected** when it is on the page axis. This value MUST be 0 and MUST be ignored for OLAP PivotTables.

p - fNotAutoSortDft (1 bit): A bit that specifies whether a sort operation that will be applied to this pivot field is an autosort operation or a simple data sort. Possible values for this field are listed in the following table.

Value	Meaning
0	A sort operation applied to this pivot field is an autosort. If this value is equal to 0, **fAutoSort** MUST be equal to 0.
1	A sort operation applied to this pivot field is a simple data sort that will only be applied once, and not an autosort.

q - fMemPropDisplayInReport (1 bit): A bit that specifies whether to show **member** property values in the OLAP PivotTable view. The member property is only displayed if the pivot hierarchy is on the row axis as specified by **sxaxis**.**sxaxisRw** or on the column (1) axis as specified by **sxaxis**.**sxaxisCol**. This value MUST be equal to 0 for non-OLAP PivotTables. If this value is 1, the **fOlapMemPropField** field on the **BrtBeginPCDField** record of the cache field associated with this pivot field MUST be 1.

r - fMemPropDisplayInTip (1 bit): A bit that specifies whether to show member property values in a **ToolTip**. This value MUST be equal to 0 for non-OLAP PivotTables. If this value is 1, the **fOlapMemPropField** field on the **BrtBeginPCDField** record of the cache field associated with this pivot field MUST be 1. If the **bVerSxMacro** field on the immediately preceding **BrtBeginSXView** record is less than 3, this value MUST be equal to 0.

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s - fMemPropDisplayInCaption (1 bit): A bit that specifies whether to show member property captions as specified by the **irstMemberPropertyCaption** field instead of the pivot item captions. This value MUST be equal to 0 for non-OLAP PivotTables. If this value is 1, the **fOlapMemPropField** field on the **BrtBeginPCDField** record of the cache field associated with this pivot field MUST be 1. If the **bVerSxMacro** field on the associated **BrtBeginSXView** is less than 3, this value MUST be equal to 0.

t - fItemsDrilledByDefault (1 bit): A bit that specifies whether the **attribute hierarchy** in an OLAP PivotTable is expanded by default. This value MUST be equal to 0 for non-OLAP PivotTables. If this value is equal to 1, the **fAttributeHierarchy** field on the **BrtBeginPCDHierarchy** record of the cache hierarchy (section 2.2.5.2.7) associated with the pivot hierarchy this pivot field is **associated** with MUST be equal to 1. For more information, section 2.2.5.3.7.4.1.

unused (7 bits): This value is undefined, and MUST be ignored.

citmAutoShow (4 bytes): A signed integer that specifies the number of items to show when the **fAutoShow** field is equal to 1. If the **bVerSxMacro** field on the associated **BrtBeginSXView** record is less than 3, this value MUST be greater than or equal to 1 and less than or equal to 255. If the **bVerSxMacro** field on the associated **BrtBeginSXView** record is greater than or equal to 3, this value MUST be greater than or equal to 1.

isxdiAutoShow (4 bytes): An **ISXDI** (section 2.5.81) that specifies the data item that AutoShow ranks by when **fAutoShow** is equal to 1. If **fAutoShow** is equal to 1, this value MUST NOT equal -1.

irstName (variable): An **XLWideString** (section 2.5.168) that specifies the name of this pivot field.

If **fDisplayName** is equal to 1, **irstName** MUST be present. If **fDisplayName** is equal to 0, **irstName** MUST NOT be present. If present, this value MUST be greater than or equal to 1 character in length. If the **bVerSxMacro** on the **BrtBeginSXView** record associated with this record is less than 3, **irstName** MUST be less than or equal to 255 characters in length. Otherwise, **irstName** MUST be less than or equal to 32,767 characters in length. If this is a non-OLAP **PivotTable**, this **irstName** MUST NOT equal the **irstName** of another **BrtBeginSXVD** associated with the same **BrtBeginSXView** that this record is associated with.

irstSub (variable): An **XLWideString** that specifies the custom text that is displayed for the subtotals label. A "?" character within the string specifies that the name of the pivot item will be inserted in that position when the string is displayed.

If **fDisplaySub** is equal to 1, **irstSub** MUST be present. If **fDisplaySub** is equal to 0, **irstSub** MUST NOT be present. If present, this value MUST be greater than or equal to 1 character in length. If the **bVerSxMacro** on the **BrtBeginSXView** associated with this record is less than 3, **irstSub** MUST be less than or equal to 255 characters in length. Otherwise, **irstSub** MUST be less than or equal to 32,767 characters in length.

irstMemberPropertyCaption (variable): An **XLWideString** that specifies the **MDX unique name** of the member property used as a caption for the pivot field and pivot items.

If **fUseMemPropCaption** is equal to 1, **irstMemberPropertyCaption** MUST be present. If **fUseMemPropCaption** is equal to 0, **irstMemberPropertyCaption** MUST NOT be present. If present, **irstMemberPropertyCaption** MUST be less than or equal to 32,767 characters in length. If present, **irstMemberPropertyCaption** MUST be greater than 0 characters in length.

2.4.271 BrtBeginSXVDs

This record specifies the beginning of a collection of records as specified by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the pivot fields (section 2.2.5) of the **PivotTable** view (section 2.2.5.3).

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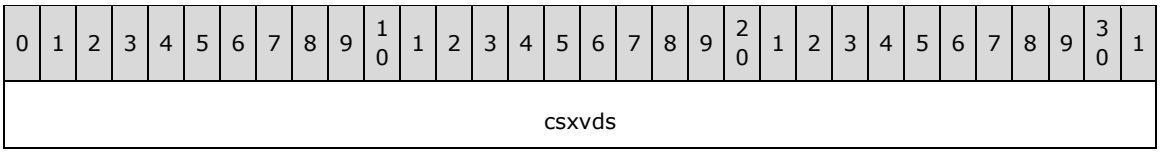
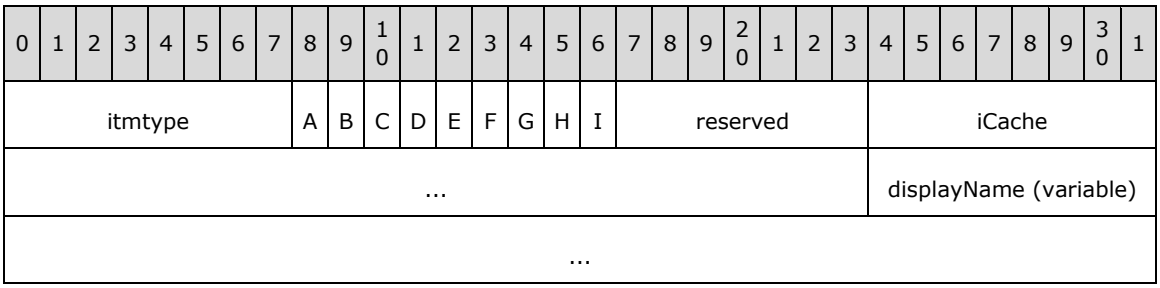


csxvds (4 bytes): An unsigned integer that specifies the number of pivot fields of the **PivotTable** view. This value MUST equal the number of **BrtBeginSXVD** records (section 2.4.270) in this collection. If this **PivotTable** is an **OLAP PivotTable**, this value MUST be less than or equal to the number of **BrtBeginPCDField** (section 2.4.135) records in the associated **PivotCache** (section 2.2.5.2). If this **PivotTable** is not an OLAP **PivotTable**, this value MUST be equal to the number of **BrtBeginPCDField** records in the associated **PivotCache**.

2.4.272 BrtBeginSXVI

This record specifies a pivot item (section 2.2.5.3.3) and specifies the beginning of an empty collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**.



itmtype (1 byte): A **PivotItemType** (section 2.5.104) that specifies the type of this pivot item. This value MUST NOT equal **PITGRAND** or **PITBLANK** (section 2.5.104). All **BrtBeginSXVI** (section 2.4.272) records that have a value of **PITDATA** (defined in section 2.5.104) for the **itmtype** field MUST precede all other **BrtBeginSXVI** records in the **PivotTable** part ABNF.

A - fHidden (1 bit): A bit that specifies whether this pivot item is **hidden** by a manual filter (section 2.2.5.3.5). If this record applies to an **OLAP PivotTable** view (section 2.2.5.3) or the value of **itmtype** is not **PITDATA**, this value MUST be 0.

B - fHideDetail (1 bit): A bit that specifies whether this pivot item is collapsed. This value MUST be 0 for OLAP PivotTable views. For more details, section 2.2.5.3.7.4.1.

C - fFormula (1 bit): A bit that specifies whether the cache item (section 2.2.5.2.3) associated with this pivot item is a calculated item (section 2.2.5.2.6). If this record applies to an OLAP **PivotTable** view or the value of the **itmtype** field is not **PITDATA**, this value MUST be 0.

D - fMissing (1 bit): A bit that specifies whether this pivot item is missing from the source data (section 2.2.5.2.1). If this record applies to an OLAP **PivotTable** view or the value of **itmtype** is not **PITDATA**, this value MUST be 0.

E - fDisplayName (1 bit): A bit that specifies whether this pivot item has a user-defined caption.

F - fDrilledMember (1 bit): A bit that specifies whether this pivot item is expanded. This value MUST be 0 for non-OLAP **PivotTable** views, or if the **fAttributeHierarchy** field in the **BrtBeginPCDHierarchy** (section 2.4.145) record in the associated cache hierarchy (section 2.2.5.2.7), as specified by section 2.2.5.3.4, has a value of 1. If the value of **itmtype** is not **PITDATA**, this value MUST be 0. For more details, section 2.2.5.3.7.4.1.

G - fHasChildrenEst (1 bit): A bit that specifies whether the pivot item can have child objects. If this record applies to a non-OLAP PivotTable view, this value MUST be 0.

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H - fCollapsedMember (1 bit): A bit that specifies whether this pivot item is collapsed when the preceding PivotTable view field is on the **row** axis or **column (1)** axis. The value MUST be 0 for non-OLAP PivotTable views. This value MUST be 0 unless the **fAttributeHierarchy** field in the **BrtBeginPCDHierarchy** record in the associated cache hierarchy, as specified by section 2.2.5.3.4, has a value of 1. This field MUST be ignored, unless there is a following pivot field (section 2.2.5.3.2) for which the **fAttributeHierarchy** field in the **BrtBeginPCDHierarchy** record in the associated cache hierarchy, as specified by cache hierarchies (section 2.2.5.2.7), also has a value of 1. For more details, section 2.2.5.3.7.4.1.

I - fOlapFilterSelected (1 bit): A bit that specifies whether this pivot item is included in the manual filter applied to the corresponding pivot field specified by the preceding **BrtBeginSXVD** record (section 2.4.270). This value MUST be 0 for non-OLAP **PivotTable** views. For more details, see section 2.2.5.3.5.2. The meaning of this value is specified in the following table.

Value of fFilterInclusive field of BrtBeginSXVD record	Value of fOlapFilterSelected	Meaning
1	1	This pivot item is included in the manual filter applied to the corresponding pivot field specified by the preceding **BrtBeginSXVD** record, and will be displayed in the corresponding **PivotTable** view specified by the preceding **BrtBeginSXView** (section 2.4.273) record.
1	0	This pivot item is not included in the manual filter applied to the corresponding pivot field specified by the preceding **BrtBeginSXVD** record, and will not be displayed in the corresponding **PivotTable** view specified by the preceding **BrtBeginSXView** record.
0	1	This pivot item is excluded from the manual filter applied to the corresponding pivot field specified by the preceding **BrtBeginSXVD** record, and will not be displayed in the corresponding **PivotTable** view specified by the preceding **BrtBeginSXView** record.
0	0	This pivot item is not excluded from the manual filter applied to the corresponding pivot field specified by the preceding **BrtBeginSXVD** record, and will be displayed in the corresponding **PivotTable** view specified by the preceding **BrtBeginSXView** record.

reserved (7 bits): This value MUST be 0, and MUST be ignored.

iCache (4 bytes): A signed integer that specifies a reference to a cache item. If **itmtype** is not **PITDATA**, a reference to a cache item is not specified and this value MUST be -1. Otherwise, this value MUST be a cache item index, as specified by Cache Items, in the cache field (section 2.2.5.2.2) that is associated with this pivot field.

displayName (variable): An **XLWideString** (section 2.5.168) that specifies the user-defined caption of this pivot item. This field exists only if the value of the **fDisplayName** field is 1. If the **bVerSxMacro** field of the **BrtBeginSXView** record for this PivotTable view is less than or equal

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to 2, the length MUST be less than 256 characters. Otherwise, the length MUST be less than 32,768 characters.

2.4.273 BrtBeginSXView

The **BrtBeginSXView** record specifies PivotTable view (section 2.2.5.3) properties and specifies the beginning of a collection of records as defined in the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a PivotTable view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
bVerSxMacro								A	B	C	D	E	F	G	H	I	J			K	L	M	N	cIndentInc							O
P	Q	R	S	T	U	V	W	X	Y	Z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u
v	w	x	y	z	ɑ	β	γ	δ	ε	ζ	η	θ	ι	κ	reserved5																
sxaxis4Data								cWrapPage												bVerSxLastUpdated								bVerSxUpdateableMin			
ipos4Data																															
itblAutoFmt																				reserved6											
dwCrtFmtId																															
idCache																															
irstName (variable)																															
...																															
irstData (variable)																															
...																															
irstGrand (variable)																															
...																															
irstErrorString (variable)																															
...																															
irstNullString (variable)																															
...																															
irstPageFieldStyle (variable)																															
...																															

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irstTableStyle (variable)
...
irstVacateStyle (variable)
...
irstTag (variable)
...
irstColHdrName (variable)
...
irstRwHdrName (variable)
...

bVerSxMacro (1 byte): A **DataFunctionalityLevel** (section 2.5.28) that specifies the data functionality level (section 2.2.5.1) that this PivotTable view was created with.

A - fDisplayImmediateItems (1 bit): A bit that specifies whether pivot item (section 2.2.5.3.3) labels will be displayed in the **row** area and the **column (1)** area when there are no data items (section 2.2.5.3.7.5.1) in the PivotTable view.

B - fEnableDataEd (1 bit): A bit that specifies whether **cells** displaying values for data items can be edited.

C - fDisableFList (1 bit): A bit that specifies whether the pivot field (section 2.2.5.3.2) list, a mechanism for adding and removing pivot fields from the PivotTable view, will not be displayed.

D - fReenterOnLoadOnce (1 bit): A bit that specifies whether the PivotTable view will be automatically updated on load.

E - fNotViewCalculatedMembers (1 bit): A bit that specifies whether OLAP calculated **members** will not be displayed in the PivotTable view. This value MUST be ignored for non-**OLAP** PivotTables.

F - fNotVisualTotals (1 bit): A bit that specifies whether **hidden** pivot items (section 2.2.5.3.3) will be included when calculating totals. This value MUST be ignored for non-OLAP PivotTable views.

G - fPageMultipleItemLabel (1 bit): A bit that specifies whether a pivot field on the page axis (section 2.2.5.3.7.1) with multiple pivot items **selected** displays "(multiple items)" instead of "All". This value MUST be ignored for OLAP PivotTable views.

H - reserved1 (1 bit): This value MUST be 0 and MUST be ignored.

I - fHideDDData (1 bit): A bit that specifies whether a drop-down button, a mechanism for removing data items from the PivotTable view, for the data field (section 2.2.5.3.7.5.2) in the PivotTable view is hidden.

J - reserved2 (3 bits): This value MUST be 0 and MUST be ignored.

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K - fHideDrillIndicators (1 bit): A bit that specifies whether **expand/collapse buttons** are hidden.

L - fPrintDrillIndicators (1 bit): A bit that specifies whether expand/collapse buttons are printed.

M - fMemPropsInTips (1 bit): A bit that specifies whether member property information is shown in PivotTable view **ToolTips**.

N - fNoPivotTips (1 bit): A bit that specifies whether ToolTips are not displayed for cells associated with the PivotTable view.

cIndentInc (7 bits): An unsigned integer that specifies the indentation increment that is used for pivot fields in **compact axis** mode. The increment is one space greater than the number specified by this field. A value of 127 specifies that indentation is not used. For more details, see section 2.2.5.3.8.3.

O - fNoHeaders (1 bit): A bit that specifies whether data field captions and pivot field captions on the row axis and the column (1) axis in the PivotTable view are not displayed.

P - fNoStencil (1 bit): A bit that specifies how **drop zones** are displayed in the PivotTable view. This value MUST be a value from the following table.

Value	Meaning
0	Large drop zones are displayed when there are no data items in the PivotTable view. Small drop zones are not displayed.
1	Small drop zones are displayed. Large drop zones are not displayed.

Q - fHideTotAnnotation (1 bit): A bit that specifies whether an asterisk is not displayed next to the caption for subtotals and grand totals when the **fNotVisualTotals** field is equal to 1. This value MUST be ignored for non-OLAP PivotTable view.

R - fIncludeEmptyRw (1 bit): A bit that specifies whether to include rows with no data in the source data (section 2.2.5.2.1) in the PivotTable view. This value MUST be ignored for non-OLAP PivotTable view.

S - fIncludeEmptyCol (1 bit): A bit that specifies whether to include columns (1) with no data in the source data in the PivotTable view. This value MUST be ignored for non-OLAP PivotTable view.

T - fEnableWizard (1 bit): A bit that specifies whether the PivotTable wizard is available.

U - fEnableDrilldown (1 bit): A bit that specifies whether details can be shown for a cell that displays the value for a data item.

V - fEnableFieldDialog (1 bit): A bit that specifies whether pivot field properties can be displayed.

W - fPreserveFormatting (1 bit): A bit that specifies whether formatting applied by the user to PivotTable view cells is preserved on **refresh**.

X - fAutoFormat (1 bit): A bit that specifies whether an **AutoFormat** has been applied to the PivotTable view.

Y - fDisplayErrorString (1 bit): A bit that specifies what is displayed in cells that contain values for data items when an error occurs. This value MUST be a value from the following table.

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Value	Meaning
0	If there are errors, error strings to display in the cells are determined by the application.
1	If there are errors, the string as specified by the **irstErrorString** field is displayed in the cells.

Z - fDisplayNullString (1 bit): A bit that specifies what is displayed in cells that contain values for data items that are empty. This value MUST be a value from the following table.

Value	Meaning
0	If a cell is empty, nothing is displayed.
1	If a cell is empty, the string as specified by the **irstNullString** field is displayed in the cell.

a - fAcrossPageLay (1 bit): A bit that specifies how pivot fields are laid out in the **sheet** when there are multiple pivot fields on the page axis. This value MUST be equal to one of the following.

Value	Meaning
0	Pivot fields will be displayed down, then over.
1	Pivot fields will be displayed over, then down.

b - fSubtotalHiddenPageItems (1 bit): A bit that specifies page-filtering behavior. See section 2.2.5.3.7.1.1 for details.

If this is an OLAP PivotTable view, this value SHOULD<24> be equal to 1. If this is not an OLAP PivotTable view and the **bVerSxMacro** field is greater than or equal to 3, this value MUST be equal to 0.

c - fRwGrand (1 bit): A bit that specifies whether **grand totals** are displayed for the column (1) axis.

d - fColGrand (1 bit): A bit that specifies whether grand totals are displayed for the row axis.

e - fPrintTitles (1 bit): A bit that specifies whether print titles are set to parts of the row area and column (1) area when the PivotTable view is recalculated.

f - unused (1 bit): This value is undefined and MUST be ignored.

g - fRepeatItemsOnEachPrintedPage (1 bit): A bit that specifies whether pivot item captions on the row area are repeated on each printed page for pivot fields in tabular form.

h - fMergeLabels (1 bit): A bit that specifies whether pivot item captions on the row area and column (1) area that span multiple cells are merged into a single cell.

i - fDisplayData (1 bit): A bit that specifies whether there is an **irstData** field after the fixed part of this record. This value MUST be equal to 1.

j - fDisplayGrand (1 bit): A bit that specifies whether there is an **irstGrand** field after the fixed part of this record.

k - fDisplayPageFieldStyle (1 bit): A bit that specifies whether there is an **irstPageFieldStyle** field after the fixed part of this record.

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l - fDisplayTableStyle (1 bit): A bit that specifies whether there is an **irstTableStyle** field after the fixed part of this record.

m - fDisplayVacateStyle (1 bit): A bit that specifies whether there is an **irstVacateStyle** field after the fixed part of this record.

n - ibitAtrNum (1 bit): A bit that specifies whether AutoFormat **number format** properties are applied.

o - ibitAtrFnt (1 bit): A bit that specifies whether AutoFormat **font** format properties are applied.

p - ibitAtrAlc (1 bit): A bit that specifies whether AutoFormat alignment format properties are applied.

q - ibitAtrBdr (1 bit): A bit that specifies whether AutoFormat **border** format properties are applied.

r - ibitAtrPat (1 bit): A bit that specifies whether AutoFormat pattern format properties are applied.

s - ibitAtrProt (1 bit): A bit that specifies whether the AutoFormat style is **protected**.

t - fDisplayTag (1 bit): A bit that specifies whether there is an **irstTag** field after the fixed part of this record.

u - reserved3 (1 bit): This value MUST be 0, and MUST be ignored.

v - fDefaultCompact (1 bit): A bit that specifies whether new pivot fields are created in compact axis mode. For more details, see section 2.2.5.3.8.3.

w - fDefaultOutline (1 bit): A bit that specifies whether new pivot fields are created in **outline** form. For more information, see section 2.2.5.3.7.4.2.

x - fOutlineData (1 bit): A bit that specifies whether the data field in the PivotTable view is displayed in outline form. For more details, see Subtotaling (section 2.2.5.3.7.4.2).

y - fCompactData (1 bit): A bit that specifies whether the data field in the PivotTable view is displayed in compact axis mode. For more details, see section 2.2.5.3.8.3.

z - fNewDropZones (1 bit): A bit that specifies whether in-grid drop zones are disabled.

α - fPublished (1 bit): A bit that specifies whether this PivotTable view is included in the version of the **workbook** that is published to or rendered on a Web or application server.

β - fEmptyDisplayErrorString (1 bit): A bit that specifies whether the **irstErrorString** field does not exist after the fixed part of this record.

γ - fEmptyDisplayNullString (1 bit): A bit that specifies whether the **irstNullString** field does not exist after the fixed part of this record.

δ - fTurnOffImmersive (1 bit): A bit that specifies whether the PivotTable contextual tab, a user interface for manipulating PivotTable options, is not displayed.

ε - fSingleFilterPerField (1 bit): A bit that specifies whether the pivot fields in the PivotTable view each can have only one **filter**. For more details, see section 2.2.5.3.5 and section 2.2.5.3.6.1. This value MUST be a value from the following table.

Value	Meaning
0	Each pivot field can have multiple filters applied to it.
1	Each pivot field can have only one filter applied to it.

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ζ - fUseRwHdrName (1 bit): A bit that specifies whether there is an **irstRwHdrName** field after the fixed part of this record.

η - fUseColHdrName (1 bit): A bit that specifies whether there is an **irstColHdrName** field after the fixed part of this record.

θ - fNonDefaultSortInFlist (1 bit): A bit that specifies how pivot fields in this PivotTable are sorted in the pivot field list, a mechanism for adding and removing pivot fields from the PivotTable view. This value MUST be a value from the following table.

Value	Meaning
0	Pivot fields are displayed in source data order.
1	Pivot fields are displayed in ascending alphabetical order.

ι - reserved4 (1 bit): This value MUST be 0, and MUST be ignored.

κ - fDontUseCustomLists (1 bit): A bit that specifies whether **custom lists** are not used when sorting the pivot items in the PivotTable view.

reserved5 (17 bits): This value MUST be 0, and MUST be ignored.

sxaxis4Data (1 byte): An unsigned integer that specifies which PivotTable axis (section 2.2.5.3.7) the data field appears on. MUST be one of the following values:

Value	Meaning
0x01	The data field appears on the row axis.
0x02	The data field appears on the column (1) axis.

cWrapPage (1 byte): An unsigned integer that specifies the number of pivot fields on the page axis to display before starting another row or column (1), as specified by the **fAcrossPageLay** field. A value of 0 specifies that no wrapping will occur.

bVerSxLastUpdated (1 byte): A **DataFunctionalityLevel** that specifies the data functionality level that this PivotTable view was last updated with.

bVerSxUpdateableMin (1 byte): A **DataFunctionalityLevel** that specifies the lowest data functionality level the application is allowed to update this PivotTable view with.

ipos4Data (4 bytes): A signed integer that specifies the default position of the data field on the PivotTable axis (section 2.2.5.3.7) specified by **sxaxis4Data**. A value of -1 specifies that the data field appears as the last field on the axis. All other values specify a specific zero-based position on that axis. This value MUST be greater than or equal to -1.

itblAutoFmt (2 bytes): An **AutoFormatID** (section 2.5.3) that specifies which AutoFormat will be applied.

reserved6 (2 bytes): This value MUST be 0, and MUST be ignored.

dwCrtFmtId (4 bytes): An unsigned integer that specifies the next available chart identifier to use when creating a **PivotChart** (section 2.2.3.2) for this PivotTable.

idCache (4 bytes): An unsigned integer that specifies the **PivotCache** (section 2.2.5.2) identifier of the **PivotCache** used by this PivotTable view. This value MUST be equal to the **idSx** field of a **BrtBeginPivotCacheID** (section 2.4.168) record. For more details, see section 2.2.5.3.1.

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irstName (variable): An **XLWideString** (section 2.5.168) that specifies the unique name for this PivotTable view. This string MUST be less than or equal to 255 characters in length. This string MUST NOT equal the **irstName** field on any other PivotTable view that exists on the same sheet.

irstData (variable): An **XLWideString** that specifies the caption of the data field in the PivotTable view. This caption is shown when the PivotTable view has two or more data items. If **fDisplayData** is equal to 1, this field MUST be present in this record. If **fDisplayData** is equal to 0, this field MUST NOT be present in this record. This string MUST be less than or equal to 255 characters in length.

irstGrand (variable): An **XLWideString** that specifies a user-defined caption to display for grand totals when the PivotTable is recalculated. This string MUST be less than or equal to 255 characters in length. If the **fDisplayGrand** field is equal to 1, this field MUST be present in this record. If **fDisplayGrand** is equal to 0, this field MUST NOT be present in this record.

irstErrorString (variable): An **XLWideString** that specifies the string to display in cells that contain values for data items when an error occurs. This string MUST be less than or equal to 255 characters in length. If **fEmptyDisplayErrorString** is equal to 0, this field MUST be present in this record. If **fEmptyDisplayErrorString** is equal to 1, this field MUST NOT be present in this record.

irstNullString (variable): An **XLWideString** that specifies the string to display in cells that contain values for data items that are empty. This string MUST be less than or equal to 255 characters in length. If **fEmptyDisplayNullString** is equal to 0, this field MUST be present in this record. If **fEmptyDisplayNullString** is equal to 1, this field MUST NOT be present in this record.

irstPageFieldStyle (variable): An **XLWideString** that specifies the cell style (section 2.2.6.1.2) to apply to each cell that contains data for pivot fields on the page axis of the PivotTable view. The style is specified by the **BrtStyle** (section 2.4.783) record that has an **stName** field equal to the value of this field. If **fDisplayPageFieldStyle** is 1, this field MUST be present in this record. If **fDisplayPageFieldStyle** is 0, this field MUST NOT be present in this record. This string MUST be less than or equal to 255 characters in length.

irstTableStyle (variable): A **XLWideString** that specifies the cell style to apply to this PivotTable view. The style is specified by the **BrtStyle** record that has an **stName** field equal to the value of this field. For more details, see section 2.2.6. If **fDisplayTableStyle** is equal to 1, this field MUST be present in the record. If **fDisplayTableStyle** is equal to 0, this field MUST NOT be present in the record.

irstVacateStyle (variable): An **XLWideString** that specifies the cell style to apply to the cells left blank when a PivotTable view shrinks during a refresh operation. The style is specified by the **BrtStyle** record that has an **stName** field equal to the value of this field. If **fDisplayVacateStyle** is equal to 1, this field MUST be present in the record. If **fDisplayVacateStyle** is equal to 0, this field MUST NOT be present in the record. This string MUST be less than or equal to 255 characters in length.

irstTag (variable): An **XLWideString** that specifies a user-defined string that is associated with this PivotTable view. This string MUST be less than or equal to 255 characters in length. If **fDisplayTag** is equal to 1, this field MUST be present in the record. If **fDisplayTag** is equal to 0, this field MUST NOT be present in the record.

irstColHdrName (variable): An **XLWideString** that specifies the user-defined string to display in the column (1) header when one or more pivot fields in the PivotTable view are in compact axis mode. If this field is not present, an application specific string is used in the column (1) header. For more details, see section 2.2.5.3.8.3.

If **fUseRwHdrName** is equal to 1, this field MUST be present in the record. If **fUseRwHdrName** is equal to 0, this field MUST NOT be present in the record. If **bVerSxMacro** is less than 3, this string MUST be less than or equal to 255 characters in length. If **bVerSxMacro** is greater than or equal to 3, this string MUST be less than or equal to 32,767 characters in length.

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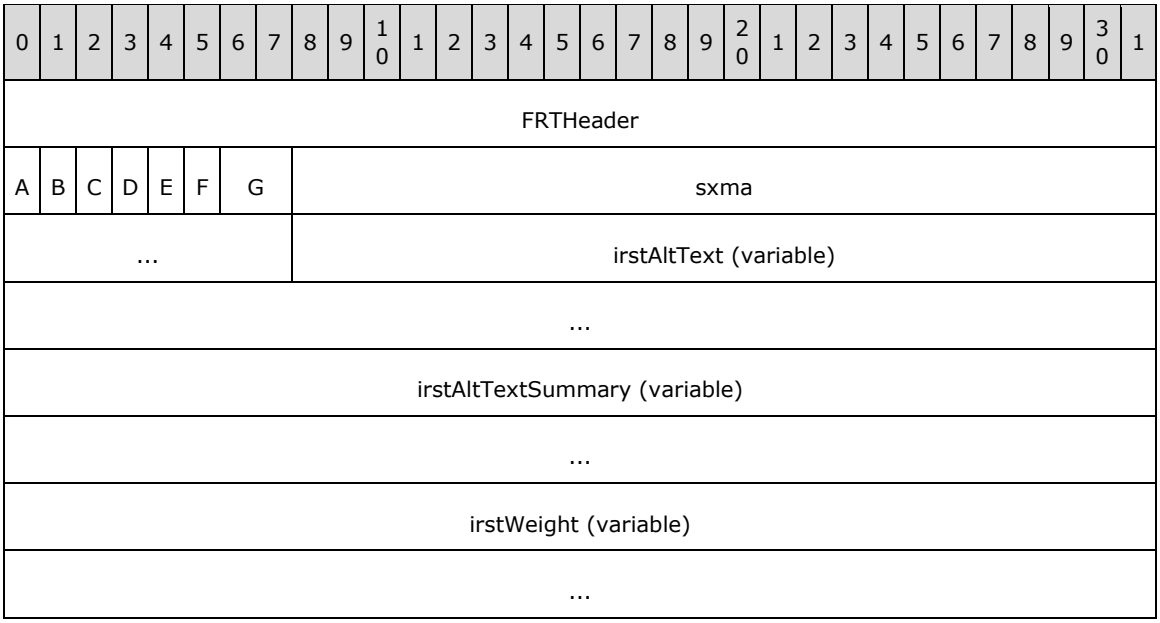
irstRwHdrName (variable): An **XLWideString** that specifies the user-defined string to display in the row header when one or more pivot fields in the PivotTable view are in compact axis mode. If this field is not present, an application-specific string is used in the row header. For more details, see section 2.2.5.3.8.3.

If **fUseRwHdrName** is equal to 1, this field MUST be present in the record. If **fUseRwHdrName** is equal to 0, this field MUST NOT be present in the record. If **bVerSxMacro** is less than 3, this string MUST be less than or equal to 255 characters in length. If **bVerSxMacro** is greater than or equal to 3, this string MUST be less than or equal to 32,767 characters in length.

2.4.274 BrtBeginSXView14

The **BrtBeginSXView14** record specifies additional properties of a PivotTable view (section 2.2.5.3) and specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies additional properties of the PivotTable view relating to **PivotTable** What-if Analysis (section 2.2.5.3.10) and **conditional formatting**.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

A - fFillDownLabelsDefault (1 bit): A bit that specifies the behavior of pivot fields (section 2.2.5.3.2) that are not a part of the PivotTable view if they are later added to a PivotTable view. This value MUST be a value from the following table.

Value	Meaning
0	Specifies that pivot fields added to the PivotTable view behave as if the **fFillDownLabels** fields of **BrtSXVD14** (section 2.4.814) records associated with those pivot fields are set to 0x00.
1	Specifies that pivot fields added to the PivotTable view behave as if the **fFillDownLabels** fields of **BrtSXVD14** records associated with those pivot fields are set to 0x01.

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B - fVisualTotalsForSets (1 bit): A bit that specifies whether **hidden** pivot items (section 2.2.5.3.3) will be included when calculating totals for named sets (section 2.2.5.2.7.3). This value MUST be a value from the following table.

Value	Meaning
0	Include hidden pivot items in the set totals.
1	Do not include hidden pivot items in the set totals.

C - fEnableWB (1 bit): A bit that specifies whether PivotTable What-if Analysis is enabled for this PivotTable view.

D - fAutoApply (1 bit): A bit that specifies whether PivotTable What-if Analysis values are automatically allocated.

E - fShowValuesRow (1 bit): A bit that specifies whether to show the values **row** in the PivotTable report.

F - fCalcMembersInAdvFilters (1 bit): A bit that specifies whether OLAP calculated **members** participate in manual filters (section 2.2.5.3.5) and advanced filters (section 2.2.5.3.6.1). This value MUST be a value in the following table.

Value	Meaning
0	OLAP calculated members do not participate in manual filters and advanced filters.
1	OLAP calculated members participate in manual filters and advanced filters as do other pivot items.

G - unused (2 bits): This value is undefined, and MUST be ignored.

sxma (4 bytes): An **SXMA** (section 2.5.147) that specifies the method of allocation to use for PivotTable What-if Analysis.

irstAltText (variable): An **XLNullableWideString** (section 2.5.166) that specifies the alternate text for the PivotTable view. This string MUST be less than or equal to 2,000 characters in length.

irstAltTextSummary (variable): An **XLNullableWideString** that specifies the alternate text summary for the PivotTable view. This string MUST be less than or equal to 2,000 characters in length.

irstWeight (variable): An **XLNullableWideString** that specifies the **Multidimensional Expressions (MDX)** of the weight expression for weighted allocations of PivotTable What-if Analysis. This string MUST be less than or equal to 65,535 characters in length.

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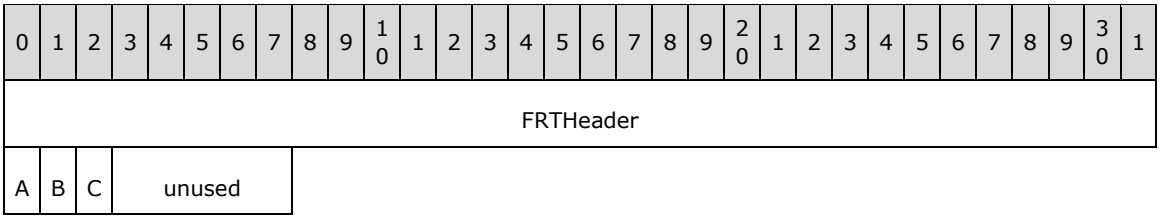
2.4.275 BrtBeginSXView16

The **BrtBeginSXView16** record specifies additional properties of a **PivotTable** view (section 2.2.5.3) and specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies additional properties of the **PivotTable view** relating to default values for **PivotTable** fields (section 2.2.5.3.2).



FRTHeader (4 bytes): An **FRTBlank** structure (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

A - fEnabledSubtotalsDefault (1 bit): A bit that specifies whether subtotals are enabled by default for the **PivotTable**.

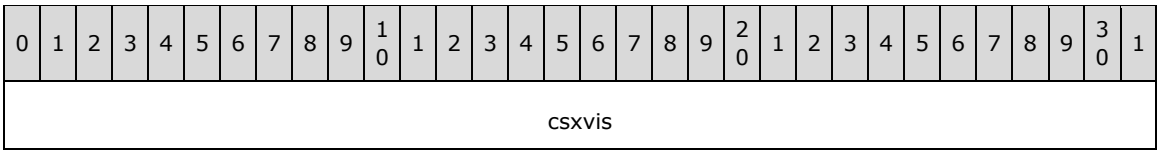
B - fSubtotalsOnTopDefault (1 bit): A bit that specifies whether subtotals for the **PivotTable** are placed on the top by default.

C - fInsertBlankRowDefault (1 bit): A bit that specifies whether blank rows are added by default for the **PivotTable**.

unused (5 bits): This value is undefined, and MUST be ignored.

2.4.276 BrtBeginSXVIs

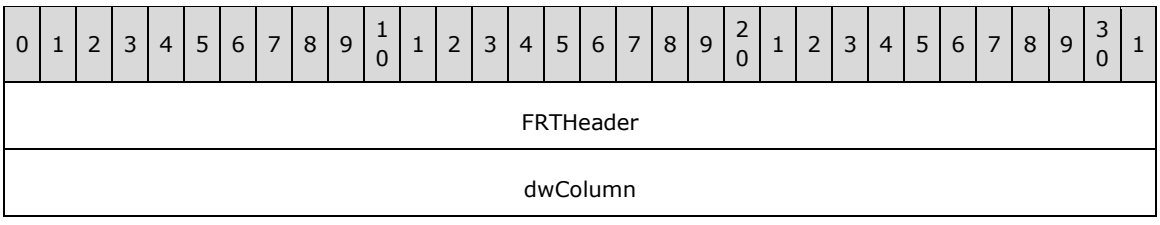
The **BrtBeginSXVIs** record specifies the beginning of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a collection of pivot items (section 2.2.5.3.3).



csxvis (4 bytes): An unsigned integer that specifies the count of pivot items in this collection.

2.4.277 BrtBeginTableSlicerCache

The **BrtBeginTableSlicerCache** record specifies the beginning of a collection of records as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies of this slicer cache (section 2.2.14.1).



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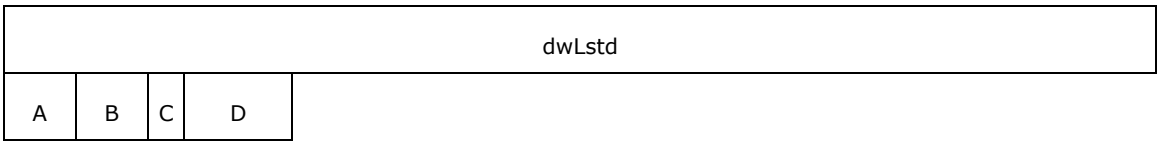

FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

dwColumn (4 bytes): An integer that specifies the associated column (2) in a **table**. MUST match the **idField** field of the **BrtBeginListCol** (section 2.4.100) record of an existing **Table**.

dwLstd (4 bytes): An integer that that specifies the associated **Table** (section 2.1.7.51). MUST match the **idList** field of the **BrtBeginList** (section 2.4.99) record of an existing **Table**.

A - fSortOrder (2 bits): An unsigned integer that specifies how the table slicer items are sorted in the slicer view (section 2.2.14.2). This value MUST be a value from the following table.

Value	Meaning
0x1	The non-OLAP slicer items are sorted in ascending order.
0x2	The non-OLAP slicer items are sorted in descending order.

B - iCrossFilter (2 bits): An unsigned integer that specifies how the table slicer items that are used in slicer cross filtering (section 2.2.14.1.5) are displayed. This value MUST be a value from the following table.

Value	Meaning
0x0	The table style element (section 2.2.6.2.2) of the slicer style (section 2.2.6.3.1) for table slicer items without data is not applied to table slicer items without data, and table slicer items without data are not sorted separately in the list of table slicer items in the slicer view.
0x1	The table style element of the slicer style for table slicer items without data is applied to table slicer items without data, and table slicer items without data are sorted at the bottom in the list of table slicer items in the slicer view.
0x2	The table style element of the slicer style for table slicer items without data is applied to table slicer items without data, and table slicer items without data are not sorted separately in the list of table slicer items in the slicer view.

C - fSortUsingCustomLists (1 bit): A bit that specifies whether **custom lists** are used when sorting the non-OLAP slicer items.

D - reserved (3 bits): This value MUST be zero, and MUST be ignored.

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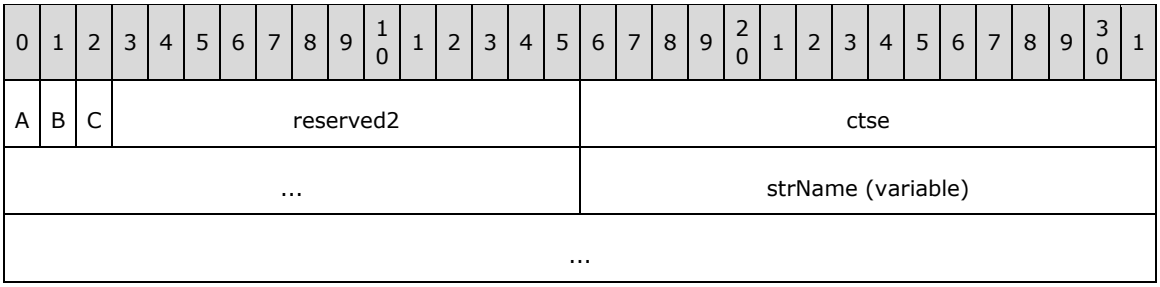
2.4.278 BrtBeginTableStyle

The **BrtBeginTableStyle** record specifies a single user-defined table style (section 2.2.6.3) and specifies the beginning of a collection of **BrtTableStyleElement** (section 2.4.819) records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtTableStyleElement** records specifies a table style.



A - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

B - fIsPivot (1 bit): A bit that specifies whether this table style is intended to be available for use with **PivotTable** (section 2.1.7.40).

C - fIsTable (1 bit): A bit that specifies whether this table style is intended to be available for use with tables.

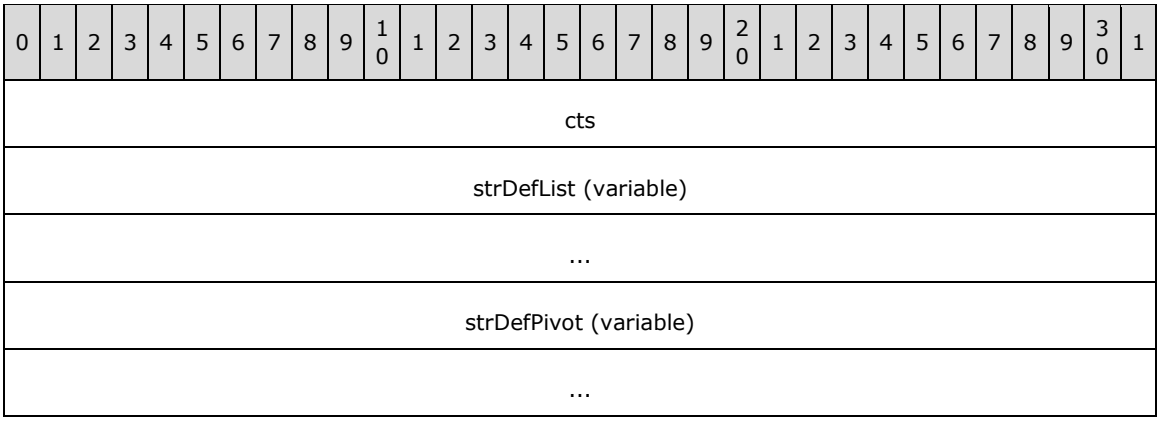
reserved2 (13 bits): This value MUST be 0, and MUST be ignored.

ctse (4 bytes): An unsigned integer that specifies the number of **BrtTableStyleElement** records in this collection. This value MUST be less than or equal to 28.

strName (variable): An **XLNullableWideString** (section 2.5.166) that specifies the name of this table style. The length of this string MUST be greater than 0 and MUST be less than 256 characters.

2.4.279 BrtBeginTableStyles

The **BrtBeginTableStyles** record specifies properties of table styles (section 2.2.6.3) and specifies the beginning of a collection of records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of records specifies the user-defined table styles for the **workbook**. This record also specifies the names of the default table styles to be assigned to new tables and **PivotTables** (section 2.1.7.40), and the count of table style records that follow.



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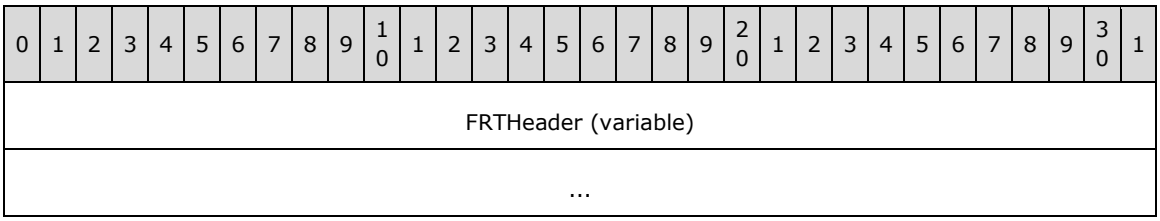
cts (4 bytes): An unsigned integer that specifies the number of **BrtBeginTableStyle** (section 2.4.278) records in the collection.

strDefList (variable): An **XLNullableWideString** that specifies the name of the default table style to be assigned to new tables. The length of this string MUST be less than 256 characters.

strDefPivot (variable): An **XLNullableWideString** that specifies the name of the default table style to be assigned to new PivotTables. The length of this string MUST be less than 256 characters.

2.4.280 BrtBeginTimelineCacheID

The **BrtBeginTimelineCacheID** record specifies a reference to a Timeline cache (section 2.2.15.1) in the **workbook** and specifies the beginning of an empty collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**.



FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the future record (section 2.1.6) information for this record.

The **FRTHeader** fields MUST have the values listed in the following table.

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	0
FRTHeader.fFormula	0
FRTHeader.fRelID	1

The **FRTHeader.RelID** specifies a relationship (section 2.1.3) that specifies a Timeline cache part in the workbook.

2.4.281 BrtBeginTimelineCacheIDs

The **BrtBeginTimelineCacheIDs** record specifies the beginning of a collection of Timeline cache identifier records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies the Timeline cache identifiers for the **workbook**.

2.4.282 BrtBeginTimelineCachePivotCacheIDs

The **BrtBeginTimelineCachePivotCacheIDs** record specifies the beginning of a collection of **PivotCache** identifier records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies the **PivotCaches** used by Timeline caches (section 2.2.15.1) with **OLAP** source data (section 2.2.5.2.1).

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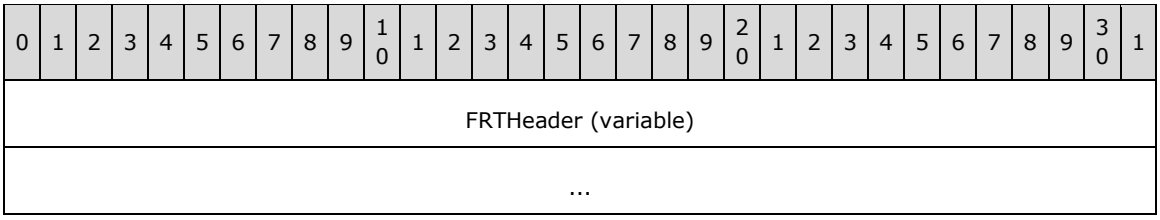
2.4.283 BrtBeginTimelineEx

The **BrtBeginTimelineEx** record specifies a relationship (section 2.1.3) identifier of the part that contains the Timelines (section 2.2.15) in this **worksheet** and specifies the beginning of an empty collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62).



FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the future record (section 2.1.6) information for this record.

The **FRTHeader** fields MUST have the values listed in the following table.

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	0
FRTHeader.fFormula	0
FRTHeader.fRelID	1

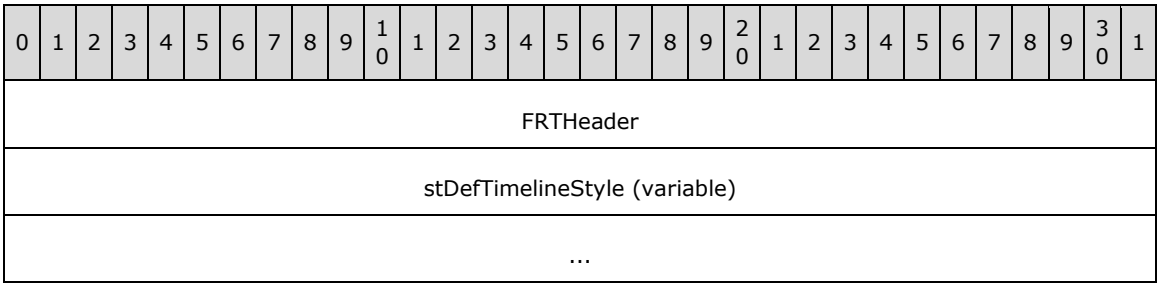
The **FRTHeader.RelID** specifies a relationship identifier of the part that contains the Timelines (section 2.2.15) in this worksheet.

2.4.284 BrtBeginTimelinesEx

The **BrtBeginTimelinesEx** record specifies the beginning of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies the Timelines (section 2.2.15) part identifier for the **worksheet**.

2.4.285 BrtBeginTimelineStyle

The **BrtBeginTimelineStyle** record specifies which table style is the basis for this timeline style and specifies the beginning of a collection of records and collections as defined by the Styles part **ABNF**. The collection of records specifies the table style elements of the timeline style that are specific to timelines. Together with the base table style, this collection specifies a user-defined timeline style.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

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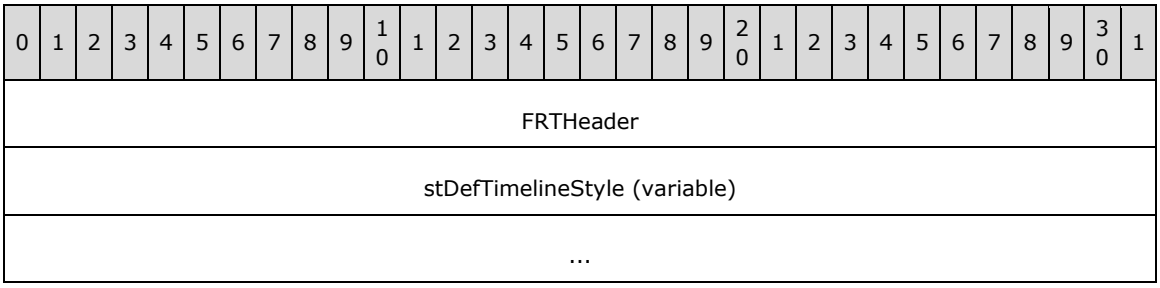
stDefTimelineStyle (variable): An **XLNullableWideString** (section 2.5.166) that specifies the name of the user-defined table style that this timeline style is based upon. The length of the string MUST be greater than or equal to 1 character and less than or equal to 255 characters. This string MUST be unique within the **BrtBeginTimelineStyle** records in the **Styles** part ABNF. This string MUST match the **strName** field of a BrtBeginTableStyle record in the **Styles** part. In the **BrtBeginTableStyle** record with a **strName** field that matches this string, the **fIsPivot** field MUST be equal to 0 and the **fIsTable** field MUST be equal to 0.

2.4.286 BrtBeginTimelineStyleElements

The **BrtBeginTimelineStyleElements** record specifies the beginning of a collection of records as defined by the Styles part **ABNF**. The collection of records specifies the table style elements of a timeline styles that are specific to timelines.

2.4.287 BrtBeginTimelineStyles

The **BrtBeginTimelineStyles** record specifies the default timeline style to apply to timelines and specifies the beginning of a collection of records and collections as defined by the Styles part **ABNF**. The collection of records specifies user-defined timeline styles.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

stDefTimelineStyle (variable): An **XLWideString** (section 2.5.168) that specifies the name of the default timeline style to apply to timeline (section 2.2.15). The length of the string MUST be greater than or equal to 1 character and less than or equal to 255 characters.

2.4.288 BrtBeginTimelineStylesheetExt15

The **BrtBeginTimelineStylesheetExt15** record specifies the beginning of a collection of records and collections as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection specifies additional style (section 2.2.6) information for the **workbook**.

2.4.289 BrtBeginUserCsView

The **BrtBeginUserCsView** record specifies settings of a **custom view** for a **chart sheet**. It also specifies the beginning of a collection of records as defined by the **Chart Sheet** (section 2.1.7.7) part **ABNF**. This collection specifies additional custom view settings. There is an accompanying **BrtUserBookView** (section 2.4.826) record that specifies the custom view settings that apply to a whole **workbook**. The set of this record and the companying **BrtUserBookView** record share the same **GUID**.

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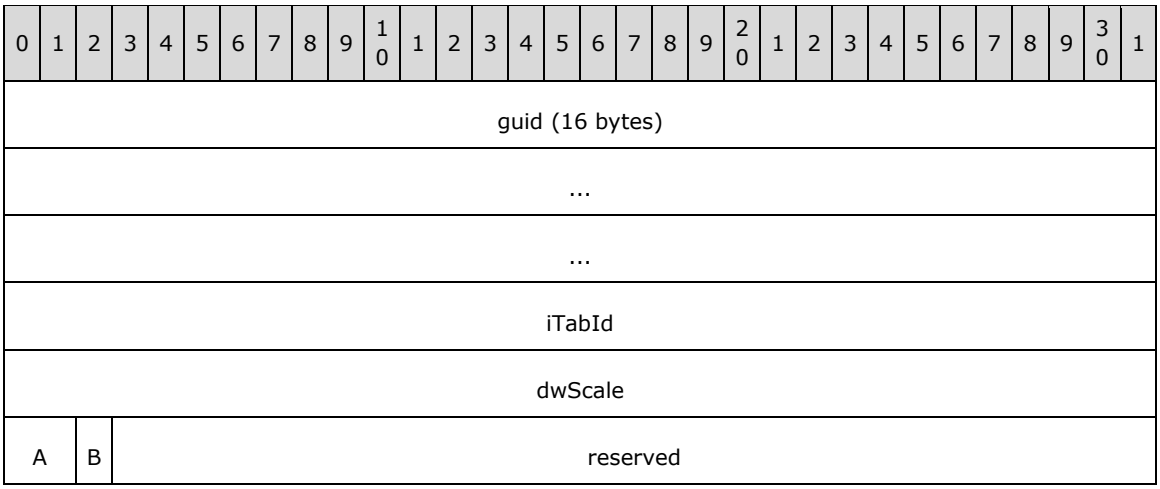

guid (16 bytes): A GUID as specified by [MS-DTYP], section 2.3.4, that specifies the unique identifier of a **BrtUserBookView** (section 2.4.826) record in the **Workbook** (section 2.1.7.61) part. The referenced **BrtUserBookView** specifies the custom **workbook view** that this custom view is associated with.

iTabId (4 bytes): An unsigned integer that specifies the **active sheet** in this view. This value MUST correspond to the **iTabID** of an existing **BrtBundleSh** (section 2.4.311).

dwScale (4 bytes): An unsigned integer that is a percentage value that specifies the **zoom level** of the chart sheet displayed in the view. This value MUST be greater than or equal to 10 and less than or equal to 400.

A - hsState (2 bits): An **ST_SheetState** (section 2.5.142) that specifies the visibility state of the chart sheet displayed in the view.

B - fZoomToFit (1 bit): A bit that specifies that the chart sheet scales to fill the entire window displaying this view.

reserved (29 bits): This value MUST be zero and MUST be ignored.

2.4.290 BrtBeginUserCsViews

The **BrtBeginUserCsViews** record specifies the beginning of a collection of records as defined by the **Chart Sheet** part **ABNF**. The collection of records specifies **custom view** settings for **chart sheets**.

2.4.291 BrtBeginUsers

The **BrtBeginUsers** record specifies the beginning of a collection of **BrtUsr** (section 2.4.827) records as defined by the **Revision Log** (section 2.1.7.44) part **ABNF** and **User Names** (section 2.1.7.55) part ABNF. The collection of **BrtUsr** records specifies properties for users editing a **shared workbook**. The count of **BrtUsr** records following this record is specified by the **BrtCUsr** (section 2.4.342) record.

2.4.292 BrtBeginUserShView

The **BrtBeginUserShView** record specifies **custom view** settings for a **sheet**. It also specifies the beginning of a collection of records as defined by the **Worksheet** (section 2.1.7.62) part **ABNF**, the **Dialog Sheet** (section 2.1.7.20) part ABNF, and the **Macro Sheet** (section 2.1.7.32) part ABNF. This collection specifies additional custom view settings. There is a companying **BrtUserBookView**

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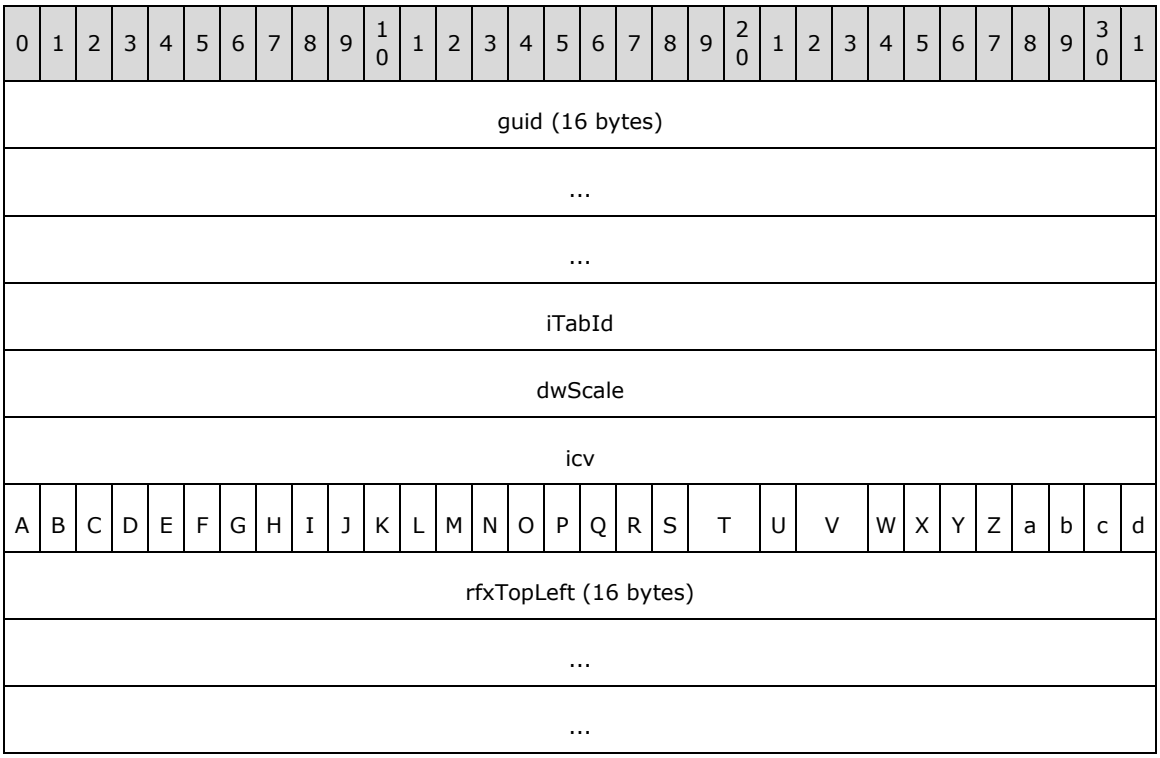
(section 2.4.826) record that specifies the custom view settings that apply to a whole **workbook**. The set of this record and the companying **BrtUserBookView** record share the same **GUID**.



guid (16 bytes): A GUID as specified by [MS-DTYP], section 2.3.4, that specifies the unique identifier of a **BrtUserBookView** (section 2.4.826) record in the **Workbook** (section 2.1.7.61) part ABNF. The referenced **BrtUserBookView** specifies the custom **workbook view** that this custom view is associated with.

iTabId (4 bytes): An unsigned integer that specifies the **active sheet** in this view. This value MUST equal the value of the **iTabID** field in a **BrtBundleSh** (section 2.4.311) record. This value MUST be greater than or equal to 1 and less than or equal to 65,535.

dwScale (4 bytes): An unsigned integer that specifies a percentage value that specifies the **zoom level** of the sheet displayed in the view. If the sheet is a **dialog sheet**, MUST be zero or a value greater than or equal to 10 and less than or equal to 400. If the sheet is not a dialog sheet, MUST be greater than or equal to 10 and less than or equal to 400.

icv (4 bytes): An **Icv** (section 2.5.75) that specifies the color of the **gridlines** displayed in the view. This value MUST be less than or equal to 64.

A - fShowBrks (1 bit): A bit that specifies whether **page breaks** are displayed in the view.

B - fDspFmlaSv (1 bit): A bit that specifies whether formulas (section 2.2.2) are displayed in the view. This value MUST be 0 for dialog sheets.

C - fDspGridSv (1 bit): A bit that specifies whether gridlines are displayed in the view.

D - fDspRwColSv (1 bit): A bit that specifies whether **row** headings and **column (1)** headings are displayed in the view. This value MUST be 0 for dialog sheets.

E - fDspGutsSv (1 bit): A bit that specifies whether **outline symbols** are displayed in the view. This value MUST be 0 for dialog sheets. This value MUST be 1 for **macro sheets**.

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F - fDspZerosSv (1 bit): A bit that specifies how zero values are displayed in **cells** in the view. This value MUST be 0 for dialog sheets.

Value	Meaning
0	Cells with a zero value appear blank.
1	Cells with a zero value display the number 0 (zero).

G - fHorizontal (1 bit): A bit that specifies whether printed pages are centered horizontally.

H - fVertical (1 bit): A bit that specifies whether printed pages are centered vertically.

I - fPrintRwCol (1 bit): A bit that specifies whether row headings and column (1) headings are printed. This value MUST be 0 for dialog sheets. This value MUST be 0 if the **BrtUserBookView** (section 2.4.826) record with **guid** field value equal to the **guid** of this record has a **fPrintIncl** field value of 0.

J - fPrintGrid (1 bit): A bit that specifies whether gridlines are printed. This value MUST be 0 for dialog sheets. This value MUST be 0 if the **BrtUserBookView** (section 2.4.826) record with **guid** field value equal to the **guid** of this record has a **fPrintIncl** field value of 0.

K - fFitToPage (1 bit): A bit that specifies whether **fit to page** is applied to printed pages. This value MUST be 0 if the **BrtUserBookView** (section 2.4.826) record with **guid** field value equal to the **guid** of this record has a **fPrintIncl** field value of 0.

L - fPrintArea (1 bit): A bit that specifies whether there is a **print area** applied to the sheet. This value MUST be 0 for dialog sheets. This value MUST be 0 if the **BrtUserBookView** (section 2.4.826) record with **guid** field value equal to the **guid** of this record has a **fPrintIncl** field value of 0.

Additionally if **fPrintArea** is 1, there MUST be a **BrtName** (section 2.4.705) record for the print area as specified in the description for the **fPrintIncl** field in **BrtUserBookView** (section 2.4.826).

M - fOnePrintArea (1 bit): A bit that specifies whether there is exactly one print area applied to the sheet. This value MUST be 0 for dialog sheets. This value MUST be 0 if the **BrtUserBookView** (section 2.4.826) record with **guid** field value equal to the **guid** of this record has a **fPrintIncl** field value of 0.

Additionally if **fOnePrintArea** is 1, there MUST be a **BrtName** record for the print area as specified in the description for the **fPrintIncl** field in **BrtUserBookView**.

N - fFilterMode (1 bit): A bit that specifies whether an **AutoFilter range** is being filtered. This value MUST be 0 for dialog sheets. This value MUST be 0 if the **BrtUserBookView** (section 2.4.826) record with **guid** field value equal to the **guid** of this record has a **fRowColIncl** field value of 0.

Additionally if **fFilterMode** is 1, there MUST be a **BrtName** record for the range being filtered and a **BrtName** record for the range containing **filter** criteria as specified in the description for the **fRowColIncl** field in **BrtUserBookView**.

O - fEzFilter (1 bit): A bit that specifies whether AutoFilter dropdown buttons are displayed in the view. This value MUST be 0 for dialog sheets. This value MUST be 0 if the **BrtUserBookView** (section 2.4.826) record with **guid** field value equal to the **guid** of this record has a **fRowColIncl** field value of 0.

Additionally if **fEzFilter** is 1, there MUST be a **BrtName** record for the range being filtered and a **BrtName** record for the range containing filter criteria as specified in the description for the **fRowColIncl** field in **BrtUserBookView**.

P - reserved1 (1 bit): This value MUST be zero and MUST be ignored.

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Q - reserved2 (1 bit): This value MUST be zero and MUST be ignored.

R - fSplitV (1 bit): A bit that specifies whether there are **split panes** stacked vertically in the view.

S - fSplitH (1 bit): A bit that specifies whether there are split panes arranged side-by-side in the view.

T - fHiddenRw (2 bits): An unsigned integer that specifies whether any **hidden rows** exist in the sheet in this view. This value MUST be a value from the following table.

Value	Meaning
0x0	There are no hidden rows in the sheet in this view.
0x1	There are hidden rows in the sheet in this view.

This value MUST be 0 for dialog sheets. This value MUST be 0 if the **BrtUserBookView** (section 2.4.826) record with **guid** field value equal to the **guid** of this record has a **fRowColIncl** field value of 0.

Additionally, if **fHiddenRw** is 0x1, there MUST be a **BrtName** record for the hidden rows as specified in the description for the **fRowColIncl** field in **BrtUserBookView**.

U - fHiddenCol (1 bit): A bit that specifies whether any **hidden columns** exist in the sheet in this view. This value MUST be 0 for dialog sheets. This value MUST be 0 if the **BrtUserBookView** (section 2.4.826) record with **guid** field value equal to the **guid** of this record has a **fRowColIncl** field value of 0.

Additionally, if **fHiddenCol** is 1, there MUST be a **BrtName** record for the hidden rows as specified in the description for the **fRowColIncl** field in **BrtUserBookView**.

V - hsState (2 bits): An **ST_SheetState** (section 2.5.142) that specifies the visibility state of the sheet in this view.

W - reserved3 (1 bit): This value MUST be zero and MUST be ignored.

X - fFilterUnique (1 bit): A bit that specifies whether duplicate records are filtered out of a range in the sheet in this view. This value MUST be 0 for dialog sheets. This value MUST be 0 if the **BrtUserBookView** (section 2.4.826) record with **guid** field value equal to the **guid** of this record has a **fRowColIncl** field value of 0.

Additionally if **fFilterUnique** is 1, there MUST be a **BrtName** record for the range being filtered and a **BrtName** record for the range containing filter criteria as specified in the description for the **fRowColIncl** field in **BrtUserBookView**.

Y - fSheetLayoutView (1 bit): A bit that specifies whether the type of view displayed is a **Page Break Preview view**. The value of **fSheetLayoutView** and **fPageLayoutView** MUST NOT both be TRUE (1). This value MUST be 0 for macro sheets and dialog sheets.

Z - fPageLayoutView (1 bit): A bit that specifies whether the type of view displayed is a **Page Layout view**. The value of **fSheetLayoutView** and **fPageLayoutView** MUST NOT both be TRUE (1). This value MUST be 0 for macro sheets and dialog sheets.

a - reserved4 (1 bit): This value MUST be zero, and MUST be ignored.

b - fRuler (1 bit): A bit that specifies whether the **ruler** is displayed in the view.

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c - reserved5 (1 bit): This value MUST be zero, and MUST be ignored.

d - reserved6 (1 bit): This value MUST be zero, and MUST be ignored.

rfxTopLeft (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the **logical top-left** cell displayed in the view.

2.4.293 BrtBeginUserShViews

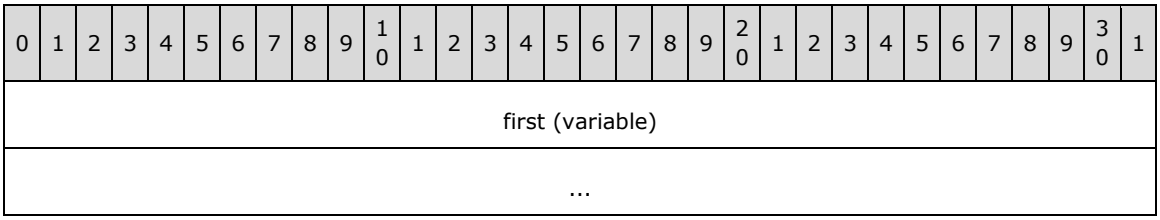
The **BrtBeginUserShViews** record specifies the beginning of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62), the **Dialog Sheet** (section 2.1.7.20) part ABNF, and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies **custom view** settings for **sheets**.

2.4.294 BrtBeginVolDeps

The **BrtBeginVolDeps** record specifies the beginning of a collection of records as defined by the **Volatile Dependencies** (section 2.1.7.60) part **ABNF**. The collection of records specifies dependency information for all **cells** that depend on either **RTD server** or **cube functions**.

2.4.295 BrtBeginVolMain

The **BrtBeginVolMain** record specifies properties of a volatile dependency (section 2.2.13) and specifies the beginning of a collection of records as defined by the **Volatile Dependencies** (section 2.1.7.60) part **ABNF**. The collection of records specifies dependency information for all **RTD topics** within a type (section 2.2.13.1) that share the same first string or **function** argument.



first (variable): An **XLWideString** (section 2.5.168) that specifies the **RTD server** or the OLAP connection (section 2.2.8.3.1) associated with the dependencies.

If the **type** field of the associated **BrtBeginVolType** (section 2.4.297) record is 0, **first** specifies the **ProgID** of the RTD server.

If the **type** field of the associated **BrtBeginVolType** record is 1, **first** specifies the name of the OLAP Connection.

The associated **BrtBeginVolType** record is the record immediately preceding this record.

2.4.296 BrtBeginVolTopic

The **BrtBeginVolTopic** record specifies the beginning of a collection of records and collections as defined by the **Volatile Dependencies** (section 2.1.7.60) part **ABNF**. The collection of records specifies a cached returned value (section 2.2.13.4) and subtopics (section 2.2.13.3).

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2.4.297 BrtBeginVolType

The **BrtBeginVolType** record specifies the type of a volatile dependency (section 2.2.13) and specifies the beginning of a collection of records as defined by the **Volatile Dependencies** (section 2.1.7.60) part **ABNF**. The collection of records specifies dependency information for a set of **cells** that either all depend upon an **RTD server**, or all depend upon **cube functions**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	reserved																														

A - type (1 bit): A bit that specifies the type of dependency information. This value MUST be a value from the following table.

Value	Meaning
0	Dependency information is for an RTD server.
1	Dependency information is for cube functions.

reserved (31 bits): This value MUST be 0, and MUST be ignored.

2.4.298 BrtBeginWebExtensions

The **BrtBeginWebExtensions** record specifies the beginning of a collection of records as defined by the WEBEXTENSIONS rule in the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of records specifies additional properties for bindings for Web Extensions ([MS-OWEXML] section 1.3) on the **worksheet**.

2.4.299 BrtBeginWebPubItem

The **BrtBeginWebPubItem** record specifies content in the **workbook** that is published to the Web and specifies the beginning of an empty collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**, **Worksheet** part ABNF (section 2.1.7.62), and **Chart Sheet** (section 2.1.7.7) part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
tws								A	B	C	D	reserved3												unused							
...									nStyleId																						
...									rfx (16 bytes, optional)																						
...																															
...																															
...									reserved4 (optional)																						
...									reserved5 (optional)																						

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...	reserved6 (optional)					
...	reserved7 (optional)					
...	E	F	G	H	I	stBkmk (variable)
...						
stName (variable)						
...						
stFile (variable)						
...						
stTitle (variable)						
...						

tws (1 byte): A **Tws** (section 2.5.150) that specifies the type of the published content. If the record belongs to **Workbook** (section 2.1.7.61) part ABNF, **tws** MUST be equal to **TWSWORKBOOK** or to **TWSLABEL**. If the record belongs to **Worksheet** part ABNF (section 2.1.7.62) or **Chart Sheet** part ABNF, **tws** MUST NOT be equal to **TWSWORKBOOK**.

A - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

B - fAutoRepublish (1 bit): A bit that specifies whether the content will be automatically published every time the workbook is saved.

C - reserved2 (1 bit): This value MUST be 0, and MUST be ignored.

D - fMhtml (1 bit): A bit that specifies whether the content is to be published as **MIME Encapsulation of Aggregate HTML Documents (MHTML)**. MHTML is used to bind resources which are typically represented by external links, such as image and sound files, along with HTML code into a single file.

reserved3 (12 bits): This value MUST be 0, and MUST be ignored.

unused (2 bytes): This value undefined and MUST be ignored.

nStyleId (4 bytes): An unsigned integer that specifies the unique identifier for this published content. This value MUST be greater than 0.

rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the rectangular **cell range** to be published. This value exists if and only if **tws** is equal to TWSREF.

reserved4 (4 bytes): This value MUST be equal to 1,048,576, and MUST be ignored. This value exists if and only if **tws** is not equal to TWSREF.

reserved5 (4 bytes): This value MUST be equal to 1,048,576, and MUST be ignored. This value exists if and only if **tws** is not equal to TWSREF.

reserved6 (4 bytes): This value MUST be equal to 16,384, and MUST be ignored. Exists if and only if **tws** is not equal to TWSREF.

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reserved7 (4 bytes): This value MUST be equal to 16,384, and MUST be ignored. Exists if and only if **tws** is not equal to TWSREF.

E - fReserved1 (1 bit): This value MUST be 1, and MUST be ignored.

F - fName (1 bit): A bit that specifies whether the **stName** exists. This value MUST be equal to 0 if **tws** is less than 0x05, or is equal to TWSCHART and this record is contained in a **Chart Sheet**. Otherwise, this value MUST be equal to 1.

G - fReserved2 (1 bit): This value MUST be 1 and MUST be ignored.

H - fTitle (1 bit): A bit that specifies whether the **stTitle** exists.

I - reserved8 (4 bits): This value MUST be zero, and MUST be ignored.

stBkmk (variable): An **XLWideString** (section 2.5.168) that specifies the destination tag of the published content. Destination tag specifies the unique section in the published HTML the content being published is written to. The length of the string MUST NOT exceed 255 characters.

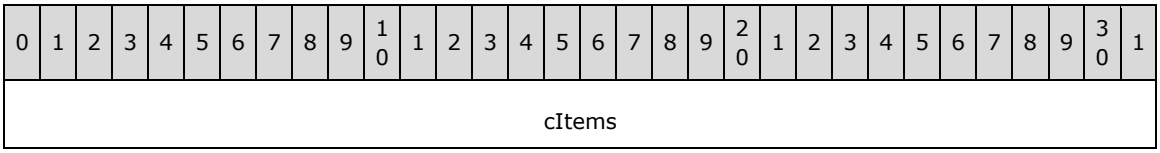
stName (variable): An **XLNameWideString** that specifies the name of the content to be published. It exists if and only if **fName** is equal 1. The length of the string MUST NOT exceed 255 characters.

stFile (variable): An **XLWideString** that specifies the name of the destination file to which the content will be published. The length of the string MUST NOT exceed 255 characters.

stTitle (variable): An **XLWideString** that specifies the title of the published content. This value exists if and only if **fTitle** is equal 1. The length of the string MUST NOT exceed 255 characters.

2.4.300 BrtBeginWebPubItems

The **BrtBeginWebPubItems** record specifies the count of **BrtBeginWebPubItem** (section 2.4.299) records in the collection and specifies the beginning of a collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**, **Worksheet** part ABNF (section 2.1.7.62), and **Chart Sheet** (section 2.1.7.7) part ABNF. The collection of records specifies the content in this **workbook** that has been published.



cItems (4 bytes): An unsigned integer that specifies the number of items in the collection. This value MUST be equal to the number of **BrtBeginWebPubItem** records in the collection.

2.4.301 BrtBeginWsSortMap

The **BrtBeginWsSortMap** record specifies sort map (section 2.2.12.10) properties of a **sheet** and specifies the beginning of a collection of records as defined by the **Sort Map** (section 2.1.7.49) part **ABNF**. The collection of records specifies the sort map properties of a sheet.

2.4.302 BrtBeginWsView

The **BrtBeginWsView** record specifies **sheet view** settings for the current **sheet**. It also specifies the beginning of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62), the **Dialog Sheet** (section 2.1.7.20) part ABNF, and the **Macro Sheet** (section 2.1.7.32) part ABNF. This collection specifies additional sheet view settings for the current sheet. Sheet view settings and

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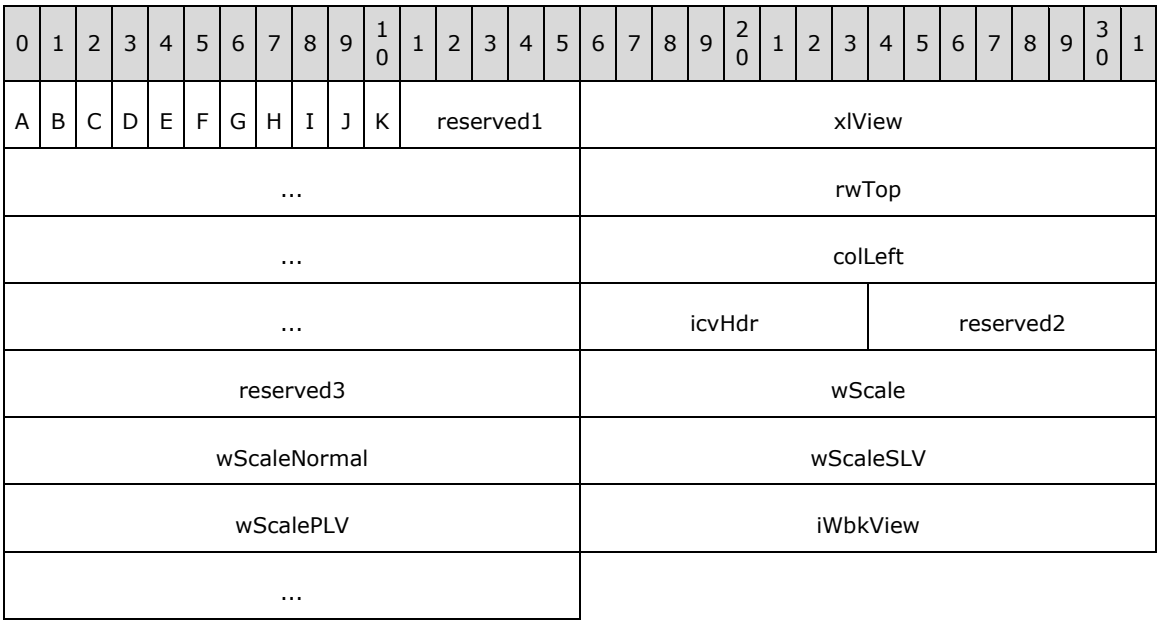
workbook view settings for the associated workbook view (specified by **iwbkview)** together define the display of a sheet.



A - fWnProt (1 bit): A bit that specifies whether the window displaying the sheet view is **locked** because of **window protection**.

B - fDspFmla (1 bit): A bit that specifies whether formulas (section 2.2.2) are displayed in **cells** in the sheet view. This value MUST be 0 for **dialog sheets**.

C - fDspGrid (1 bit): A bit that specifies whether **gridlines** are displayed in the sheet view.

D - fDspRwCol (1 bit): A bit that specifies whether **row** headings and **column (1)** headings are displayed in the sheet view. This value MUST be 0 for dialog sheets.

E - fDspZeros (1 bit): A bit that specifies how zero values are displayed in cells in the sheet view. This value MUST be 0 for dialog sheets. Possible values for this field are listed in the following table.

Value	Meaning
0	Cells with a zero value appear blank.
1	Cells with a zero value display the number 0 (zero).

F - fRightToLeft (1 bit): A bit that specifies whether the sheet view is displayed in a **right-to-left** manner.

G - fSelected (1 bit): A bit that specifies whether the sheet is **selected** in the sheet view.

H - fDspRuler (1 bit): A bit that specifies whether the **ruler** is displayed in the sheet view. This value MUST be ignored if **xlView** is not equal to XLVPAGELAYOUTVIEW. This value MUST be 1 for dialog sheets and **macro sheets**.

I - fDspGuts (1 bit): A bit that specifies whether **outline symbols** are displayed in the sheet view. This value MUST be 0 for dialog sheets.

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J - fDefaultHdr (1 bit): A bit that specifies whether the default color is used for the gridlines, overriding the color specified in **icvHdr**. This value MUST be 1 for dialog sheets.

K - fWhitespaceHidden (1 bit): A bit that specifies whether the **page margins**, headers, and footers are **hidden**. This value MUST be ignored if **xlView** is not equal to XLVPAGELAYOUTVIEW. This value MUST be zero for dialog sheets and macro sheets.

reserved1 (5 bits): This value MUST be zero and MUST be ignored.

xlView (4 bytes): An **XLView** (section 2.5.167) that specifies the type of sheet view.

rwTop (4 bytes): An **UncheckedRw** (section 2.5.154) that specifies the first row that is displayed in the sheet view.

colLeft (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies the first column (1) that is displayed in the sheet view.

icvHdr (1 byte): An **Icv** (section 2.5.75) that specifies the color of the gridlines displayed in the sheet view.

reserved2 (1 byte): This value MUST be zero and MUST be ignored.

reserved3 (2 bytes): This value MUST be zero and MUST be ignored.

wScale (2 bytes): An unsigned integer that specifies a percentage value that specifies the **zoom level** of the sheet displayed in the sheet view. This value MUST be greater than or equal to 10 and less than or equal to 400.

wScaleNormal (2 bytes): An unsigned integer that specifies a percentage value that specifies the zoom level of the sheet when displayed in **Normal view**. This value MUST be zero or a value greater than or equal to 10 and less than or equal to 400. If the value is zero, the zoom level is assumed to be 100.

wScaleSLV (2 bytes): An unsigned integer that specifies a percentage value that specifies the zoom level of the sheet when displayed in **Page Break Preview view**. This value MUST be zero or a value greater than or equal to 10 and less than or equal to 400. If the value is zero, the zoom level is assumed to be 100.

wScalePLV (2 bytes): An unsigned integer that specifies a percentage value that specifies the zoom level of the sheet when displayed in **Page Layout view**. This value MUST be zero or a value greater than or equal to 10 and less than or equal to 400. If the value is zero, the zoom level is assumed to be 100.

iWbkView (4 bytes): An unsigned integer that specifies the zero-based index of a **BrtBookView** (section 2.4.308) record in the collection of all records directly following **BrtBeginBookViews** (section 2.4.11) in the **Workbook** (section 2.1.7.61) part. The referenced **BrtBookView** specifies the workbook view this sheet view is associated with.

2.4.303 BrtBeginWsViews

The **BrtBeginWsViews** record specifies the beginning of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62), the **Dialog Sheet** (section 2.1.7.20) part ABNF, and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies the **sheet views** for the current **sheet**.

2.4.304 BrtBigName

The **BrtBigName** record specifies a name/value pair of arbitrary user-defined data that is associated with the current **sheet**.

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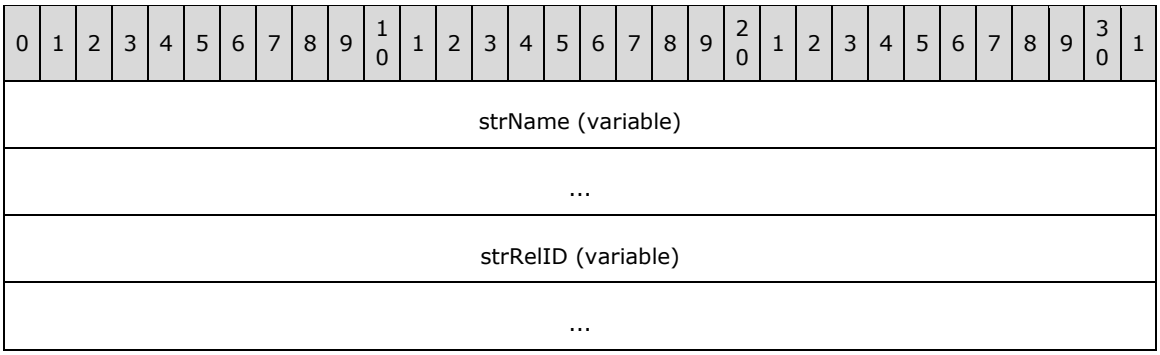
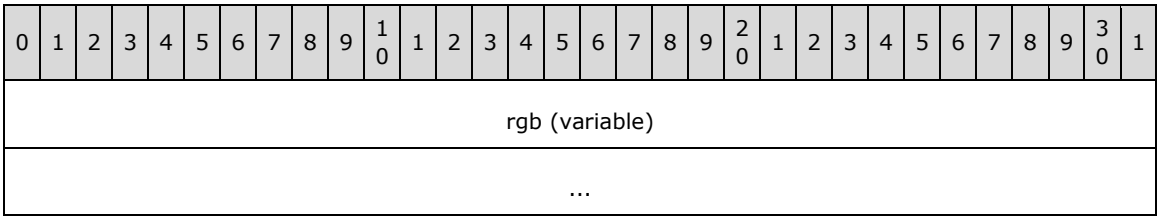


strName (variable): An **XLWideString** (section 2.5.168) that specifies the name of the custom property. The name MUST be unique in the current sheet. The length of the name MUST NOT exceed 65,535 characters.

strRelID (variable): A **RelID** (section 2.5.114) that specifies a binary part that contains the value of the custom property in this file.

2.4.305 BrtBkHim

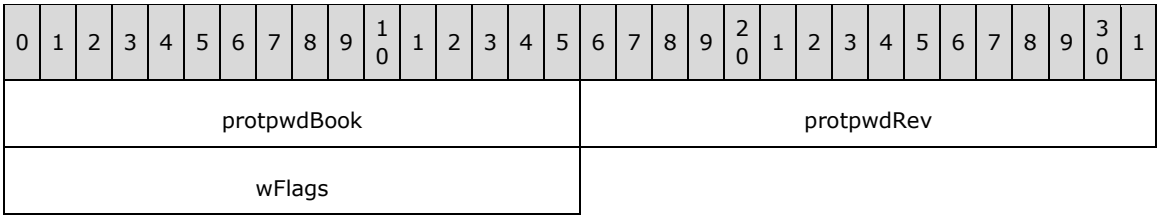
The **BrtBkHim** record specifies the background image of the **sheet**.



rgb (variable): A **RelID** (section 2.5.114) that specifies the relationship to the **Images** (section 2.1.7.30) part. This value MUST NOT be NULL and MUST have length greater than zero.

2.4.306 BrtBookProtection

The **BrtBookProtection** record specifies **protection** options for a **workbook**.



protpwdBook (2 bytes): An unsigned integer that specifies the verifier value of the password required for unlocking structure and **window protection** for the workbook<25>.

Window protection is defined as preventing changes to the windows of the workbook such as moving, resizing, and closing windows.

Structure protection is defined as preventing changes to the structure of the workbook such as moving, deleting, hiding, unhiding, renaming **sheets**, inserting new sheets, and moving sheets to another workbook.

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If the value of this field is 0x0000, then no password is required to remove structure and window protection. If the value is not 0x0000, then the field contains the password verifier of the password required to remove structure and window protection. The algorithm to generate the password verifier is specified in Password Verifier Algorithm (section 2.2.9).

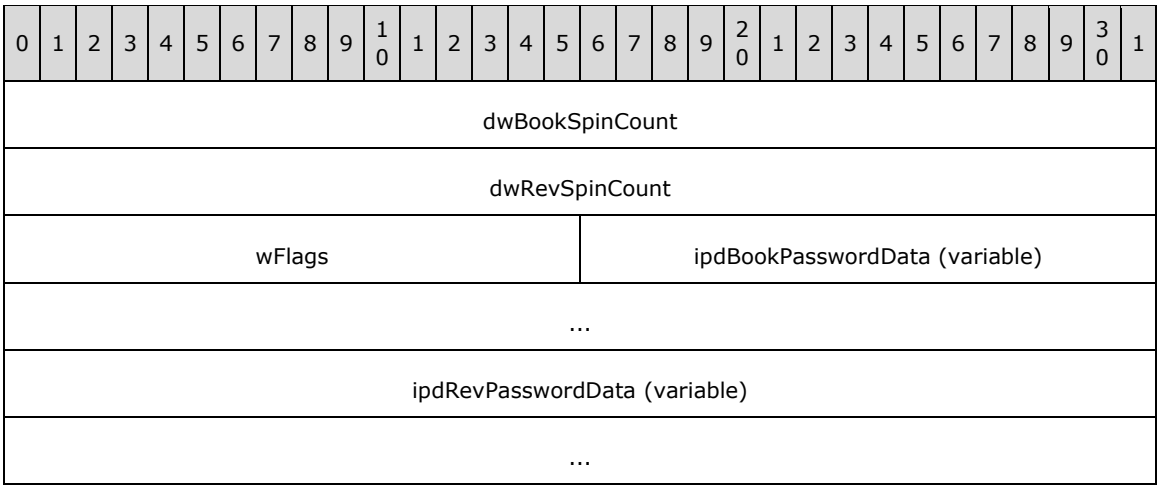
protpwdRev (2 bytes): An unsigned integer that specifies the verifier value of the password required to unlock change tracking information for the workbook<26>.

If the value of this field is 0x0000, then no password is required to remove **revision** protection. If the value is not 0x0000, then the field contains the password verifier of the password required to remove revision protection. The algorithm to generate the password verifier is specified in Password Verifier Algorithm.

wFlags (2 bytes): A **BookProtectionFlags** (section 2.5.6) that specifies what aspects of the workbook are **protected**.

2.4.307 BrtBookProtectionIso

The **BrtBookProtectionIso** record specifies **protection** options for a **workbook** in a manner compatible with ISO/IEC 29500 workbook protection records as specified in [ISO/IEC29500-1:2016], section 18.2.29. A **BrtBookProtectionIso** record MUST be immediately followed by a **BrtBookProtection** (section 2.4.306) record whose **protpwdBook** and **protpwdRev** fields MUST be set to 0x0000 and whose **wFlags** field MUST have the same value as the field of the same name in the **BrtBookProtectionIso** record.



dwBookSpinCount (4 bytes): An unsigned 32-bit integer that specifies the number of times that the hash function was iterated over the password to generate the **rgbHash** field of **ipdBookPasswordData**, as described in Strong Password Verifier Algorithm (section 2.2.10). This value MUST NOT be greater than 10,000,000.

dwRevSpinCount (4 bytes): An unsigned 32-bit integer that specifies the number of times that the hash function was iterated over the password to generate the **rgbHash** field of **ipdRevPasswordData**, as described in Strong Password Verifier Algorithm. This value MUST NOT be greater than 10,000,000.

wFlags (2 bytes): A **BookProtectionFlags** (section 2.5.6) that specifies what aspects of the workbook are **protected**. It MUST have the same value as the **wFlags** field in the following **BrtBookProtection** (section 2.4.306) record.

ipdBookPasswordData (variable): An **IsoPasswordData** (section 2.5.79) that specifies the **salt**, hash algorithm and password hash of the password required for unlocking structure and **window**

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protection for the workbook<27>. If the size of the **rgbHash** member of this field is zero, then no password is required to remove structure and window protection and the size of the **rgbHash** member of **ipdRevPasswordData** MUST be nonzero.

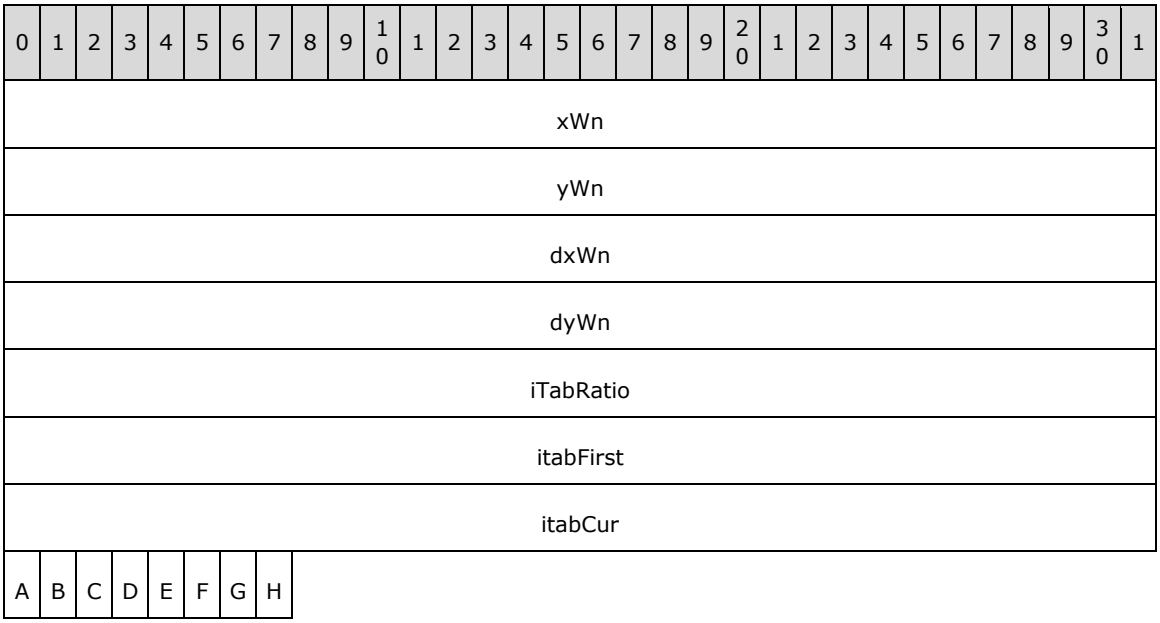
Window protection is defined as preventing changes to the windows of the workbook such as moving, resizing, and closing windows.

Structure protection is defined as preventing changes to the structure of the workbook such as moving, deleting, hiding, unhiding, renaming **sheets**, inserting new sheets, and moving sheets to another workbook.

ipdRevPasswordData (variable): An **IsoPasswordData** (section 2.5.79) that specifies the salt, hash algorithm, and password hash for the password required to unlock change tracking information for the workbook<28>. If the size of this field is zero, then no password is required to remove **revision** protection and the size of the **rgbHash** member of **ipdBookPasswordData** MUST be nonzero.

2.4.308 BrtBookView

The **BrtBookView** record specifies a single **workbook view**.



xWn (4 bytes): A signed integer that specifies the X coordinate for the left side of the window that contains the **workbook**. The unit of measurement for this value is **twips**.

yWn (4 bytes): A signed integer that specifies the Y coordinate for the top of the window that contains the workbook. The unit of measurement for this value is twips.

dxWn (4 bytes): An unsigned integer that specifies the width of the window that contains the workbook. The value MUST be less than 2,147,483,647. The unit of measurement for this value is twips.

dyWn (4 bytes): An unsigned integer that specifies the height of the window that contains the workbook. The value MUST be less than 2,147,483,647. The unit of measurement for this value is twips.

iTabRatio (4 bytes): An unsigned integer that specifies the ratio of the window area used for selecting **sheets** to the window area used for horizontal scrolling. The value of **iTabRatio** MUST

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be greater than or equal to 0 and less than or equal to 1,000, where 1,000 means the space is entirely used for sheet **selection**, and 0 means the space is entirely used for horizontal scrolling.

itabFirst (4 bytes): An unsigned integer that specifies a zero-based index of a **BrtBundleSh** (section 2.4.311) record in the collection of all records directly following **BrtBeginBundleShs** (section 2.4.13). The referenced **BrtBundleSh** specifies the first sheet in this workbook view.

itabCur (4 bytes): An unsigned integer that specifies a zero-based index of a **BrtBundleSh** record in the collection of all records directly following **BrtBeginBundleShs**. The referenced **BrtBundleSh** specifies the **active sheet** in this workbook view.

A - fHidden (1 bit): A bit that specifies whether the window that contains the workbook is in the list of hidden windows.

B - fVeryHidden (1 bit): A bit that specifies whether the window that contains the workbook has the properties of **fHidden**, and also that the user cannot see that the window that contains the workbook is in the list of hidden windows.

C - fIconic (1 bit): A bit that specifies whether the window that contains the workbook is minimized in the workbook view.

D - fDspHScroll (1 bit): A bit that specifies whether a horizontal scroll bar is displayed in the workbook view.

E - fDspVScroll (1 bit): A bit that specifies whether a vertical scroll bar is displayed in the workbook view.

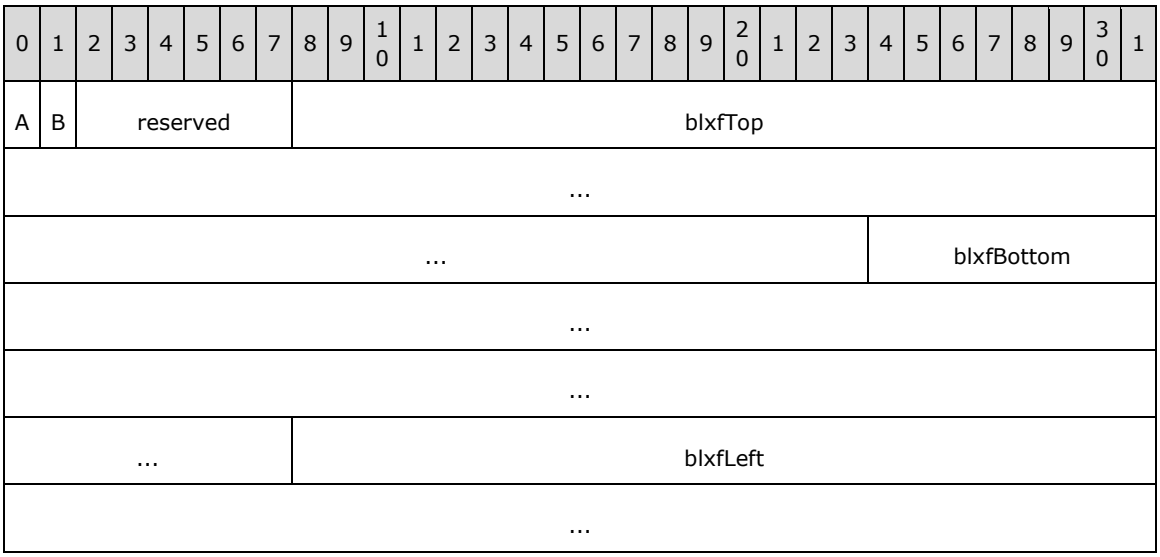
F - fBotAdornment (1 bit): A bit that specifies whether the **sheet tabs** are displayed in the workbook view.

G - fAFDateGroup (1 bit): A bit that specifies whether to group dates when presenting the user with filtering options in the user interface.

H - unused (1 bit): This value is undefined, and MUST be ignored.

2.4.309 BrtBorder

The **BrtBorder** record specifies the set of formats for the **border** of a cell.



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...	blxfRight
...	
...	
...	blxfDiag
...	
...	

A - fBdrDiagDown (1 bit): A bit that specifies a diagonal line that extends from the upper-left corner of the cell to the lower-right corner of the cell.

B - fBdrDiagUp (1 bit): A bit that specifies a diagonal line that extends from the lower-left corner of the cell to the upper-right corner of the cell.

reserved (6 bits): This value MUST be 0, and MUST be ignored.

blxfTop (10 bytes): A **Blxf** (section 2.5.4) that specifies the format for the top border of the cell.

blxfBottom (10 bytes): A **Blxf** that specifies the format for the bottom border of the cell.

blxfLeft (10 bytes): A **Blxf** that specifies the format for the left border of the cell.

blxfRight (10 bytes): A **Blxf** that specifies the format for the right border of the cell.

blxfDiag (10 bytes): A **Blxf** that specifies the format for the diagonal lines in the cell. If **fBdrDiagDown** or **fBdrDiagUp** is 1, then **blxfDiag.dg** MUST NOT be 0.

2.4.310 BrtBrk

The **BrtBrk** record specifies a single **page break**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
unRwCol																															
unColRwStrt																															
unColRwEnd																															
fMan																															
fPivot																															

unRwCol (4 bytes): A **Rw_Col** (section 2.5.126) that specifies the **row** or **column (1)** index of the page break. If this record is preceded by a **BrtBeginRwBrk** (section 2.4.194), then **unRwCol** specifies a row index. If this record is preceded by a **BrtBeginColBrk** (section 2.4.24), then **unRwCol** specifies a column (1) index and MUST be less than 16,384.

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unColRwStrt (4 bytes): A **Rw_Col** that specifies the index of the column (1) or row where this page break begins. If this record is preceded by a **BrtBeginRwBrk**, then **unColRwStrt** specifies a column (1) index and MUST be less than 16,384. If this record is preceded by a **BrtBeginColBrk**, then **unColRwStrt** specifies a row index.

unColRwEnd (4 bytes): A **Rw_Col** that specifies the index of the column (1) or row where this page break ends. If this record is preceded by a **BrtBeginRwBrk**, then **unColRwEnd** specifies a column (1) index and MUST be less than 16,384. If this record is preceded by a **BrtBeginColBrk**, then **unColRwEnd** specifies a row index. This value MUST be greater than or equal to **unColRwStrt**.

For example, a horizontal page break at row 8 that spans between column (1) A and column (1) Z will be saved with values given by the following table.

Field	Value	Meaning
unRwCol	7	The zero-based index of the eighth row.
unColRwStrt	0	The zero-based index of column (1) A.
unColRwEnd	25	The zero-based index of column (1) Z.

fMan (4 bytes): An unsigned integer that specifies whether the page break was specified by the user. This value MUST be a value from the following table.

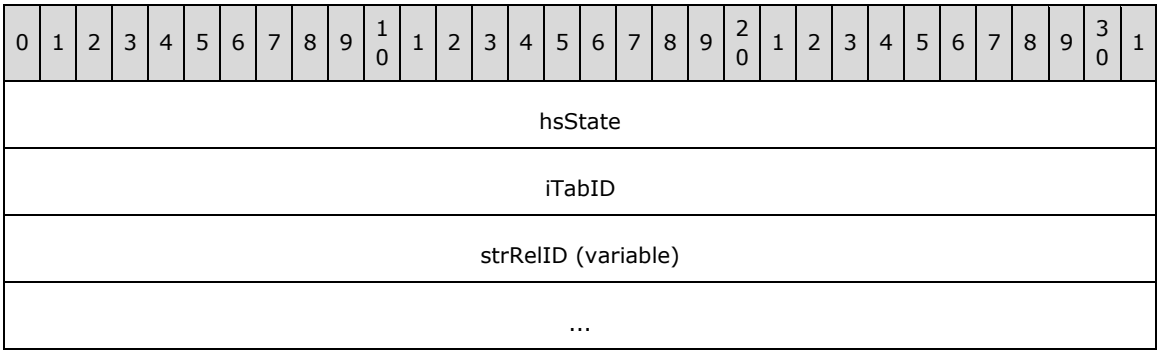
Value	Meaning
0x00000000	The page break occurs automatically when the printable region does not fit the page.
0x00000001	The page break was specified by the user.

fPivot (4 bytes): An unsigned integer that specifies whether this page break was created by a **PivotTable** (section 2.1.7.40). This value MUST be a value from the following table.

Value	Meaning
0x00000000	The page break was not created by a PivotTable.
0x00000001	The page break was created by a PivotTable.

2.4.311 BrtBundleSh

The **BrtBundleSh** record specifies a **sheet**.



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strName (variable)
...

hsState (4 bytes): An **ST_SheetState** (section 2.5.142) that specifies the visibility state of the sheet.

iTabID (4 bytes): An unsigned integer that specifies the unique identifier of the sheet. This value MUST be between 1 and 0x0000FFFF inclusive.

strRelID (variable): A **RelID** (section 2.5.114) that specifies the relationship that specifies the part containing sheet data. The relationship MUST be one of the following types:

- Chart Sheet (section 2.1.7.7)
- Dialog Sheet (section 2.1.7.20)
- Macro Sheet (section 2.1.7.32)
- International Macro Sheet (section 2.1.7.31)
- Worksheet (section 2.1.7.62)

If **strRelID** is NULL and **hsState** is VERYHIDDEN, then the type of sheet is a **module sheet**.

strName (variable): An **XLWideString** (section 2.5.168) that specifies the unique case-insensitive name of the sheet. The length of this string MUST be at least 1 and MUST NOT exceed 31 characters. The string MUST NOT contain the following characters:

- 0x0000
- 0x0003
- colon (:)
- backslash (\)
- asterisk (*)
- question mark (?)
- forward slash (/)
- opening square bracket ([)
- closing square bracket (])

The string MUST NOT begin or end with the single quote (') character.

2.4.312 BrtCalcFeature

The **BrtCalcFeature** record specifies a feature that is part of the calculation engine.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
FRTHeader																															

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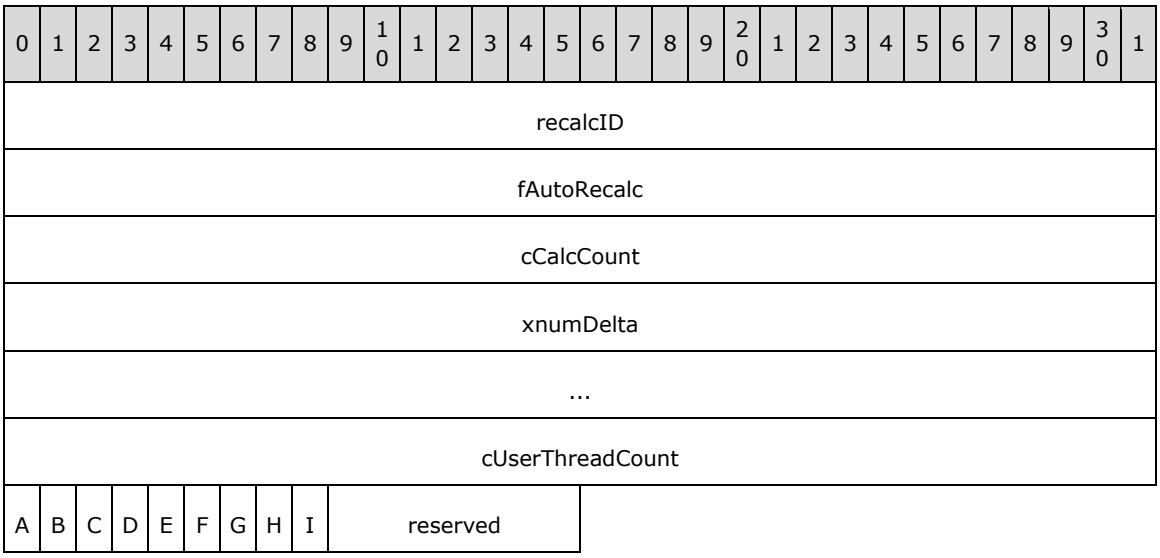
szName (variable)
...

FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the Future Record (section 2.1.6) information for this record.

szName (variable): An **XLWideString** (section 2.5.168) that specifies the name of the feature that is part of the calculation engine.

2.4.313 BrtCalcProp

The **BrtCalcProp** record specifies **workbook** calculation properties.



recalcID (4 bytes): An unsigned integer that specifies the recalculation engine identifier of the recalculation engine that performed the last recalculation. If the value is less than the recalculation engine identifier associated with the application, the application will recalculate the results of all formulas on this workbook immediately after loading the file.

fAutoRecalc (4 bytes): An unsigned integer that specifies the **calculation mode** for the workbook. This value MUST be one of the values from the following table.

Value	Meaning
0x00000000	Workbook is in **manual calculation mode**.
0x00000001	Workbook is in **automatic calculation mode**.
0x00000002	Same as 0x00000001, except that tables are excluded from automatic calculation.

cCalcCount (4 bytes): An unsigned integer that specifies the number of iterations to run when calculating a workbook in **iterative calculation** mode. This value is used when **fIter** is set to 1.

xnumDelta (8 bytes): An **Xnum** (section 2.5.171) that specifies the minimum change for iterative calculations. This value is used when **fIter** is set to 1. The application stops calculating after **cCalcCount** iterations or after all values in the circular reference change by less than **xnumDelta** between iterations, whichever comes first.

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cUserThreadCount (4 bytes): A signed integer that specifies the number of concurrent calculation processes to be used to calculate this workbook. This value is used when **fUserSetThreadCount** and **fMTREnabled** are set to 1. This value MUST be greater than 0 and MUST be less than or equal to 1,024.

A - fFullCalcOnLoad (1 bit): A bit that specifies whether the application performs a full calculation when the workbook is opened.

B - fRefA1 (1 bit): A bit that specifies the **cell reference** style used by this workbook. Possible values for this field are listed in the following table.

Value	Meaning
0	Specifies **R1C1** reference style.
1	Specifies **A1** reference style.

C - fIter (1 bit): A bit that specifies whether to enable iterative calculation. If the value is 0, iterative calculation is disabled. If the value is 1, iterative calculation is enabled.

D - fFullPrec (1 bit): A bit that specifies whether the **precision as displayed** mode is selected. Possible values for this field are listed in the following table.

Value	Meaning
0	Specifies that precision as displayed mode is selected.
1	Specifies that precision as displayed mode is not selected.

E - fSomeUncalced (1 bit): A bit that specifies whether the workbook was calculated before it was saved. Possible values for this field are listed in the following table.

Value	Meaning
0	Specifies that recalculation was fully finished before save.
1	Specifies that recalculation was not fully finished before the workbook was saved.

F - fSaveRecalc (1 bit): A bit that specifies whether to recalculate the workbook before it is saved, when in manual calculation mode.

G - fMTREnabled (1 bit): A bit that specifies whether concurrent calculation processes are enabled for this workbook.

H - fUserSetThreadCount (1 bit): A bit that specifies whether the user has set the number of concurrent calculation processes for this workbook.

I - fNoDeps (1 bit): A bit that specifies whether all cells in the workbook are calculated. Possible values for this field are listed in the following table.

Value	Meaning
0	Dependencies are respected and only formulas (section 2.2.2) that depend on cells that changed in the workbook are calculated.
1	Dependencies are ignored and all cell formulas in this workbook fully calculate every time a calculation is triggered.

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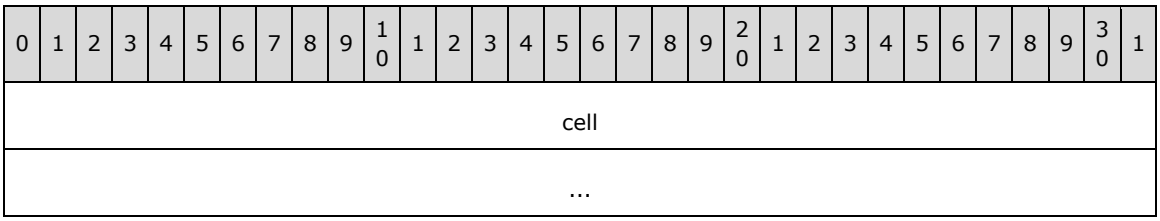
reserved (7 bits): This value MUST be 0, and MUST be ignored.

2.4.314 BrtCellBlank

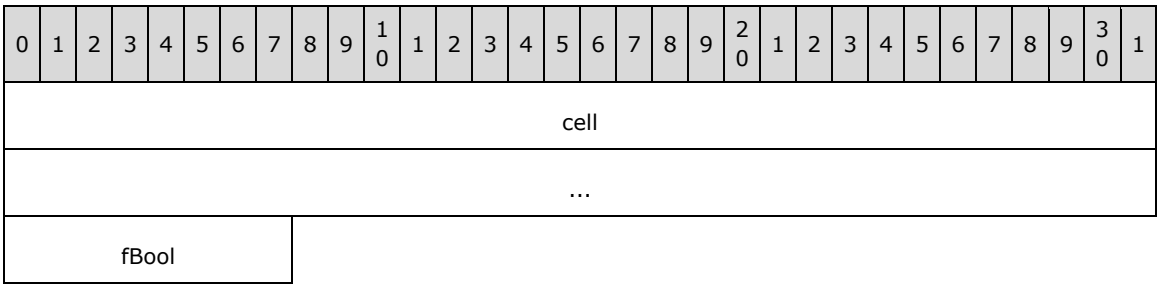
The **BrtCellBlank** record specifies a **cell** that is blank as specified in the **Worksheet** part **ABNF** (section 2.1.7.62), **Macro Sheet** (section 2.1.7.32) part ABNF, and **Revision Log** (section 2.1.7.44) part ABNF.



cell (8 bytes): A **Cell** (section 2.5.9) that specifies cell information such as the **column (1)**, style, and **phonetic information**.

2.4.315 BrtCellBool

The **BrtCellBool** record specifies a **cell** containing a **Boolean** (section 2.5.97.3) value as specified in the **Worksheet** part **ABNF** (section 2.1.7.62), **Macro Sheet** (section 2.1.7.32) part ABNF, and **Revision Log** (section 2.1.7.44) part ABNF.



cell (8 bytes): A **Cell** (section 2.5.9) that specifies cell information such as the **column (1)**, style, and **phonetic information**.

fBool (1 byte): A **Boolean** that specifies the value contained in the cell. This value MUST be a value from the following table.

Value	Meaning
0x00	**Boolean** value FALSE.
0x01	**Boolean** value TRUE.

2.4.316 BrtCellError

The **BrtCellError** record specifies a **cell** containing an error value as specified in the **Worksheet** part **ABNF** (section 2.1.7.62), **Macro Sheet** (section 2.1.7.32) part ABNF, and **Revision Log** (section 2.1.7.44) part ABNF.

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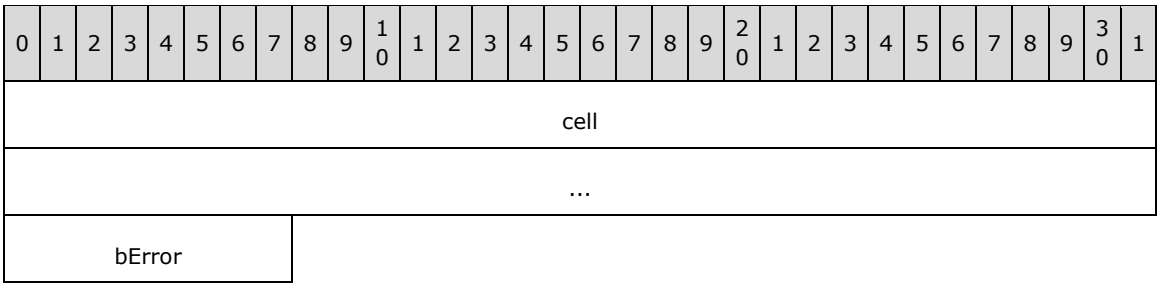
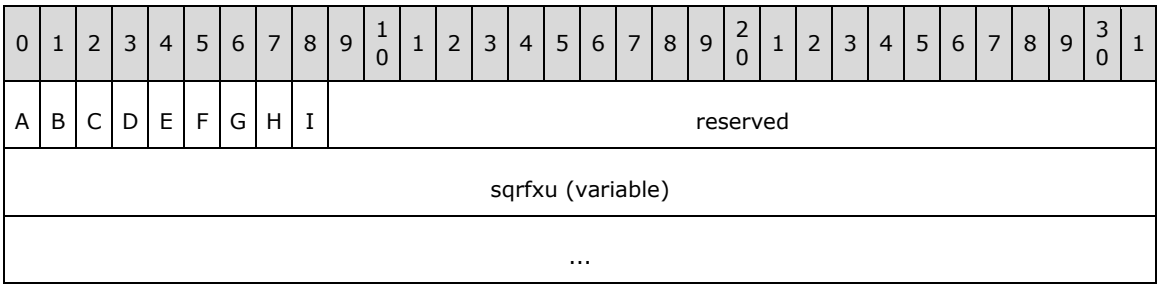


cell (8 bytes): A **Cell** (section 2.5.9) that specifies cell information such as the **column (1)**, style, and **phonetic information**.

bError (1 byte): A **BErr** (section 2.5.97.2) that specifies the type of error in this cell.

2.4.317 BrtCellIgnoreEC

The **BrtCellIgnoreEC** record specifies the types of error conditions that are ignored in a formula evaluation for a specified **range** or ranges.



A - ffecCalcError (1 bit): A bit that specifies whether to ignore calculation errors.

B - ffecEmptyCellRef (1 bit): A bit that specifies whether to ignore errors arising from references to empty **cells**.

C - ffecNumStoredAsText (1 bit): A bit that specifies whether to ignore errors arising from formatting of numeric values.

D - ffecInconsistRange (1 bit): A bit that specifies whether to ignore errors arising from formulas that contain references to less than the entirety of a range containing continuous data.

E - ffecInconsistFmla (1 bit): A bit that specifies whether to ignore errors arising from formulas that are inconsistent with formulas in neighboring cells.

F - ffecTextDateInsuff (1 bit): A bit that specifies whether to ignore errors arising from formatting of date/time values.

G - ffecUnprotFmla (1 bit): A bit that specifies whether to ignore errors arising from unprotected formulas.

H - ffecDataValidation (1 bit): A bit that specifies whether to ignore errors arising from **data validation**.

I - ffecCalcCol (1 bit): A bit that specifies whether to ignore errors arising from **calculated column** formulas (section 2.2.2).

reserved (23 bits): This value MUST be 0, and MUST be ignored.

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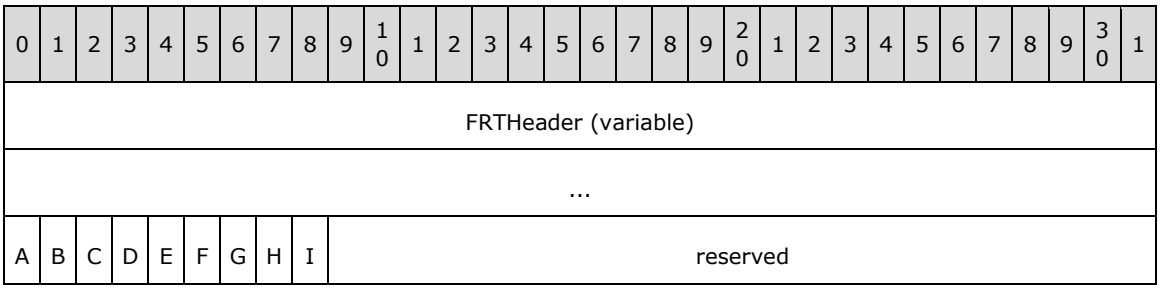
sqrfxu (variable): An **UncheckedSqRfX** (section 2.5.155) that specifies the range or ranges where cell errors have been ignored. The **sqrfxu.crfx** MUST be less than 8,192.

2.4.318 BrtCellIgnoreEC14

The **BrtCellIgnoreEC14** record specifies the types of error conditions that are ignored in a formula evaluation for a specified **range** or ranges. This record is equivalent to **BrtCellIgnoreEC** (section 2.4.317) but allows for more than 8,192 ranges where **cell** errors have been ignored.



FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the future record (section 2.1.6) information for this record.

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	1
FRTHeader.fFormulas	0
FRTHeader.fRelID	0

The **sqrfx** of the single **FRTSqref** (section 2.5.65) comprising the **array** of the **FRTHeader.rgSqrefs** is an **UncheckedSqRfX** (section 2.5.155) that specifies the range or ranges where cell errors have been ignored.

The **FRTHeader.rgSqrefs.csqref** MUST be 1.

The **sqrfx.crfx** of the single **FRTSqref** comprising the **array** of the **FRTHeader.rgSqrefs** MUST be equal to or greater than 8,192.

A - ffecCalcError (1 bit): A bit that specifies whether to ignore calculation errors.

B - ffecEmptyCellRef (1 bit): A bit that specifies whether to ignore errors arising from references to empty cells.

C - ffecNumStoredAsText (1 bit): A bit that specifies whether to ignore errors arising from formatting of numeric values.

D - ffecInconsistRange (1 bit): A bit that specifies whether to ignore errors arising from formulas (section 2.2.2) that contain references to less than the entirety of a range containing continuous data.

E - ffecInconsistFmla (1 bit): A bit that specifies whether to ignore errors arising from formulas that are inconsistent with formulas in neighboring cells.

F - ffecTextDateInsuff (1 bit): A bit that specifies whether to ignore errors arising from formatting of date/time values.

G - ffecUnprotFmla (1 bit): A bit that specifies whether to ignore errors arising from unprotected formulas.

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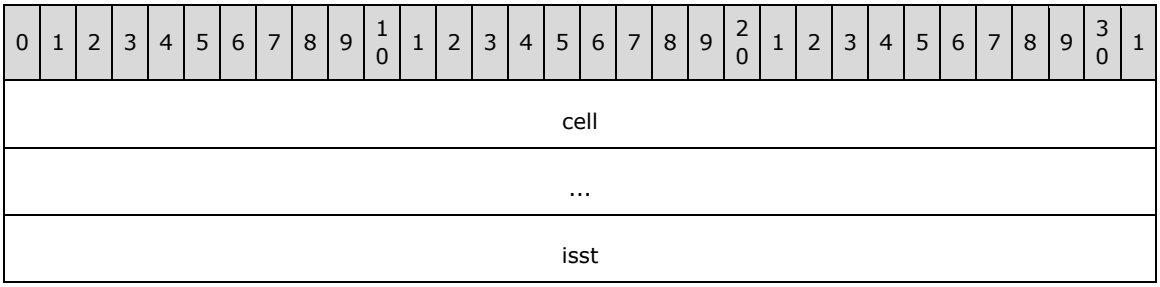
H - ffecDataValidation (1 bit): A bit that specifies whether to ignore errors arising from **data validation**.

I - ffecCalcCol (1 bit): A bit that specifies whether to ignore errors arising from **calculated column** formulas.

reserved (23 bits): This value MUST be 0, and MUST be ignored.

2.4.319 BrtCellIsst

The **BrtCellIsst** record specifies a **cell** that contains a string as specified in the **Worksheet** part **ABNF** (section 2.1.7.62), **Macro Sheet** (section 2.1.7.32) part ABNF, and **Revision Log** (section 2.1.7.44) part ABNF.

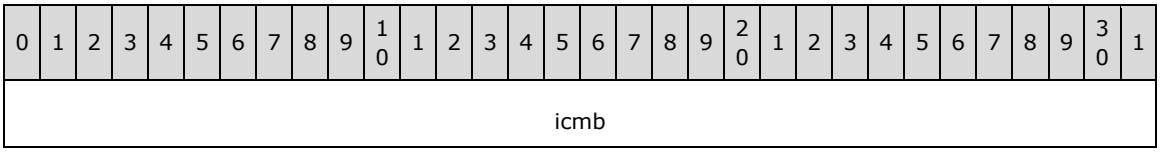


cell (8 bytes): A **Cell** (section 2.5.9) that specifies cell information such as the **column (1)**, **style**, and **phonetic information**.

isst (4 bytes): An unsigned integer that specifies a zero-based index of a **BrtSSTItem** (section 2.4.781) record in the collection of all records directly following **BrtBeginSst** (section 2.4.228) in the **Shared Strings (**section 2.1.7.45) part ABNF. The referenced **BrtSSTItem** specifies the string that this cell contains. This value MUST be less than the total number of **BrtSSTItem** records between **BrtBeginSst** and **BrtEndSst** (section 2.4.576).

2.4.320 BrtCellMeta

The **BrtCellMeta** record specifies a reference to a cell metadata (section 2.2.4.2) metadata block (section 2.2.4.5) in the metadata part (section 2.1.7.34).



icmb (4 bytes): A signed integer that specifies a one-based index of a **BrtMdb** (section 2.4.697) record in the collection of all records directly following the **BrtBeginEsmdb** (section 2.4.73) record whose **fCellMeta** field equals 0x00000001. The referenced **BrtMdb** specifies a cell metadata (section 2.2.4.2) metadata block that is associated with the **BrtCellBlank** (section 2.4.314), **BrtCellRk** (section 2.4.322), **BrtCellError** (section 2.4.316), **BrtCellBool** (section 2.4.315), **BrtCellReal** (section 2.4.321), **BrtCellIsst** (section 2.4.319), **BrtCellSt** (section 2.4.325), **BrtFmlaString** (section 2.4.674), **BrtFmlaNum** (section 2.4.673), **BrtFmlaBool** (section 2.4.671), or **BrtFmlaError** (section 2.4.672) record that follows **BrtCellMeta** (section 2.4.320).

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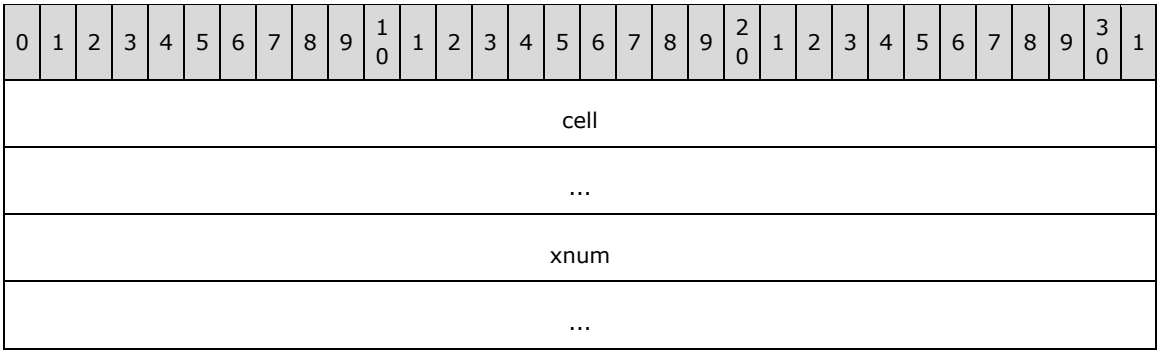
2.4.321 BrtCellReal

The **BrtCellReal** record specifies a **cell** containing a real number as specified in the **Worksheet** (section 2.1.7.62) part **ABNF**, **Macro Sheet** (section 2.1.7.32) part ABNF, and **Revision Log** (section 2.1.7.44) part ABNF.

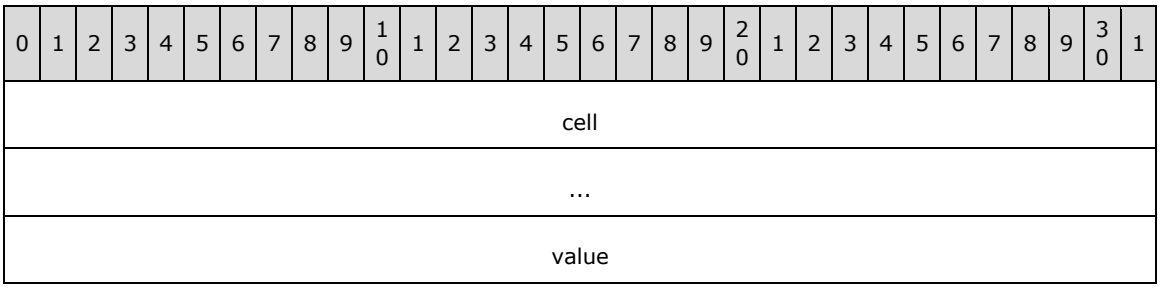


cell (8 bytes): A **Cell** (section 2.5.9) that specifies cell information such as the **column (1)**, **style**, and **phonetic information**.

xnum (8 bytes): An **Xnum** (section 2.5.171) that specifies the value of the cell.

2.4.322 BrtCellRk

The **BrtCellRk** record specifies a **cell** containing a number as specified in the **Worksheet** (section 2.1.7.62) part **ABNF**, **Macro Sheet** (section 2.1.7.32) part ABNF, and **Revision Log** (section 2.1.7.44) part ABNF.

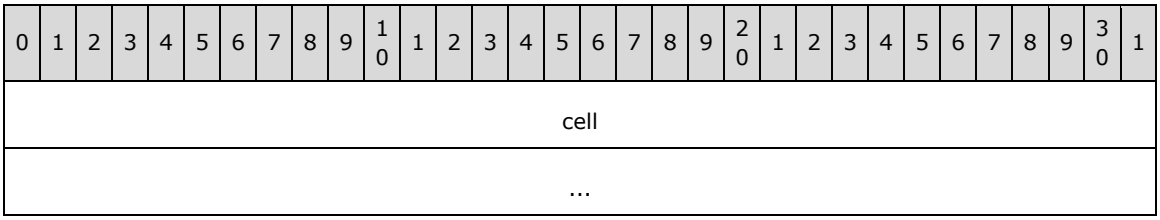


cell (8 bytes): A **Cell** (section 2.5.9) that specifies cell information such as the **column (1)**, **style**, and **phonetic information**.

value (4 bytes): An **RkNumber** (section 2.5.122) that contains the value of this cell.

2.4.323 BrtCellRString

The **BrtCellRString** record specifies a **cell** that contains a string, as specified in the **Revision Log** (section 2.1.7.44) part **ABNF**.



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value (variable)
...

cell (8 bytes): A **Cell** (section 2.5.9) that specifies cell information such as the **column (1)**, **style**, and **phonetic information**.

value (variable): A **RichStr** (section 2.5.121) that specifies the string value of the cell.

2.4.324 BrtCellSmartTagProperty

The **BrtCellSmartTagProperty** record specifies a property of a **smart tag** in a **cell**.<29>

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
key (variable)
...
val (variable)
...

key (variable): An **XLWideString** (section 2.5.168) that specifies the key of the property. The length of the string MUST be greater than or equal to 1 character and less than or equal to 255 characters.

val (variable): An **XLWideString** that specifies the value of the property. The length of the string MUST be greater than or equal to 1 character and less than or equal to 65535<30> characters.

2.4.325 BrtCellSt

The **BrtCellSt** record specifies a **cell** that contains a string or the most recent evaluation of a **data table** formula (section 2.2.2) that resulted in a string, as specified in the **Worksheet** (section 2.1.7.62) part **ABNF**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cell
...
value (variable)
...

cell (8 bytes): A **Cell** (section 2.5.9) that specifies cell information such as the **column (1)**, **style**, and **phonetic information**.

value (variable): An **XLWideString** (section 2.5.168) that contains the string content of the cell. This value MUST be less than or equal to 32,767 characters.

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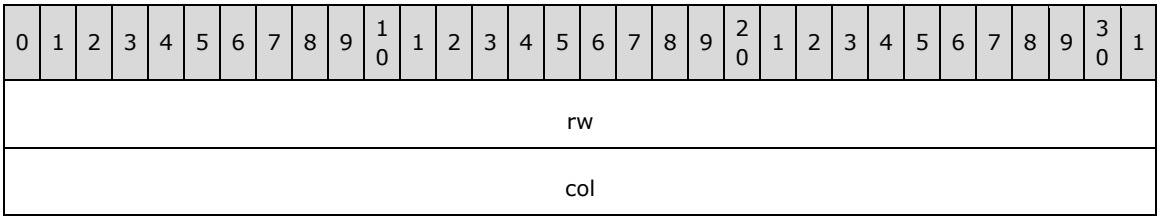
2.4.326 BrtCellWatch

The **BrtCellWatch** record specifies a reference to a **watched cell**.

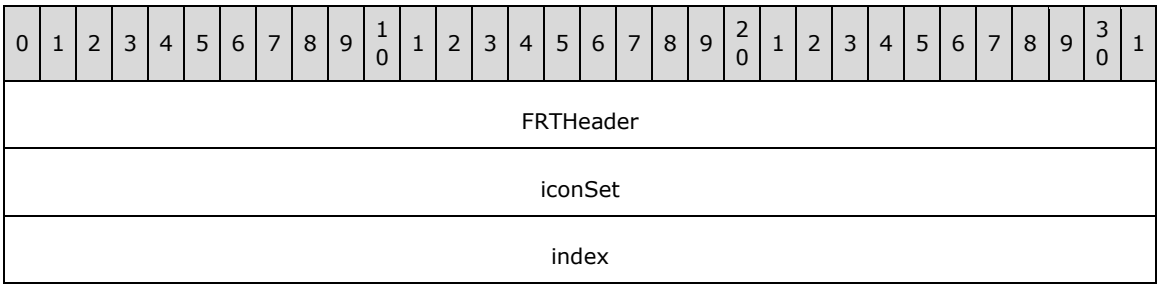


rw (4 bytes): An **UncheckedRw** (section 2.5.154) that specifies the **row** of the **cell**.

col (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies the **column (1)** of the cell.

2.4.327 BrtCFIcon

The **BrtCFIcon** record specifies a single **icon** of an **icon set**.



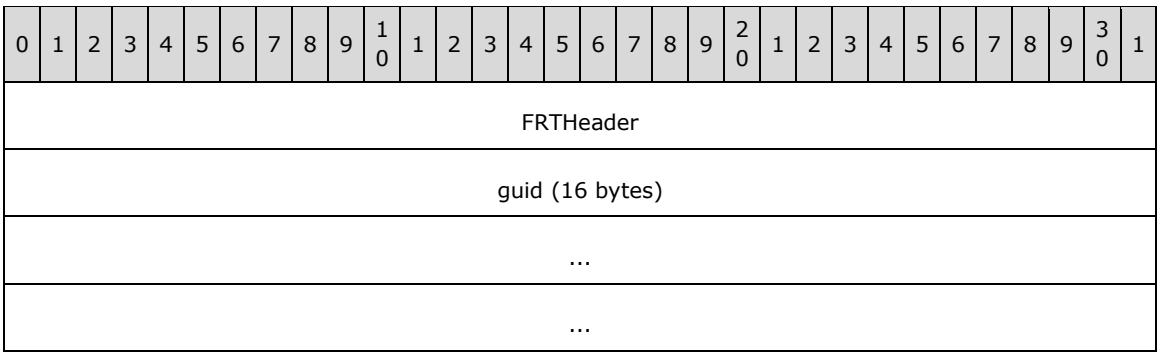
FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record information for this record.

iconSet (4 bytes): A **KPISets14** (section 2.5.86) that specifies the icon set.

index (4 bytes): An **Icon** (section 2.5.74) that specifies the icon. If **iconSet** is equal to -1, this value MUST be -1. If **iconSet** is not equal to -1, this value MUST be greater than or equal to 0. If the icon set specified by **iconSet** has 3 icons, this value MUST be less than or equal to 2. If the icon set specified by **iconSet** has 4 icons, this value MUST be less than or equal to 3. If the icon set specified by **iconSet** has 5 icons, this value MUST be less than or equal to 4.

2.4.328 BrtCFRuleExt

The **BrtCFRuleExt** record specifies additional properties for **conditional formatting** rule.



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FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

guid (16 bytes): A **GUID** as specified by [MS-DTYP] section 2.3.4 that is used to identify the **BrtBeginCFFRule14** (section 2.4.23) record that contains the additional properties for this conditional formatting rule. This value MUST be equal to the **guid** field of one of the **BRTBeginCFRule14** records as described by the **Worksheet** (section 2.1.7.62) part **ABNF**.

2.4.329 BrtCFVO

The **BrtCFVO** record specifies a Conditional Formatting Value Object (CFVO) that specifies how to calculate a value from the **range** of cells to which a **conditional formatting** rule applies.

The value this structure specifies how to calculate is referred to as a CFVO value in other records.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iType																															
numParam																															
...																															
fSaveGTE																															
fGTE																															
cbFmla																															
formula (variable)																															
...																															

iType (4 bytes): A **CFVOtype** (section 2.5.18) that specifies how the CFVO value is determined.

- If this record is preceded by a **BrtBeginColorScale** (section 2.4.27) record and specifies the beginning of the **color scale**, then this value MUST NOT be CFVOMAX.
- If this record is preceded by a **BrtBeginColorScale** record and specifies the end of the color scale, then this value MUST NOT be CFVOMIN.
- If this record is preceded by a **BrtBeginColorScale** record and specifies the midpoint of the color scale, then this value MUST NOT be CFVOMAX and MUST NOT be CFVOMIN.
- If this record is preceded by a **BrtBeginDatabar** (section 2.4.42) record and specifies the **cell value** for the shortest **data bar**, then this value MUST NOT be CFVOMAX.
- If this record is preceded by a **BrtBeginDatabar** record and specifies the cell value for the longest data bar, then this value MUST NOT be CFVOMIN.
- If this record is preceded by a **BrtBeginIconSet** (section 2.4.90) record, then this value MUST NOT be CFVOMAX or CFVOMIN.
- If **iType** is CFVOMIN or CFVOMAX, **numParam**, **cbFmla**, and **formula** are all undefined and MUST be ignored.

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- If **iType** is CFVOFMLA, **numParam** is undefined and MUST be ignored.
- If **iType** is CFVONUM, CFVOPERCENT, or CFVOPERCENTILE and **cbFmla** is greater than 0, then **numParam** is undefined and MUST be ignored.
- If **iType** is CFVONUM, CFVOPERCENT, or CFVOPERCENTILE and **cbFmla** is 0, then **numParam** is used.

numParam (8 bytes): An **Xnum** (section 2.5.171) that specifies the numerical value of this **BrtCFVO** (section 2.4.329) as specified by **iType**. If **iType** is CFVOPERCENT or CFVOPERCENTILE, **numParam** MUST be greater than or equal to 0 and less than or equal to 100.

fSaveGTE (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether the value of **fGTE** is used to specify the conditional formatting behavior of this **BrtCFVO**. If the current group of **BrtCFVO** records are not preceded by a **BrtBeginIconSet** record and therefore not describing an **icon set**, then this value MUST be ignored. Otherwise, it MUST have a value of 0x00000001.

fGTE (4 bytes): A **Boolean** that specifies whether the first **BrtCFVO** will use greater-than or greater-than-or-equal-to when applying conditional formatting rules. This value MUST have a value from the following table.

Value	Meaning
0x00000000	Greater-than is used when applying conditional formatting rules.
0x00000001	Greater-than-or-equal-to is used when applying conditional formatting rules.

This value MUST be ignored if the current group of **BrtCFVO** records is not preceded by a **BrtBeginIconSet** record and therefore does not describe an icon set.

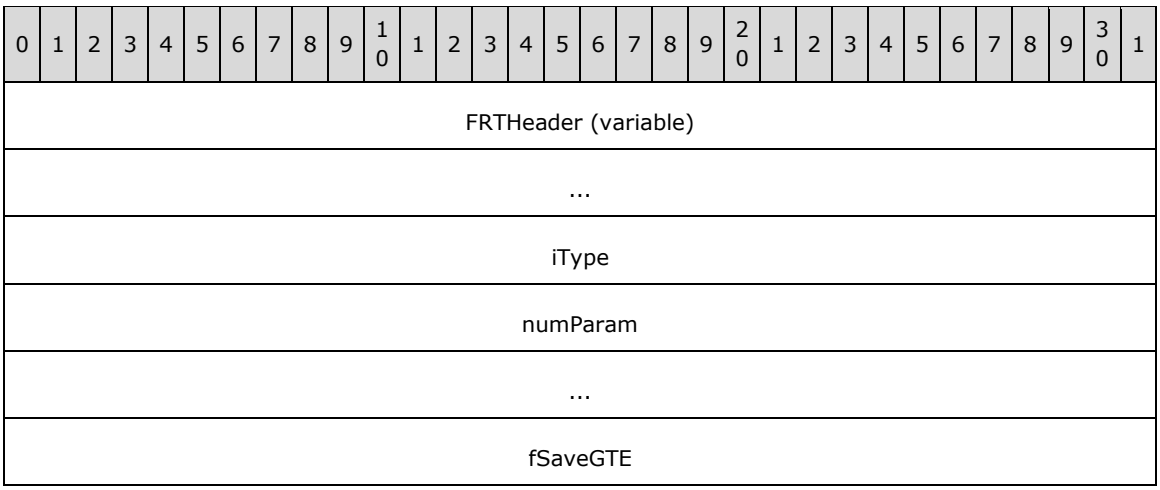
cbFmla (4 bytes): An unsigned integer that specifies the length in bytes of **formula.rgce**.

formula (variable): A **CFVOParsedFormula** (section 2.5.97.7) that specifies the formula (section 2.2.2) that is evaluated and compared to the cell value by using the comparison method specified by this **BrtCFVO**.

2.4.330 BrtCFVO14

The **BrtCFVO14** record specifies a Conditional Formatting Value Object (CFVO) that specifies how to calculate a value from the **range** of cells to which a **conditional formatting** rule applies. This record is equivalent to **BrtCFVO** (section 2.4.329) but allows to specify additional values for the **iType** field.

The value this structure specifies how to calculate is referred to as a CFVO value in other records.



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fGTE
cbFmla

FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the future record (section 2.1.6) information for this record. The **FRTHeader** flags MUST have the values listed in the following table.

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	0
FRTHeader.fFormula	0 or 1
FRTHeader.fRelID	0

The **FRTHeader.fFormula** MUST be 1 if **cbFmla** is greater than 0.

If **FRTHeader.fFormula** is 1, **rgFormulas**.**cformula** MUST equal 1. The **formula** of the single **FRTFormula** (section 2.5.58) comprising the **array** of the **rgFormulas** specifies the **FRTCFVOParsedFormula14** (section 2.5.56) for this **BrtCFVO14** (section 2.4.330).

iType (4 bytes): A **CFVOType14** (section 2.5.19) that specifies how the CFVO value is determined.

- If this record is preceded by a **BrtBeginColorScale14** (section 2.4.28) record and specifies the beginning of the **color scale**, then this value MUST NOT be CFVOMAX_14.
- If this record is preceded by a **BrtBeginColorScale14** record and specifies the end of the color scale, then this value MUST NOT be CFVOMIN_14.
- If this record is preceded by a **BrtBeginColorScale14** record and specifies the midpoint of the color scale, then this value MUST NOT be CFVOMAX_14 and MUST NOT be CFVOMIN_14.
- If this record is not preceded by a **BrtBeginDatabar14** record, then this value MUST NOT be CFVOAUTOMAX_14 and MUST NOT be CFVOAUTOMIN_14.
- If this record is preceded by a **BrtBeginDatabar14** record and specifies the minimum **cell value** used for the **data bars** in this conditional formatting range, then this value MUST NOT be CFVOMAX_14 or CFVOAUTOMAX_14.
- If this record is preceded by a **BrtBeginDatabar14** record and specifies the maximum cell value used for the data bars in this conditional formatting range, then this value MUST NOT be CFVOMIN_14 or CFVOAUTOMIN_14.
- If this record is preceded by a **BrtBeginIconSet14** (section 2.4.91) record, then this value MUST NOT be CFVOMAX_14 or CFVOMIN_14.
- If **iType** is CFVOMIN_14, CFVOMAX_14, CFVOAUTOMAX_14, or CFVOAUTOMIN_14, **numParam**, **cbFmla**, and **formula** are all undefined and MUST be ignored.
- If **iType** is CFVOFMLA_14, **numParam** is undefined and MUST be ignored.
- If **iType** is CFVONUM_14, CFVOPERCENT_14, or CFVOPERCENTILE_14 and **cbFmla** is greater than 0, then **numParam** is undefined and MUST be ignored.
- If **iType** is CFVONUM_14, CFVOPERCENT_14, or CFVOPERCENTILE_14 and **cbFmla** is 0, then **numParam** is used.

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numParam (8 bytes): An **Xnum** (section 2.5.171) that specifies the numerical value of this **BrtCFVO14** as specified by **iType**. If **iType** is CFVOPERCENT_14 or CFVOPERCENTILE_14, **numParam** MUST be greater than or equal to 0 and less than or equal to 100.

fSaveGTE (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether the value of **fGTE** is used to specify the conditional formatting behavior of this **BrtCFVO14**. If the current group of **BrtCFVO14** records are not preceded by a **BrtBeginIconSet14** record and therefore not describing an **icon set**, then this value MUST be ignored. Otherwise, it MUST have a value of 0x00000001.

fGTE (4 bytes): A **Boolean** that specifies whether the first **BrtCFVO14** will use greater-than or greater-than-or-equal-to when applying conditional formatting rules. This value MUST have a value from the following table.

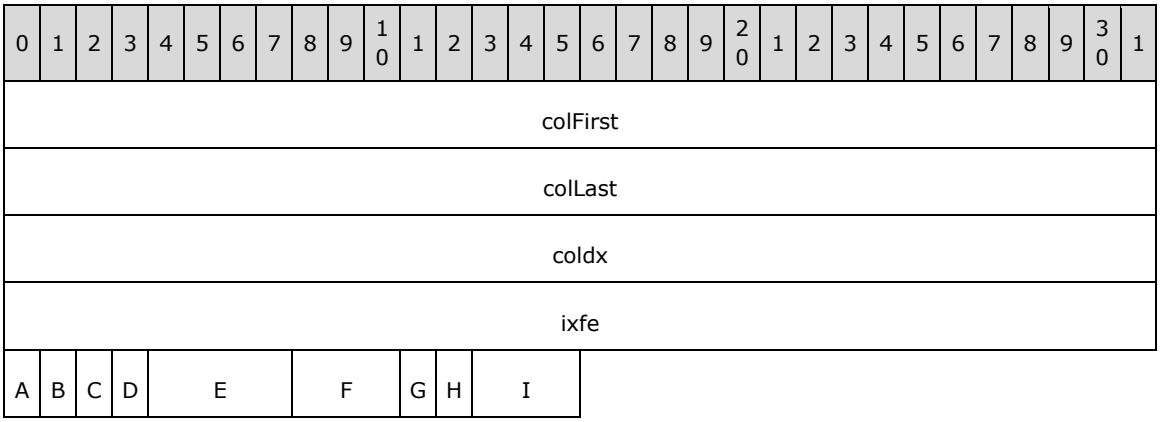
Value	Meaning
0x00000000	Greater-than is used when applying conditional formatting rules.
0x00000001	Greater-than-or-equal-to is used when applying conditional formatting rules.

This value MUST be ignored if the current group of **BrtCFVO14** records is not preceded by a **BrtBeginIconSet14** record and therefore does not describe an icon set.

cbFmla (4 bytes): An unsigned integer that specifies whether a formula (section 2.2.2) is present in **FRTHeader**. This value MUST be 0x00000000 if there is no formula, and MUST be nonzero if there is. This value MUST be equal to the number of bytes in the formula **rgce** if a formula is present in **FRTHeader**.

2.4.331 BrtColInfo

The **BrtColInfo** record specifies the **column (1)** width and formatting for one or more columns (1) of a **sheet**.



colFirst (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies the first column (1) to which this width and formatting is applied.

colLast (4 bytes): An **UncheckedCol** that specifies the last column (1) to which this width and formatting is applied.

coldx (4 bytes): An unsigned integer that specifies the column (1) width in standard digits for all columns (1) between **colFirst** and **colLast**, inclusive. For the purposes of this field specification, a standard digit is defined as the widest digit in the Normal style (section 2.2.6.1.2.2) **font**. The default column (1) width is measured in the number of standard digits that fit in the column (1) multiplied by 256 and rounded down. This value MUST be less than or equal to 65,535.

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ixfe (4 bytes): An unsigned integer that specifies the zero-based index of a **BrtXF** (section 2.4.845) record in the collection of all records directly following **BrtBeginCellXFs** (section 2.4.21) in the **Styles** (section 2.1.7.50) part. The referenced **BrtXF** specifies the format to apply as the default format for the columns (1) specified by **colFirst** and **colLast**. This value MUST be less than the **cxfs** field of the **BrtBeginCellXFs** record in the styles part.

A - fHidden (1 bit): A bit that specifies whether the columns (1) are **hidden**.

B - fUserSet (1 bit): A bit that specifies whether the width of the columns (1) is different than the default.

C - fBestFit (1 bit): A bit that specifies whether the width of the columns (1) has been adjusted to display all contents of all **cells** in those columns (1).

D - fPhonetic (1 bit): A bit that specifies whether **phonetic information** is displayed in the cells of the specified columns (1) by default.

E - reserved1 (4 bits): This value MUST be 0, and MUST be ignored.

F - iOutLevel (3 bits): An unsigned integer that specifies the **outline level** of the columns (1). The value MUST be greater than or equal to 0 and less than or equal to 7.

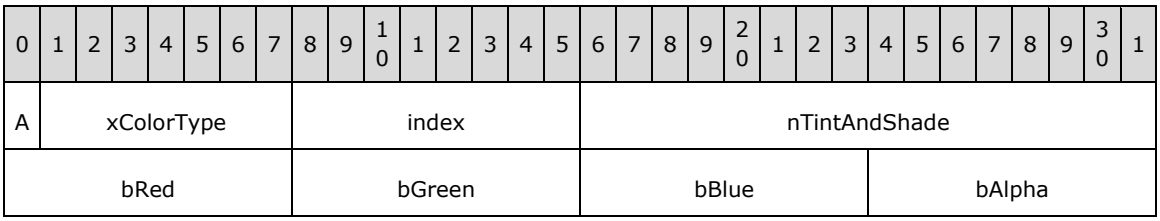
G - unused (1 bit): This value is undefined, and MUST be ignored.

H - fCollapsed (1 bit): A bit that specifies whether the outline level of the columns (1) is collapsed.

I - reserved2 (3 bits): This value MUST be 0, and MUST be ignored.

2.4.332 BrtColor

The **BrtColor** record specifies a color.



A - fValidRGB (1 bit): A bit that specifies whether the color specified by **index** matches the color specified by **bRed**, **bGreen**, **bBlue**, and **bAlpha**. This value MUST be 1 if **xColorType** is 2. Possible values for this field and their meanings are listed in the following table.

Value	Meaning
0	The color specified by **index** does not match the color specified by **bRed**, **bGreen**, **bBlue**, and **bAlpha**. **bRed**, **bGreen**, **bBlue**, and **bAlpha** MUST be ignored.
1	The color specified by **index** matches the color specified by **bRed**, **bGreen**, **bBlue**, and **bAlpha**.

xColorType (7 bits): An unsigned integer that specifies the type of color information contained in this record. This value MUST be a value from the following table.

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Value	Meaning
0x00	Color information is automatically determined by the application.
0x01	This color is a color from a color palette and is specified by **index**.
0x02	This color is a standard **ARGB** color and is specified by the values in **bRed**, **bGreen**, **bBlue**, and **bAlpha**.
0x03	This color is a **theme** color and is specified by **index**.

index (1 byte): A value that specifies the index of a color from a collection of colors. The type and meaning of this field depends on the value of **xColorType** and is specified by the following table.

Value of xColorType	Meaning of index field
0x00	Undefined and MUST be ignored.
0x01	An **Icv** (section 2.5.75) that specifies a color from a color palette.
0x02	Undefined and MUST be ignored.
0x03	An unsigned integer that specifies a subelement of the **clrScheme** element in the **Theme** (section 2.1.7.52) part that specifies a color. The following lists which subelement of clrScheme to use for each legal value of **index**: ▪ Index = 0x00, subelement = dk1 ▪ Index = 0x01, subelement = lt1 ▪ Index = 0x02, subelement = dk2 ▪ Index = 0x03, subelement = lt2 ▪ Index = 0x04, subelement = accent1 ▪ Index = 0x05, subelement = accent2 ▪ Index = 0x06, subelement = accent3 ▪ Index = 0x07, subelement = accent4 ▪ Index = 0x08, subelement = accent5 ▪ Index = 0x09, subelement = accent6 ▪ Index = 0x0A, subelement = hlink ▪ Index = 0x0B, subelement = folHlink

nTintAndShade (2 bytes): A signed integer that specifies the amount of tint or **shade** applied to the color specified by **index** or **bRed**, **bGreen**, **bBlue**, and **bAlpha**. The maximum possible positive value means 100% lightening, the maximum possible negative value means 100% darkening, and 0 means no change.

bRed (1 byte): An unsigned integer that specifies the intensity of red in this color, where 0 is no red and 255 is maximum red.

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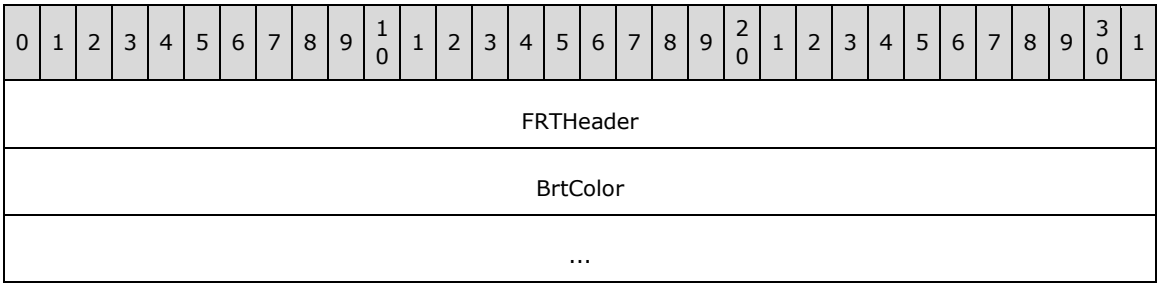
bGreen (1 byte): An unsigned integer that specifies the intensity of green in this color, where 0 is no green and 255 is maximum green.

bBlue (1 byte): An unsigned integer that specifies the intensity of blue in this color, where 0 is no blue and 255 is maximum blue.

bAlpha (1 byte): An unsigned integer that specifies the transparency of this color, where 0 is completely transparent and 255 is completely opaque.

2.4.333 BrtColor14

The **BrtColor14** record specifies a color.

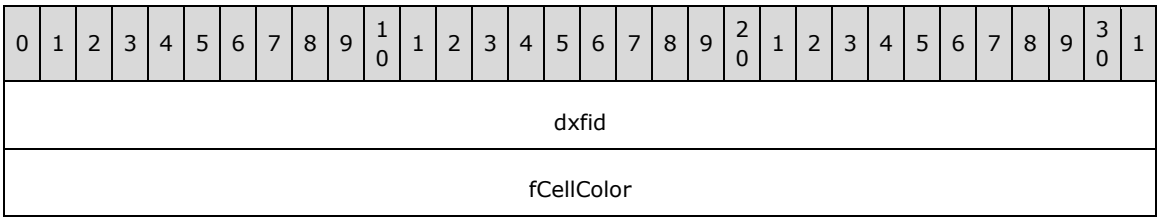


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

BrtColor (8 bytes): A **BrtColor** (section 2.4.332) that specifies a color.

2.4.334 BrtColorFilter

The **BrtColorFilter** record specifies the color by which to **filter** and whether to use the **fill color** of the **cell** or **font face color** in the filter criteria. If the fill color or font face color of the cell does not match the color specified in the criteria, the **rows** corresponding to those cells are **hidden** from view.



dxfid (4 bytes): A **DXFId** (section 2.5.37) section that specifies the color by which to filter. This value MUST NOT equal 0xFFFFFFFF.

fCellColor (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether to filter by the fill color of the cell or font face color. This value MUST be a value from the following table.

Value	Meaning
0x00000000	The application filters by font face color of the cell.
0x00000001	The application filters by the fill color of the cell.

2.4.335 BrtCommentAuthor

The **BrtCommentAuthor** record specifies the author of a **comment**.

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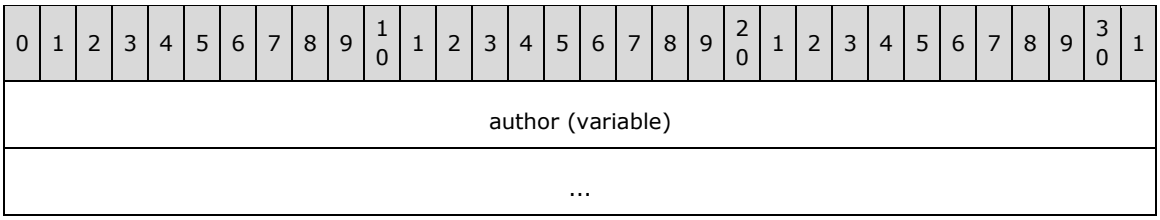
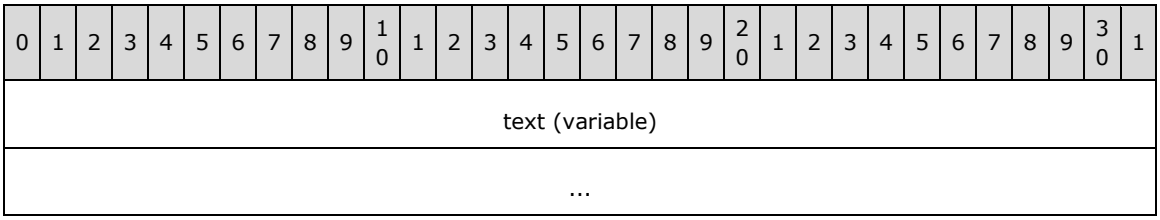


author (variable): An **XLWideString** (section 2.5.168) that specifies the author. The string length MUST be greater than or equal to 1 and less than or equal to 54.

2.4.336 BrtCommentText

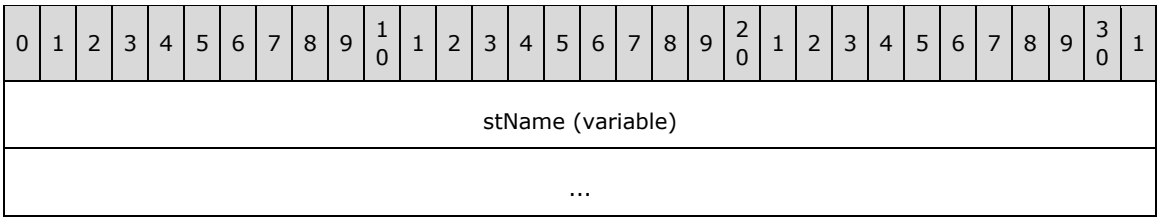
The **BrtCommentText** record specifies the text of a **comment**.



text (variable): A **RichStr** (section 2.5.121) that specifies the text. The value of **text**.**fRichStr** MUST be 1. The value of **text**.**fExtStr** MUST be 0.

2.4.337 BrtCrashRecErr

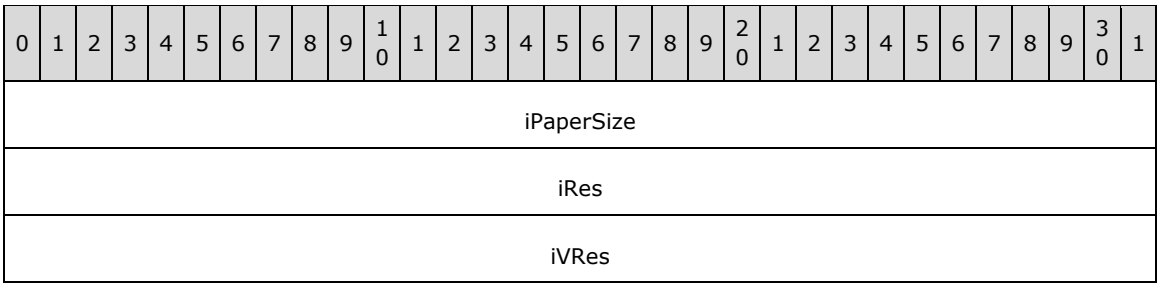
The **BrtCrashRecErr** record specifies an error found during an application fault.



stName (variable): An **XLWideString** (section 2.5.168) that specifies the description of the error that occurred during an application fault. The length of the string MUST be less than or equal to 65,535.

2.4.338 BrtCsPageSetup

The **BrtCsPageSetup** record specifies page layout and printing settings for a **chart sheet**.



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iCopies							
iPageStart	A	B	C	D	E	F	reserved2
szRelID (variable)							
...							

iPaperSize (4 bytes): An unsigned integer that specifies the size of the printer paper. This value MUST be greater than or equal to 0 and less than 2,147,483,647. The value 0 or values greater than or equal to 256 specify printer paper sizes defined by the user. Values greater than 118 and less than 256 are reserved for future use.

The meaning of values between 1 and 118, inclusive, is given by the following table.

Value	Meaning
1	US Letter 8 1/2 x 11 in.
2	US Letter Small 8 1/2 x 11 in.
3	US Tabloid 11 x 17 in.
4	US Ledger 17 x 11 in.
5	US Legal 8 1/2 x 14 in.
6	US Statement 5 1/2 x 8 1/2 in.
7	US Executive 7 1/4 x 10 1/2 in.
8	A3 297 x 420 mm.
9	A4 210 x 297 mm.
10	A4 Small 210 x 297 mm.
11	A5 148 x 210 mm.
12	B4 (JIS) 250 x 354.
13	B5 (JIS) 182 x 257 mm.
14	Folio 8 1/2 x 13 in.
15	Quarto 215 x 275 mm.
16	10 x 14 in.
17	11 x 17 in.
18	US Note 8 1/2 x 11 in.
19	US Envelope #9 3 7/8 x 8 7/8.
20	US Envelope #10 4 1/8 x 9 1/2.
21	US Envelope #11 4 1/2 x 10 3/8.
22	US Envelope #12 4 3/4 x 11.
23	US Envelope #14 5 x 11 1/2.
24	C size sheet.
25	D size sheet.
26	E size sheet.
27	Envelope DL 110 x 220mm.
28	Envelope C5 162 x 229 mm.
29	Envelope C3 324 x 458 mm.
30	Envelope C4 229 x 324 mm.
31	Envelope C6 114 x 162 mm.
32	Envelope C65 114 x 229 mm.
33	Envelope B4 250 x 353 mm.

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Value	Meaning
34	Envelope B5 176 x 250 mm.
35	Envelope B6 176 x 125 mm.
36	Envelope 110 x 230 mm.
37	US Envelope Monarch 3.875 x 7.5 in.
38	6 3/4 US Envelope 3 5/8 x 6 1/2 in.
39	US Std Fanfold 14 7/8 x 11 in.
40	German Std Fanfold 8 1/2 x 12 in.
41	German Legal Fanfold 8 1/2 x 13 in.
42	B4 (ISO) 250 x 353 mm.
43	Japanese Postcard 100 x 148 mm.
44	9 x 11 in.
45	10 x 11 in.
46	15 x 11 in.
47	Envelope Invite 220 x 220 mm.
48	RESERVED--DO NOT USE.
49	RESERVED--DO NOT USE.
50	US Letter Extra 9 1/2 x 12 in.
51	US Legal Extra 9 1/2 x 15 in.
52	US Tabloid Extra 11.69 x 18 in.
53	A4 Extra 9.27 x 12.69 in.
54	Letter Transverse 8 1/2 x 11 in.
55	A4 Transverse 210 x 297 mm.
56	Letter Extra Transverse 9 1/2 x 12 in.
57	SuperA/A4 227 x 356 mm.
58	SuperB/A3 305 x 487 mm.
59	US Letter Plus 8.5 x 12.69 in.
60	A4 Plus 210 x 330 mm.
61	A5 Transverse 148 x 210 mm.
62	B5 (JIS) Transverse 182 x 257 mm.
63	A3 Extra 322 x 445 mm.
64	A5 Extra 174 x 235 mm.
65	B5 (ISO) Extra 201 x 276 mm.
66	A2 420 x 594 mm.
67	A3 Transverse 297 x 420 mm.
68	A3 Extra Transverse 322 x 445 mm.
69	Japanese Double Postcard 200 x 148 mm.
70	A6 105 x 148 mm.
71	Japanese Envelope Kaku #2.
72	Japanese Envelope Kaku #3.
73	Japanese Envelope Chou #3.
74	Japanese Envelope Chou #4.
75	Letter Rotated 11 x 8 1/2 11 in.
76	A3 Rotated 420 x 297 mm.
77	A4 Rotated 297 x 210 mm.
78	A5 Rotated 210 x 148 mm.
79	B4 (JIS) Rotated 364 x 257 mm.
80	B5 (JIS) Rotated 257 x 182 mm.

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Value	Meaning
81	Japanese Postcard Rotated 148 x 100 mm.
82	Double Japanese Postcard Rotated 148 x 200 mm.
83	A6 Rotated 148 x 105 mm.
84	Japanese Envelope Kaku #2 Rotated.
85	Japanese Envelope Kaku #3 Rotated.
86	Japanese Envelope Chou #3 Rotated.
87	Japanese Envelope Chou #4 Rotated.
88	B6 (JIS) 128 x 182 mm.
89	B6 (JIS) Rotated 182 x 128 mm.
90	12 x 11 in.
91	Japanese Envelope You #4.
92	Japanese Envelope You #4 Rotated.
93	PRC 16K 146 x 215 mm.
94	PRC 32K 97 x 151 mm.
95	PRC 32K(Big) 97 x 151 mm.
96	PRC Envelope #1 102 x 165 mm.
97	PRC Envelope #2 102 x 176 mm.
98	PRC Envelope #3 125 x 176 mm.
99	PRC Envelope #4 110 x 208 mm.
100	PRC Envelope #5 110 x 220 mm.
101	PRC Envelope #6 120 x 230 mm.
102	PRC Envelope #7 160 x 230 mm.
103	PRC Envelope #8 120 x 309 mm.
104	PRC Envelope #9 229 x 324 mm.
105	PRC Envelope #10 324 x 458 mm.
106	PRC 16K Rotated.
107	PRC 32K Rotated.
108	PRC 32K(Big) Rotated.
109	PRC Envelope #1 Rotated 165 x 102 mm.
110	PRC Envelope #2 Rotated 176 x 102 mm.
111	PRC Envelope #3 Rotated 176 x 125 mm.
112	PRC Envelope #4 Rotated 208 x 110 mm.
113	PRC Envelope #5 Rotated 220 x 110 mm.
114	PRC Envelope #6 Rotated 230 x 120 mm.
115	PRC Envelope #7 Rotated 230 x 160 mm.
116	PRC Envelope #8 Rotated 309 x 120 mm.
117	PRC Envelope #9 Rotated 324 x 229 mm.
118	PRC Envelope #10 Rotated 458 x 324 mm.

iRes (4 bytes): An unsigned integer that specifies the horizontal resolution of the printer in dots per inch.

iVRes (4 bytes): An unsigned integer that specifies the vertical resolution of the printer in dots per inch.

iCopies (4 bytes): An unsigned integer that specifies the number of copies to print. This value MUST be greater than or equal to 1 and less than or equal to 32,767.

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iPageStart (2 bytes): A signed integer that specifies the page number of the starting page for a count or numbering of pages in a chart sheet. This value MUST be ignored if **fUsePage** is 0.

A - fLandscape (1 bit): A bit that specifies the orientation of the printed page. This value MUST be ignored if **fNoOrient** has a value of 1. Otherwise, the orientation is indicated by values and meanings in the following table.

Value	Meaning
0	Portrait orientation, in which the longest edge of the page is vertical.
1	Landscape orientation, in which the longest edge of the page is horizontal.

B - reserved1 (1 bit): This value MUST be zero, and MUST be ignored.

C - fNoColor (1 bit): A bit that specifies the color setting of the printed page.

Value	Meaning
0	The printer will be instructed to print the page in color.
1	The printer will be instructed to print the page in black and white.

D - fNoOrient (1 bit): A bit that specifies orientation of the printed page. Possible values for this field are listed in the following table.

Value	Meaning
0	The value of **fLandscape** is used to specify the orientation settings of the printed page.
1	Application-specific and printer-specific behavior is used to determine the orientation settings of the printed page.

E - fUsePage (1 bit): A bit that specifies whether **iPageStart** is used to specify the first page number in the chart sheet. Possible values for this field are listed in the following table.

Value	Meaning
0	The page numbering will start with a value of 1.
1	The value of **iPageStart** is used to specify the first page number in the chart sheet.

F - fDraft (1 bit): A bit that specifies whether graphics are included on the printed page. Possible values for this field are listed in the following table.

Value	Meaning
0	Graphics are included on the printed page.
1	Graphics are omitted from the printed page.

reserved2 (10 bits): This value MUST be 0, and MUST be ignored.

szRelID (variable): A **RelID** (section 2.5.114) that specifies the link to the **Printer Settings** (section 2.1.7.41) part. This value MUST be a reference to a valid **Printer Settings** part. This value MUST be less than or equal to 260 characters long.

2.4.339 BrtCsProp

The **BrtCsProp** record specifies properties for a **chart sheet**.

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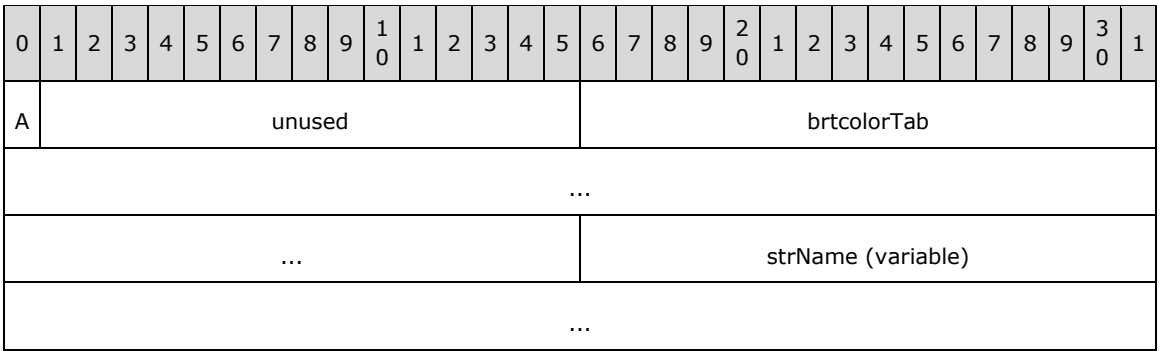


A - fPublish (1 bit): A bit that specifies whether the chart sheet is **published**.

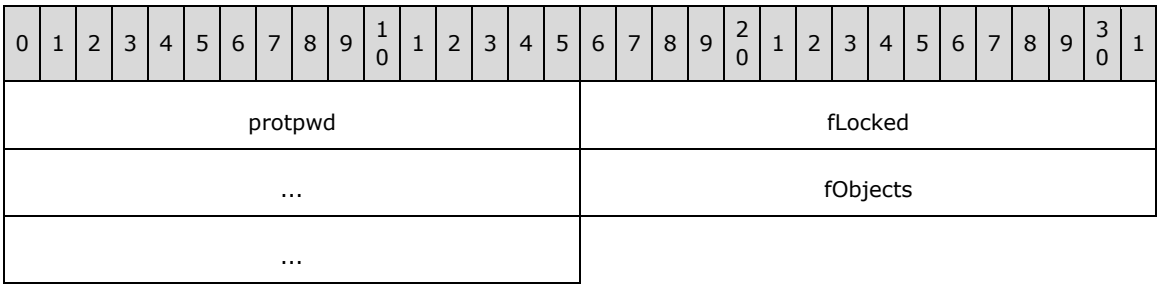
unused (15 bits): This value is undefined, and MUST be ignored.

brtcolorTab (8 bytes): A **BrtColor** (section 2.4.332) that specifies a **background color** of the **sheet tab**.

strName (variable): A **CodeName** (section 2.5.21) for this chart sheet.

2.4.340 BrtCsProtection

The **BrtCsProtection** record specifies **protection** options for a **chart sheet**.



protpwd (2 bytes): An unsigned integer that specifies the verifier value for the password required for editing the chart sheet. If the value is 0x0000, then no password is required. The algorithm to generate the verifier value from the password is specified in section 2.2.9.

fLocked (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether changes can be made to elements of the chart in the chart sheet. The chart will continue to reflect changes in source data (section 2.2.5.2.1). This value MUST be a value from the following table.

Value	Meaning
0x00000000	Changes to the chart elements are not prevented.
0x00000001	Changes to the chart elements are prevented.

fObjects (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether changes can be made to graphic objects (such as shapes, text boxes, and controls) in the chart sheet. This value MUST be a value from the following table.

Value	Meaning
0x00000000	Changes to the graphic objects are not prevented.
0x00000001	Changes to the graphic objects are prevented.

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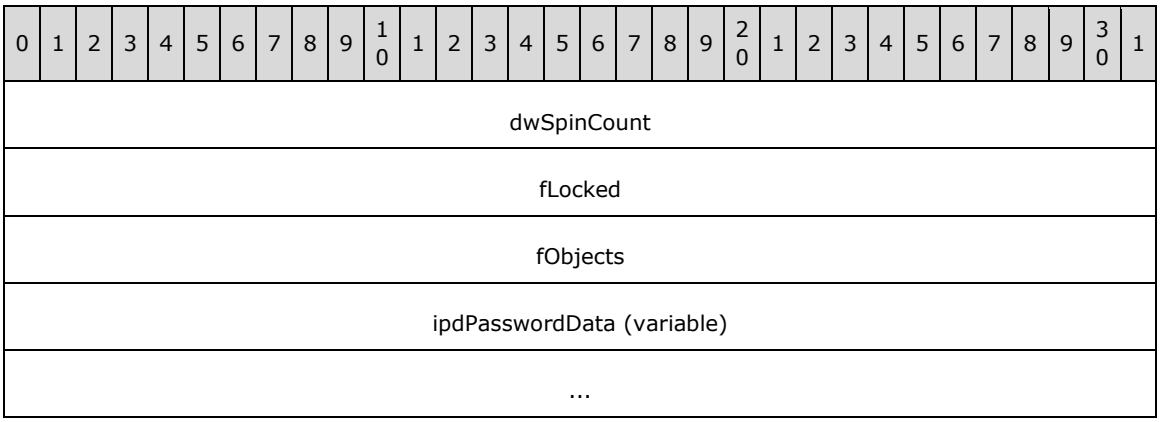
2.4.341 BrtCsProtectionIso

The **BrtCsProtectionIso** record specifies **protection** options for a **chart sheet** in a manner compatible with ISO/IEC 29500 chart sheet protection records as specified in [ISO/IEC29500-1:2016], section 18.3.1.84. A **BrtCsProtectionIso** record MUST be immediately followed by a **BrtCsProtection** record (section 2.4.340) whose **protpwd** field MUST be set to 0x0000 and whose **fLocked** and **fObjects** fields MUST have the same values as the fields of the same names in the **BrtCsProtectionIso** record.



dwSpinCount (4 bytes): An unsigned 32-bit integer that specifies the number of times that the hash function was iterated over the password to generate the **rgbHash** field of **ipdPasswordData**, as described in section 2.2.10. This value MUST NOT be greater than 10,000,000.

fLocked (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether changes can be made to elements of the chart in the chart sheet. The chart will continue to reflect changes in source data (section 2.2.5.2.1). This value MUST have the same value as the **fLocked** field in the following **BrtCsProtection** record (section 2.4.340), and MUST be a value from the following table.

Value	Meaning
0x00000000	Changes to the chart elements are not prevented.
0x00000001	Changes to the chart elements are prevented.

fObjects (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether changes can be made to graphic objects (such as shapes, text boxes, and controls) in the chart sheet. This value MUST have the same value as the **fObjects** field in the following **BrtCsProtection** record (section 2.4.340), and MUST be a value from the following table.

Value	Meaning
0x00000000	Changes to the graphic objects are not prevented.
0x00000001	Changes to the graphic objects are prevented.

ipdPasswordData (variable): An **IsoPasswordData** (section 2.5.79) that specifies the **salt**, hash algorithm and password hash of the password required for editing the chart sheet, calculated using the Strong Password Verifier Algorithm (section 2.2.10). The size of the **rgbHash** member of this field MUST NOT be zero.

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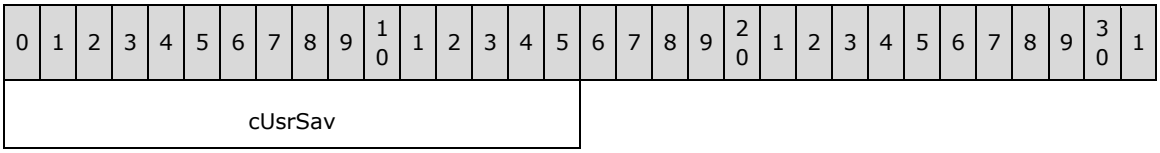
2.4.342 BrtCUsr

The **BrtCUsr** record specifies the count of users that are currently editing this **shared workbook**.



cUsrSav (2 bytes): An unsigned integer that specifies the count of **BrtUsr** records (section 2.4.827) that appear after the **BrtBeginUsers** record (section 2.4.291). This value MUST be a value between 0 and 256, inclusive.

2.4.343 BrtCustomFilter

The **BrtCustomFilter** record specifies custom **AutoFilter** criteria.

vts (1 byte): An unsigned integer that specifies the type of data used in this record. This value MUST be a value from the following table.

Value	Meaning
0x04	**Filter** by a real number.
0x06	Filter by a string.
0x08	Filter by a Boolean.
0x0C	Filter by blanks values.
0x0E	Filter by values that are not blank.

grbitSgn (1 byte): An unsigned integer that specifies the comparison operation to be performed. This value MUST be a value from the following table.

Value	Meaning
0x01	Less than.
0x02	Equal to.
0x03	Less than or equal to.
0x04	Greater than.
0x05	Not equal to.
0x06	Greater than or equal to.

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union (8 bytes): A union that specifies the Boolean or numeric value of the comparison criteria to be used for this AutoFilter. The data type of the content of the union is dependent on **vts**, and is defined in the following table.

Value of vts	Type and meaning of union
0x00000004	An **Xnum** (section 2.5.171) that specifies a numeric value.
0x00000008	A 1-byte **Boolean** (section 2.5.97.3) that specifies a Boolean value, followed by a 7-byte field that is undefined and MUST be ignored.
0x00000006 0x0000000C 0X0000000E	Unused. This union is undefined and MUST be ignored.

vtsStringXls (variable): An **XLWideString** (section 2.5.168) that specifies the string-based value of the comparison criteria to be used for this AutoFilter. For the purposes of comparisons, the characters "?" and "*" are used as wildcards. A "?" refers to any single character, and a "*" refers to any number of characters. This field MUST be present if and only if **vts** is equal to 0x06.

2.4.344 BrtCustomFilter14

The **BrtCustomFilter** record specifies custom **AutoFilter** criteria.

vts (1 byte): An unsigned integer that specifies the type of data used in this record. This value MUST be a value from the following table.

Value	Meaning
0x04	**Filter** by a real number.
0x06	Filter by a string.
0x08	Filter by a Boolean.
0x0C	Filter by blanks values.
0x0E	Filter by values that are not blank.

grbitSgn (1 byte): An unsigned integer that specifies the comparison operation to be performed. This value MUST be a value from the following table.

Value	Meaning
0x01	Less than.
0x02	Equal to.

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Value	Meaning
0x03	Less than or equal to.
0x04	Greater than.
0x05	Not equal to.
0x06	Greater than or equal to.

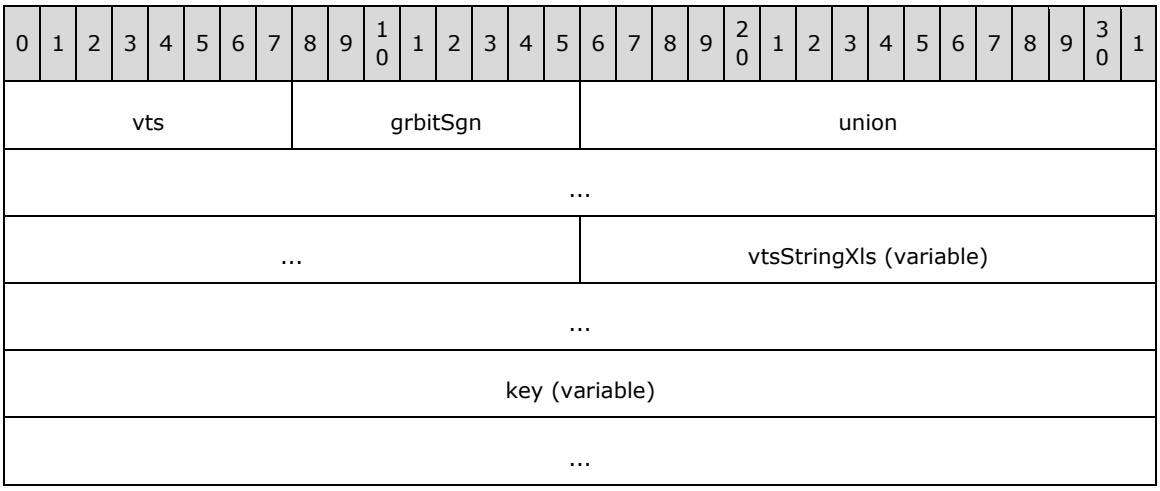
union (8 bytes): A union that specifies the Boolean or numeric value of the comparison criteria to be used for this AutoFilter. The data type of the content of the union is dependent on **vts**, and is defined in the following table.

Value of vts	Type and meaning of union
0x00000004	An **Xnum** (section 2.5.171) that specifies a numeric value.
0x00000008	A 1-byte **Boolean** (section 2.5.97.3) that specifies a Boolean value, followed by a 7-byte field that is undefined and MUST be ignored.
0x00000006 0x0000000C 0X0000000E	Unused. This union is undefined and MUST be ignored.

vtsStringXls (variable): An **XLWideString** (section 2.5.168) that specifies the string-based value of the comparison criteria to be used for this AutoFilter. For the purposes of comparisons, the characters "?" and "*" are used as wildcards. A "?" refers to any single character, and a "*" refers to any number of characters. This field MUST be present if and only if **vts** is equal to 0x06.

2.4.345 BrtCustomRichFilter

The **BRTCustomRichFilter** record specifies custom **AutoFilter** criteria associated with **rich values**.



vts (1 byte): An unsigned integer that specifies the type of data used in this record. This value MUST be a value from the following table.

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Value	Meaning
0x04	**Filter** by a real number.
0x06	Filter by a string.
0x08	Filter by a **Boolean**.
0x0C	Filter by blank values.
0x0E	Filter by values that are not blank.

grbitSgn (1 byte): An unsigned integer that specifies the comparison operation to be performed. This value MUST be a value from the following table.

Value	Meaning
0x01	Less than.
0x02	Equal to.
0x03	Less than or equal to.
0x04	Greater than.
0x05	Not equal to.
0x06	Greater than or equal to.

union (8 bytes): A union that specifies the Boolean or numeric value of the comparison criteria to be used for this AutoFilter. The data type of the content of the union is dependent on **vts**, and is defined in the following table.

Value of vts	Type and meaning of union
0x00000004	An **Xnum** (section 2.5.171) that specifies a numeric value.

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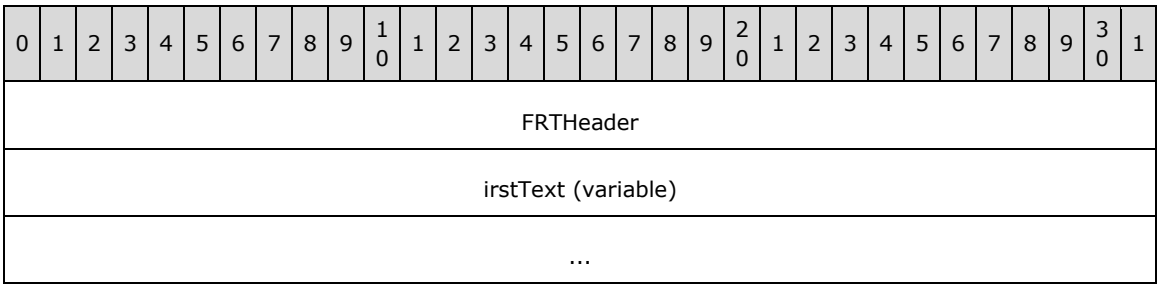
Value of vts	Type and meaning of union
0x00000008	A 1-byte **Boolean** (section 2.5.97.3) that specifies a Boolean value, followed by a 7-byte field that is undefined and MUST be ignored.
0x00000006 0x0000000C 0x0000000E	Unused. This union is undefined and MUST be ignored.

vtsStringXls (variable): An **XLWideString** (section 2.5.168) that specifies the string-based value of the comparison criteria to be used for this AutoFilter. For the purposes of comparisons, the characters "?" and "*" are used as wildcards. A "?" refers to any single character, and a "*" refers to any number of characters. This field MUST be present if and only if **vts** is equal to 0x06.

key (variable): An **XLWideString** (section 2.5.168) that specifies the **rich value key** for which the filter is defined. This string MUST be less than or equal to 255 characters in length.

2.4.346 BrtDbCommand15

The **BrtDbCommand15** record specifies **OLE DB** command text used by this **model data source OLE DB connection** (section 2.2.8.9.1).

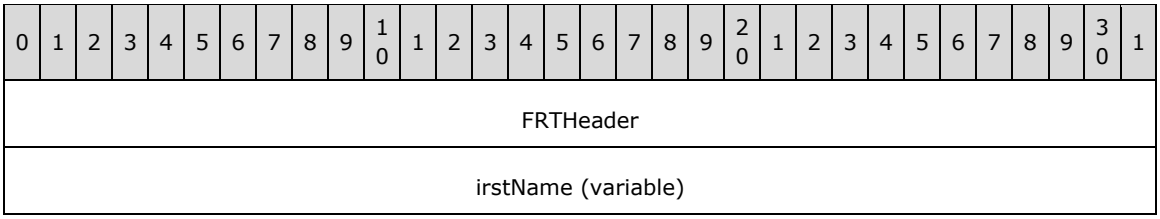


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) structure that specifies the future record (section 2.1.6) information for this record.

irstText (variable): An **XLWideString** (section 2.5.168) that specifies the command text.

2.4.347 BrtDbTable15

The **BrtDbTable15** record specifies a single database table used by this **model data source OLE DB connection** (section 2.2.8.9.1) or **model data source data feed connection** (section 2.2.8.9.2).



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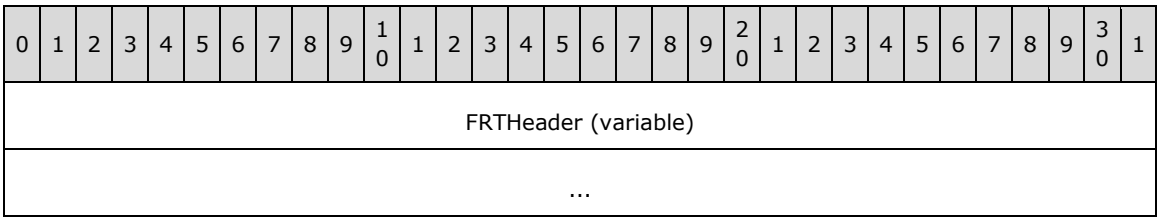
...

FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) structure that specifies the future record (section 2.1.6) information for this record.

irstName (variable): An **XLWideString** (section 2.5.168) that specifies the name of this table.

2.4.348 BrtDecoupledPivotCacheID

The **BrtDecoupledPivotCacheID** record specifies both a reference to a **PivotCache** (section 2.2.5.2) structure that is used by a Non-Worksheet PivotTables (section 2.2.5.5) and the beginning of an empty collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF** rules.



FRTHeader (variable): An **FRTHeader** (section 2.5.60) structure that specifies the future record (section 2.1.6) information for this record.

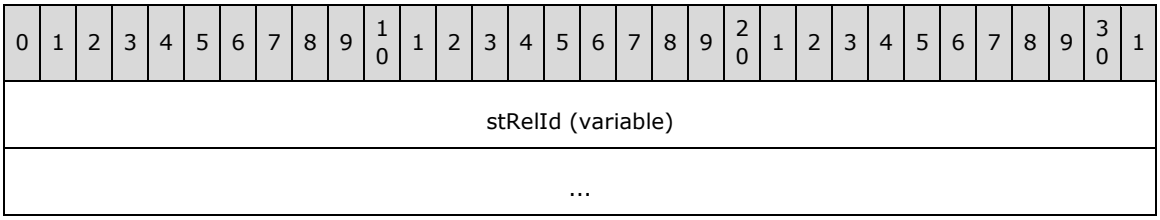
The **FRTHeader** fields MUST have the values that are listed in the following table.

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	0
FRTHeader.fFormula	0
FRTHeader.fRelID	1

The **FRTHeader.RelID** specifies a relationship (section 2.1.3) that specifies a **PivotCache** part containing a **PivotCache** structure used by a Non-Worksheet PivotTable (section 2.2.5.5).

2.4.349 BrtDrawing

The **BrtDrawing** record specifies a link to a **Drawings** part as specified in [ISO/IEC29500-1:2016], section 12.3.8, that specifies a drawing for a **sheet**.



stRelId (variable): A **RelID** (section 2.5.114) that specifies the link to the **Drawings** part.

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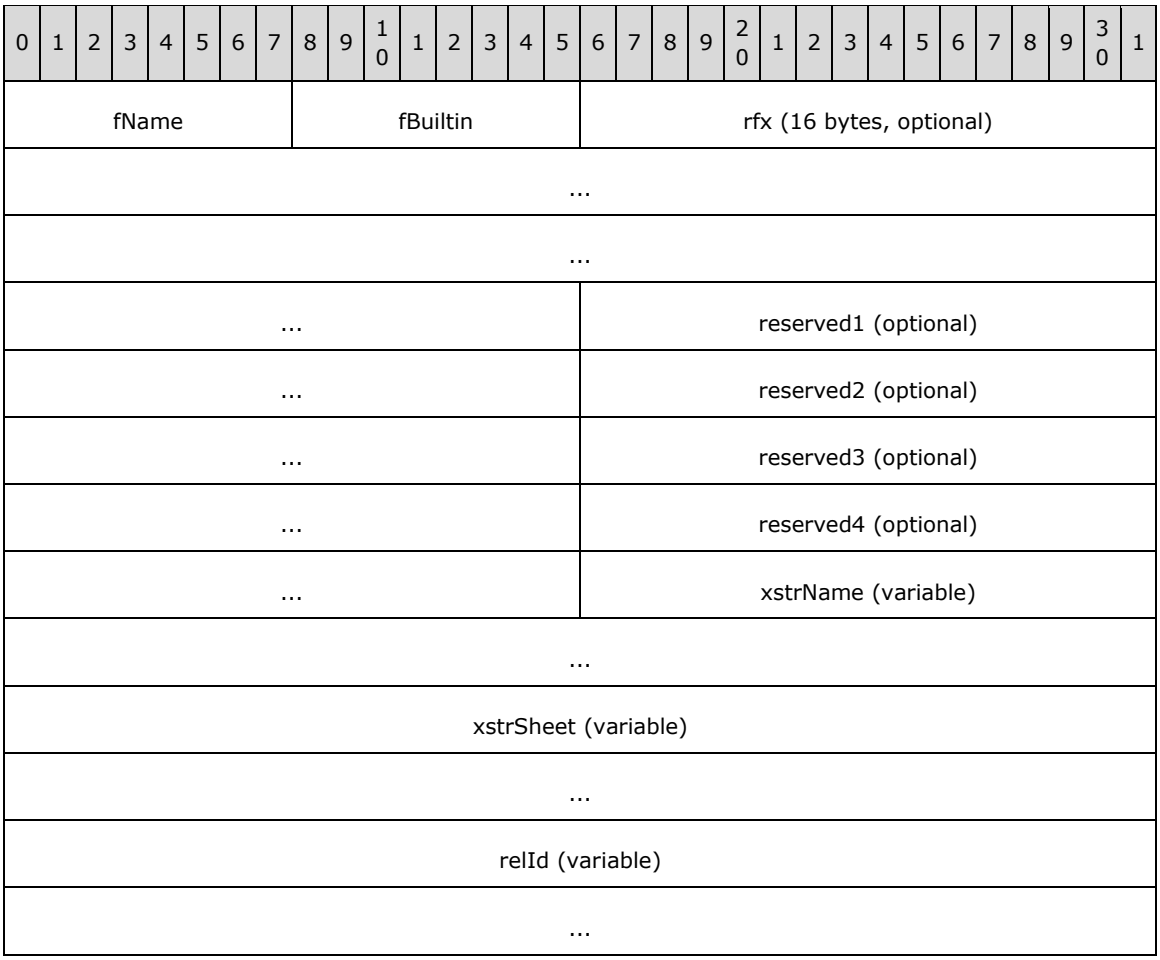
2.4.350 BrtDRef

The **BrtDRef** record specifies a data reference used by **data consolidation**. A data reference is either an **UncheckedRfX** (section 2.5.153) or a **defined name**.



fName (1 byte): A **Boolean** (section 2.5.97.3) that specifies whether this data reference is a **cell range** or a defined name. This value MUST be a value in the following table.

Value	Meaning
0x00	This data reference refers to a cell range.
0x01	This data reference refers to a defined name.

fBuiltin (1 byte): A **Boolean** (section 2.5.97.3) that specifies whether the value of **xstrName** refers to a built-in defined name or a user-created defined name. When **fName** is 0x00, **fBuiltin** MUST be 0x00. When **fName** is 0x01, **fBuiltin** MUST be a value in the following table.

Value	Meaning
0x00	The value in **xstrSheet** refers to a user-created defined name.
0x01	The value in **xstrSheet** refers to a built-in defined name. The value in **xstrSheet** MUST be one of values in the following list: ▪ Consolidate_Area

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Value	Meaning
	▪ Auto_Open ▪ Auto_Close ▪ Extract ▪ Database ▪ Criteria ▪ Print_Area ▪ Print_Titles ▪ Recorder ▪ Data_Form ▪ Auto_Activate ▪ Auto_Deactivate ▪ Sheet_Title ▪ _FilterDatabase

rfx (16 bytes): An **UncheckedRfX** that specifies the cell range referenced by this data reference. This value exists if and only if **fName** is 0x00.

reserved1 (4 bytes): This value MUST be equal to 1,048,576 and MUST be ignored. Exists if and only if **fName** is 0x01.

reserved2 (4 bytes): This value MUST be equal to 1,048,576 and MUST be ignored. Exists if and only if **fName** is 0x01.

reserved3 (4 bytes): This value MUST be equal to 16,384 and MUST be ignored. Exists if and only if **fName** is 0x01.

reserved4 (4 bytes): This value MUST be equal to 16,384 and MUST be ignored. Exists if and only if **fName** is 0x01.

xstrName (variable): An **XLWideString** (section 2.5.168) that specifies the name of this data reference. When **fName** is 0x00, this field MUST be an empty **XLWideString**. When **fName** is 0x01, **xstrName** MUST specify a non-empty string which represents the name of this data reference.

xstrSheet (variable): An **XLWideString** that specifies the name of the **sheet** containing the source of this data reference. If **fName** is 0x01 and the defined name has **workbook** scope, **xstrSheet** MUST be an empty **XLWideString**. Otherwise, **xstrSheet** MUST be the name of the sheet which contains this data reference.

relId (variable): A **RelID** (section 2.5.114) that specifies the source of this data reference. When this data reference refers to an external workbook (section 2.1.10), **relId** MUST specify the relationship identifier describing this external reference. Otherwise, **relId** MUST be a zero-length **RelID**.

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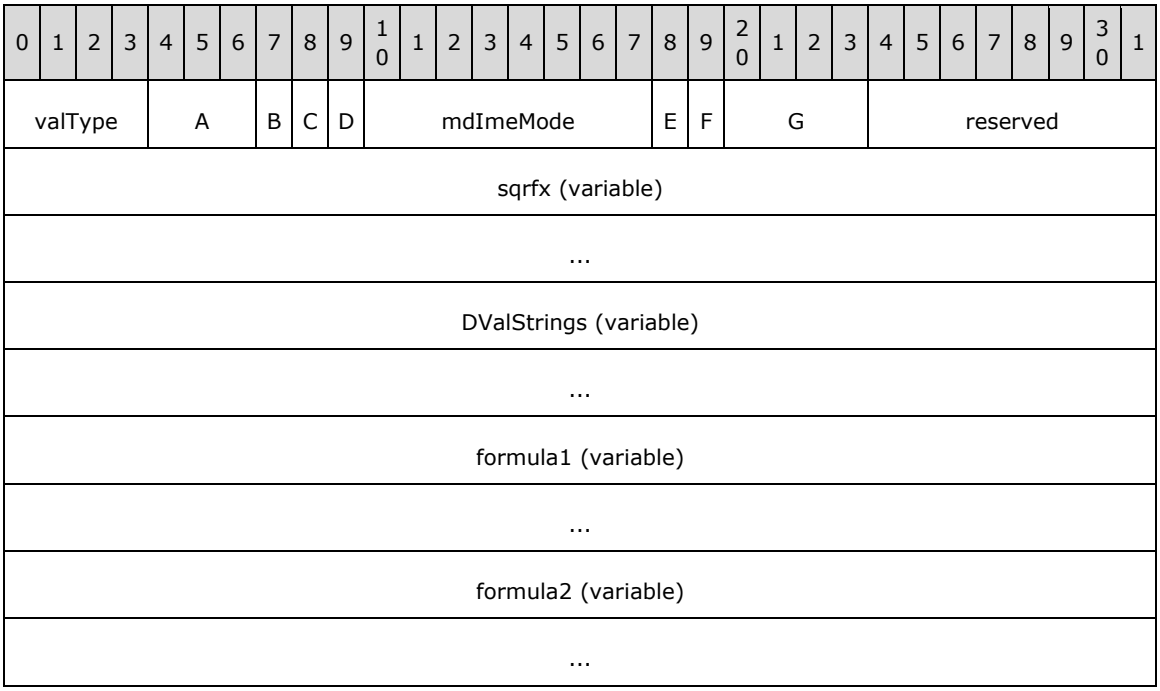
2.4.351 BrtDVal

The **BrtDVal** record specifies **data validation** for a **range** on this **sheet**.



valType (4 bits): An unsigned integer that specifies the type of data validation. This value MUST be a value from the following table.

Value	Meaning
0x0	Specifies that the data validation allows any type of value and does not check for a type or range of values.
0x1	Specifies that the data validation checks for and allows whole number values satisfying the given condition.
0x2	Specifies that the data validation checks for and allows decimal values satisfying the given condition.
0x3	Specifies that the data validation checks for and allows a value that matches one in a list of values.
0x4	Specifies that the data validation checks for and allows date values satisfying the given condition.
0x5	Specifies that the data validation checks for and allows time values satisfying the given condition.
0x6	Specifies that the data validation checks for and allows text values whose length satisfies the given condition.
0x7	Specifies that the data validation uses a custom formula (section 2.2.2) to check the **cell value**.

A - errStyle (3 bits): An unsigned integer that specifies the **style** of error alert used for this data validation. This value MUST be a value from the following table.

Value	Meaning
0	Specifies that the data validation error style uses a stop **icon** in the error alert.
1	Specifies that the data validation error style uses a warning icon in the error alert.

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Value	Meaning
2	Specifies that the data validation error style uses an information icon in the error alert.

B - unused (1 bit): This value is undefined, and MUST be ignored.

C - fAllowBlank (1 bit): A bit that specifies whether the data validation treats empty or blank entries as valid.

D - fSuppressCombo (1 bit): A bit that specifies the behavior of the dropdown combo box. Possible values for this field are listed in the following table.

Value of fSuppressCombo	Value of valType	Meaning
0	3	Displays the dropdown combo box.
1	3	Suppresses the dropdown combo box.

mdImeMode (8 bits): An unsigned integer that specifies the **Input Method Editor (IME)** mode enforced by this data validation. This value MUST be a value from the following table.

Value	IME Mode
0x00	No control.
0x01	On.
0x02	Off (English).
0x03	Disabled.
0x04	Hiragana.
0x05	Full-width katakana.
0x06	Half-width katakana.
0x07	Full-width alphanumeric.
0x08	Half-width alphanumeric.
0x09	Full-width hangul.
0x0A	Half-width hangul.

E - fShowInputMsg (1 bit): A bit that specifies whether to display the input prompt message.

F - fShowErrorMsg (1 bit): A bit that specifies whether to display the error alert message.

G - typOperator (4 bits): An unsigned integer that specifies the relational operator used with this data validation. If **valType** is equal to 0, 3 or 7, the value of the **typOperator** field is undefined and MUST be ignored. This value MUST be a value from the following table.

Value	Type of relational operator
0x00	**Between**
0x01	**Not Between**
0x02	**Equal**
0x03	**Not Equal**
0x04	**Greater Than**
0x05	**Less Than**
0x06	**Greater Than or Equal**
0x07	**Less Than or Equal**

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reserved (8 bits): This value MUST be 0, and MUST be ignored.

sqrfx (variable): A **UncheckedSqRfX** (section 2.5.155) that specifies the ranges over which data validation is applied. The value **sqrfx.crfx** MUST be greater than or equal to 1 and MUST be less than 8,192.

DValStrings (variable): A **DValStrings** (section 2.5.36) that specifies the strings used by data validation.

formula1 (variable): A **DVParsedFormula** (section 2.5.97.8) specifying the first formula (section 2.2.2) in the data validation drop-down combo box.

If **typOperator** is equal to 0 or 1 and **valType** is not 0, 3, or 7, this formula is used as the lesser of two bounding values and **formula1.cce** MUST be greater than or equal to 1.

If **typOperator** is greater than or equal to 2 or **valType** is equal to 3 or 7, this formula is the only formula for those cases, and **formula1.cce** MUST be greater than or equal to 1.

If the **valType** is equal to 0, this formula MUST be ignored and **formula1.cce** MUST be 0.

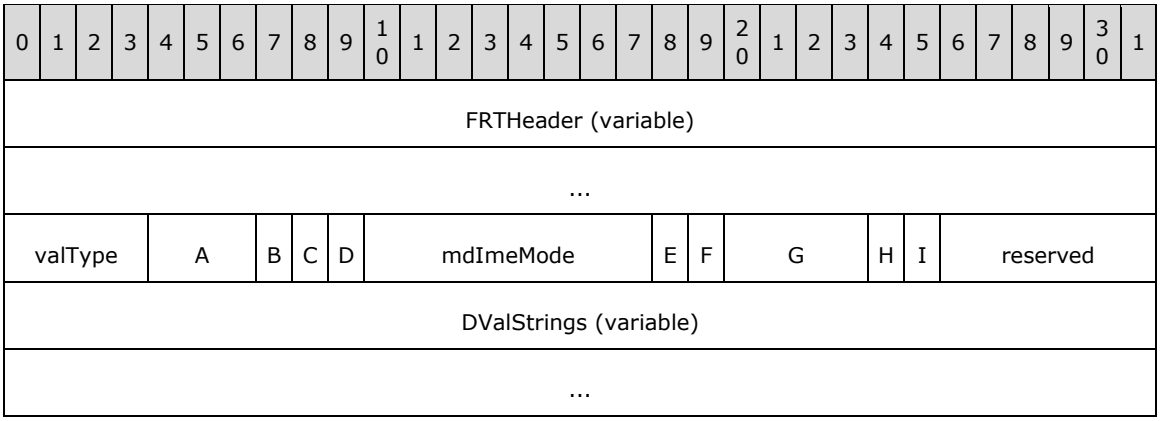
formula2 (variable): A **DVParsedFormula** (section 2.5.97.8) that specifies the second formula (section 2.2.2) in the data validation drop-down combo box.

If **typOperator** is equal to 0 or 1 and **valType** is not 0, 3, or 7, this formula is used as the greater of two bounding values and **formula2.cce** MUST be greater than or equal to 1.

If **typOperator** is greater than or equal to 2 or **valType** is equal to 0, 3, or 7, this formula MUST be ignored and **formula2.cce** MUST be 0.

2.4.352 BrtDVal14

The **BrtDVal14** record specifies **data validation** for a **range** on this **sheet**. This record is equivalent to **BrtDval** (section 2.4.351) but allows for more than 8,192 ranges to which data validation is applied.



FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the future record (section 2.1.6) information for this record.

The **FRTHeader** flags MUST have the values listed in the following table.

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Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	1
FRTHeader.fFormula	0 or 1
FRTHeader.fRelID	0

The **FRTHeader.fFormula** MUST be 0 if **fDVMinFmla** equals 0 and **fDVMaxFmla** equals 0.

The **FRTHeader.fFormula** MUST be 1 if **fDVMinFmla** equals 1 or **fDVMaxFmla** equals 1.

The **sqrfx** of the single **FRTSqref** (section 2.5.65) comprising the array of the **FRTHeader.rgSqrefs** specifies the ranges to which data validation is applied. The **rgSqrefs.csqref** MUST equal 1. The **sqrfx.crfx** of the single **FRTSqref** comprising the **array** of the **rgSqrefs** MUST be greater than or equal to 1.

The value of **FRTHeader.rgFormulas**.**cformula** MUST be equal to the sum of **fDVMinFmla** + **fDVMaxFmla.**

If **fDVMinFmla** is 1, the **FRTFormula** (section 2.5.58) of the first **FRTDVParsedFormula14** (section 2.5.57) comprising the **array** of the **FRTHeader.rgFormulas** specifies the first formula (section 2.2.2) for the data validation. The following MUST be true:

- If **typOperator** is equal to 0 or 1 and **valType** is not 0, 3, or 7, then this formula is used as the lesser of two bounding values and **frtformula.formula**.**cce** MUST be greater than or equal to 1.
- If **typOperator** is greater than or equal to 2 or **valType** is equal to 3 or 7, then this formula is the only formula for those cases, and **frtformula.formula.cce** MUST be greater than or equal to 1.

If **fDVMaxFmla** is 1, the **frtformula** of the last **FRTDVParsedFormula14** (section 2.5.57) comprising the **array** of the **FRTHeader.rgFormulas** specifies the second formula (section 2.2.2) for the data validation. The following MUST be true:

- If **typOperator** is equal to 0 or 1 and **valType** is not 0, 3, or 7, then this formula is used as the greater of two bounding values and **frtformula.formula.cce** MUST be greater than or equal to 1.

valType (4 bits): An unsigned integer that specifies the type of data validation. This value MUST be a value from the following table.

Value	Meaning
0x00	Specifies that the data validation allows any type of value and does not check for a type or range of values.
0x01	Specifies that the data validation checks for and allows whole number values satisfying the given condition.
0x02	Specifies that the data validation checks for and allows decimal values satisfying the given condition.
0x03	Specifies that the data validation checks for and allows a value that matches one in a list of values.
0x04	Specifies that the data validation checks for and allows date values satisfying the given condition.
0x05	Specifies that the data validation checks for and allows time values satisfying the given condition.
0x06	Specifies that the data validation checks for and allows text values whose length satisfies the given condition.
0x07	Specifies that the data validation uses a custom formula (section 2.2.2) to check the **cell**

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Value	Meaning
	value.

A - errStyle (3 bits): An unsigned integer that specifies the **style** of error alert used for this data validation. This value MUST be a value from the following table.

Value	Meaning
0x00	Specifies that the data validation error style uses a stop **icon** in the error alert.
0x01	Specifies that the data validation error style uses a warning icon in the error alert.
0x02	Specifies that the data validation error style uses an information icon in the error alert.

B - unused (1 bit): This value is undefined, and MUST be ignored.

C - fAllowBlank (1 bit): A bit that specifies whether the data validation treats empty or blank entries as valid.

D - fSuppressCombo (1 bit): A bit that specifies the behavior of the drop-down combo box. Possible values for this field are listed in the following table.

Value of fSuppressCombo	Value of valType	Meaning
0	3	Displays the dropdown combo box.
1	3	Suppresses the dropdown combo box.

mdImeMode (8 bits): An unsigned integer that specifies the **Input Method Editor (IME)** mode enforced by this data validation. This value MUST be a value from the following table.

Value	IME Mode
0x00	No control.
0x01	On.
0x02	Off (English).
0x03	Disabled.
0x04	Hiragana.
0x05	Full-width katakana.
0x06	Half-width katakana.
0x07	Full-width alphanumeric.
0x08	Half-width alphanumeric.
0x09	Full-width Hangul.
0x0A	Half-width Hangul.

E - fShowInputMsg (1 bit): A bit that specifies whether to display the input prompt message.

F - fShowErrorMsg (1 bit): A bit that specifies whether to display the error alert message.

G - typOperator (4 bits): An unsigned integer that specifies the relational operator used with this data validation. If **valType** is equal to 0, 3, or 7, the value of the **typOperator** field is undefined and MUST be ignored. This value MUST be a value from the following table.

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Value	Type of Relational Operator
0x00	1. Between.
0x01	2. Not Between.
0x02	3. Equal.
0x03	4. Not Equal.
0x04	5. Greater Than.
0x05	6. Less Than.
0x06	7. Greater Than or Equal.
0x07	8. Less Than or Equal.

H - fDVMinFmla (1 bit): A bit that specifies if there is a first formula (section 2.2.2) for the data validation.

If **typOperator** is equal to 0 or 1 and **valType** is not 0, 3, or 7, then **fDVMinFmla** MUST be 1.

If **typOperator** is greater than or equal to 2 or **valType** is equal to 3 or 7, then **fDVMinFmla** MUST be 1.

If the **valType** is equal to 0, then **fDVMinFmla** MUST be 0.

I - fDVMaxFmla (1 bit): A bit that specifies if there is a second formula (section 2.2.2) for the data validation.

If **typOperator** is equal to 0 or 1 and **valType** is not 0, 3, or 7, then **fDVMaxFmla** MUST be 1.

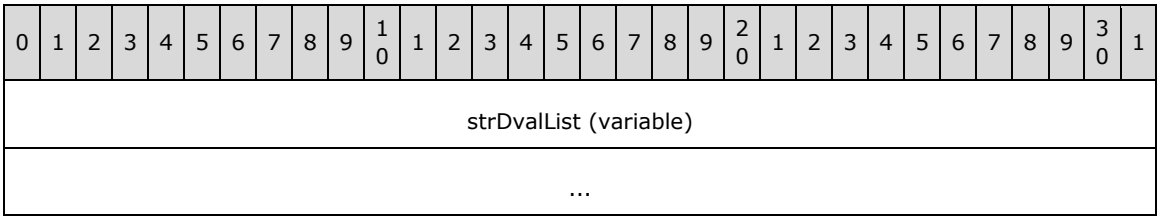
If **typOperator** is greater than or equal to 2 or **valType** is equal to 0, 3 or 7, then **fDVMaxFmla** MUST be 0.

reserved (6 bits): This value MUST be 0, and MUST be ignored.

DValStrings (variable): A **DValStrings** (section 2.5.36) that specifies the strings used by data validation.

2.4.353 BrtDValList

The **BrtDValList** record specifies a list of data validation entries.



strDvalList (variable): An **XLWideString** (section 2.5.168) that specifies a **formula** for **data validation**. This value replaces the formula specified by the **formula1** attribute in immediately following **BrtDval** (section 2.4.351). This value MUST adhere to the following ABNF:

```
formula = string *string
string = string-constant / string-chars
string-constant = double-quote [string-chars] double-quote
```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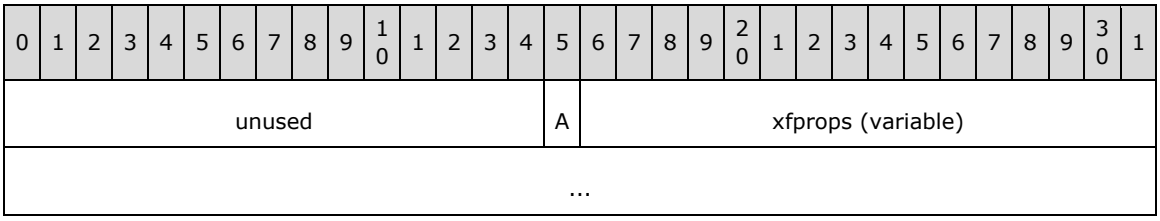
```
string-chars = string-char *string-char
string-char = escaped-double-quote / character ; MUST NOT be a double-quote
escaped-double-quote = 2double-quote
double-quote = %x22
character = as defined by the production Char in the [W3C-XML] section 2.2
```

2.4.354 BrtDXF

The **BrtDXF** record specifies differential formatting (section 2.2.6.2).



unused (15 bits): This value is undefined and MUST be ignored.

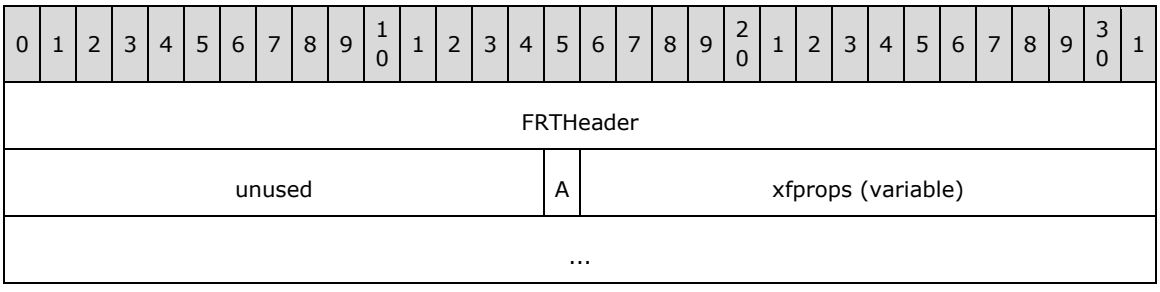
A - fNewBorder (1 bit): A bit that specifies whether it is possible to specify internal **border formatting** in **XFProps** (section 2.5.163). Internal border formatting is formatting that applies to **borders** that lie within a **range** of **cells**.

Value	Meaning
0	Specifies that the internal border formatting cannot be used in **xfprops**. **XFProp** (section 2.5.158) elements of **xfprops.xfPropArray** MUST NOT have an **xfPropType** of either 0x000B or 0x000C.
1	Specifies that the internal border formatting can be used in **xfprops**.

xfprops (variable): A **XFProps** that specifies the formatting properties.

2.4.355 BrtDXF14

The **BrtDXF14** record specifies differential formatting (section 2.2.6.2) referred to by a future record (section 2.1.6).



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

unused (15 bits): This value is undefined, and MUST be ignored.

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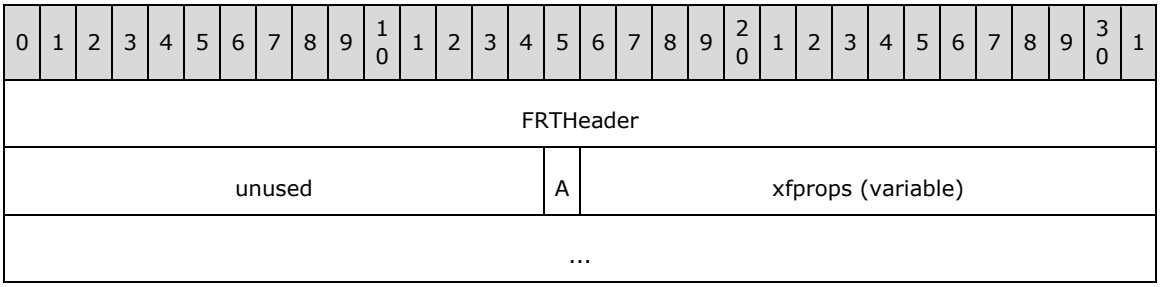
A - fNewBorder (1 bit): A bit that specifies whether it is possible to specify internal **border formatting** in **XFProps** (section 2.5.163). Internal border formatting is formatting that applies to **borders** that lie between a **range** of **cells**.

Value	Meaning
0	Specifies that the internal border formatting cannot be used in **xfprops**. **XFProp** (section 2.5.158) elements of **xfprops.xfPropArray** MUST NOT have an **xfPropType** of either 0x000B or 0x000C.
1	Specifies that the internal border formatting can be used in **xfprops**.

xfprops (variable): A **XFProps** (section 2.5.163) that specifies the formatting properties.

2.4.356 BrtDXF15

The **BrtDXF15** record specifies differential formatting referred to by a future record.



FRTHeader (4 bytes): An FRTBlank that specifies the future record information for this record.

unused (15 bits): This value is undefined, and MUST be ignored.

A - fNewBorder (1 bit): A bit that specifies whether it is possible to specify internal **border formatting** in **xfprops**. Internal border formatting is formatting that applies to **borders** that lie between a **range** of **cells**.

Value	Meaning
0	Specifies that the internal border formatting cannot be used in **xfprops**. **XFProp** (section 2.5.158) elements of **xfprops.xfPropArray** MUST NOT have an **xfPropType** of either 0x000B or 0x000C.
1	Specifies that the internal border formatting can be used in **xfprops**.

xfprops (variable): A XFProps that specifies the formatting properties.

2.4.357 BrtDynamicFilter

The **BrtDynamicFilter** record specifies dynamic **filter** criteria. These criteria are considered dynamic because they can change, either with the data itself (for example, "above average") or with the current system date (for example, show values for "today"). For any **cells** whose values do not meet the specified criteria, the corresponding **rows** will be **hidden** from view when the filter is applied.

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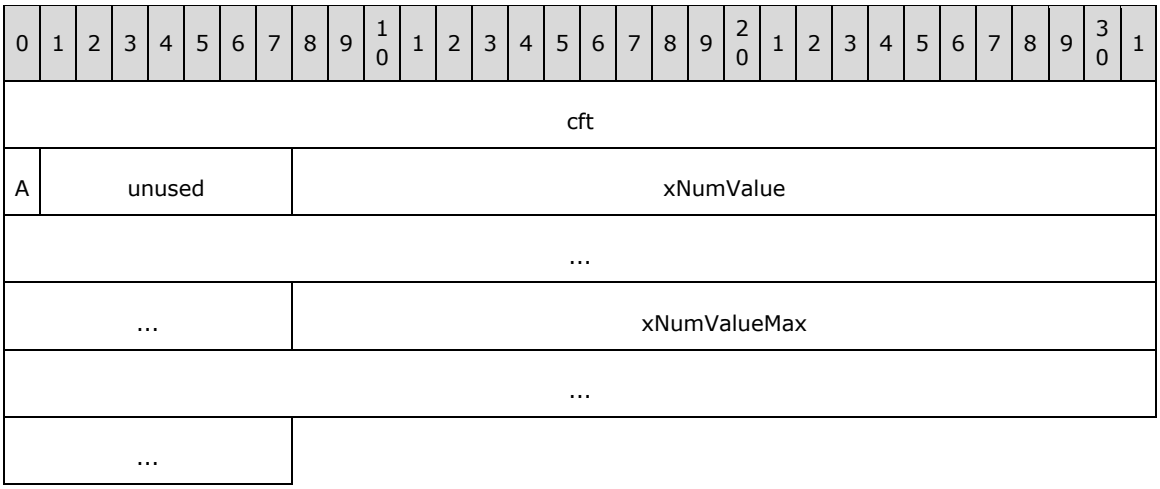

cft (4 bytes): An unsigned integer that specifies the type of filter to be applied. This MUST be a value from the following table.

Value	Enumeration Name	Meaning
0x00000000	CFTNIL	No filter
0x00000001	CFTABOVEAVERAGE	Shows values that are above average.
0x00000002	CFTBELOWAVERAGE	Shows values that are below average.
0x00000008	CFTTOMORROW	Shows tomorrow's dates.
0x00000009	CFTTODAY	Shows today's dates.
0x0000000A	CFTYESTERDAY	Shows yesterday's dates.
0x0000000B	CFTNEXTWEEK	Shows next week's dates.
0x0000000C	CFTTHISWEEK	Shows this week's dates.
0x0000000D	CFTLASTWEEK	Shows last week's dates.
0x0000000E	CFTNEXTMONTH	Shows next month's dates.
0x0000000F	CFTTHISMONTH	Shows this month's dates.
0x00000010	CFTLASTMONTH	Shows last month's dates.
0x00000011	CFTNEXTQUARTER	Shows next quarter's dates.
0x00000012	CFTTHISQUARTER	Shows this quarter's dates.
0x00000013	CFTLASTQUARTER	Shows last quarter's dates.
0x00000014	CFTNEXTYEAR	Shows next year's dates.
0x00000015	CFTTHISYEAR	Shows this year's dates.
0x00000016	CFTLASTYEAR	Shows last year's dates.
0x00000017	CFTYEARTODATE	Shows the dates between the beginning of the year and today, inclusive.
0x00000018	CFTQ1	Shows the dates that are in the first quarter, regardless of year.
0x00000019	CFTQ2	Shows the dates that are in the second quarter, regardless of year.
0x0000001A	CFTQ3	Shows the dates that are in the third quarter, regardless of year.
0x0000001B	CFTQ4	Shows the dates that are in the

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Value	Enumeration Name	Meaning
		fourth quarter, regardless of year.
0x0000001C	CFTM1	Shows the dates that are in January, regardless of year.
0x0000001D	CFTM2	Shows the dates that are in February, regardless of year.
0x0000001E	CFTM3	Shows the dates that are in March, regardless of year.
0x0000001F	CFTM4	Shows the dates that are in April, regardless of year.
0x00000020	CFTM5	Shows the dates that are in May, regardless of year.
0x00000021	CFTM6	Shows the dates that are in June, regardless of year.
0x00000022	CFTM7	Shows the dates that are in July, regardless of year.
0x00000023	CFTM8	Shows the dates that are in August, regardless of year.
0x00000024	CFTM9	Shows the dates that are in September, regardless of year.
0x00000025	CFTM10	Shows the dates that are in October, regardless of year.
0x00000026	CFTM11	Shows the dates that are in November, regardless of year.
0x00000027	CFTM12	Shows the dates that are in December, regardless of year.

A - fApplied (1 bit): A bit that specifies whether the **range** of the filter, as specified by the **rfx** field in the **BrtBeginAFilter** (section 2.4.8) record that begins the collection this record is a part of, has been calculated. A value of 1 specifies that the range of the filter has been calculated. A value of 1 also specifies that **xNumValue** and **xNumValueMax** are correctly calculated, if these values are not ignored. The value of **fApplied** MUST be 0 if **cft** is greater than or equal to 0x00000018 or equal to 0x00000000.

unused (7 bits): This value is undefined, and MUST be ignored.

xNumValue (8 bytes): An **Xnum** (section 2.5.171) that specifies a value for the filter. For **cft** values greater than or equal to 0x00000008 and less than or equal to 0x00000017, this value specifies the minimum value in the range as specified by the **rfx** field in the **BrtBeginAFilter** record that begins the collection of which this record is a part. For **cft** values of 0x00000001 or 0x00000002, this specifies the computed average. The value of **xNumValue** MUST be 0x00000000 and MUST be ignored unless **cft** is greater than or equal to 0x00000001 and less than or equal to 0x00000017.

xNumValueMax (8 bytes): An **Xnum** (section 2.5.171) that specifies the maximum value for this filter. This value MUST be 0x00000000 and MUST be ignored if **cft** is less than 0x00000008 or greater than 0x00000017.

2.4.358 BrtDynamicRichFilter

The **BrtDynamicRichFilter** record specifies dynamic **filter** criteria associated with **rich values**. These criteria are considered dynamic because they can change, either with the data itself (for example, "above average") or with the current system date (for example, show values for "today").

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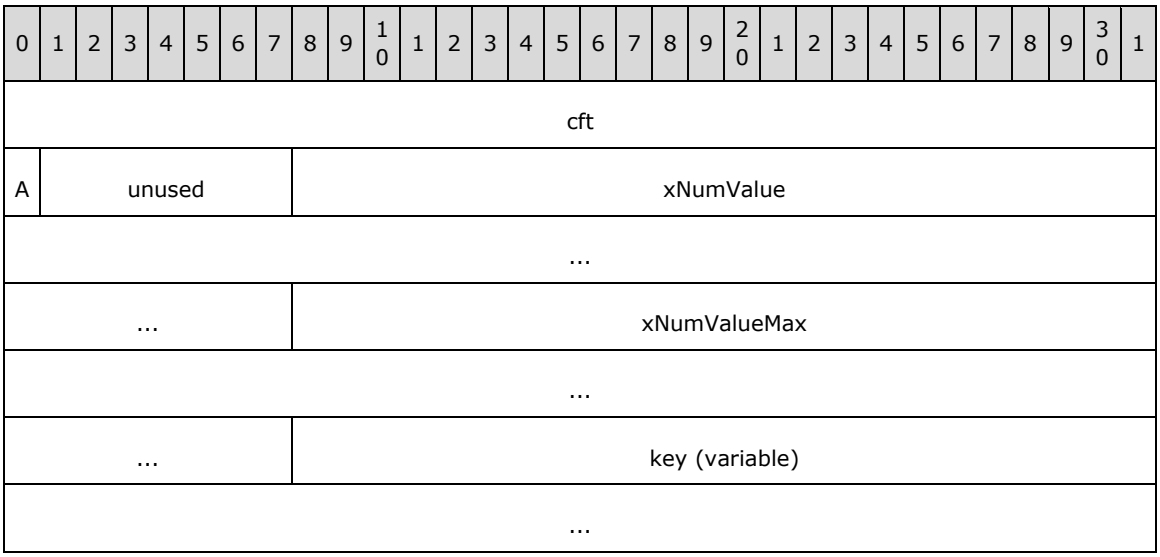
For any **cells** whose values do not meet the specified criteria, the corresponding **rows** will be **hidden** from view when the filter is applied.



cft (4 bytes): An unsigned integer that specifies the type of filter to be applied. This MUST be a value from the following table.

Value	Enumeration Name	Meaning
0x00000000	CFTNIL	No filter
0x00000001	CFTABOVEAVERAGE	Shows values that are above average.
0x00000002	CFTBELOWAVERAGE	Shows values that are below average.
0x00000008	CFTTOMORROW	Shows tomorrow’s dates.
0x00000009	CFTTODAY	Shows today’s dates.
0x0000000A	CFTYESTERDAY	Shows yesterday’s date.
0x0000000B	CFTNEXTWEEK	Shows next week’s dates.
0x0000000C	CFTTHISWEEK	Shows this week’s dates.
0x0000000D	CFTLASTWEEK	Shows last week’s dates.

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Value	Enumeration Name	Meaning
0x0000000E	CFTNEXTMONTH	Shows next month’s dates.
0x0000000F	CFTTHISMONTH	Shows this month’s dates.
0x00000010	CFTLASTMONTH	Shows last month’s dates.
0x00000011	CFTNEXTQUARTER	Shows next quarter’s dates.
0x00000012	CFTTHISQUARTER	Shows this quarter’s dates.
0x00000013	CFTLASTQUARTER	Shows last quarter’s dates.
0x00000014	CFTNEXTYEAR	Shows next year’s dates.
0x00000015	CFTTHISYEAR	Shows this year’s dates.
0x00000016	CFTLASTYEAR	Shows last year’s dates.
0x00000017	CFTYEARTODATE	Shows the dates between the beginning of the year and today, inclusive.
0X00000018	CFTQ1	Shows the dates that are in the first quarter, regardless of year.
0x00000019	CFTQ2	Shows the dates that are in the second quarter, regardless of year.
0x0000001A	CFTQ3	Shows the dates that are in the third quarter, regardless of year.
0x0000001B	CFTQ4	Shows the dates that are in the fourth quarter, regardless of year.
0x0000001C	CFTM1	Shows the dates that are in January, regardless of year.
0x0000001D	CFTM2	Shows the dates that are in February, regardless of year.

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Value	Enumeration Name	Meaning
0x0000001E	CFTM3	Shows the dates that are in March, regardless of year.
0x0000001F	CFTM4	Shows the dates that are in April, regardless of year.
0x00000020	CFTM5	Shows the dates that are in May, regardless of year.
0x00000021	CFTM6	Shows the dates that are in June, regardless of year.
0x00000022	CFTM7	Shows the dates that are in July, regardless of year.
0x00000023	CFTM8	Shows the dates that are in August, regardless of year.
0x00000024	CFTM9	Shows the dates that are in September, regardless of year.
0x00000025	CFTM10	Shows the dates that are in October, regardless of year.
0x00000026	CFTM11	Shows the dates that are in November, regardless of year.
0x00000027	CFTM12	Shows the dates that are in December, regardless of year.

A - fApplied (1 bit): A bit that specifies whether the **range** of the filter, as specified by the **rfx** field in the **BrtBeginAFilter** (section 2.4.8) record that begins the collection this record is a part of, has been calculated. A value of 1 specifies that the range of the filter has been calculated. A value of 1 also specifies that **xNumValue** and **xNumValueMax** are correctly calculated, if these values are not ignored. The value of **fApplied** MUST be 0 if **cft** is greater than or equal to 0x00000018 or equal to 0x00000000.

unused (7 bits): This value is undefined and MUST be ignored.

xNumValue (8 bytes): An **Xnum** (section 2.5.171) that specifies a value for the filter. For **cft** values greater than or equal to 0x00000008 and less than or equal to 0x00000017, this value specifies the minimum value in the range as specified by the **rfx** field in the **BrtBeginAFilter** (section 2.4.8) record that begins the collection of which this record is a part. For **cft** values of 0x00000001 or 0x00000002, this specifies the computed average. The value of **xNumValue**

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MUST be 0x00000000 and MUST be ignored unless **cft** is greater than or equal to 0x00000001 and less than or equal to 0x00000017.

xNumValueMax (8 bytes): An **Xnum** (section 2.5.171) that specifies the maximum value for this filter. This value MUST be 0x00000000 and MUST be ignored if **cft** is less than 0x00000008 or greater than 0x00000017.

key (variable): An **XLWideString** (section 2.5.168) that specifies the **rich value key** for which the filter is defined. This string MUST be less than or equal to 255 characters in length.

2.4.359 BrtEndActiveXControls

The **BrtEndActiveXControls** record specifies the end of a collection of **BrtActiveX** (section 2.4.4) records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of **BrtActiveX** records specifies **ActiveX controls** embedded in the **sheet**.

2.4.360 BrtEndAFilter

The **BrtEndAFilter** record specifies the end of a collection of records as defined by the **Macro Sheet** (section 2.1.7.32) part **ABNF**, the **PivotTable** (section 2.1.7.40) part ABNF, the **Table** (section 2.1.7.51) part ABNF, and the **Worksheet** part ABNF (section 2.1.7.62). The collection of records specifies an **AutoFilter**.

2.4.361 BrtEndAutoSortScope

The **BrtEndAutoSortScope** record specifies the end of a collection of records as specified by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies sort information for the pivot items (section 2.2.5.3.3) of a pivot field (section 2.2.5.3.2).

2.4.362 BrtEndBook

The **BrtEndBook** record specifies the end of a collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies properties of a **workbook**.

2.4.363 BrtEndBookViews

The **BrtEndBookViews** record specifies the end of a collection of **BrtBookView** (section 2.4.308) records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of **BrtBookView** records specifies **workbook views**.

2.4.364 BrtEndBorders

The **BrtEndBorders** record specifies the end of a collection of **BrtBorder** (section 2.4.309) records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtBorder** records specifies **cell border style**.

2.4.365 BrtEndBundleShs

The **BrtEndBundleShs** record specifies the end of a collection of **BrtBundleSh** (section 2.4.311) records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of **BrtBundleSh** records specifies the **sheets** in the **workbook**.

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2.4.366 BrtEndCalcFeatures

The **BrtEndCalcFeatures** record specifies the end of a collection of **BrtCalcFeature** (section 2.4.312) records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of **BrtCalcFeature** records specifies features that are part of the calculation engine.

2.4.367 BrtEndCellIgnoreECs

The **BrtEndCellIgnoreECs** record specifies the end of a collection of **BrtCellIgnoreEC** (section 2.4.317) records as defined by **Worksheet** part **ABNF** (section 2.1.7.62). The collection of **BrtCellIgnoreEC** records specifies the types of **cell** errors that are to be ignored for specific cell **ranges**.

2.4.368 BrtEndCellIgnoreECs14

The **BrtEndCellIgnoreECs14** record specifies the end of a collection of **BrtCellIgnoreEC14** (section 2.4.318) records as defined by **Worksheet** part **ABNF** (section 2.1.7.62). The collection of **BrtCellIgnoreEC14** records specifies the types of **cell** errors that are to be ignored for specific cell **ranges**.

2.4.369 BrtEndCellSmartTag

The **BrtEndCellSmartTag** record specifies the end of a collection of **BrtCellSmartTagProperty** (section 2.4.324) records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection **BrtCellSmartTagProperty** records specifies the **smart tag** properties of a **cell**.<31>

2.4.370 BrtEndCellSmartTags

The **BrtEndCellSmartTags** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies the **smart tag** properties of a **cell**.<32>

2.4.371 BrtEndCellStyleXFs

The **BrtEndCellStyleXFs** record specifies the end of a collection of **BrtXF** (section 2.4.845) records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtXF** records specifies all cell style XFs (section 2.2.6.1.2.1) in the **workbook**. The collection MUST contain at least 1 and no more than 0xFF96 **BrtXF** records.

2.4.372 BrtEndCellWatches

The **BrtEndCellWatches** record specifies the end of a collection of **BrtCellWatch** (section 2.4.326) records as defined by **Worksheet** part **ABNF** (section 2.1.7.62). Each **BrtCellWatch** record specifies a reference to a **watched cell**.

2.4.373 BrtEndCellXFs

The **BrtEndCellXFs** record specifies the end of a collection of **BrtXF** (section 2.4.845) records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtXF** records specifies all cell XFs (section 2.2.6.1.1) in the **workbook**. The collection MUST contain at least 1 and no more than 0xFF96 **BrtXF** records.

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2.4.374 BrtEndCFRule

The **BrtEndCFRule** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62) and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies a **conditional formatting** rule used in conditional formatting.

2.4.375 BrtEndCFRule14

The **BrtEndCFRule14** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies a **conditional formatting** rule used in conditional formatting.

2.4.376 BrtEndColBrk

The **BrtEndColBrk** record specifies the end of a collection of **BrtBrk** (section 2.4.310) records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62) and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of **BrtBrk** records specifies vertical **page breaks**.

2.4.377 BrtEndColInfos

The **BrtEndColInfos** record specifies the end of a collection of **BrtColInfo** (section 2.4.331) records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62) and **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of **BrtColInfo** records specifies the **column (1)** width and formatting for one or more columns (1) of a **sheet**.

2.4.378 BrtEndColorPalette

The **BrtEndColorPalette** record specifies the end of a collection of records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of records specifies the color information associated with this workbook.

2.4.379 BrtEndColorScale

The **BrtEndColorScale** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62) and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies a **color scale** used in **conditional formatting**.

2.4.380 BrtEndColorScale14

The **BrtEndColorScale14** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies a **color scale** used in **conditional formatting**.

2.4.381 BrtEndComment

The **BrtEndComment** record specifies the end of a **BrtCommentText** (section 2.4.336) record as defined by the **Comments** (section 2.1.7.8) part **ABNF**. A **BrtCommentText** record specifies the text of a **comment**.

2.4.382 BrtEndCommentAuthors

The **BrtEndCommentAuthors** record specifies the end of a collection of **BrtCommentAuthor** (section 2.4.335) records as defined by the **Comments** (section 2.1.7.8) part **ABNF**. The collection specifies a list of authors of **comments**.

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2.4.383 BrtEndCommentList

The **BrtEndCommentList** record specifies the end of a collection of records as defined by the **Comments** (section 2.1.7.8) part **ABNF**. The collection specifies a list of **comments**.

2.4.384 BrtEndComments

The **BrtEndComments** record specifies the end of a collection of records as defined by the **Comments** (section 2.1.7.8) part **ABNF**. The collection of records specifies lists of authors and their **comments**.

2.4.385 BrtEndConditionalFormatting

The **BrtEndConditionalFormatting** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62) and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies **conditional formatting** information for a **range**.

2.4.386 BrtEndConditionalFormatting14

The **BrtEndConditionalFormatting14** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies **conditional formatting** information for a **range**.

2.4.387 BrtEndConditionalFormattings

The **BrtEndConditionalFormattings** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF**. The collection specifies **conditional formatting** information for the **Worksheet**.

2.4.388 BrtEndCRErrs

The **BrtEndCRErrs** record specifies the end of a collection of **BrtCrashRecErr** (section 2.4.337) records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of **BrtCrashRecErr** records specifies the errors that occurred during an application fault.

2.4.389 BrtEndCsView

The **BrtEndCsView** record specifies the end of an empty collection of records as defined by the **Chart Sheet** (section 2.1.7.7) part **ABNF**. The collection of records specifies a **chart sheet view**.

2.4.390 BrtEndCsViews

The **BrtEndCsViews** record specifies the end of a collection of records as defined by the **Chart Sheet** (section 2.1.7.7) part **ABNF**. The collection of records specifies the **chart sheet views** of this **chart sheet**.

2.4.391 BrtEndCustomFilters

The **BrtEndCustomFilters** record specifies the end of a collection of **BrtCustomFilter** (section 2.4.343) records as defined by the **Macro Sheet** (section 2.1.7.32) part **ABNF**, the **PivotTable** (section 2.1.7.40) part ABNF, the **Table** (section 2.1.7.51) part ABNF, and the **Worksheet** part ABNF (section 2.1.7.62). The collection of **BrtCustomFilter** records specifies custom **filter** criteria to be applied to a filter.

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2.4.392 BrtEndCustomRichFilters

The **BrtEndCustomRichFilters** record specifies the end of a collection of **BrtCustomRichFilter** (section 2.4.345) records as defined in the **Common Productions** (section 2.1.8) part **ABNF**.

2.4.393 BrtEndDatabar

The **BrtEndDatabar** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62) and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies a **data bar** used in **conditional formatting**.

2.4.394 BrtEndDatabar14

The **BrtEndDatabar14** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies a **data bar** used in **conditional formatting**.

2.4.395 BrtEndDataFeedPr15

The **BrtEndDataFeedPr15** record specifies the end of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies properties of a **model data source data feed connection** (section 2.2.8.9.2).

2.4.396 BrtEndDataModel

The **BrtEndDataModel** record specifies the end of a collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies properties of the **spreadsheet data model**.

2.4.397 BrtEndDbTables15

The **BrtEndDbTables15** record specifies the end of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies the list of database tables used by this **model data source OLE DB connection** (section 2.2.8.9.1) or **model data source data feed connection** (section 2.2.8.9.2).

2.4.398 BrtEndDCon

The **BrtEndDCon** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62) and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies **data consolidation** information.

2.4.399 BrtEndDecoupledPivotCacheIDs

The **BrtEndDecoupledPivotCacheIDs** record specifies the end of a collection of **PivotCache** identifier records as defined by the **Workbook** (section 2.1.7.61) part **ABNF** rules. The collection of records specifies the **PivotCache** structures that are associated with Non-Worksheet PivotTables (section 2.2.5.5).

2.4.400 BrtEndDeletedName

The **BrtEndDeletedName** record specifies the end of an empty collection of records as defined by the **Query Table** (section 2.1.7.42) part **ABNF**. The collection of records specifies a **query** field that has been deleted from the **query table**.

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2.4.401 BrtEndDeletedNames

The **BrtEndDeletedNames** record specifies the end of a collection of records as defined by the **Query Table** (section 2.1.7.42) part **ABNF**. The collection of records specifies **query** fields that have been deleted from the **query table**.

2.4.402 BrtEndDim

The **BrtEndDim** record specifies the end of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a **PivotCache** (section 2.2.5.2) **OLAP dimension**.

2.4.403 BrtEndDims

The **BrtEndDims** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies **PivotTable** (section 2.1.7.40) **OLAP dimensions**.

2.4.404 BrtEndDRefs

The **BrtEndDRefs** record specifies the end of a collection of **BrtDRef** (section 2.4.350) records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62) and **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of **BrtDRef** records specifies the references used by **data consolidation**.

2.4.405 BrtEndDVals

The **BrtEndDVals** record specifies the end of a collection of **BrtDVal** (section 2.4.351) records as defined in the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of **BrtDVal** records specifies **data validation** properties of a worksheet.

2.4.406 BrtEndDVals14

The **BrtEndDVals14** record specifies the end of a collection of **BrtDVal14** (section 2.4.352) records as defined in the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of **BrtDVal14** records specifies **data validation** properties of a worksheet.

2.4.407 BrtEndDXF14s

The **BrtEndDXF14s** record specifies the end of a collection of records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of records specifies a set of differential formatting (section 2.2.6.2).

2.4.408 BrtEndDXFs

The **BrtEndDXFs** record specifies the end of a collection of **BrtDXF** (section 2.4.354) records as defined by the **Revision Log** (section 2.1.7.44) part **ABNF** and the **Styles** (section 2.1.7.50) part ABNF. The collection of **BrtDXF** records specifies a set of differential formatting (section 2.2.6.2).

2.4.409 BrtEndDXFs15

The **BrtEndDXFs15** record specifies the end of a collection of records as defined by the Styles part **ABNF**. The collection of records specifies a set of differential formatting (section 2.2.6.2).

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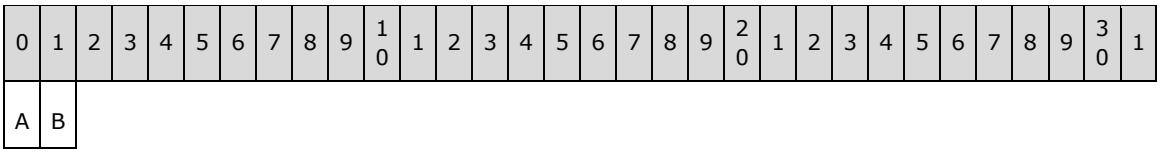
2.4.410 BrtEndDynamicArrayPr

The **BrtEndDynamicArrayPr** record specifies the end of an empty collection of records that specifies information about **dynamic arrays**, as defined in the **Metadata** (section 2.1.7.34) part **ABNF**.



A - fDynamic (1 bit): A bit indicating the presence of a dynamic array.

B - fCollapsed (1 bit): A bit which MUST be ignored and MUST be 0.

2.4.411 BrtEndECDbProps

The **BrtEndECDbProps** record specifies the end of an empty collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies the properties associated with an **ODBC** or **OLE DB** external connection (section 2.2.8).

2.4.412 BrtEndECOlapProps

The **BrtEndECOlapProps** record specifies the end of an empty collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies properties of OLAP connection (section 2.2.8.3.1).

2.4.413 BrtEndECParam

The **BrtEndECParam** record specifies the end of an empty collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies parameters of an external connection (section 2.2.8).

2.4.414 BrtEndECParams

The **BrtEndECParams** record specifies the end of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies connection parameters.

2.4.415 BrtEndECTWFldInfoLst

The **BrtEndECTWFldInfoLst** record specifies the end of a collection of **BrtBeginECTwFldInfo** (section 2.4.64) records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection specifies a collection of **columns (1)** of data in a text file.

2.4.416 BrtEndECTWFldInfoLst15

The **BrtEndECTWFldInfoLst15** record specifies the end of a collection of **BrtBeginECTwFldInfo15** (section 2.4.65) records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection specifies a collection of **columns (1)** of data in a text file.

2.4.417 BrtEndECTxtWiz

The **BrtEndECTxtWiz** record specifies the end of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection specifies text import properties.

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2.4.418 BrtEndECTxtWiz15

The **BrtEndECTxtWiz15** record specifies the end of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies the model **data source** text importation connection properties (section 2.2.8.9.4).

2.4.419 BrtEndECWebProps

The **BrtEndECWebProps** record specifies the end of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies the properties of a Web connection (section 2.2.8.5).

2.4.420 BrtEndECWPTables

The **BrtEndECWPTables** record specifies the end of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection specifies a collection of tables to be returned via a **Web query** data connection.

2.4.421 BrtEndEsfmd

The **BrtEndEsfmd** record specifies the end of a collection of records as defined by the **Metadata** part (section 2.1.7.34) **ABNF**. The collection of records specifies a future metadata store (section 2.2.4.4).

2.4.422 BrtEndEsmdb

The **BrtEndEsmdb** record specifies the end of a collection of **BrtMdb** (section 2.4.697) records as defined by the **Metadata** part (section 2.1.7.34) **ABNF**. The collection of records MUST contain metadata block (section 2.2.4.5) records of the same kind: only cell metadata (section 2.2.4.2) records or only value metadata (section 2.2.4.3) records.

2.4.423 BrtEndEsmdtinfo

The **BrtEndEsmdtinfo** record specifies the end of the collection of **BrtMdtinfo** (section 2.4.698) records as defined by the **Metadata** part (section 2.1.7.34) **ABNF**. The collection of records specifies the list of metadata types (section 2.2.4.1).

2.4.424 BrtEndEsmdx

The **BrtEndEsmdx** record specifies the end of a collection of records as defined by the **Metadata** part (section 2.1.7.34) **ABNF**. The collection of records specifies the **MDX** metadata store (section 2.2.4.4).

2.4.425 BrtEndEsstr

The **BrtEndEsstr** record specifies the end of the collection of **BrtStr** (section 2.4.782) records.

2.4.426 BrtEndExtConn14

The **BrtEndExtConn14** record specifies the end of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies the OLAP calculated **members** that are associated with this external connection (section 2.2.8).

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2.4.427 BrtEndExtConn15

The **BrtEndExtConn15** record specifies the end of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The record specifies the extended properties of an external connection (section 2.2.8).

2.4.428 BrtEndExtConnection

The **BrtEndExtConnection** record specifies the end of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**.

2.4.429 BrtEndExtConnections

The **BrtEndExtConnections** record specifies the end of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies external connections (section 2.2.8).

2.4.430 BrtEndExternals

The **BrtEndExternals** record specifies the end of a collection of records as defined by **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies a collection of supporting links (section 2.2.7.2) and specifies a collection of **Xti** (section 2.5.172) structures.

2.4.431 BrtEndFills

The **BrtEndFills** record specifies the end of a collection of **BrtFill** (section 2.4.668) records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtFill** records specifies **cell fill** styles.

2.4.432 BrtEndFilterColumn

The **BrtEndFilterColumn** record specifies the end of a collection of records as defined by the **Macro Sheet** (section 2.1.7.32) part **ABNF**, the **PivotTable** (section 2.1.7.40) part ABNF, the **Table** (section 2.1.7.51) part ABNF, and the **Worksheet** part ABNF (section 2.1.7.62). The collection of records specifies an **AutoFilter column (1)**.

2.4.433 BrtEndFilters

The **BrtEndFilters** record specifies the end of a collection of records as defined by the **Macro Sheet** (section 2.1.7.32) part **ABNF**, the **PivotTable** (section 2.1.7.40) part ABNF, the **Table** (section 2.1.7.51) part ABNF, and the **Worksheet** part ABNF (section 2.1.7.62). The collection of records specifies information about the **filter**.

2.4.434 BrtEndFmd

The **BrtEndFmd** record specifies the end of a collection of records as defined by the **Metadata** part (section 2.1.7.34) **ABNF**. The collection of records specifies future records (section 2.1.6).

2.4.435 BrtEndFmts

The **BrtEndFmts** record the end of a collection of **BrtFmt** (section 2.4.675) records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtFmt** records specifies the properties of the **number formats** that indicate how to format and render the numeric value of the **cells**.

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2.4.436 BrtEndFnGroup

The **BrtEndFnGroup** record specifies the end of a collection of **BrtFnGroup** (section 2.4.676) records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of **BrtFnGroup** records specifies **function category** names.

2.4.437 BrtEndFonts

The **BrtEndFonts** record specifies the end of a collection of **BrtFont** (section 2.4.677) records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtFont** records specifies the fonts for the **workbook**.

2.4.438 BrtEndHeaderFooter

The **BrtEndHeaderFooter** record specifies the end of an empty collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62), **Chart Sheet** (section 2.1.7.7) part ABNF, **Dialog Sheet** (section 2.1.7.20) part ABNF, and **Macro Sheet** (section 2.1.7.32) part ABNF.

2.4.439 BrtEndIconSet

The **BrtEndIconSet** record specifies the end of a collection of **BrtCFVO** (section 2.4.329) records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62) and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of **BrtCFVO** records specifies a **conditional formatting** rule defined using an **icon set**.

2.4.440 BrtEndIconSet14

The **BrtEndIconSet14** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies a **conditional formatting** rule defined using an **icon set**.

2.4.441 BrtEndIndexedColors

The **BrtEndIndexedColors** record specifies the end of a collection of **BrtIndexedColor** (section 2.4.684) records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtIndexedColor** records specifies indexed colors.

2.4.442 BrtEndISXTHCols

The **BrtEndISXTHCols** record specifies the end of an empty collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies references to pivot hierarchies (section 2.2.5.3.4) and any data field (section 2.2.5.3.7.5.2) that appear on the **column (1)** axis of a PivotTable view (section 2.2.5.3).

2.4.443 BrtEndISXTHRws

The **BrtEndISXTHRws** record specifies the end of an empty collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies references to pivot hierarchies (section 2.2.5.3.4) and any data fields (section 2.2.5.3.7.5.2) that appear on the **row** axis of a PivotTable view (section 2.2.5.3).

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2.4.444 BrtEndISXVDCols

The **BrtEndISXVDCols** record specifies the end of an empty collection of records as defined in the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies which pivot fields (section 2.2.5.3.2) appear on the **column (1)** axis of this PivotTable view (section 2.2.5.3).

2.4.445 BrtEndISXVDRws

The **BrtEndISXVDRws** record specifies the end of an empty collection of records as specified by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies which pivot fields appear on the **row** axis of this PivotTable view (section 2.2.5.3).

2.4.446 BrtEndISXVIs

The **BrtEndISXVIs** record specifies the end of an empty collection of records as defined in the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the pivot line entries (section 2.2.5.3.8.4) that occur on a pivot line (section 2.2.5.3.8.3).

2.4.447 BrtEndItemUniqueNames

The **BrtEndItemUniqueNames** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**.

2.4.448 BrtEndList

The **BrtEndList** record specifies the end of a collection of records as defined by the **Table** (section 2.1.7.51) part **ABNF** and the **Single Cell Tables** (section 2.1.7.46) part ABNF. The collection of records specifies a **table**.

2.4.449 BrtEndListCol

The **BrtEndListCol** record specifies the end of a collection of records, as defined by the **Table** (section 2.1.7.51) part **ABNF** and the **Single Cell Tables** (section 2.1.7.46) part ABNF. The collection of records specifies a **table column (1)**.

2.4.450 BrtEndListCols

The **BrtEndListCols** record specifies the end of a collection of records, as defined by the **Table** (section 2.1.7.51) part **ABNF** and the **Single Cell Tables** (section 2.1.7.46) part ABNF. The collection of records specifies the set of **table columns (1)** for a single table.

2.4.451 BrtEndListParts

The **BrtEndListParts** record specifies the end of a collection of **BrtListPart** (section 2.4.694) records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of **BrtListPart** records specifies **tables** defined in the **workbook**.

2.4.452 BrtEndListXmlCPr

The **BrtEndListXmlCPr** record specifies the end of an empty collection of records, as defined by the **Table** (section 2.1.7.51) part **ABNF** and the **Single Cell Tables** (section 2.1.7.46) part ABNF. The collection specifies information about the **XML map** properties of a **table column (1)**.

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2.4.453 BrtEndMap

The **BrtEndMap** record specifies the end of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the mapping between **BrtBeginDim** (section 2.4.51) and **BrtBeginMG** (section 2.4.112).

2.4.454 BrtEndMdx

The **BrtEndMdx** record specifies the end of a collection of records as defined by the **Metadata** part (section 2.1.7.34) **ABNF**. The collection of records specifies additional properties for MDX Metadata (section 2.2.4.8).

2.4.455 BrtEndMdxKPI

The **BrtEndMdxKPI** record specifies the end of an empty collection of records as defined by the **Metadata** part (section 2.1.7.34) **ABNF**. The collection of records specifies the properties of MDX Metadata (section 2.2.4.8).

2.4.456 BrtEndMdxMbrProp

The **BrtEndMdxMbrProp** record specifies the end of an empty collection of records as defined by the **Metadata** part (section 2.1.7.34) **ABNF**. The collection of records specifies the properties of an **OLAP member**.

2.4.457 BrtEndMdxSet

The **BrtEndMdxSet** record specifies the end of a collection of **BrtMdxMbrIstr** (section 2.4.699) records as defined by the **Metadata** part (section 2.1.7.34) **ABNF**. The collection of **BrtMdxMbrIstr** records specifies **MDX unique names** and their properties.

2.4.458 BrtEndMdxTuple

The **BrtEndMdxTuple** record specifies the end of a collection of **BrtMdxMbrIstr** (section 2.4.699) records as defined by the **Metadata** part (section 2.1.7.34) **ABNF**. The collection of **BrtMdxMbrIstr** records specifies **MDX unique names** and their properties.

2.4.459 BrtEndMergeCells

The **BrtEndMergeCells** record specifies the end of a collection of **BrtMergeCell** (section 2.4.700) records as defined in the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of **BrtMergeCell** records specifies the **merged cells** for the **sheet**.

2.4.460 BrtEndMetadata

The **BrtEndMetadata** record specifies the end of a collection of records as defined by the **Metadata** part (section 2.1.7.34) **ABNF**. The collection of records specifies the metadata (section 2.2.4) associated with the book.

2.4.461 BrtEndMG

The **BrtEndMG** record specifies the end of an empty collection as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a **measure group** for a **PivotCache** (section 2.2.5.2).

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2.4.462 BrtEndMGMaps

The **BrtEndMGMaps** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the mappings between **OLAP dimensions** and the OLAP **measure groups** that each OLAP dimension is related to.

2.4.463 BrtEndMGs

The **BrtEndMGs** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies **PivotTable** (section 2.1.7.40) **OLAP measure groups**.

2.4.464 brtEndModelRelationships

The **BrtEndModelRelationships** record specifies the end of a collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies relationships in **spreadsheet data model**.

2.4.465 BrtEndModelTables

The **BrtEndModelTables** record specifies the end of a collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies properties of tables in **spreadsheet data model**.

2.4.466 brtEndModelTimeGrouping

The **brtEndModelTimeGrouping** record specifies the end of a collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies a single time grouping in the **spreadsheet data model**.

2.4.467 brtEndModelTimeGroupings

The **brtEndModelTimeGroupings** record specifies the end of a collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies time groupings in the **spreadsheet data model**.

2.4.468 BrtEndMRUColors

The **BrtEndMRUColors** record specifies the end of a collection of **BrtMRUColor** (section 2.4.704) records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtMRUColor** records specifies the collection of most recently used colors selected by the user for this **workbook**.

2.4.469 BrtEndOledbPr15

The **BrtEndOledbPr15** record specifies the end of a collection of records as defined by the **External Data Connections** (section 2.1.7.24) part **ABNF**. The collection of records specifies properties of a **model data source OLE DB connection** (section 2.2.8.9.1).

2.4.470 BrtEndOleObjects

The **BrtEndOleObjects** record specifies the end of a collection of **BrtOleObject** (section 2.4.707) records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62), **Dialog Sheet** (section 2.1.7.20) part ABNF, and **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of **BrtOleObject** records specifies information about **OLE objects** that are embedded in the **workbook**.

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2.4.471 BrtEndPCD14

The **BrtEndPCD14** record specifies the end of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**.

2.4.472 BrtEndPCDCalcItem

The **BrtEndPCDCalcItem** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the locations in the PivotTable view (section 2.2.5.3) to which the calculated item (section 2.2.5.2.6) applies, and a reference to the cache fields (section 2.2.5.2.2) and cache items (section 2.2.5.2.3) that the formula (section 2.2.2) of the calculated item uses.

2.4.473 BrtEndPCDCalcItems

The **BrtEndPCDCalcItems** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a collection of calculated items (section 2.2.5.2.6) in the **PivotCache** (section 2.2.5.2).

2.4.474 BrtEndPCDCalcMem

The **BrtEndPCDCalcMem** record specifies the end of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies an OLAP calculated **member** or a named set (section 2.2.5.2.7.3) in a **PivotCache** (section 2.2.5.2).

2.4.475 BrtEndPCDCalcMem14

The **BRTEndPCDCalcMem14** record specifies the end of a collection of records as defined by the Common Productions **ABNF** (section 2.1.8). The collection of records specifies extended properties of an OLAP calculated **member**.

2.4.476 BrtEndPCDCalcMemExt

The **BrtEndPCDCalcMemExt** record specifies the end of a collection of records as defined by the Common Productions **ABNF** (section 2.1.8). The collection of records specifies the OLAP calculated **member** that is associated with an external connection (section 2.2.8) that is not associated with a **PivotCache** (section 2.2.5.2).

2.4.477 BrtEndPCDCalcMems

The **BrtEndPCDCalcMems** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the OLAP calculated **members** in a **PivotCache** (section 2.2.5.2).

2.4.478 BrtEndPCDCalcMemsExt

The **BrtEndPCDCalcMemsExt** record specifies the end of a collection of records as defined by the Common Productions **ABNF** (section 2.1.8). The collection of records specifies the OLAP calculated **members** that are associated with an external connection (section 2.2.8) that is not associated with a **PivotCache** (section 2.2.5.2).

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2.4.479 BrtEndPCDFAtbl

The **BrtEndPCDFAtbl** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a collection of cache items (section 2.2.5.2.3).

2.4.480 BrtEndPCDFGDiscrete

The **BrtEndPCDFGDiscrete** record specifies the end of a collection of **BrtPCDIIndex** (section 2.4.724) records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of **BrtPCDIIndex** records specifies a mapping from a cache item (section 2.2.5.2.3) in the **BrtBeginPCDFAtbl** (section 2.4.130) collection of the base field of this grouping field to a cache item in the **BrtBeginPCDFGItems** (section 2.4.132) collection of the grouping field. The base field and grouping field are specified in grouping (section 2.2.5.2.4).

2.4.481 BrtEndPCDFGItems

The **BrtEndPCDFGItems** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a collection of cache items for a grouping (section 2.2.5.2.4) field.

2.4.482 BrtEndPCDFGRange

The **BrtEndPCDFGRange** record specifies the end of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the grouping (section 2.2.5.2.4) properties of a cache field (section 2.2.5.2.2).

2.4.483 BrtEndPCDFGroup

The **BrtEndPCDFGroup** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the relation of this cache fields (section 2.2.5.2.2) and other cache fields (section 2.2.5.2.2) to grouping (section 2.2.5.2.4).

2.4.484 BrtEndPCDField

The **BrtEndPCDField** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a single cache field (section 2.2.5.2.2) in the **PivotCache** (section 2.2.5.2).

2.4.485 BrtEndPCDFields

The **BrtEndPCDFields** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a collection of cache fields (section 2.2.5.2.2) in the **PivotCache** (section 2.2.5.2).

2.4.486 BrtEndPCDHFieldsUsage

The **BrtEndPCDHFieldsUsage** record specifies the end of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. This collection of records specifies the cache fields (section 2.2.5.2.2) in the **PivotCache** (section 2.2.5.2) that are associated with the cache hierarchy (section 2.2.5.2.7) this record is within.

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2.4.487 BrtEndPCDHGLevel

The **BrtEndPCDHGLevel** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies an **OLAP** grouping level in a **PivotCache** (section 2.2.5.2), as specified in (section 2.2.5.2.8).

2.4.488 BrtEndPCDHGLevels

The **BrtEndPCDHGLevels** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a collection of **OLAP** grouping levels, as specified in (section 2.2.5.2.8).

2.4.489 BrtEndPCDHGLGMember

The **BrtEndPCDHGLGMember** record specifies the end of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies an **OLAP member** or name of a group in the subsequent **OLAP level** that is part of an **OLAP** Grouping (section 2.2.5.2.8).

2.4.490 BrtEndPCDHGLGMembers

The **BrtEndPCDHGLGMembers** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the **OLAP members** that are part of an **OLAP** Grouping (section 2.2.5.2.8).

2.4.491 BrtEndPCDHGLGroup

The **BrtEndPCDHGLGroup** record specifies the end a collection as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a group as specified in section 2.2.5.2.8.

2.4.492 BrtEndPCDHGLGroups

The **BrtEndPCDHGLGroups** record specifies the end of a collection as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the groups as specified by **OLAP** grouping (section 2.2.5.2.8) within the preceding cache hierarchy (section 2.2.5.2.7).

2.4.493 BrtEndPCDHierarchies

The **BrtEndPCDHierarchies** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a collection of cache hierarchies (section 2.2.5.2.7 in the **PivotCache** (section 2.2.5.2).

2.4.494 BrtEndPCDHierarchy

The **BrtEndPCDHierarchy** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a cache hierarchy (section 2.2.5.2.7) in the **PivotCache** (section 2.2.5.2).

2.4.495 BrtEndPCDIRun

The **BrtEndPCDIRun** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a sequence of cache items (section 2.2.5.2.3) that all have the same data type.

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2.4.496 BrtEndPCDKPI

The **BrtEndPCDKPI** record specifies the end of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies an **OLAP** key performance indicator (**KPI**).

2.4.497 BrtEndPCDKPIs

The **BrtEndPCDKPIs** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the **KPI**s in a **PivotCache** (section 2.2.5.2).

2.4.498 BrtEndPCDSConsol

The **BrtEndPCDSConsol** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the source data (section 2.2.5.2.1) ranges for a multiple consolidation ranges (section 2.2.5.2.1.1) **PivotCache** (section 2.2.5.2) in the **workbook**.

2.4.499 BrtEndPCDSCPage

The **BrtEndPCDSCPage** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a collection of values that correspond to cache items (section 2.2.5.2.3) of a cache field (section 2.2.5.2.2) for a multiple consolidation ranges (section 2.2.5.2.1.1) **PivotCache** (section 2.2.5.2).

2.4.500 BrtEndPCDSCPages

The **BrtEndPCDSCPages** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies information for optional cache fields (section 2.2.5.2.2) in the **PivotCache** (section 2.2.5.2), as specified by multiple consolidation ranges (section 2.2.5.2.1.1).

2.4.501 BrtEndPCDSCPItem

The **BrtEndPCDSCPItem** record specifies the end of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a value that corresponds to a cache item (section 2.2.5.2.3), as specified by multiple consolidation ranges (section 2.2.5.2.1.1).

2.4.502 BrtEndPCDSCSet

The **BrtEndPCDSCSet** record specifies the end of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies properties of a **range** of the source data (section 2.2.5.2.1) for a multiple consolidation ranges (section 2.2.5.2.1.1) **PivotCache** (section 2.2.5.2). The **workbook** containing the source data is either in this workbook or in another workbook.

2.4.503 BrtEndPCDSCSets

The **BrtEndPCDSCSets** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies **ranges** used as source data for a multiple consolidation ranges (section 2.2.5.2.1.1) **PivotCache** (section 2.2.5.2).

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2.4.504 BrtEndPCDSDTCEMember

The **BrtEndPCDSDTCEMember** record specifies the end of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a tuple cache entry in the tuple cache.

2.4.505 BrtEndPCDSDTCEMembers

The **BrtEndPCDSDTCEMembers** record specifies the end of a collection of **BrtBeginPCDSDTCEMember** records (section 2.4.155) as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies tuple cache entries, as specified in section 2.2.5.2.11.

2.4.506 BrtEndPCDSDTCEntries

The **BrtEndPCDSDTCEntries** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a cache of **cube** values; each of the values is optionally followed by a collection of tuple cache entries, specified in section 2.2.5.2.11, used in the value calculation.

2.4.507 BrtEndPCDSDTCQueries

The **BrtEndPCDSDTCQueries** record specifies the end of a collection of **BrtBeginPCDSDTCQuery** (section 2.4.160) records.

2.4.508 BrtEndPCDSDTCQuery

The **BrtEndPCDSDTCQuery** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**.

2.4.509 BrtEndPCDSDTCSet

The **BrtEndPCDSDTCSet** record specifies the end of a **BrtBeginPCDSDTCSet** (section 2.4.161) record as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**.

2.4.510 BrtEndPCDSDTCSets

The **BrtEndPCDSDTCSets** record specifies the end of a collection as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies the tuple cache set (section 2.2.5.2.11) in the **PivotCache** (section 2.2.5.2).

2.4.511 BrtEndPCDSDTupleCache

The **BrtEndPCDSDTupleCache** record specifies the end of a collection of record as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a tuple cache (section 2.2.5.2.11) within the **PivotCache** (section 2.2.5.2).

2.4.512 BrtEndPCDSFCIEntries

The **BrtEndPCDSFCIEntries** record specifies the end of a collection of **BrtPCDSFCIEntry** (section 2.4.728) records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of **BrtPCDSFCIEntry** records specifies the **number formats** provided by an **OLAP** server for **cube** values.

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2.4.513 BrtEndPCDSource

The **BrtEndPCDSource** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies properties of the source data (section 2.2.5.2.1) of a **PivotCache** (section 2.2.5.2).

2.4.514 BrtEndPCDSRange

The **BrtEndPCDSRange** record specifies the properties of the source data (section 2.2.5.2.1) for a **PivotCache** (section 2.2.5.2) contained in the **workbook** and specifies the end of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies source data for a **PivotCache** contained in the workbook.

2.4.515 BrtEndPivotCacheDef

The **BrtEndPivotCacheDef** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a **PivotCache** (section 2.2.5.2).

2.4.516 BrtEndPivotCacheID

The **BrtEndPivotCacheID** record specifies the end of an collection of **PivotCache** (section 2.2.5.2) identifier records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of PivotCache identifier records specifies the relationship between a specific **PivotCache** identifier and its associated **PivotCache Definition** (section 2.1.7.38). For more information, see section 2.2.5.3.1.

2.4.517 BrtEndPivotCacheIDs

The **BrtEndPivotCacheIDs** record specifies the end of a collection of **PivotCache** (section 2.2.5.2) identifier records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies the **PivotCache** identifiers for the **workbook**.

2.4.518 BrtEndPivotCacheRecords

The **BrtEndPivotCacheRecords** record specifies the end of a collection of records as defined by the **PivotCache Records** (section 2.1.7.39) part **ABNF**. The collection of records specifies the cache records (section 2.2.5.2.10) for a **PivotCache** (section 2.2.5.2).

2.4.519 BrtEndPivotTableRefs

The **BrtEndPivotTableRefs** record specifies the end of a collection of **PivotTable** identifier records as defined by the **Workbook** (section 2.1.7.61) part **ABNF** rules. The collection of records specifies the Non-Worksheet PivotTables (section 2.2.5.5) in the **Workbook**.

2.4.520 BrtEndPivotTableUISettings

The **BrtEndPivotTableUISettings** record specifies the end of a collection of records as defined in the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies settings for the **PivotTable field list**.

2.4.521 BrtEndPName

The **BrtEndPName** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. This record specifies information used for calculated field (section 2.2.5.2.5) and calculated items (section 2.2.5.2.6). When used for a calculated field, this

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record specifies a reference to a cache field (section 2.2.5.2.2) used in a calculated field formula (section 2.2.2). When used for a calculated item, this record specifies a reference to a pivot item used in a calculated item formula (section 2.2.2).

2.4.522 BrtEndPNames

The **BrtEndPNames** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a collection of references to cache field (section 2.2.5.2.2) used in a calculated field (section 2.2.5.2.5) formula (section 2.2.2) or pivot items (section 2.2.5.3.3) used in a calculated item (section 2.2.5.2.6) formula (section 2.2.2).

2.4.523 BrtEndPNPair

The **BrtEndPNPair** record specifies the end of an empty collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a reference to a pivot item (section 2.2.5.3.3) used in a calculated item (section 2.2.5.2.6) formula (section 2.2.2).

2.4.524 BrtEndPNPairs

The **BrtEndPNPairs** record specifies the end of a collection of records as defined by the **PivotCache Definition** (section 2.1.7.38) part **ABNF**. The collection of records specifies a reference to a pivot item (section 2.2.5.3.3), which is used in a calculated item (section 2.2.5.2.6) formula (section 2.2.2).

2.4.525 BrtEndPRFilter

The **BrtEndPRFilter** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**, **PivotCache Definition** (section 2.1.7.38) part ABNF, and **Worksheet** part ABNF (section 2.1.7.62). The collection of records specifies the selected pivot field (section 2.2.5.3.2) and the selected pivot items within that pivot field referred within **BrtBeginPRFilters** (section 2.4.179).

2.4.526 BrtEndPRFilter14

The **BrtEndPRFilter14** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the set of pivot items (section 2.2.5.3.3), or data items (section 2.2.5.3.7.5.1) included in the **filter**.

2.4.527 BrtEndPRFilters

The **BrtEndPRFilters** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**, **PivotCache Definition** (section 2.1.7.38) part ABNF, and **Worksheet** part ABNF (section 2.1.7.62). The collection of records specifies the **selected** pivot fields (section 2.2.5.3.2) and the selected pivot items (section 2.2.5.3.3) within those pivot fields.

2.4.528 BrtEndPRFilters14

The **BrtEndPRFilters14** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the **selected** pivot fields (section 2.2.5.3.2) and the selected pivot items (section 2.2.5.3.3) within those pivot fields.

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2.4.529 BrtEndPRFItem

The **BrtEndPRFItem** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**, **PivotCache Definition** (section 2.1.7.38) part ABNF, and **Worksheet** part ABNF (section 2.1.7.62). The collection of records specifies a pivot item (section 2.2.5.3.3).

2.4.530 BrtEndPRFItem14

The **BrtEndPRFItem14** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a pivot item (section 2.2.5.3.3) or data item (section 2.2.5.3.7.5.1) for a **PivotTable** rule (section 2.2.5.3.9).

2.4.531 BrtEndPRule

The **BrtEndPRule** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**, **PivotCache Definition** (section 2.1.7.38) part ABNF, and **Worksheet** part ABNF (section 2.1.7.62). The collection of records specifies a **PivotTable** rule (section 2.2.5.3.9).

2.4.532 BrtEndPRule14

The **BrtEndPRule14** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a PivotTable rule.

2.4.533 BrtEndQSI

The **BrtEndQSI** record specifies the end of a collection of records as defined by the **Query Table** (section 2.1.7.42) part **ABNF**. The collection of records specifies a **query table**.

2.4.534 BrtEndQSIF

The **BrtEndQSIF** record specifies the end of an empty collection of records as defined by the **Query Table** (section 2.1.7.42) part **ABNF**. The collection of records specifies properties of a single field of a **query table**.

2.4.535 BrtEndQSIFs

The **BrtEndQSIFs** record specifies the end of a collection of records as defined by the **Query Table** (section 2.1.7.42) part **ABNF**. The collection of records specifies the **query** fields in this **query table**.

2.4.536 BrtEndQSIR

The **BrtEndQSIR** record specifies the end of a collection of records as defined by the **Query Table** (section 2.1.7.42) part **ABNF**. The collection of records specifies information related to the refreshing of **query tables**.

2.4.537 BrtEndRichFilterColumn

The **BrtEndRichFilterColumn** specifies the end of a collection of records that specifies an associated **AutoFilter column (1)** with rich values as defined in the **Common Productions** (section 2.1.8) part **ABNF**.

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2.4.538 BrtEndRichFilters

The **BrtEndRichFilters** specifies the end of a collection of records that specifies information about the **filter** that applies to rich values, as defined in the **Common Productions** (section 2.1.8) part **ABNF**.

2.4.539 BrtEndRichSortCondition

The **BrtEndRichSortCondition** specifies the end of a sort condition associated with rich values, and associated **row** or **column (1)** to which the sort condition applies, as defined in the **Common Productions** (section 2.1.8) part **ABNF**.

2.4.540 BrtEndRichValueBlock

The **BrtEndRichValueBlock** specifies the end of an empty collection of records that specifies information about **rich values**, as defined in the **Metadata** (section 2.1.7.34) part **ABNF**.

2.4.541 BrtEndRRSort

The **BrtEndRRSort** record specifies the end of a collection of **BrtRRSortItem** (section 2.4.762) records as defined by the **Sort Map** (section 2.1.7.49) part **ABNF**. The collection of **BrtRRSortItem** records specifies the sort map (section 2.2.12.10) properties of the specified **cell range**.

2.4.542 BrtEndRwBrk

The **BrtEndRwBrk** record specifies the end of a collection of **BrtBrk** (section 2.4.310) records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62) and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of **BrtBrk** records specifies horizontal **page breaks**.

2.4.543 BrtEndScenMan

The **BrtEndScenMan** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies the **Scenario Manager** for the **sheet**.

2.4.544 BrtEndSct

The **BrtEndSct** record specifies the end of a collection of **BrtSlc** (section 2.4.771) records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of **BrtSlc** records specifies the **cells** that are included in the **scenario**.

2.4.545 BrtEndSheet

The **BrtEndSheet** record specifies the end of a collection of records as defined by the **Chart Sheet** (section 2.1.7.7) part **ABNF**, **Dialog Sheet** (section 2.1.7.20) part ABNF, **Macro Sheet** (section 2.1.7.32) part ABNF, and **Worksheet** part ABNF (section 2.1.7.62). The collection of records specifies properties of the **sheet**.

2.4.546 BrtEndSheetData

The **BrtEndSheetData** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62) and **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies the cell table (section 2.2.1) data for a **sheet**.

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2.4.547 BrtEndSingleCells

The **BrtEndSingleCells** record specifies the end of a collection of records as defined by the **Single Cell Tables** (section 2.1.7.46) part **ABNF**. The collection of records specifies a **table**.

2.4.548 BrtEndSlicer

The **BrtEndSlicer** record specifies the end of an empty collection of records as defined by the **Slicers** (section 2.1.7.48) part **ABNF**. The collection of records specifies a slicer view (section 2.2.14.2).

2.4.549 BrtEndSlicerCache

The **BrtEndSlicerCache** record specifies the end of a collection of records as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies a slicer cache (section 2.2.14.1).

2.4.550 BrtEndSlicerCacheDef

The **BrtEndSlicerCacheDef** record specifies the end of a collection of records as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. This collection specifies a slicer cache (section 2.2.14.1).

2.4.551 BrtEndSlicerCacheID

The **BrtEndSlicerCacheID** record specifies the end of an empty collection as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies a reference to a slicer cache (section 2.2.14.1) in this **workbook**.

2.4.552 BrtEndSlicerCacheIDs

The **BrtEndSlicerCacheIDs** record specifies the end of a collection of slicer cache (section 2.2.14.1) identifier records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies the slicer cache identifiers for the **workbook**.

2.4.553 BrtEndSlicerCacheLevelData

The **BrtEndSlicerCacheLevelData** record specifies the end of a collection of records and collections as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies **OLAP members** that are cached for this **OLAP level** within the **OLAP hierarchy** specified by this slicer cache (section 2.2.14.1).

2.4.554 BrtEndSlicerCacheLevelsData

The **BrtEndSlicerCacheLevelsData** record specifies the end of a collection of records and collections as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies **OLAP levels** of the **OLAP hierarchy** specified by this slicer cache (section 2.2.14.1).

2.4.555 BrtEndSlicerCacheNative

The **BrtEndSlicerCacheNative** record specifies the end of a collection of records as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies non-**OLAP** items that are cached within this slicer cache (section 2.2.14.1).

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2.4.556 BrtEndSlicerCacheOlapImpl

The **BrtEndSlicerCacheOlapImpl** record specifies the end of a collection of records and collections as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies the associated **OLAP PivotCache** (section 2.2.5.2). See section 2.2.14.1.2 for more details.

2.4.557 BrtEndSlicerCacheSelections

The **BrtEndSlicerCacheSelections** record specifies the end of a collection of records as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies the **OLAP members** from the slicer cache (section 2.2.14.1) that are **selected**.

2.4.558 BrtEndSlicerCacheSiRange

The **BrtEndSlicerCacheSiRange** record specifies the end of a collection of records as defined by the **slicer cache** part **ABNF**. The collection of records specifies **OLAP members** in the **OLAP level** specified by the **BrtBeginSlicerCacheLevelData** (section 2.4.205) record that precedes this record.

2.4.559 BrtEndSlicerCacheSiRanges

The **BrtEndSlicerCacheSiRanges** record specifies the end of a collection of records and collections as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. This collection specifies **OLAP members** in the **OLAP level** specified by the **BrtBeginSlicerCacheLevelData** (section 2.4.205) that precedes this collection.

2.4.560 BrtEndSlicerCachesPivotCacheID

The **BrtEndSlicerCachesPivotCacheID** record specifies the end of an empty collection as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies a reference to a **PivotCache** (section 2.2.5.2) used by a slicer cache (section 2.2.14.1) with **OLAP** source data (section 2.2.5.2.1).

2.4.561 BrtEndSlicerCachesPivotCacheIDs

The **BrtEndSlicerCachesPivotCacheIDs** record specifies the end of a collection of **PivotCache** (section 2.2.5.2) identifier records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies the PivotCaches used by slicer caches (section 2.2.14.1) with **OLAP** source data (section 2.2.5.2.1).

2.4.562 BrtEndSlicerEx

The **BrtEndSlicerEx** record specifies the end of an empty collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies a relationship (section 2.1.3) identifier of the part that contains the slicers (section 2.2.14) in this **worksheet**.

2.4.563 BrtEndSlicers

The **BrtEndSlicers** record specifies the end of a collection of **BrtBeginSlicer** (section 2.4.200) records as defined by the **Slicers** (section 2.1.7.48) part **ABNF**. The collection of **BrtBeginSlicer** records specifies all slicer views (section 2.2.14.2) in the **worksheet**.

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2.4.564 BrtEndSlicersEx

The **BrtEndSlicersEx** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies the **Slicers** (section 2.1.7.48) part ABNF identifier for the **worksheet**.

2.4.565 BrtEndSlicerStyle

The **BrtEndSlicerStyle** record specifies the end of a collection of records and collections as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of records specifies the table style (section 2.2.6.3) elements (section 2.2.6.2.2) of the slicer style (section 2.2.6.3.1) that are specific to slicers (section 2.2.14). Together with the base table style, this collection specifies a slicer style.

2.4.566 BrtEndSlicerStyleElements

The **BrtEndSlicerStyleElements** record specifies the end of a collection of records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of records specifies table style elements (section 2.2.6.2.2) of a slicer style (section 2.2.6.3.1) that are specific to slicers (section 2.2.14).

2.4.567 BrtEndSlicerStyles

The **BrtEndSlicerStyles** record specifies the end of a collection of records and collections as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of records specifies custom slicer styles (section 2.2.6.3.1).

2.4.568 BrtEndSmartTags

The **BrtEndSmartTags** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies the **smart tag** properties of this **sheet**.<33>

2.4.569 BrtEndSmartTagTypes

The **BrtEndSmartTagTypes** record specifies the end of a collection of **BrtSmartTagType** (section 2.4.779) records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of **BrtSmartTagType** records specifies the properties for a **smart tag** type that contain the identification information for the smart tag.<34>

2.4.570 BrtEndSortCond

The **BrtEndSortCond** record specifies the end of an empty collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62), the **Macro Sheet** (section 2.1.7.32) part ABNF, the **Table** (section 2.1.7.51) part ABNF, and the **Query Table** (section 2.1.7.42) part ABNF. The collection specifies a **sort condition** to apply to a **range**.

2.4.571 BrtEndSortCond14

The **BrtEndSortCond14** record specifies the end of an empty collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62), the **Macro Sheet** (section 2.1.7.32) part ABNF, the **Table** (section 2.1.7.51) part ABNF, and the **Query Table** (section 2.1.7.42) part ABNF. The collection specifies a **sort condition** to apply to a **range**.

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2.4.572 BrtEndSortState

The **BrtEndSortState** record specifies the end of a collection of records as specified by the **Worksheet** part **ABNF** (section 2.1.7.62), the **Macro Sheet** (section 2.1.7.32) part ABNF, the **Table** part ABNF, and the **Query Table** (section 2.1.7.42) part ABNF. The collection of records specifies the different **sort conditions** that apply to a **range**.

2.4.573 BrtEndSparklineGroup

The **BrtEndSparklineGroup** record specifies the end of a collection of records and collections as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies the properties for this **sparkline** group.

2.4.574 BrtEndSparklineGroups

The **BrtEndSparklineGroups** record specifies the end of a collection of records and collections as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies the groups of **sparklines** on the **sheet**.

2.4.575 BrtEndSparklines

The **BrtEndSparklines** record specifies the end of a collection of **BrtSparkline** (section 2.4.780) records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of **BrtSparkline** records specifies properties for individual **sparklines**.

2.4.576 BrtEndSst

The **BrtEndSst** record specifies the end of a collection of **BrtSSTItem** (section 2.4.781) records as defined by the **Shared Strings (**section 2.1.7.45) part **ABNF**. The collection of **BrtSSTItem** records specifies a shared string table.

2.4.577 BrtEndStyles

The **BrtEndStyles** record specifies the end of a collection of **BrtStyle** (section 2.4.783) records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtStyle** records specifies all cell styles (section 2.2.6.1.2) in the **workbook**. The collection MUST contain at least 1 and no more than 0xFF96 **BrtStyle** records.

2.4.578 BrtEndStyleSheet

The BrtEndStyleSheet record specifies the end of a collection of records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of records specifies style (section 2.2.6) information for a **workbook**.

2.4.579 BrtEndStyleSheetExt14

The **BrtEndStyleSheetExt14** record specifies the end of a collection of records and collections as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection specifies additional style (section 2.2.6) information for the **workbook**.

2.4.580 BrtEndSupBook

The **BrtEndSupBook** record specifies the end of a collection of records as defined by the **External Link** (section 2.1.7.25) part **ABNF**. The collection of records specifies information about the external link (section 2.2.7.4).

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2.4.581 BrtEndSXChange

The **BrtEndSXChange** record specifies the end of a collection of records and collections as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the value used for **PivotTable** What-if Analysis (section 2.2.5.3.10) calculation and the allocation method for how to apply the value, and specifies a collection of **MDX unique names** that identifies the original value in the **OLAP** source data (section 2.2.5.2.1) that was changed.

2.4.582 BrtEndSXChanges

The **BrtEndSXChanges** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the values used for **PivotTable** What-if Analysis (section 2.2.5.3.10) calculations and the allocation methods for how to apply the values, and specifies the collections of **MDX unique names** that identify original values in the **OLAP** source data (section 2.2.5.2.1) that were changed.

2.4.583 BrtEndSXCondFmt

The **BrtEndSXCondFmt** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies details about where this **conditional formatting** applies in the PivotTable view (section 2.2.5.3).

2.4.584 BrtEndSXCondFmt14

The **BrtEndSXCondFmt14** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies details about where this **conditional formatting** applies in the PivotTable view (section 2.2.5.3).

2.4.585 BrtEndSXCondFmts

The **BrtEndSXCondFmts** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies conditional formats that apply to this **PivotTable** (section 2.1.7.40).

2.4.586 BrtEndSXCondFmts14

The **BrtEndSXCondFmts14** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies conditional formats that apply to this **PivotTable** (section 2.1.7.40).

2.4.587 BrtEndSXCrtFormat

The **BrtEndSXCrtFormat** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a reference to a **PivotChart** (section 2.2.3.2) format.

2.4.588 BrtEndSXCrtFormats

The **BrtEndSXCrtFormats** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies references to **PivotChart** (section 2.2.3.2) formats.

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2.4.589 BrtEndSXDI

The **BrtEndSXDI** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a data item (section 2.2.5.3.7.5.1) that summarizes data in a PivotTable view (section 2.2.5.3).

2.4.590 BrtEndSXDIs

The **BrtEndSXDIs** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**, that specifies the data items (section 2.2.5.3.7.5.1) that appear on the data axis (section 2.2.5.3.7.5) of this PivotTable view (section 2.2.5.3).

2.4.591 BrtEndSXEdit

The **BrtEndSXEdit** record specifies the end of a collection of records and collections as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the user input, related to What-if Analysis (section 2.2.5.3.10), in a single cell of the **PivotTable** data area (section 2.2.5.3.8.1.4), and specifies a collection of **MDX unique names** that identifies the value in the **OLAP** source data (section 2.2.5.2.1), and specifies a **PivotTable** rule (section 2.2.5.3.9) that can be used to identify the **cell** in the **PivotTable** data area.

2.4.592 BrtEndSXEdits

The **BrtEndSXEdits** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies user inputs, related to What-if Analysis (section 2.2.5.3.10), to single cells of the **PivotTable** data area (section 2.2.5.3.8.1.4), and specifies the collections of **MDX unique names** that identify the values in the **OLAP** source data (section 2.2.5.2.1), and specifies the **PivotTable** rules (section 2.2.5.3.9) that can be used to identify the **cells** in the **PivotTable** data area.

2.4.593 BrtEndSXFilter

The **BrtEndSXFilter** record specifies the end of a collection of records and collections as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a **PivotTable** advanced filter (section 2.2.5.3.6.1)

2.4.594 BrtEndSXFilters

The **BrtEndSXFilters** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a collection of advanced filters (section 2.2.5.3.6.1) that apply to this PivotTable view (section 2.2.5.3).

2.4.595 BrtEndSXFormat

The **BrtEndSXFormat** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the differential formatting (section 2.2.6.2) to be applied to the PivotTable view (section 2.2.5.3) area identified by a **PivotTable** rule (section 2.2.5.3.9).

2.4.596 BrtEndSxFormats

The **BrtEndSxFormats** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a collection of formats that apply to this PivotTable view (section 2.2.5.3).

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2.4.597 BrtEndSXLI

The **BrtEndSXLI** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a pivot line (section 2.2.5.3.8.3) in a PivotTable view (section 2.2.5.3).

2.4.598 BrtEndSXLICols

The **BrtEndSXLICols** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the pivot lines (section 2.2.5.3.8.3) that appear on the **column (1)** area of the PivotTable view (section 2.2.5.3).

2.4.599 BrtEndSXLIRws

The **BrtEndSXLIRws** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the pivot lines (section 2.2.5.3.8.3) that appear on the **row** area of the PivotTable view (section 2.2.5.3).

2.4.600 BrtEndSXLocation

The **BrtEndSXLocation** record specifies the end of an empty collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the location of a PivotTable view (section 2.2.5.3) in a **sheet**.

2.4.601 BrtEndSXPI

The **BrtEndSXPI** record specifies the end of a collection of records and collections as defined in the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a pivot field (section 2.2.5.3.2) or a pivot hierarchy (section 2.2.5.3.4) on the page axis (section 2.2.5.3.7.1) of the **PivotTable**.

2.4.602 BrtEndSXPIs

The **BrtEndSXPIs** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the pivot fields (section 2.2.5.3.2) on the page axis (section 2.2.5.3.7.1) of the PivotTable view (section 2.2.5.3).

2.4.603 BrtEndSxRow

The **BrtEndSxRow** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF** rules. The collection of records specifies a collection of **PivotValueCell** (section 2.2.5.6.1) data units.

2.4.604 BrtEndSxRules

The **BrtEndSxRules** record specifies the end of a collection of records as defined in the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a collection of **PivotTable** rules (section 2.2.5.3.9).

2.4.605 BrtEndSXRules14

The **BrtEndSXRules14** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a collection of **PivotTable** rules (section 2.2.5.3.9).

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2.4.606 BrtEndSxSelect

The **BrtEndSxSelect** record specifies end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies a **PivotTable** rule (section 2.2.5.3.9) used to identify **cells** of the **selection**. This record MUST be ignored if **irstRelID** is NULL or points to an invalid **PivotTable** (section 2.1.7.40) part.

2.4.607 BrtEndSXTDMP

The **BrtEndSXTDMP** record specifies the end of an empty collection of records as defined in the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a **member** property.

2.4.608 BrtEndSXTDMPs

The **BrtEndSXTDMPs** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies **member** properties in this pivot hierarchy (section 2.2.5.3.4).

2.4.609 BrtEndSXTH

The **BrtEndSXTH** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a pivot hierarchy (section 2.2.5.3.4).

2.4.610 BrtEndSXTHItem

The **BrtEndSXTHItem** record specifies the end of an empty collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the **MDX unique name** of an **OLAP member** to be included or excluded in PivotTable view (section 2.2.5.3) manual filtering (section 2.2.5.3.5).

2.4.611 BrtEndSXTHItems

The **BrtEndSXTHItems** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the **members** to be included or excluded in **PivotTable** manual filtering (section 2.2.5.3.5).

2.4.612 BrtEndSXTHs

The **BrtEndSXTHs** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies pivot hierarchies (section 2.2.5.3.4) of the PivotTable view (section 2.2.5.3).

2.4.613 BrtEndSXTupleSet

The **BrtEndSXTupleSet** record specifies the end of a collection of records and collections as defined by the Common Productions **ABNF** (section 2.1.8). The collection of records specifies an **OLAP named set**.

2.4.614 BrtEndSXTupleSetData

The **BrtEndSXTupleSetData** record specifies the end of a collection of records as defined by the Common Productions **ABNF** (section 2.1.8). The collection of records specifies the **MDX tuples** within the associated **OLAP named set**.

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2.4.615 BrtEndSXTupleSetHeader

The **BrtEndSXTupleSetHeader** record specifies the end of a collection of records as defined by the Common Productions **ABNF** (section 2.1.8). The collection of records specifies the **MDX unique names** of the **OLAP hierarchies** and the MDX unique names of the **OLAP levels** of the **OLAP named set**.

2.4.616 BrtEndSXTupleSetRow

The **BrtEndSXTupleSetRow** record specifies the end of a collection of records as defined by the Common Productions **ABNF** (section 2.1.8). The collection of records specifies an **MDX tuple** within the **OLAP named set**. The value of the **cRow** field in the **BrtBeginSXTupleSet** (section 2.4.265) record that immediately precedes this record MUST be equal to the number of **BrtEndSXTupleSetRow** (section 2.4.616) records between the **BrtBeginSXTupleSetData** (section 2.4.266) record that immediately precedes this record and the **BrtEndSXTupleSetData** record that immediately follows this record.

2.4.617 BrtEndSxvcells

The **BrtEndSxvcells** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF** rules. The collection of records specifies a collection of **PivotValueCell** (section 2.2.5.6.1) data units.

2.4.618 BrtEndSXVD

The **BrtEndSXVD** record specifies the end of a collection of records and collections as defined in the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a pivot field (section 2.2.5.3.2) on the PivotTable view (section 2.2.5.3).

2.4.619 BrtEndSXVDs

The **BrtEndSXVDs** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies the pivot fields (section 2.2.5.3.2) of the PivotTable view (section 2.2.5.3).

2.4.620 BrtEndSXVI

The **BrtEndSXVI** record specifies the end of an empty collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a pivot item (section 2.2.5.3.3).

2.4.621 BrtEndSXView

The **BrtEndSXView** record specifies the end of a collection of records and collections as defined in the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a PivotTable view (section 2.2.5.3).

2.4.622 BrtEndSXView14

The **BrtEndSXView14** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies additional properties of the PivotTable view (section 2.2.5.3) relating to **PivotTable** What-if Analysis (section 2.2.5.3.10) and **conditional formatting**.

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2.4.623 BrtEndSXView16

The **BrtEndSXView16** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**.

2.4.624 BrtEndSXVIs

The **BrtEndSXVIs** record specifies the end of a collection of records as defined by the **PivotTable** (section 2.1.7.40) part **ABNF**. The collection of records specifies a collection of pivot items (section 2.2.5.3.3).

2.4.625 BrtEndTableSlicerCache

The **BrtEndTableSlicerCache** record specifies the end of a collection of records as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**. The collection of records specifies this table slicer cache (section 2.2.14.1).

2.4.626 BrtEndTableStyle

The **BrtEndTableStyle** record specifies the end of a collection of **BrtTableStyleElement** (section 2.4.819) records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of **BrtTableStyleElement** records specifies a table style (section 2.2.6.3).

2.4.627 BrtEndTableStyles

The **BrtEndTableStyles** record specifies the end of a collection of records as defined by the **Styles** (section 2.1.7.50) part **ABNF**. The collection of records specifies the user-defined table styles (section 2.2.6.3) for the workbook.

2.4.628 BrtEndTimelineCacheID

The **BrtEndTimelineCacheID** record specifies the end of an empty collection as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies a reference to a Timeline cache (section 2.2.15.1) in the **workbook**.

2.4.629 BrtEndTimelineCacheIDs

The **BrtEndTimelineCacheIDs** record specifies the end of a collection of Timeline cache (section 2.2.15.1) identifier records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies the Timeline cache identifiers for the **workbook**.

2.4.630 BrtEndTimelineCachePivotCacheIDs

The **BrtEndTimelineCachePivotCacheIDs** record specifies the end of a collection of **PivotCache** (section 2.2.5.2) identifier records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies the PivotCaches used by Timeline caches (section 2.2.15.1) with **OLAP** source data (section 2.2.5.2.1).

2.4.631 BrtEndTimelineEx

The **BrtEndTimelineEx** record specifies the end of an empty collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies a relationship (section 2.1.3) identifier of the part that contains the Timelines (section 2.2.15) in this **worksheet**.

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2.4.632 BrtEndTimelinesEx

The **BrtEndTimelinesEx** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62). The collection of records specifies the **Timelines** (section 2.1.7.54) part ABNF identifier for the **worksheet**.

2.4.633 BrtEndTimelineStyle

The **BrtEndTimelineStyle** record specifies the end of a collection of records and collections as defined by the Styles part **ABNF**. The collection of records specifies the table style elements (section 2.2.6.2.2) of the timeline style that are specific to Timelines. Together with the base table style, this collection specifies a timeline style.

2.4.634 BrtEndTimelineStyleElements

The **BrtEndTimelineStyleElements** record specifies the end of a collection of records as defined by the Styles part **ABNF**. The collection of records specifies table style elements of a timeline style that are specific to timelines.

2.4.635 BrtEndTimelineStyles

The **BrtEndTimelineStyles** record specifies the end of a collection of records and collections as defined by the Styles part **ABNF**. The collection of records specifies custom timeline styles.

2.4.636 BrtEndTimelineStylesheetExt15

The **BrtEndTimelineStyleSheetExt15** record specifies the end of a collection of records and collections as defined by the Styles part **ABNF**. The collection specifies additional style information for the **workbook**.

2.4.637 BrtEndUserCsView

The **BrtEndUserCsView** record specifies the end of a collection of records as defined by the **Chart Sheet** (section 2.1.7.7) part **ABNF**. The collection of records specifies settings of a **custom view** for a **chart sheet**.

2.4.638 BrtEndUserCsViews

The **BrtEndUserCsViews** record specifies the end of a collection of records as defined by the **Chart Sheet** (section 2.1.7.7) part **ABNF**. The collection of records specifies **custom view** settings for **chart sheets**.

2.4.639 BrtEndUserShView

The **BrtEndUserShView** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62), the **Dialog Sheet** (section 2.1.7.20) part ABNF, and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies settings of a **custom view** for a **sheet**.

2.4.640 BrtEndUserShViews

The **BrtEndUserShViews** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62), the **Dialog Sheet** (section 2.1.7.20) part ABNF, and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies **custom view** settings for **sheets**.

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2.4.641 BrtEndVolDeps

The **BrtEndVolDeps** record specifies the end of a collection of records as defined by the **Volatile Dependencies** (section 2.1.7.60) part **ABNF**. The collection of records specifies dependency information for all **cells** that depend on either **RTD server** or **cube functions**.

2.4.642 BrtEndVolMain

The **BrtEndVolMain** record specifies the end of a collection of records as defined by the **Volatile Dependencies** (section 2.1.7.60) part **ABNF**. The collection of records specifies dependency information for all **RTD topics** within a type (section 2.2.13.1) that share the same first string or function argument.

2.4.643 BrtEndVolTopic

The **BrtEndVolTopic** record specifies the end of a collection of records and collections as defined by the **Volatile Dependencies** (section 2.1.7.60) part **ABNF**. The collection of records specifies a cached returned value (section 2.2.13.4) and subtopics (section 2.2.13.3).

2.4.644 BrtEndVolType

The **BrtEndVolType** record specifies the end of a collection of records as defined by the **Volatile Dependencies** (section 2.1.7.60) part **ABNF**. The collection of records specifies dependency information for a set of **cells** that either all depend on an **RTD server** or all depend on **cube functions**.

2.4.645 BrtEndWebExtensions

The **BrtEndWebExtensions** record specifies the end of a collection of records as defined by the WEBEXTENSIONS rule in the **Worksheet** (section 2.1.7.62) part **ABNF**. The collection of records specifies additional properties for bindings for Web Extensions ([MS-OWEXML] section 1.3) on the **worksheet**.

2.4.646 BrtEndWebPubItem

The **BrtEndWebPubItem** record specifies the end of an empty collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**, **Worksheet** part ABNF (section 2.1.7.62), and **Chart Sheet** (section 2.1.7.7) part ABNF. The collection of records specifies content in the workbook that is published.

2.4.647 BrtEndWebPubItems

The **BrtEndWebPubItems** record specifies the end of a collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**, **Worksheet** part ABNF (section 2.1.7.62), and **Chart Sheet** (section 2.1.7.7) part ABNF. The collection of records specifies the content in this **workbook** that has been published.

2.4.648 BrtEndWsSortMap

The **BrtEndWsSortMap** record specifies the end of a collection of records as defined by the **Sort Map** (section 2.1.7.49) part **ABNF**. The collection of records specifies the sort map (section 2.2.12.10) properties of a **sheet**.

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2.4.649 BrtEndWsView

The **BrtEndWsView** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62), the **Dialog Sheet** (section 2.1.7.20) part ABNF, and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies a **sheet view**.

2.4.650 BrtEndWsViews

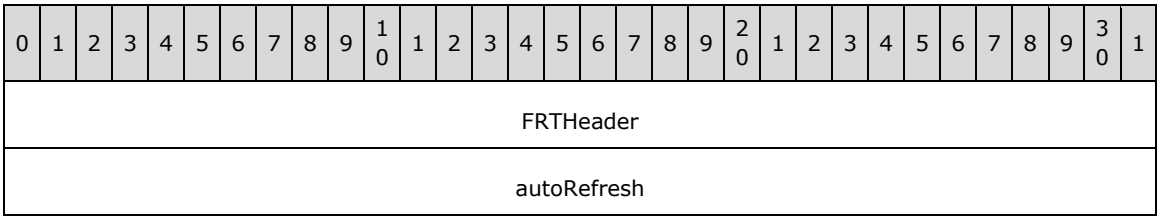
The **BrtEndWsViews** record specifies the end of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62), the **Dialog Sheet** (section 2.1.7.20) part ABNF, and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies the **sheet views** for the current **sheet**.

2.4.651 BrtEOF

The **BrtEOF** record specifies the end of a collection of records as defined by **Revision Headers** (section 2.1.7.43) part **ABNF**, **Revision Log** (section 2.1.7.44) part ABNF, and **User Names** (section 2.1.7.55) part ABNF. The collection of records specifies properties for a **shared workbook**.

2.4.652 BrtExternalLinksPr

The **BrtExternalLinksPr** record specifies extended properties applicable to all **external links** of this **workbook**.

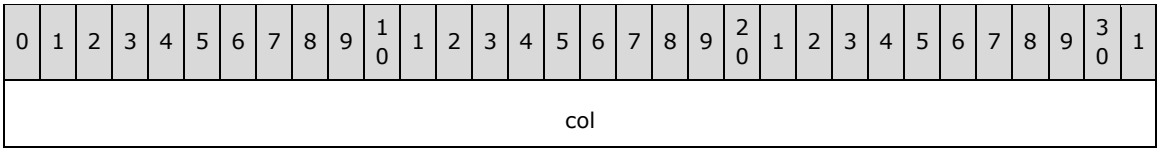


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

autoRefresh (4 bytes): A **Boolean** (section 2.5.97.3) attribute that specifies whether to refresh external links periodically.

2.4.653 BrtExternCellBlank

The **BrtExternCellBlank** record specifies an External Cell (section 2.2.7.4.1.2.1) in the External Cell Cache (section 2.2.7.4.1.2) that does not contain a value.



col (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies the **column (1)** containing this External Cell. The value of this field MUST be less than 16384.

2.4.654 BrtExternCellBool

The **BrtExternCellBool** record specifies an External Cell (section 2.2.7.4.1.2.1) in the External Cell Cache (section 2.2.7.4.1.2) that contains a Boolean value.

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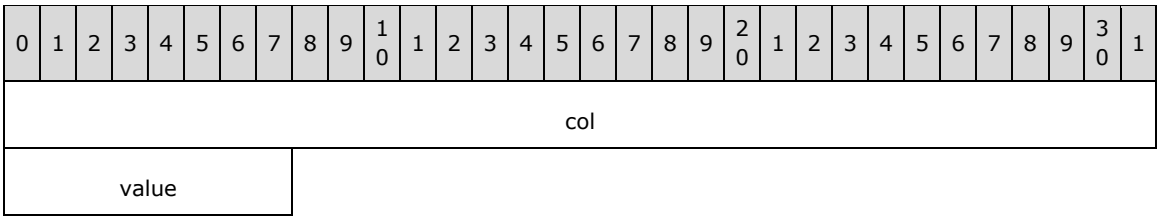
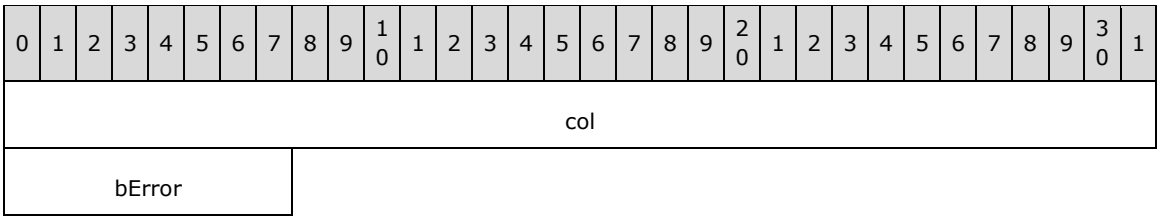


col (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies the **column (1)** containing this External Cell. The value of this field MUST be less than 16384.

value (1 byte): A **Boolean** (section 2.5.97.3) that specifies the value.

2.4.655 BrtExternCellError

The **BrtExternCellError** record specifies an External Cell (section 2.2.7.4.1.2.1) in the External Cell Cache (section 2.2.7.4.1.2) that contains an error value.

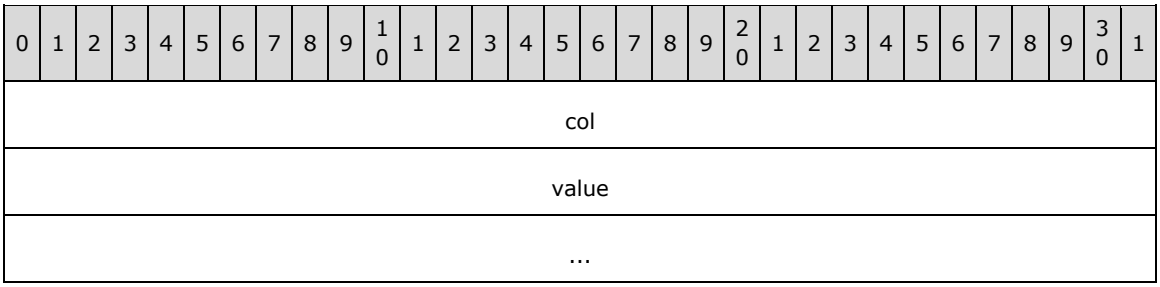


col (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies the **column (1)** containing this External Cell. The value of this field MUST be less than 16384.

bError (1 byte): A **BErr** (section 2.5.97.2) that specifies an error value.

2.4.656 BrtExternCellReal

The **BrtExternCellReal** record specifies an External Cell (section 2.2.7.4.1.2.1) in the External Cell Cache (section 2.2.7.4.1.2) that contains a numeric value.



col (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies the **column (1)** containing this External Cell. The value of this field MUST be less than 16384.

value (8 bytes): An **Xnum** (section 2.5.171) that specifies a numeric value.

2.4.657 BrtExternCellString

The **BrtExternCellString** record specifies an External Cell (section 2.2.7.4.1.2.1) in the External Cell Cache (section 2.2.7.4.1.2) that contains a string value.

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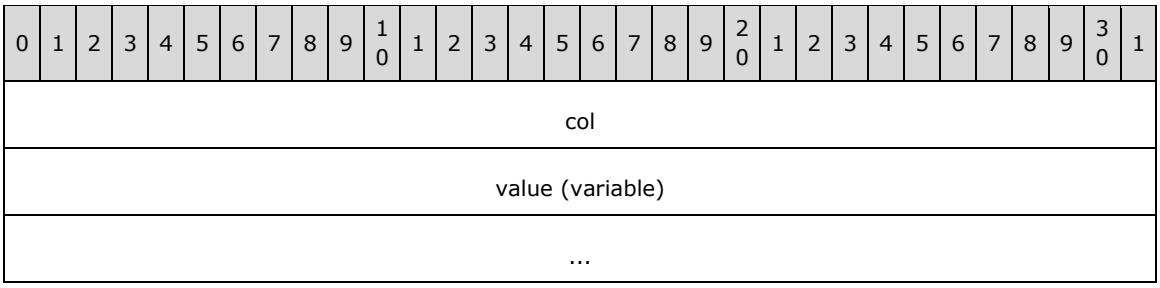
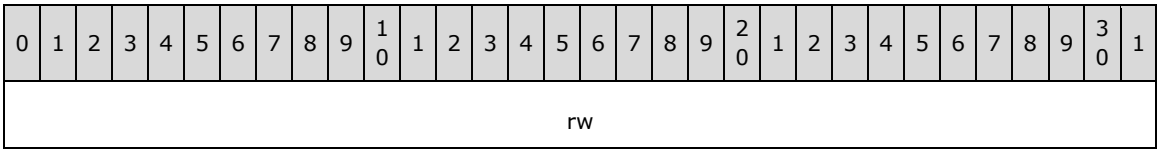


col (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies **column (1)** containing this External Cell. The value of this field MUST be less than 16384.

value (variable): An **XLWideString** (section 2.5.168) that specifies a string value. The length of this string MUST be less than 32768 characters.

2.4.658 BrtExternRowHdr

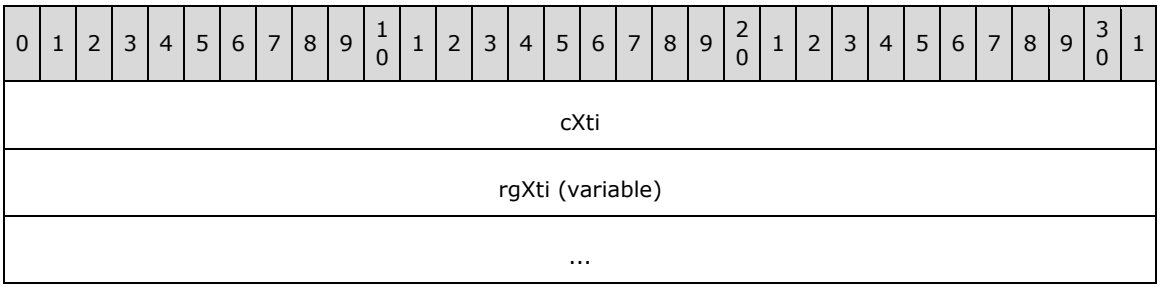
The **BrtExternRowHdr** record specifies properties of **row** in an External Cell Cache (section 2.2.7.4.1.2) and specifies the beginning of a collection of records as defined by the **External Link** (section 2.1.7.25) part **ABNF**. The collection of records specifies a row in an External Cell Cache. Subsequent External Cell (section 2.2.7.4.1.2.1) records prior to the subsequent **BrtExternRowHdr** (section 2.4.658) record are in this row.



rw (4 bytes): An **UncheckedRw** (section 2.5.154) that specifies a row. The value of this field MUST be less than 1048576 and MUST be less than the **rw** field of any subsequent **BrtExternRowHdr** record in this External Cell Cache.

2.4.659 BrtExternSheet

The **BrtExternSheet** record specifies a collection of **Xti** (section 2.5.172) structures.



cXti (4 bytes): An unsigned integer that specifies the count of items in the **rgXti** array. The value of this field MUST be less than 65536.

rgXti (variable): An array of **Xti** (section 2.5.172). The number of items in the array MUST equal the value of **cXti**.

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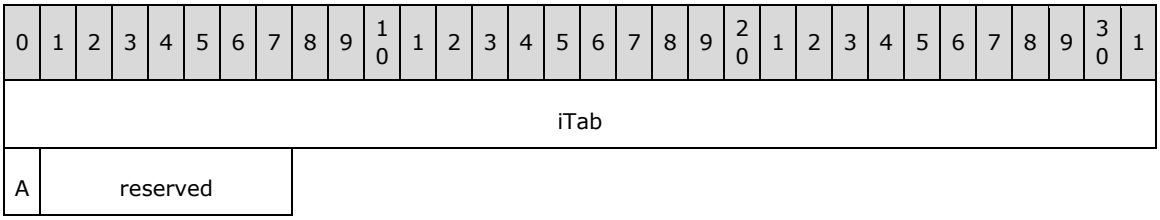
2.4.660 BrtExternTableEnd

The **BrtExternTableEnd** record specifies the end of a collection of records as defined by the **External Link** (section 2.1.7.25) part **ABNF**. The collection of records specifies an External Cell Cache (section 2.2.7.4.1.2).

2.4.661 BrtExternTableStart

The **BrtExternTableStart** record specifies properties of an External Cell Cache (section 2.2.7.4.1.2) and specifies the beginning of a collection of records as defined by the **External Link** (section 2.1.7.25) part **ABNF**. The collection of records specifies an External Cell Cache.



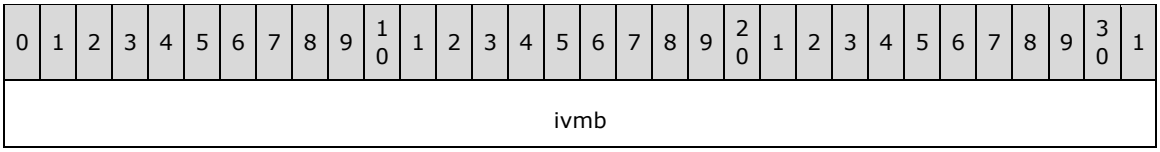
iTab (4 bytes): An unsigned integer that specifies the zero-based index of an item in the **sheetNames** field in the **BrtSupTabs** (section 2.4.799) record in this external link part. The referenced item MUST specify the name of a worksheet or macro sheet in the external workbook (section 2.1.10).

A - fRefreshError (1 bit): A bit that specifies that an error occurred during the last refresh of this External Cell Cache.

reserved (7 bits): The value of this field MUST be 0 and MUST be ignored.

2.4.662 BrtExternValueMeta

The **BrtExternValueMeta** record specifies a reference to a value metadata (section 2.2.4.3) metadata block (section 2.2.4.5) in the **Metadata** part (section 2.1.7.34) **ABNF**.



ivmb (4 bytes): A signed integer that specifies a one-based index of a **BrtMdb** (section 2.4.697) record in the collection of all records directly following the **BrtBeginEsmdb** (section 2.4.73) record whose **fCellMeta** field equals 0x00000000. The referenced **BrtMdb** specifies a value metadata (section 2.2.4.3) metadata block (section 2.2.4.5) that is associated with the **BrtExternCellBlank** (section 2.4.653), **BrtExternCellReal** (section 2.4.656), **BrtExternCellBool** (section 2.4.654), **BrtExternCellError** (section 2.4.655) or **BrtExternCellString** (section 2.4.657) record that follows **BrtExternValueMeta** (section 2.4.662).

2.4.663 BrtFieldListActiveItem

A **BrtFieldListActiveItem** record specifies a top-level object in the hierarchy of objects displayed in the **PivotTable field list**.

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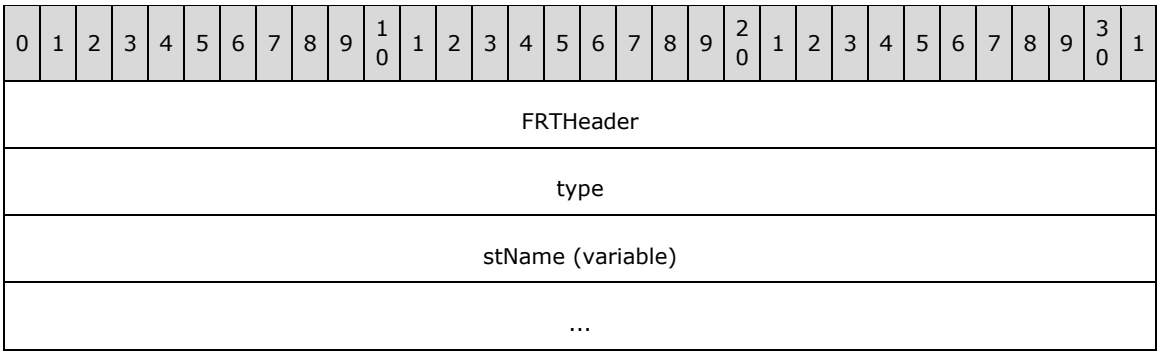


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

type (4 bytes): An unsigned integer which specifies the type of this object. MUST be a value from the following table:

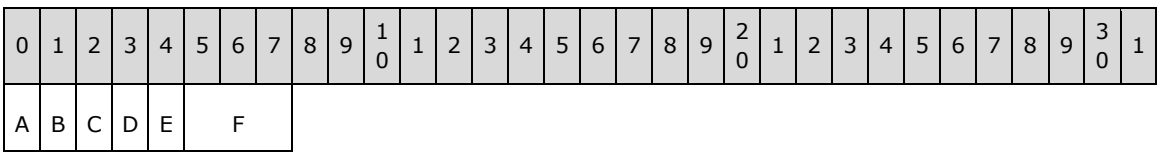
Value	Meaning
0x00000000	This object represents a **spreadsheet data model** (as specified in [MS-XLDM]) table.
0x00000001	This object represents a workbook table.

stName (variable): An **XlWideString** (section 2.5.168) attribute that specifies the following, depending on the value of **type** field:

Value of *type* field	Meaning of *stName* field
0x00000000	**MDX unique name** of the spreadsheet data model table.
0x00000001	Name of the workbook table.

2.4.664 BrtFileRecover

The **BrtFileRecover** record specifies state of **workbook** file.



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A - fDontAutoRecover (1 bit): A bit that specifies whether **AutoRecover** is disabled for the workbook.

B - fSavedDuringRecovery (1 bit): A bit that specifies whether the workbook was saved during the AutoRecover process.

C - fCreatedViaMinimalSave (1 bit): A bit that specifies whether the workbook was created by a **minimal save** during **data recovery**.

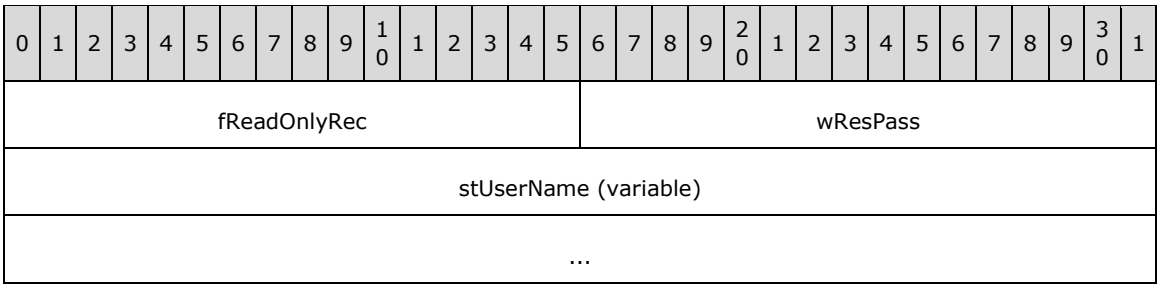
D - fOpenedViaDataRecovery (1 bit): A bit that specifies whether the workbook was opened by means of data recovery.

E - fOpenedViaSafeLoad (1 bit): A bit that specifies whether the workbook was opened in **safe load** mode.

F - reserved (3 bits): The value of this field MUST be 0, and MUST be ignored.

2.4.665 BrtFileSharing

The **BrtFileSharing** record specifies file sharing options.



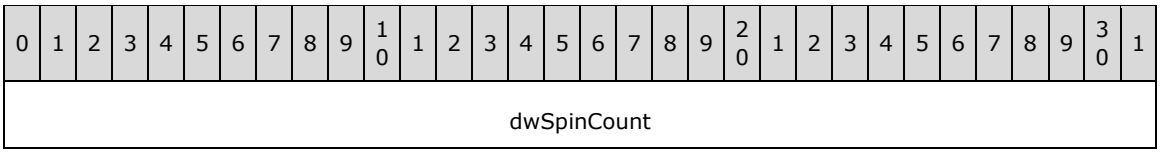
fReadOnlyRec (2 bytes): A **Boolean** (section 2.5.97.3) that specifies whether the **read-only recommended** option is selected for this file. If the value is 1, the read-only recommended option is selected for this file.

wResPass (2 bytes): An unsigned integer that specifies the password verifier value, which has been calculated as specified in the Password Verifier Algorithm (section 2.2.9) overview, for **write reservation**. If the value is 0, there is no write reservation password.

stUserName (variable): A **XLNullableWideString** (section 2.5.166) that specifies the name of the user that added the **write-reservation password**. The length of **stUserName** MUST NOT exceed 54 characters.

2.4.666 BrtFileSharingIso

The **BrtFileSharingIso** record specifies file sharing options in a manner compatible with ISO/IEC 29500 file sharing records as specified in [ISO/IEC29500-1:2016], section 18.2.12. A **BrtFileSharingIso** record MUST be immediately followed by a **BrtFileSharing** (section 2.4.665) record whose **wResPass** field value MUST be set to 0x0000 and whose **fReadOnlyRec** and **stUserName** fields MUST have the same values as the fields of the same names in the **BrtFileSharingIso** record.



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fReadOnlyRec	stUserName (variable)
...	
ipdPasswordData (variable)	
...	

dwSpinCount (4 bytes): An unsigned 32-bit integer that specifies the number of times that the hash function was iterated over the password to generate the **rgbHash** field of **ipdPasswordData**, as described in the Strong Password Verifier Algorithm (section 2.2.10). It MUST NOT be greater than 10,000,000.

fReadOnlyRec (2 bytes): A **Boolean** (section 2.5.97.3) that specifies whether the **read-only recommended** option is selected for this file. If the value is 1, the read-only recommended option is selected for this file. It MUST have the same value as the **fReadOnlyRec** field in the following **BrtFileSharing** record.

stUserName (variable): An **XLNullableWideString** (section 2.5.166) that specifies the name of the user that added the **write reservation** password. The length of **stUserName** MUST NOT exceed 54 characters. It MUST have the same value as the **stUserName** field in the following **BrtFileSharing** record.

ipdPasswordData (variable): An **IsoPasswordData** (section 2.5.79) that specifies the **salt**, hash algorithm and password hash of the write reservation password, calculated using the Strong Password Verifier Algorithm. The size of the **rgbHash** member of this field MUST NOT be zero.

2.4.667 BrtFileVersion

The **BrtFileVersion** record specifies which application and which versions of that application accessed the data contained in the file. When saving, an application can write its name in the **stAppName** field, and the application can use **stLastEdited**, **stLowestEdited** and **stRupBuild** values to track the versions of the application that performed those actions. When opening, application can examine the value of **stAppName** and decide how to interpret the **stLastEdited**, **stLowestEdited**, and **stRupBuild** values.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
guidCodeName (16 bytes)																															
...																															
...																															
stAppName (variable)																															
...																															
stLastEdited (variable)																															
...																															

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stLowestEdited (variable)
...
stRupBuild (variable)
...

guidCodeName (16 bytes): A **GUID** as specified by [MS-DTYP] section 2.3.4 that specifies the **type library** of the application that wrote the **Visual Basic for Applications (VBA)** project in the file. The value SHOULD<35> be 0x0.

stAppName (variable): An **XLWideString** (section 2.5.168) that specifies the application name. Other applications SHOULD NOT<36> use value "xl". The string length MUST be less than or equal to 65535 characters.

stLastEdited (variable): An **XLWideString** that specifies the version of the application that last saved the file. The string length MUST be less than or equal to 65535 characters.

stLowestEdited (variable): An **XLWideString** that specifies the earliest version of the application that saved the file. The string length MUST be less than or equal to 65535 characters.

stRupBuild (variable): An **XLWideString** that specifies the **build number** of the application. The string length MUST be less than or equal to 65535 characters.

2.4.668 BrtFill

The **BrtFill** record specifies an individual **cell fill pattern**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
fls																															
brtColorFore																															
...																															
brtColorBack																															
...																															
iGradientType																															
xnumDegree																															
...																															
xnumFillToLeft																															
...																															

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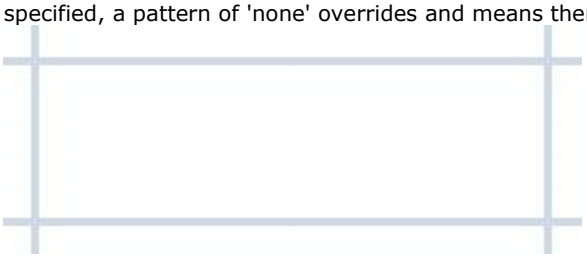
xnumFillToRight
...
xnumFillToTop
...
xnumFillToBottom
...
cNumStop
xfillGradientStop (variable)
...

fls (4 bytes): An unsigned integer that specifies the type of fill pattern. If **fls** is NOT 0x00000028, the **iGradientType**, **xnumDegree**, **xnumFillToLeft**, **xnumFillToRight**, **xnumFillToTop**, **xnumFillToBottom**, and **cNumStop** field values MUST be 0 and MUST be ignored. If The value of **fls** field is 0x00000028, the **brtColorFore** and **brtColorBack** fields are undefined and MUST be ignored. MUST be a value from the following table:

Value	Meaning
0x00000000	The fill pattern is none (no fill). When **brtColorFore** or **brtColorBack** is specified, a pattern of 'none' overrides and means there is no fill. 
0x00000001	The fill pattern is solid. When solid is specified, **brtColorFore** is the only color rendered, even when **brtColorBack** is also specified.
0x00000002	The fill pattern is medium gray.

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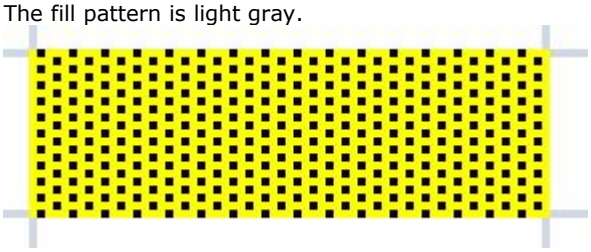
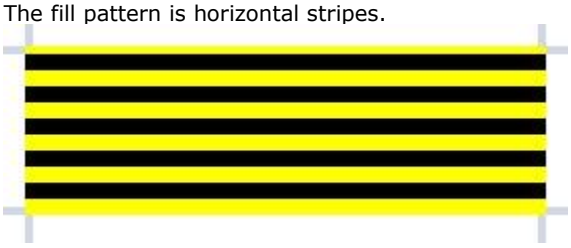
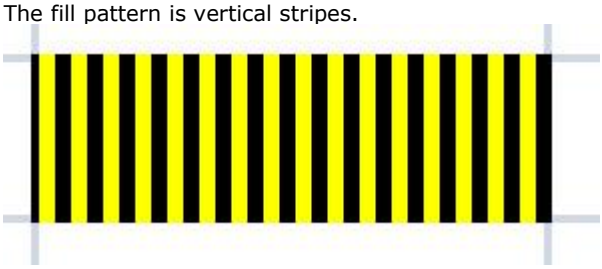
Value	Meaning
0x00000003	The fill pattern is dark gray.
0x00000004	The fill pattern is light gray. 
0x00000005	The fill pattern is horizontal stripes. 
0x00000006	The fill pattern is vertical stripes. 
0x00000007	The fill pattern is downward diagonal stripes.

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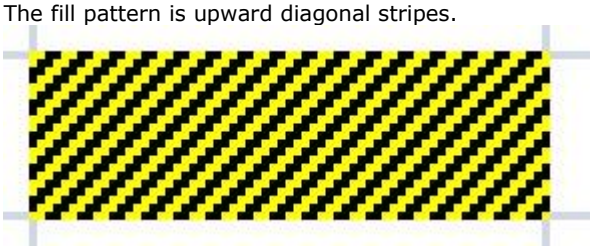
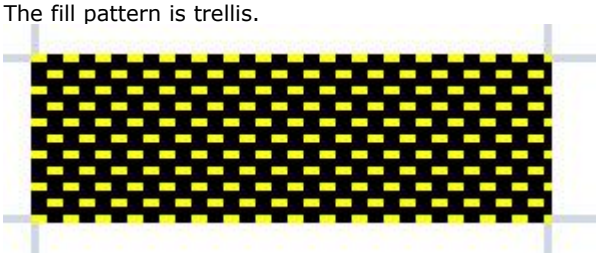
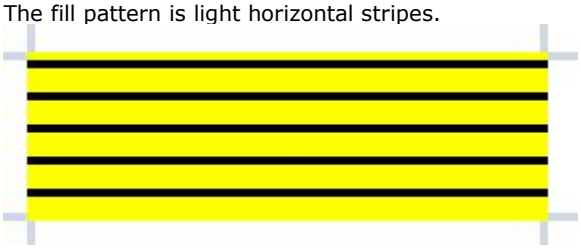
Value	Meaning
00000x0008	The fill pattern is upward diagonal stripes. 
0x00000009	The fill pattern is grid.
0x0000000A	The fill pattern is trellis. 
0x0000000B	The fill pattern is light horizontal stripes. 
0x0000000C	The fill pattern is light vertical stripes.

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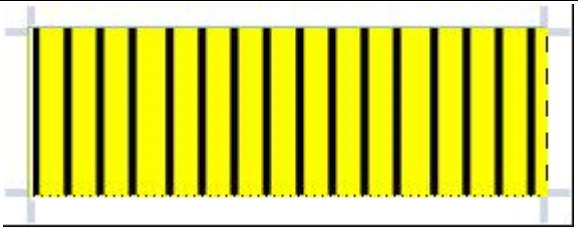
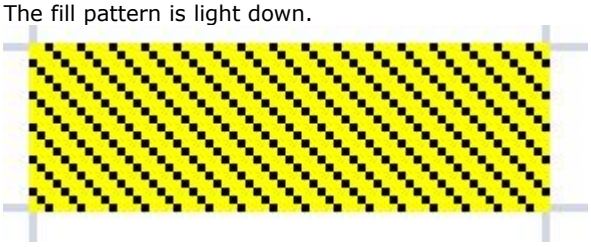
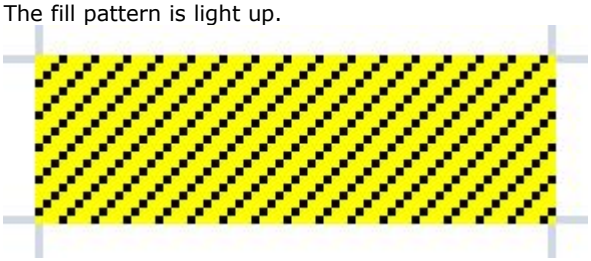
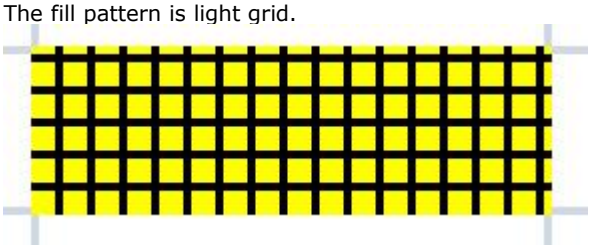
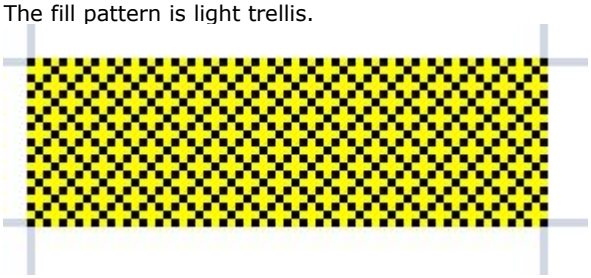
Value	Meaning
	
0x0000000D	The fill pattern is light down. 
0x0000000E	The fill pattern is light up. 
0x0000000F	The fill pattern is light grid. 
0x00000010	The fill pattern is light trellis. 
0x00000011	The fill pattern is grayscale of 0.125 (1/8) value.

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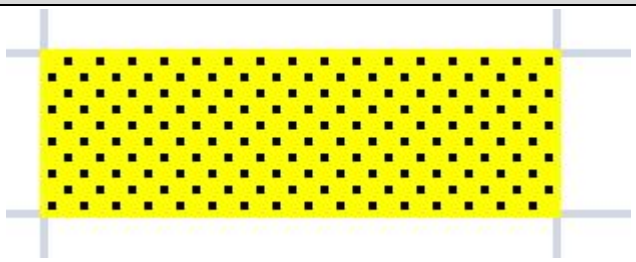
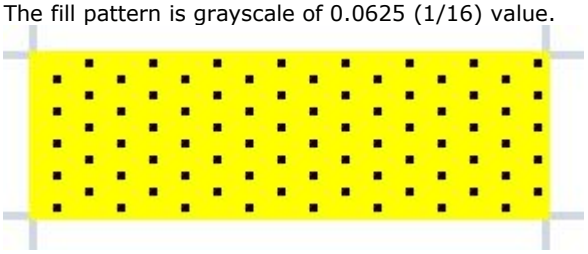
Value	Meaning
	
0x00000012	The fill pattern is grayscale of 0.0625 (1/16) value. 
0x00000028	The fill pattern is a gradient fill.

brtColorFore (8 bytes): A **BrtColor** (section 2.4.332) that specifies the foreground color for this cell.

brtColorBack (8 bytes): A **BrtColor** that specifies the **background color** for this cell.

iGradientType (4 bytes): An unsigned integer that specifies the type of **gradient fill** used. The value of this field MUST be of the values from the following table:

Value	Meaning
0x00000000	**Linear gradient**
0x00000001	**Rectangular gradient**

xnumDegree (8 bytes): An **Xnum** (section 2.5.171) that specifies the gradient angle in degrees for linear gradient. The gradient angle specifies the angle at which the gradient strokes are drawn.

For example, a value of 90 for **xnumDegree** means that the gradient color starts from the bottom of the cell.

Gradient angle example

MUST be used when **iGradientType** is Linear gradient.

xnumFillToLeft (8 bytes): An **Xnum** that specifies, as a fraction of the length of the cell, the left edge of the **inner rectangle** of a rectangular gradient. For example, a value of 0 for **xnumFillToLeft** means the left edge of the inner rectangle is the left edge of the cell, and 1 means its right edge of the cell. MUST exist when **iGradientType** is Rectangular gradient. The value of this field MUST be greater than or equal to 0 and less than or equal to 1.

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xnumFillToRight (8 bytes): An **Xnum** that specifies, as a fraction of the length of the cell, the right edge of the inner rectangle of a rectangular gradient. For example, a value of 0 for **xnumFillToRight** means the right edge of the inner rectangle is on the left edge of the cell, and 1 means it is on the right edge of the cell. MUST exist when **iGradientType** is Rectangular gradient. The value of this field MUST be greater than or equal to 0 and less than or equal to 1.

xnumFillToTop (8 bytes): An **Xnum** that specifies, as a fraction of the height of the cell, the top edge of the inner rectangle of a rectangular gradient. For example, a value of 0 for **xnumFillToTop** means the top edge of the inner rectangle is on the top edge of the cell, and 1 means it is on the bottom edge of the cell. MUST exist when **iGradientType** is Rectangular gradient. The value of this field MUST be greater than or equal to 0 and less than or equal to 1.

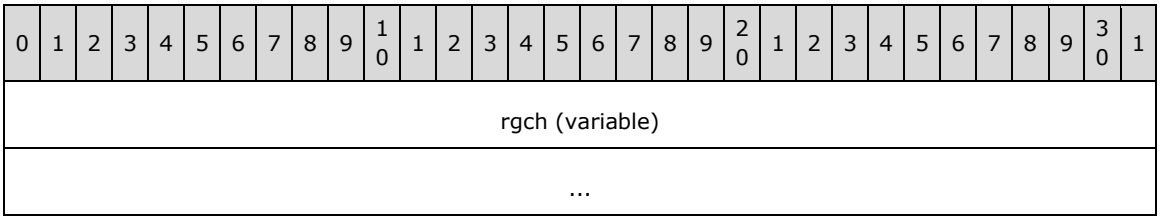
xnumFillToBottom (8 bytes): An **Xnum** that specifies, as a fraction of the height of the cell, the bottom edge of the inner rectangle of a rectangular gradient. For example, a value of 0 for **xnumFillToBottom**, means the bottom edge of the inner rectangle is on the bottom edge of the cell, and 1 means it is on the top edge of the cell. MUST exist when **iGradientType** is Rectangular gradient. The value of this field MUST be greater than or equal to 0 and less than or equal to 1.

cNumStop (4 bytes): An unsigned integer that specifies the number of elements in **xfillGradientStop**. The value of this field MUST be greater than or equal to 0 and less than or equal to 256.

xfillGradientStop (variable): An array of **GradientStop** (section 2.5.67). The number of elements MUST be equal to **cNumStop**.

2.4.669 BrtFilter

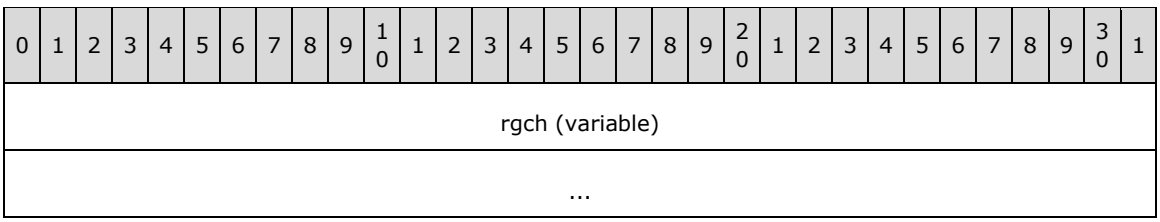
The **BrtFilter** record specifies a **filter**.



rgch (variable): An **XLWideString** (section 2.5.168) that specifies the criteria string used in the filter. Cells that contain a string that matches this string criteria case insensitively, and cells that contain a calculation such that the resulting value expressed as a string matches this string criteria case insensitively will have their corresponding **rows** shown. The value of this field this field MUST be greater than or equal to 1 character in length and less than or equal to 255 characters in length.

2.4.670 BrtFilter14

The **BrtFilter14** record specifies a **filter**.



rgch (variable): An **XLWideString** (section 2.5.168) that specifies the criteria string used in the filter. Cells that contain a string that matches this string criteria case insensitively, and cells that

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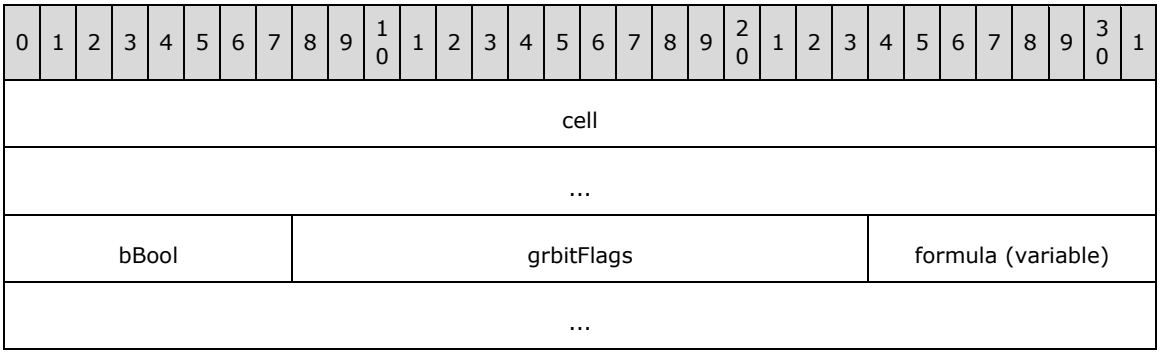
contain a calculation such that the resulting value expressed as a string matches this string criteria case insensitively will have their corresponding **rows** shown. The value of this field MUST be greater than or equal to 1 character in length and less than or equal to 32767 characters in length.

2.4.671 BrtFmlaBool

The **BrtFmlaBool** record specifies a **cell** that contains a formula (section 2.2.2) of which the most recent evaluation resulted in a Boolean value.



cell (8 bytes): A **Cell** (section 2.5.9) that specifies the cell that contains this formula.

bBool (1 byte): A **Boolean** value to which the formula is evaluated.

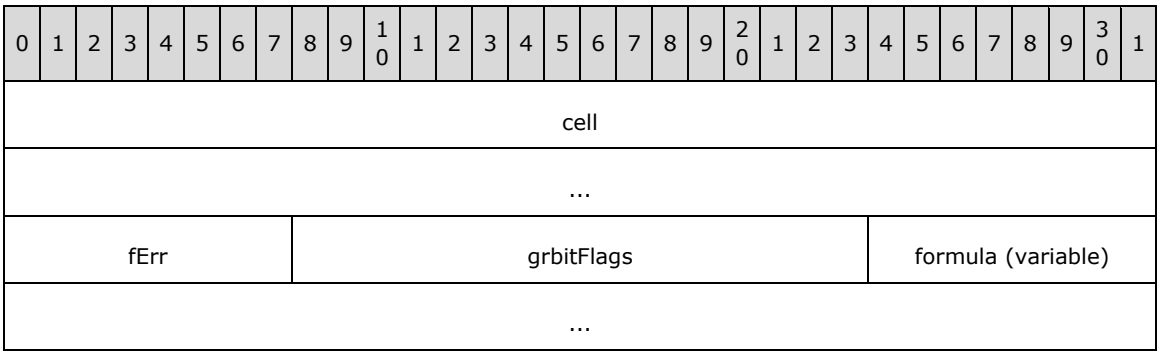
Value	Meaning
0x00	False
0x01	True

grbitFlags (2 bytes): A **GrbitFmla** (section 2.5.69) that specifies additional formula data.

formula (variable): A **CellParsedFormula** (section 2.5.97.4) that specifies the formula stored in this cell.

2.4.672 BrtFmlaError

The **BrtFmlaError** record specifies a **cell** that contains a formula (section 2.2.2) of which the most recent evaluation resulted in an error.



cell (8 bytes): A **Cell** (section 2.5.9) that specifies the cell that contains this formula.

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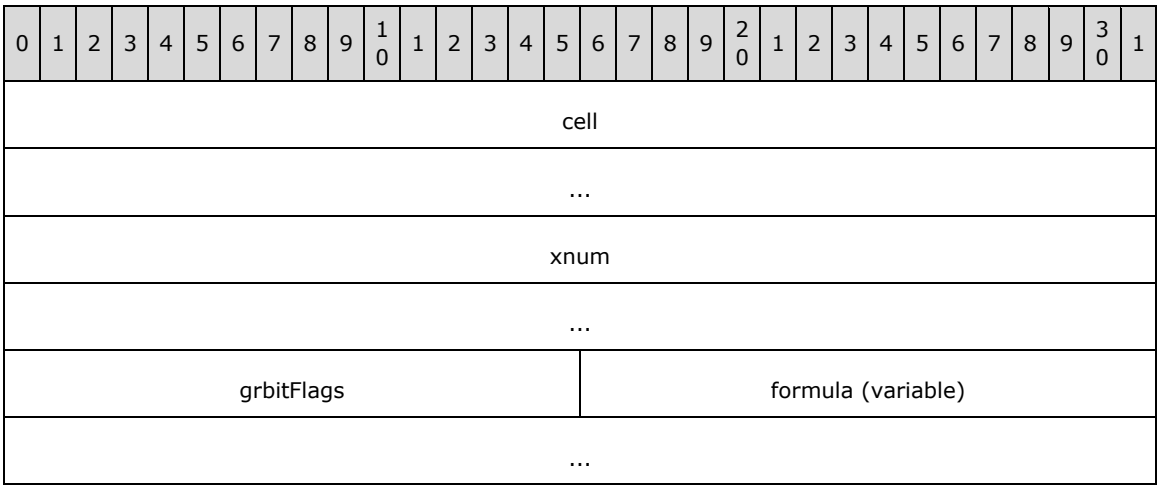
fErr (1 byte): A **BErr** (section 2.5.97.2) that specifies the error in this formula.

grbitFlags (2 bytes): A **GrbitFmla** (section 2.5.69) that specifies additional formula data.

formula (variable): A **CellParsedFormula** (section 2.5.97.4) that specifies the formula stored in this cell

2.4.673 BrtFmlaNum

The **BrtFmlaNum** record specifies a **cell** that contains a formula (section 2.2.2) of which the most recent evaluation resulted in a numeric value.



cell (8 bytes): A **Cell** (section 2.5.9) that specifies the cell that contains this formula.

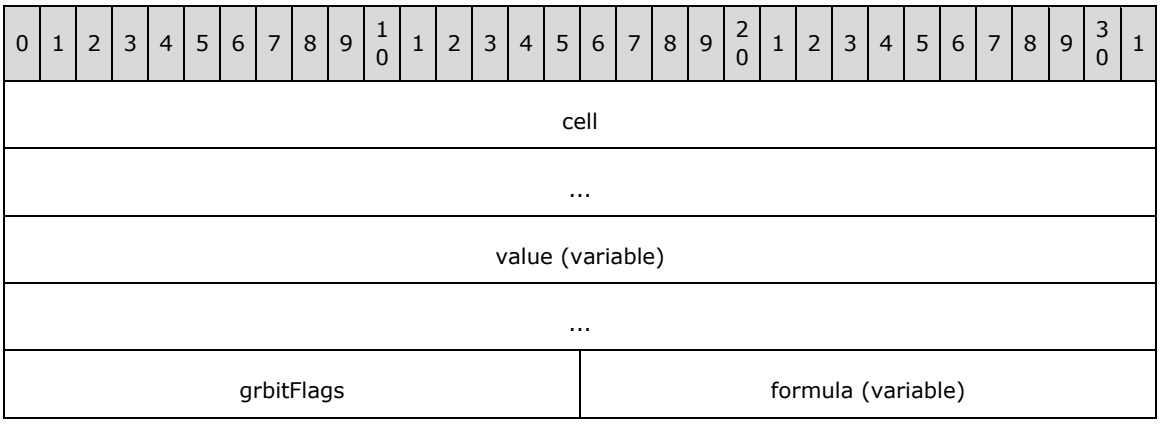
xnum (8 bytes): An **Xnum** (section 2.5.171) that specifies the value to which this formula evaluated.

grbitFlags (2 bytes): A **GrbitFmla** (section 2.5.69) that specifies additional formula data.

formula (variable): A **CellParsedFormula** (section 2.5.97.4) that specifies the formula stored in this cell

2.4.674 BrtFmlaString

The **BrtFmlaString** record specifies a **cell** that contains a formula (section 2.2.2) of which the most recent evaluation resulted in a string value.



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...

cell (8 bytes): A **Cell** (section 2.5.9) that specifies cell information such as the **column (1)**, style, and **phonetic information**.

value (variable): An **XLWideString** (section 2.5.168) that specifies the value to which this formula evaluated. The value of this field MUST be less than 32768 characters.

grbitFlags (2 bytes): A **GrbitFmla** (section 2.5.69) that specifies additional formula data.

formula (variable): A **CellParsedFormula** (section 2.5.97.4) that specifies the formula stored in this cell

2.4.675 BrtFmt

The **BrtFmt** record<37> specifies a **number format**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ifmt																stFmtCode (variable)															
...																															

ifmt (2 bytes): An **Ifmt** (section 2.5.76) that specifies the identifier of the **format string** specified by **stFmtCode**. The value of this field MUST be within one of the following ranges.

- 5 to 8
- 23 to 26
- 41 to 44
- 63 to 66
- 164 to 382

stFmtCode (variable): An **XLWideString** (section 2.5.168) that specifies the format string for this number format. The format string indicates how to format the numeric value of the **cell**. The length of this field MUST be greater than or equal to 1 character and less than or equal to 255 characters. For more information about how format strings are interpreted, see [ISO/IEC29500-1:2016], section 18.8.31. The **ABNF** grammar for the format string is specified in [MS-XLS] section 2.4.126. If this **BrtFmt** record is between a **BrtACBegin** (section 2.4.2) record which has **RgACVer** (section 2.4.2) that contains at least one **ACProductVersion** (section 2.5.1) greater than 0x1000, and a **BrtACEnd** (section 2.4.3) record, **stFmtCode** can also contain a format string as defined in [MS-XLSX] section 2.5.4.

2.4.676 BrtFnGroup

The **BrtFnGroup** record specifies an individual **function category**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
stGroup (variable)																															

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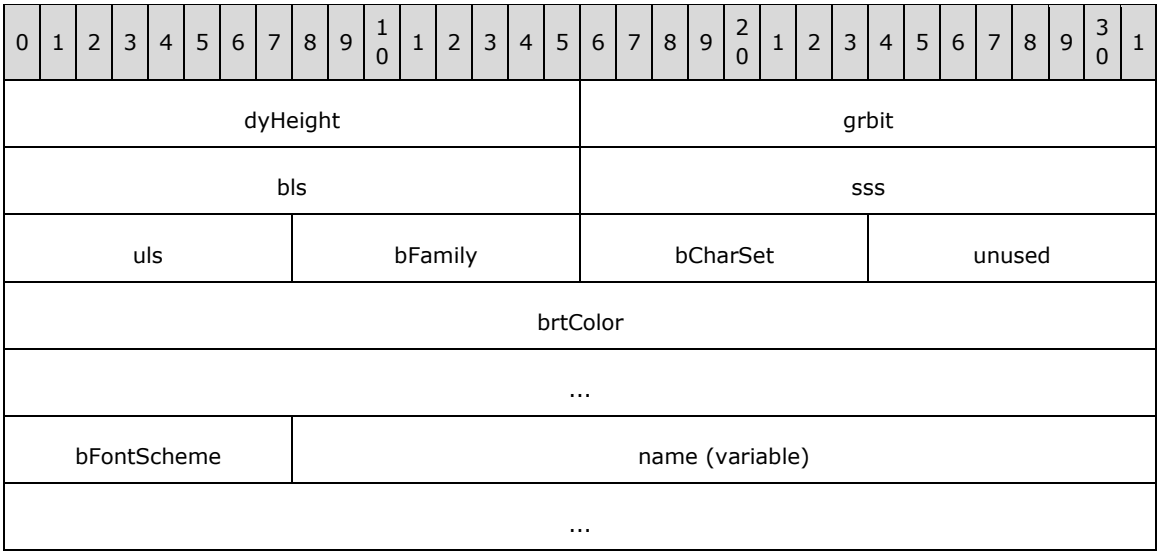
...

stGroup (variable): An **XLWideString** (section 2.5.168) that specifies the name of the function category. Its length MUST be less than or equal to 32 characters.

2.4.677 BrtFont

The **BrtFont** record specifies the properties of one of the fonts used in the **workbook**.



dyHeight (2 bytes): An unsigned integer that specifies height of the **font** in **twips**. The value of this field MUST be greater than or equal to 0x0014 and less than or equal to 0x1FFF.

grbit (2 bytes): A **FontFlags** (section 2.5.52) that specifies the font attributes.

bls (2 bytes): An unsigned integer that specifies the weight of the font. The value of this field MUST be greater than or equal to 0x0190 and less than or equal to 0x03E8. The values are 0x0190 for normal text and 0x02BC for bold text.

sss (2 bytes): An unsigned integer that specifies whether the font is a subscript or a superscript font. The value of this field MUST be one of the values from the following table:

Value	Meaning
0x0000	None
0x0001	Superscript
0x0002	Subscript

uls (1 byte): An unsigned integer that specifies the type of underline to be used. The value of this field MUST be one of the values from the following table:

Value	Meaning
0x00	None
0x01	Single

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Value	Meaning
0x02	Double
0x21	**Single accounting**
0x22	**Double accounting**

bFamily (1 byte): An unsigned integer that specifies the **font family** to which this font belongs. The value of this field MUST be one of the values from the following table:

Value	Meaning
0x00	Not applicable
0x01	Roman
0x02	Swiss
0x03	Modern
0x04	Script
0x05	Decorative

For more information about font family, see the Windows API LOGFONT structure in [MSDN-FONTS].

bCharSet (1 byte): An unsigned integer that specifies the **character set**. The value of this field MUST be one of the values from the following table:

Value	Name	Meaning
0x00	ANSI_CHARSET	English
0x01	DEFAULT_CHARSET	System locale based
0x02	SYMBOL_CHARSET	Symbol
0x4D	MAC_CHARSET	Macintosh
0x80	SHIFTJIS_CHARSET	Japanese
0x81	HANGUL_CHARSET / HANGEUL_CHARSET	Hangul (Hangeul) Korean
0x82	JOHAB_CHARSET	Johab Korean
0x86	GB2312_CHARSET	Simplified Chinese
0x88	CHINESEBIG5_CHARSET	Traditional Chinese
0xA1	GREEK_CHARSET	Greek
0xA2	TURKISH_CHARSET	Turkish
0xA3	VIETNAMESE_CHARSET	Vietnamese
0xB1	HEBREW_CHARSET	Hebrew
0xB2	ARABIC_CHARSET	Arabic
0xBA	BALTIC_CHARSET	Baltic
0xCC	RUSSIAN_CHARSET	Russian
0xDE	THAI_CHARSET	Thai
0xEE	EASTEUROPE_CHARSET	Eastern European

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Value	Name	Meaning
0xFF	OEM_CHARSET	OEM code page (based on system locale)

For more information about character set, see the Windows API LOGFONT structure in [MSDN-FONTS].

unused (1 byte): Undefined and MUST be ignored.

brtColor (8 bytes): A **BrtColor** (section 2.4.332) that specifies the color of this font.

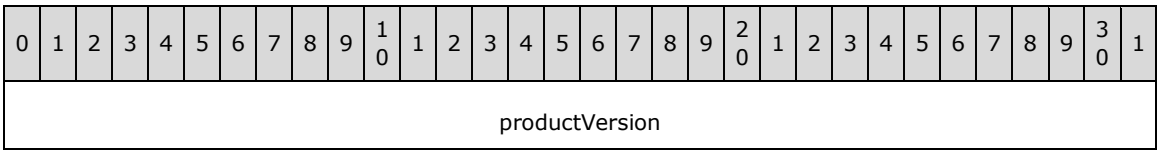
bFontScheme (1 byte): An unsigned integer that specifies the **font scheme** to which this font belongs. When a font is part of a theme as specified in [ISO/IEC29500-1:2016], section 14.2.7, the font is categorized as a **major scheme** or a **minor scheme**. When a new theme is chosen, every font that is part of the theme is updated to use the major scheme or the minor scheme. The value of this field MUST be one of the values from the following table:

Value	Meaning
0x00	None
0x01	Major font scheme
0x02	Minor font scheme

name (variable): An **XLWideString** (section 2.5.168) that specifies the name of the font. The length of this field MUST be greater than or equal to 1 and less than or equal to 31.

2.4.678 BrtFRTBegin

The **BrtFRTBegin** record specifies the beginning of a collection of Future Records (section 2.1.6).



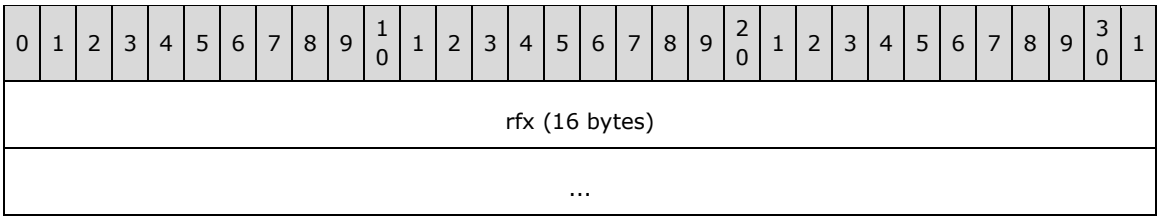
productVersion (4 bytes): An **FRTProductVersion** (section 2.5.61) that specifies the application which created the future records (section 2.1.6).

2.4.679 BrtFRTEnd

The **BrtFRTEnd** record specifies the end of a collection of future records (section 2.1.6).

2.4.680 BrtHLink

The **BrtHLink** record specifies a **hyperlink** that applies to a **range** of **cells**.



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...
relId (variable)
...
location (variable)
...
tooltip (variable)
...
display (variable)
...

rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the range in the **sheet** that contains this hyperlink.

relId (variable): A **RelID** (section 2.5.114) that specifies the destination URL of this hyperlink. The value of this field MUST be an empty string if and only if the destination is this **workbook**. MUST NOT be a NULL string.

location (variable): An **XLWideString** (section 2.5.168) that specifies the **fragment identifier** of the destination URL specified by **relId**. If **relId** is an empty string, this fragment identifier specifies a location within this workbook. The value of this field MUST be less than 2084 characters.

tooltip (variable): An **XLWideString** that specifies the **ToolTip** for the hyperlink. The value of this field MUST be less than 256 characters.

display (variable): An **XLWideString** (section 2.5.168) that specifies the name of the run-time object that implements this hyperlink.

2.4.681 BrtIconFilter

The **BrtIconFilter** record specifies the **icon set** and particular **icon** within that set to **filter** by. **Rows** with a **cell** icon that do not match these criteria will be hidden when the filter is applied.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iIconSet																															
iIcon																															

iIconSet (4 bytes): A **KPISets** (section 2.5.85) that specifies the icon set used as the filter criteria.

iIcon (4 bytes): An Icon (section 2.5.74) that specifies the icon to be used as filter criteria. If the **iIconSet** field value is "KPINIL", then the value of the **iIcon** field value MUST be -1. If the **iIconSet** field value is "KPINIL", then this record does not specify a filter and MUST be ignored. If **iIconSet** is not KPINIL, then this value MUST be greater than or equal to 0. If the icon set

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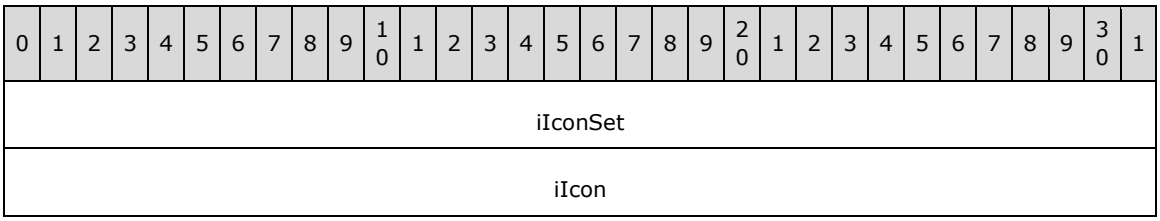
specified by **iIconSet** has 3 icons, this value MUST be less than or equal to 2. If the icon set specified by **iIconSet** has 4 icons, this value MUST be less than or equal to 3. If the icon set specified by **iIconSet** has 5 icons, this value MUST be less than or equal to 4.

2.4.682 BrtIconFilter14

The **BrtIconFilter14** record specifies the **icon set** and particular **icon** within that set to **filter** by. **Rows** with a **cell** icon that do not match these criteria will be hidden when the filter is applied. This record is equivalent to **BrtIconFilter** (section 2.4.681) but allows specification of additional values for the **iIconSet** field.

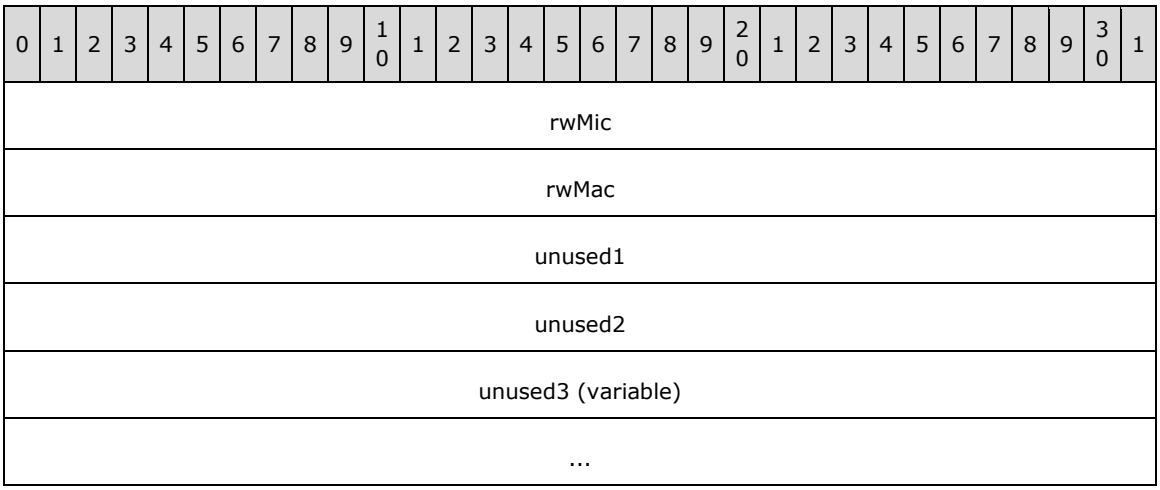


iIconSet (4 bytes): A **KPISets14** (section 2.5.86) that specifies the icon set used as the filter criteria. The value of this field MUST NOT equal KPINIL_14.

iIcon (4 bytes): An Icon (section 2.5.74) that specifies the icon to be used as filter criteria. This value MUST be greater than or equal to 0. If the icon set specified by **iIconSet** has 3 icons, this value MUST be less than or equal to 2. If the icon set specified by **iIconSet** has 4 icons, this value MUST be less than or equal to 3. If the icon set specified by **iIconSet** has 5 icons, this value MUST be less than or equal to 4.

2.4.683 BrtIndexBlock

The **BrtIndexBlock** record specifies the minimum and maximum **rows** in a **range** within a **sheet**.



rwMic (4 bytes): An **UncheckedRw** (section 2.5.154) that specifies a zero-based starting row for the range.

rwMac (4 bytes): An unsigned integer that specifies a one-based ending row for the range. The value of this field MUST be less than or equal to the value of the **rwMic** field + 32. The value of the **rwMac** field MUST be less than or equal to 1048576.

unused1 (4 bytes): Undefined and MUST be ignored.

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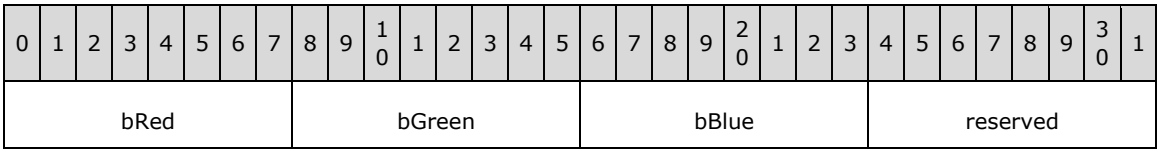
unused2 (4 bytes): Undefined and MUST be ignored.

unused3 (variable): Undefined and MUST be ignored. The size of this field in bytes MUST be equal to the value as specified in the following formula:

((**rwMac** – **rwMic** + 32) / 32) * 4

2.4.684 BrtIndexedColor

The **BrtIndexedColor** record specifies an indexed color definition in **red-green-blue (RGB)**.



bRed (1 byte): An unsigned integer that specifies the intensity of the color red.

bGreen (1 byte): An unsigned integer that specifies the intensity of the color green.

bBlue (1 byte): An unsigned integer that specifies the intensity of the color blue.

reserved (1 byte): Undefined and MUST be ignored.

2.4.685 BrtIndexPartEnd

The **BrtIndexPartEnd** record specifies the end of a collection of **BrtIndexBlock** (section 2.4.683) and **BrtIndexRowBlock** (section 2.4.686) records.

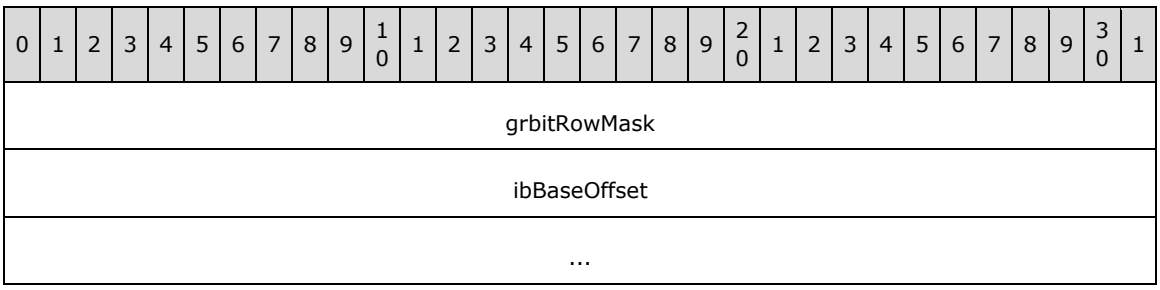
2.4.686 BrtIndexRowBlock

The **BrtIndexRowBlock** record specifies the **cells** that contain data within the **range** specified by a preceding **BrtIndexBlock** (section 2.4.683) record. This **BrtIndexRowBlock** record provides byte indexes into the **Worksheet** part **ABNF** (section 2.1.7.62) or **Macro Sheet** (section 2.1.7.32) part for certain cell records that contain data and are within the range corresponding to the preceding **BrtIndexBlock**.

The range specified by the **BrtIndexBlock** is referred to as the block range.

Cell records are records of type **BrtCellBlank** (section 2.4.314), **BrtCellRk** (section 2.4.322), **BrtCellError** (section 2.4.316), **BrtCellBool** (section 2.4.315), **BrtCellReal** (section 2.4.321), **BrtCellSt** (section 2.4.325), **BrtCellIsst** (section 2.4.319), **BrtFmlaString** (section 2.4.674), **BrtFmlaNum** (section 2.4.673), **BrtFmlaBool** (section 2.4.671), **BrtFmlaError** (section 2.4.672), or **BrtCellRString** (section 2.4.323).

This record MUST follow a **BrtIndexBlock** record which specifies the **rows** which the block range spans.



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arrayColbitMask (variable)
...
arraySubBaseOffset (variable)
...

grbitRowMask (4 bytes): An unsigned integer that specifies which rows in the block range contain data. If a row contains data, the bit in **grbitRowMask** corresponding to the one-based row index is set to 1. For example **grbitRowMask** with value 0x00000003 corresponds to a block range where the first and second rows contain data.

ibBaseOffset (8 bytes): An unsigned integer that specifies a 64-bit zero-based index to the cell record within the **Worksheet** part ABNF (section 2.1.7.62) or **Macro Sheet** (section 2.1.7.32) part for the first cell in the block range which contains data.

arrayColbitMask (variable): An array of 2-byte unsigned integers that specify for every row which ranges of **columns (1)** contain data in the **sheet**. Each item in this array corresponds to a row that contains data. The number of items in this array MUST equal the number of bits that are set in **grbitRowMask**. The sheet is divided into 16 equal ranges of columns (1). Each column (1) range is one row by 1024 columns (1) in size. For every row which has a bit set in **grbitRowMask**, the bit corresponding to the one-based index to the column (1) range that contains data in at least one of the cells is set in the corresponding item of **arrayColbitMask**. For example, if **arrayColbitMask**[0] has the value 0x0002, then at least one cell in the first row and the second column (1) range has data.

arraySubBaseOffset (variable): An array of 4-byte unsigned integers, each of which specifies the zero-based byte index to the beginning of a cell record within the **Worksheet** part ABNF (section 2.1.7.62) or **Macro Sheet** (section 2.1.7.32) part, for all cells that contain data within the block range when used in the following formula:

ibBaseOffset + **arraySubBaseOffset**[x]

where x is the index of an item in the **arraySubBaseOffset** array.

The number of elements in **arraySubBaseOffset** MUST be equal to the total number of bits set in **arrayColbitMask.**

For example, if **arrayColbitMask**[0] has the value 0x0002, then **ibBaseOffset + arraySubBaseOffset**[0] specifies the byte index to the first cell which contains data in the first row of the block range and is in the second column (1) range.

2.4.687 BrtInfo

The **BrtInfo** record specifies properties of **workbook** revisions and specifies the beginning of a collection of **BrtRRHeader** (section 2.4.756) records as defined by the **Revision Headers** (section 2.1.7.43) part **ABNF**. The collection of **BrtRRHeader** records specifies the list of revision headers in a shared workbook (section 2.2.12).

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	reserved												guid (16 bytes)															

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...				
...				
...	guidRoot (16 bytes)			
...				
...				
...	revid			
...	version			
...	E	F	unused4	
wRevHistInterval				

A - unused1 (1 bit): The value of this field MUST be 1 and MUST be ignored.

B - fDiskHasRev (1 bit): A bit that specifies whether this workbook contains revisions.

C - unused2 (1 bit): The value of this field MUST be 1 and MUST be ignored.

D - unused3 (1 bit): The value of this field MUST be 1 and MUST be ignored.

reserved (12 bits): The value of this field MUST be 0 and MUST be ignored.

guid (16 bytes): A **GUID** as specified by [MS-DTYP] section 2.3.4 that specifies the last set of revisions. The value of this field MUST match the GUID for the most recent header.

guidRoot (16 bytes): A GUID as specified by [MS-DTYP] section 2.3.4 that specifies the last set of revisions that was saved to the file. The value of this field MUST match the GUID for one of the revision headers.

revid (4 bytes): An unsigned integer that specifies the current revision number of this shared workbook (section 2.2.12).

version (4 bytes): A signed integer that specifies the current version of this shared workbook (section 2.2.12). The value of this field MUST be greater than or equal to 1.

E - fNoRevHist (1 bit): A bit that specifies whether the **revision history** is kept for this shared workbook (section 2.2.12). If **fNoRevHist** equals 1, the history is not kept.

F - fProtRev (1 bit): A bit that specifies whether the change tracking in this shared workbook (section 2.2.12) can be removed. If **fProtRev** is 1, the tracking cannot be removed.

unused4 (14 bits): Undefined and MUST be ignored.

wRevHistInterval (2 bytes): An unsigned integer that specifies the number of days the change history is kept for this shared workbook (section 2.2.12). The value of this field MUST be greater than or equal to 0 and less than or equal to 32767. A value of 0 is means the default value of 30 days is used, and it is valid only when **fNoRevHist** is 1.

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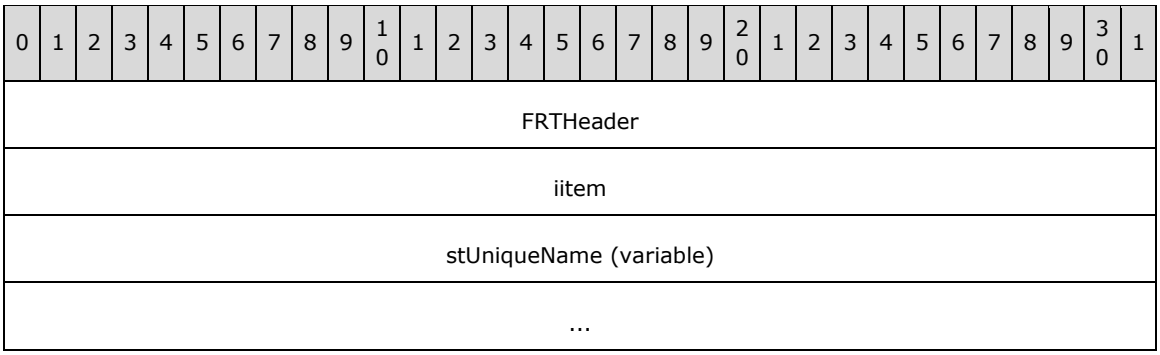
2.4.688 BrtItemUniqueName

The **BrtItemUniqueName** record specifies the **MDX unique name** for cache item.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

iitem (4 bytes): An unsigned integer that specifies a zero-based index of the cache item, in the collection of cache items specified by the **BrtBeginPCDFAtbl** (section 2.4.130) record in this cache field (section 2.2.5.2.2). MUST be unique within collection specified by the **BrtBeginItemUniqueNames** (section 2.4.98) record of this cache field (section 2.2.5.2.2).

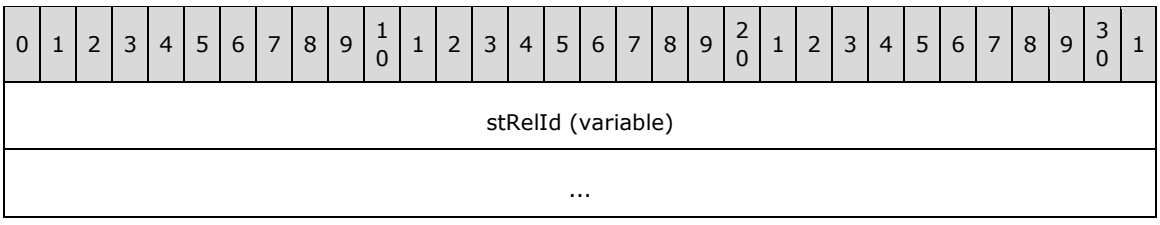
stUniqueName (variable): An **XLWideString** that specifies the MDX unique name.

2.4.689 BrtKnownFonts

The **BrtKnownFonts** record specifies that typographical descent information is stored in the **workbook**. This record MUST be present if and only if a **BrtRwDescent** (section 2.4.765) record is stored for every non-empty **row** in all **Macro Sheet** (section 2.1.7.32) and **Worksheet** parts (section 2.1.7.62) (see section 2.2.1 for more information) in the workbook, and if and only if a **BrtWsFmtInfoEx14** (section 2.4.843) record is stored in all **Macro Sheet** and **Worksheet** parts in the workbook.

2.4.690 BrtLegacyDrawing

The **BrtLegacyDrawing** record specifies a link to a VML Drawing Part as specified in [ISO/IEC29500-1:2016], section 18.1 that specifies a drawing for a **sheet**.



stRelId (variable): A **RelID** (section 2.5.114) that specifies the link to the VML Drawing Part.

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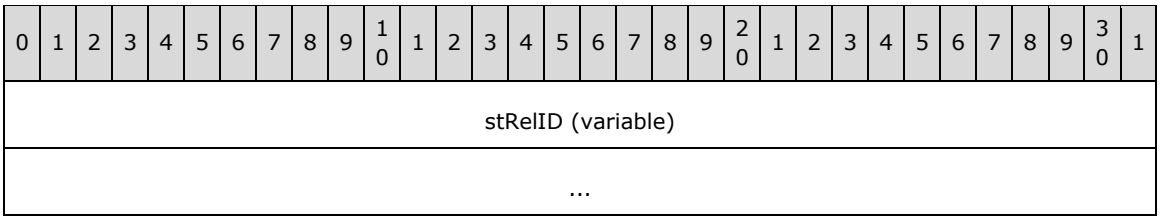
2.4.691 BrtLegacyDrawingHF

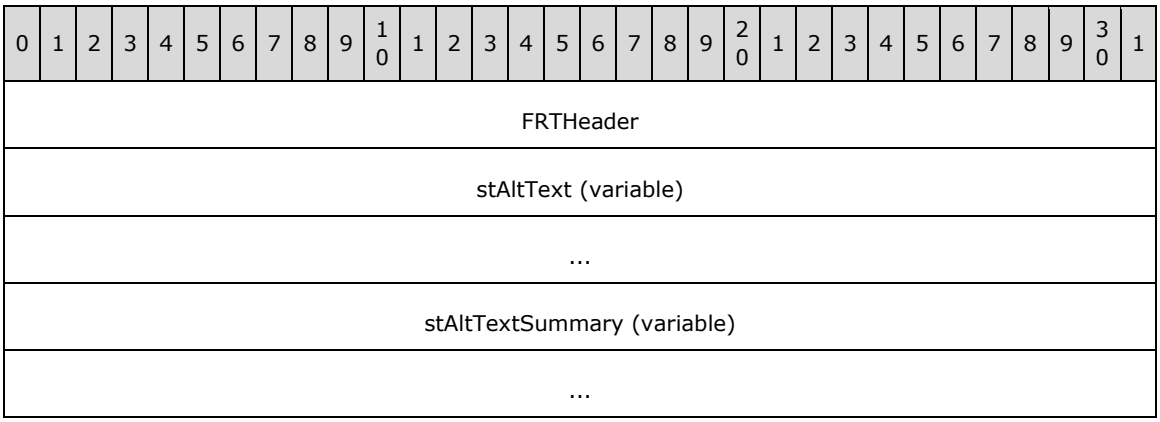
The **BrtLegacyDrawingHF** record specifies a link to a VML Drawing Part as specified in [ISO/IEC29500-1:2016], section 18.1 that specifies a drawing for the header or footer of a **sheet**.



stRelID (variable): A **RelID** (section 2.5.114) that specifies the link to the VML Drawing Part.

2.4.692 BrtList14

The **BrtList14** record specifies information about the alternate text of a **table**.



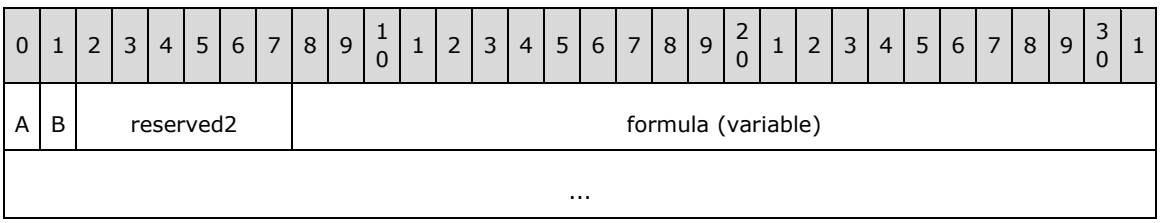
FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

stAltText (variable): An **XLNullableWideString** (section 2.5.166) that specifies the alternate text. This string MUST be less than or equal to 25000 characters in length.

stAltTextSummary (variable): An **XLNullableWideString** that specifies the alternate text summary. This string MUST be less than or equal to 50000 characters in length.

2.4.693 BrtListCCFmla

The **BrtListCCFmla** record specifies information about the **calculated column** formula (section 2.2.2) of a **table column (1)**.



A - reserved1 (1 bit): This value MUST be 0 and MUST be ignored.

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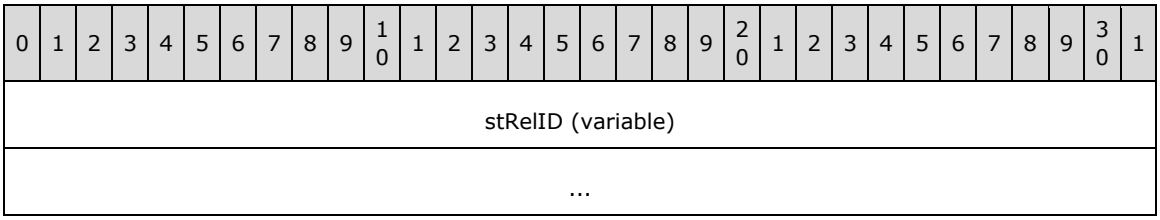
B - fArray (1 bit): A bit that specifies whether this is an array formula.

reserved2 (6 bits): This value MUST be 0 and MUST be ignored.

formula (variable): A **ListParsedFormula** (section 2.5.97.11) that specifies the formula associated with the table column (1).

2.4.694 BrtListPart

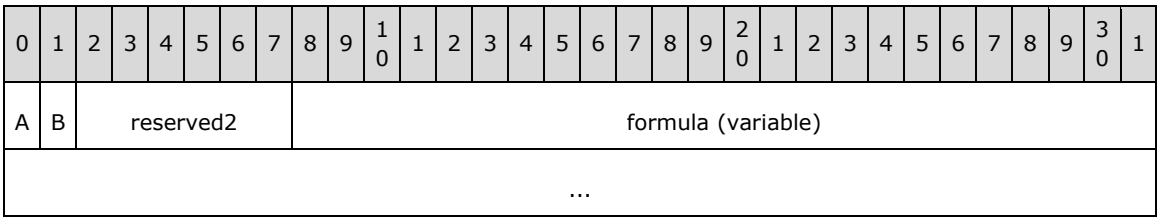
The **BrtListPart** record specifies a reference to a **Table** (section 2.1.7.51) part **ABNF**.



stRelID (variable): A **RelID** (section 2.5.114) that specifies a **Table** part in this file.

2.4.695 BrtListTrFmla

The **BrtListTrFmla** record specifies information about the **total row** formula (section 2.2.2) of a **table**.



A - reserved1 (1 bit): This value MUST be 0 and MUST be ignored.

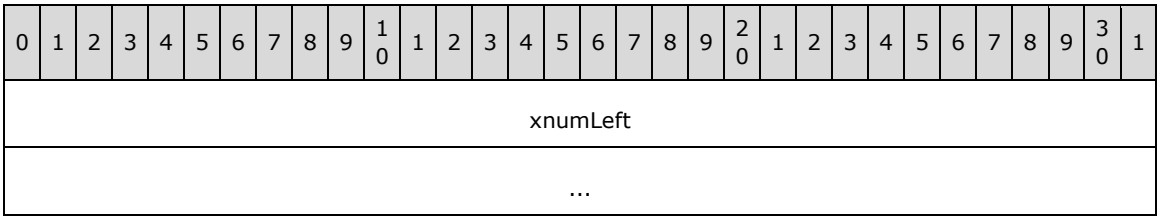
B - fArray (1 bit): A bit that specifies whether this is an array formula.

reserved2 (6 bits): This value MUST be 0 and MUST be ignored.

formula (variable): A **ListParsedFormula** (section 2.5.97.11) that specifies the formula associated with the table **column (1)**. The **ilta** field of the preceding **BrtBeginListCol** (section 2.4.100) record MUST be ILTA_CUSTOM. If the **crwTotals** field of the preceding **BrtBeginList** (section 2.4.99) record is 1, then the formula specified by this value MUST equal the formula of the **cell** intersected by the table total row and table column (1).

2.4.696 BrtMargins

The **BrtMargins** record specifies all the page margins for a **sheet**.



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xnumRight
...
xnumTop
...
xnumBottom
...
xnumHeader
...
xnumFooter
...

xnumLeft (8 bytes): A **Margin** (section 2.5.92) that specifies the left **page margin**.

xnumRight (8 bytes): A **Margin** (section 2.5.92) that specifies the right page margin.

xnumTop (8 bytes): A **Margin** that specifies the top page margin.

xnumBottom (8 bytes): A **Margin** that specifies the bottom page margin.

xnumHeader (8 bytes): A **Margin** that specifies the header page margin.

xnumFooter (8 bytes): A **Margin** that specifies the footer page margin.

2.4.697 BrtMdb

The **BrtMdb** record specifies an array of **Mdir** (section 2.5.93) structures.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cMdir																															
rgMdir (variable)																															
...																															

cMdir (4 bytes): A signed integer that specifies the number of items in the **rgMdir** array. This number MUST be greater than or equal to 1, and MUST be equal to the number of items in the **rgMdir** array.

rgMdir (variable): An array of **Mdir** structures. The number of items in the array MUST be equal to the value of **cMdir**. **Mdir** structures in the array MUST be stored in the strictly increasing order of their **iMdt** field.

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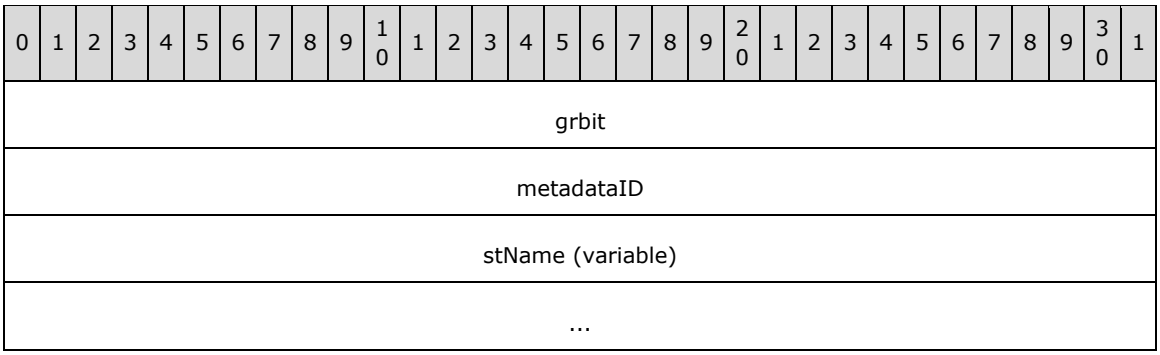
2.4.698 BrtMdtinfo

The **BrtMdtinfo** record specifies the name and properties of a cell metadata (section 2.2.4.2) or value metadata (section 2.2.4.3) type.



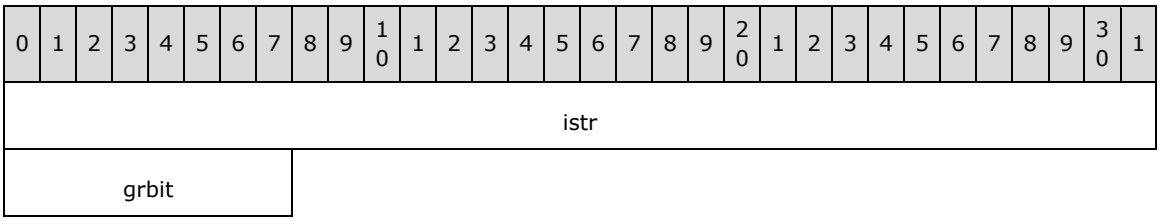
grbit (4 bytes): An **MdtFlags** (section 2.5.94) that specifies the properties of the metadata type.

metadataID (4 bytes): An unsigned integer that specifies the version of the application that introduced the metadata type (section 2.2.4.1).

stName (variable): An **XLWideString** (section 2.5.168) that specifies the name of the metadata type. The name of the metadata type MUST be unique within the collection of metadata types. The length of the name MUST be greater than or equal to 1 character and less than or equal to 65535 characters.

2.4.699 BrtMdxMbrIstr

The **BrtMdxMbrIstr** record specifies an **MDX unique name** and its properties.

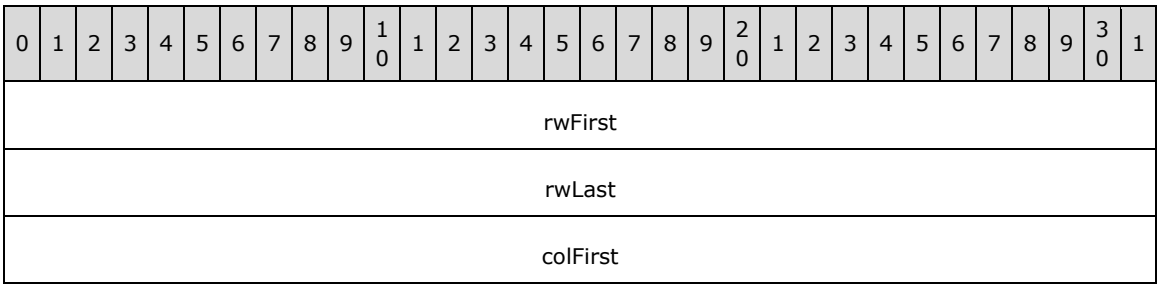


istr (4 bytes): An **Istr** (section 2.5.80) that specifies the MDX unique name.

grbit (1 byte): An **MdxMbrIstrFlags** (section 2.5.95) that specifies the properties of the MDX unique name.

2.4.700 BrtMergeCell

The **BrtMergeCell** record specifies a single **merged cell**.



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colLast

rwFirst (4 bytes): An **UncheckedRw** (section 2.5.154) that specifies the first **row** of the merged cell. This value MUST NOT be greater than **rwLast**. This value MUST be 0 and **rwLast** MUST be 1048575, or MUST be within the bounds of **Rw** (section 2.5.125).

rwLast (4 bytes): An **UncheckedRw** that specifies the last row of the merged cell. This value MUST NOT be less than **rwFirst**. This value MUST be 1048575 and **rwFirst** MUST be 0, or MUST be within the bounds of Rw.

colFirst (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies the first **column (1)** of the merged cell. MUST NOT be greater than **colLast**. This value MUST be 0 and **colLast** MUST be 16383, or MUST be within the bounds of **Col** (section 2.5.22).

colLast (4 bytes): An **UncheckedCol** that specifies the last column (1) of the merged cell. MUST NOT be less than **colFirst**. This value MUST be 16383 and **colFirst** MUST be 0, or MUST be within the bounds of Col.

2.4.701 brtModelRelationship

The **brtModelRelationship** record specifies properties of a single relationship in **spreadsheet data model** (as specified in [MS-XLDM]).

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
FRTHeader																															
irstFromTable (variable)																															
...																															
irstFromColumn (variable)																															
...																															
irstToTable (variable)																															
...																															
irstToColumn (variable)																															
...																															

FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

irstFromTable (variable): Name of the spreadsheet data model table to which foreign key column of this relationship belongs.

irstFromColumn (variable): Name of the spreadsheet data model table column which is the foreign key column of this relationship.

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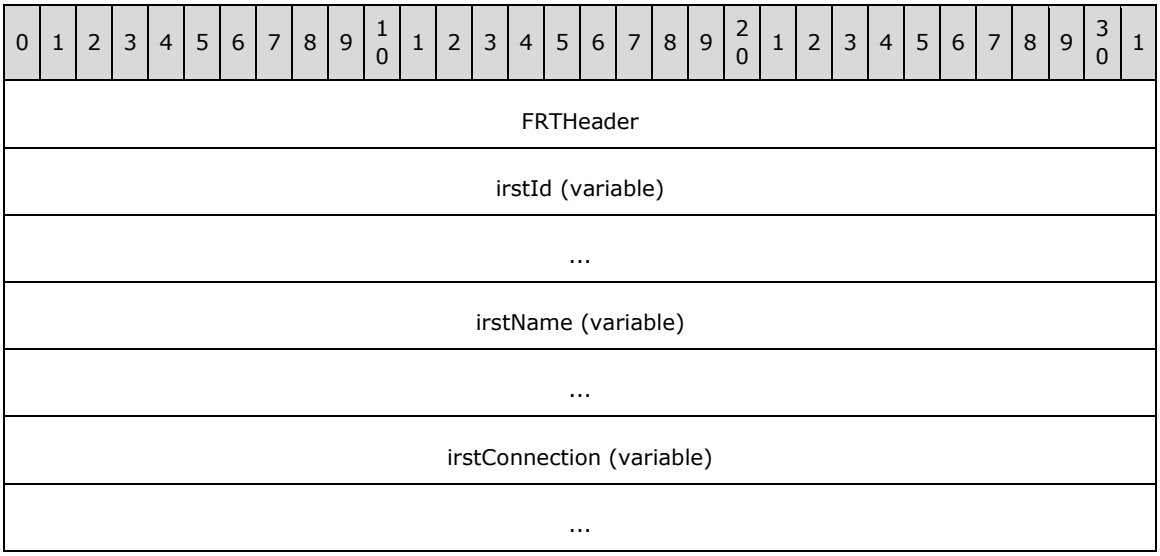
irstToTable (variable): Name of the spreadsheet data model table to which primary key column of this relationship belongs.

irstToColumn (variable): Name of the spreadsheet data model table column which is the primary key column of this relationship.

2.4.702 BrtModelTable

The **BrtModelTable** record specifies properties of a single **spreadsheet data model** (as specified in [MS-XLDM]) table.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

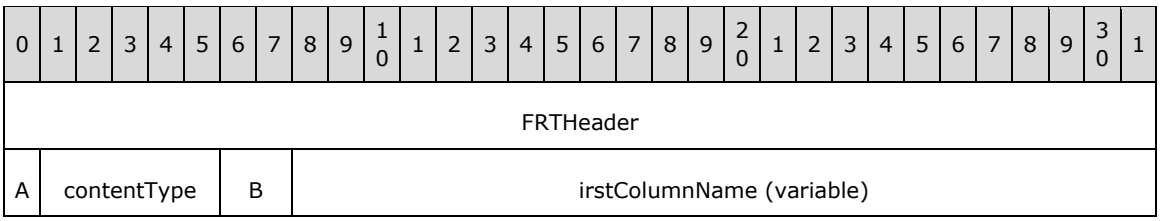
irstId (variable): An **XLWideString** (section 2.5.168) that specifies the identifier of the spreadsheet data model table.

irstName (variable): An **XLWideString** (section 2.5.168) that specifies the name of the spreadsheet data model table.

irstConnection (variable): An **XLWideString** (section 2.5.168) that specifies the name of the external connection (section 2.2.8) to which this spreadsheet data model table belongs.

2.4.703 brtModelTimeGroupingCalcCol

The **brtModelTimeGroupingCalcCol** record specifies properties of a single time grouping calculated column in the **spreadsheet data model** (as specified in [MS-XLDM]).



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...
irstColumnId (variable)
...

FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

A - fIsSelected (1 bit): A bit that specifies whether this time grouping granularity was applied in the last time grouping selection.

contentType (5 bits): An unsigned integer that specifies the time grouping granularity. This value MUST be a value from the following table.

contentType	Meaning
0x00	Years.
0x01	Quarters.
0x02	Months Index.
0x03	Months.
0x04	Days Index.
0x05	Days.
0x06	Hours.
0x07	Minutes.
0x08	Seconds.

B - reserved (2 bits): This value MUST be 0, and MUST be ignored.

irstColumnName (variable): Name of the spreadsheet data model column name for a specific time grouping granularity.

irstColumnId (variable): Name of the spreadsheet data model column immutable identifier for a specific time grouping granularity.

2.4.704 BrtMRUColor

The **BrtMRUColor** record specifies the color that the user has most recently used in the **workbook**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
colorMRU																															
...																															

colorMRU (8 bytes): A **BrtColor** (section 2.4.332) that specifies the most recently used color. Subfields are further specified in the following table.

Field	Meaning
colorMRU.fValidRGB	MUST be 0x1.
colorMRU.xcolorType	MUST be 0x02.

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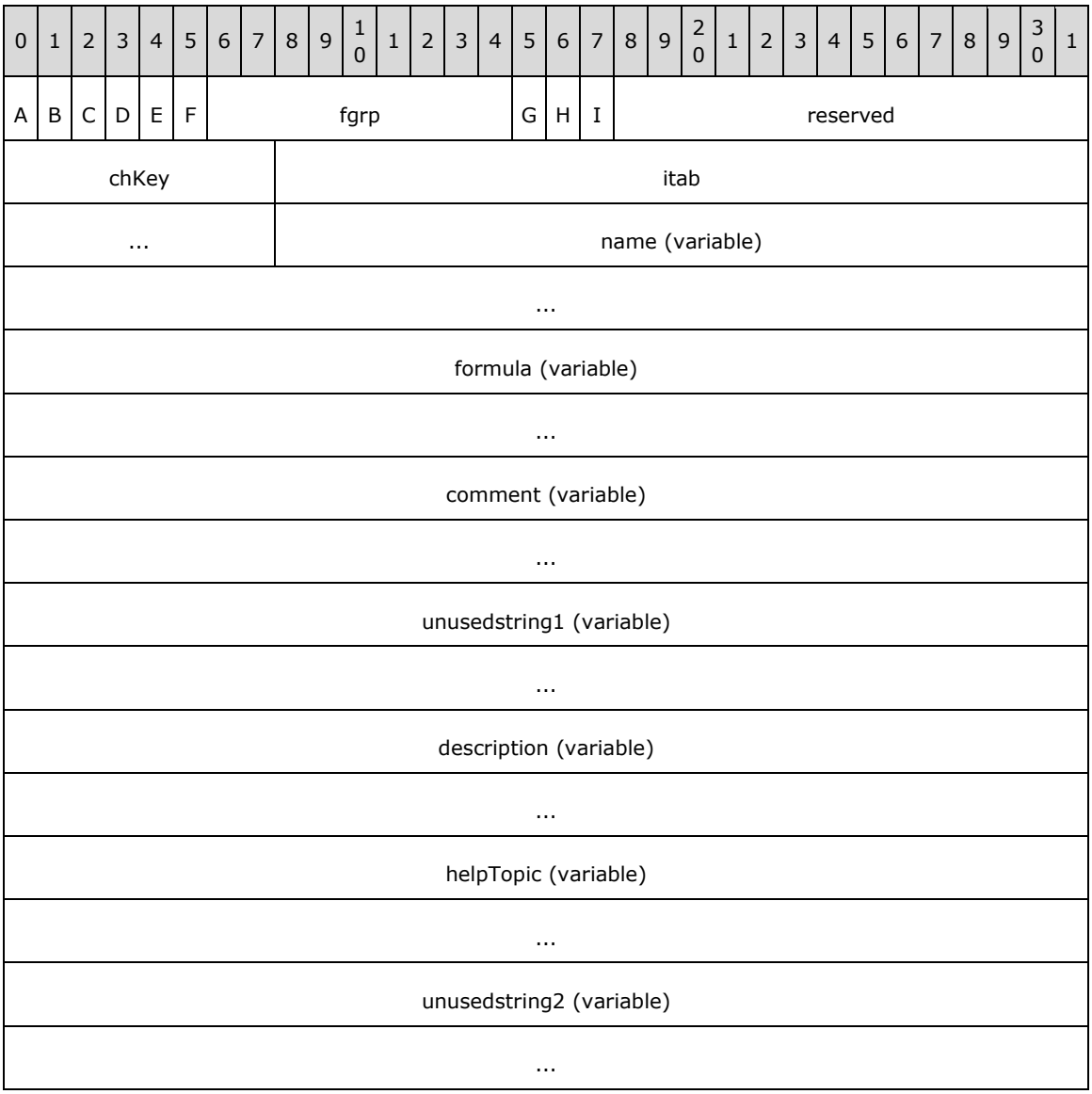
Field	Meaning
colorMRU.Index	MUST be 0xFF.
colorMRU.nTintAndShade	MUST be 0x00.
colorMRU.bAlpha	MUST be 0xFF.

2.4.705 BrtName

The **BrtName** record specifies a **defined name**.



A - fHidden (1 bit): A bit that specifies whether the defined name is not **visible** in the list of defined names.

B - fFunc (1 bit): A bit that specifies whether the defined name represents an **XLM macro**. If this bit is 1, then **fProc** MUST also be 1.

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C - fOB (1 bit): A bit that specifies whether the defined name represents a **Visual Basic for Applications (VBA)** macro. If this bit is 1, then **fProc** MUST also be 1.

D - fProc (1 bit): A bit that specifies whether the defined name represents a macro.

E - fCalcExp (1 bit): A bit that specifies whether **formula.rgce** contains a call to a **function** that can return an array.

F - fBuiltin (1 bit): A bit that specifies whether the defined name represents a **built-in name**.

fgrp (9 bits): An **FnGroupID** (section 2.5.51) that specifies the **function category** for the defined name. This value MUST be less than **iMac** field of **BrtBeginFnGroup** (section 2.4.87) plus the count of **BrtFnGroup** (section 2.4.676) records. If **fProc** is 0, then the value MUST be 0 and MUST be ignored.

G - fPublished (1 bit): A bit that specifies whether the defined name was **published**.

H - fWorkbookParam (1 bit): A bit that specifies whether the defined name is a **workbook** parameter.

I - fFutureFunction (1 bit): A bit that specifies whether the defined name is a **future function**. **fFutureFunction** MUST be 0 if one of the following conditions is TRUE: **fHidden** is 0, **fFunc** is 0, **fOB** is 1, **fProc** is 0, **fCalcExp** is 1, **fgrp** is not 0, **fPublished** is 1, **fBuiltin** is 1, **fWorkbookParam** is 1, **comment.cchCharacters** is not 0xFFFFFFFF, or **itab** is not 0xFFFFFFFF.

reserved (14 bits): This value MUST be 0, and MUST be ignored.

chKey (1 byte): The unsigned integer value of the **ASCII** character that specifies the shortcut key for the macro represented by the defined name. This value MUST be 0 if **fFunc** is 1 or if **fProc** is 0. Otherwise MUST be greater than or equal to 0x20.

itab (4 bytes): An unsigned integer that specifies the scope of the defined name. This value MUST be a value from the following table.

Value	Meaning
0xFFFFFFFF	The scope is entire workbook.
Greater than or equal to 0 and less than 0xFFFFFFFF	Specifies a zero-based index of a **BrtBundleSh** (section 2.4.311) record in the collection of all records directly following **BrtBeginBundleShs** (section 2.4.13). The referenced **BrtBundleSh** specifies the scope of the defined name.

name (variable): An **XLNameWideString** (section 2.5.165) that specifies the name of the defined name. If **fFutureFunction** is 1, **name** MUST be equal to one of the values in the Future Function table in **Ftab** (section 2.5.97.10).

If **fFutureFunction** is 0, **name** MUST NOT be equal to one of the values in the Future Function table in **Ftab**.

formula (variable): A **NameParsedFormula** (section 2.5.97.12) that specifies the formula (section 2.2.2) for the defined name. If **fFutureFunction** is 1, **formula.rgce** MUST consist of a single **PtgErr** (section 2.5.97.39) with a **err** equal to 0x1D.

comment (variable): An **XLNullableWideString** (section 2.5.166) that specifies the **comment** for the defined name. The length of this string MUST be less than 256 characters.

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unusedstring1 (variable): An **XLNullableWideString** that MUST be a NULL string and MUST be ignored. This value MUST exist if and only if **fProc** is 1.

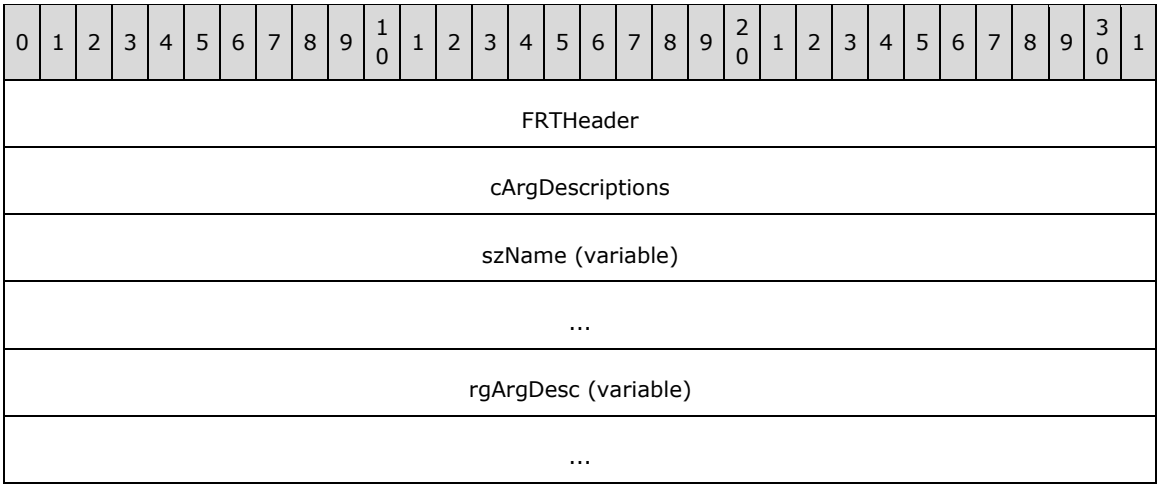
description (variable): An **XLNullableWideString** that specifies the custom menu for the macro represented by the defined name. This value MUST exist if and only if **fProc** is 1. The length of this string MUST be less than 32768 characters.

helpTopic (variable): An **XLNullableWideString** that specifies the description for the macro represented by the defined name. This value MUST exist if and only if **fProc** is 1. The length of this string MUST be less than 32768 characters.

unusedstring2 (variable): An **XLNullableWideString** that MUST be a NULL string and MUST be ignored. This value MUST exist if and only if **fProc** is 1.

2.4.706 BrtNameExt

The **BrtNameExt** record specifies additional properties for a **macro** named **szName**.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

cArgDescriptions (4 bytes): An unsigned integer that specifies the number of argument descriptions that the associated macro has. This value MUST be greater than or equal to 1 and MUST be less than or equal to 60.

szName (variable): An **XLNameWideString** (section 2.5.165) that specifies the name of the macro associated with this record. **szName** MUST be unique within the **BrtNameExt** (section 2.4.706) records in the **Workbook** (section 2.1.7.61) part. At least one of the following conditions MUST be true: there exists a **BrtName** (section 2.4.705) record in the **Workbook** (section 2.1.7.61) part such that the **name** field of that **BrtName** record is equal to **szName** and the **fProc** field of that **BrtName** record is equal to 1, or there exists a **Visual Basic for Applications (VBA)** macro named **szName**.

rgArgDesc (variable): An array of **ArgDesc** (section 2.5.2). Each array item specifies the description for an argument of the associated macro. The count of items in this array MUST be equal to **cArgDescriptions**. The values of the **iArgDesc** fields of all **ArgDesc** structure items MUST be unique within this array.

2.4.707 BrtOleObject

The **BrtOleObject** record specifies an **embedded object**.

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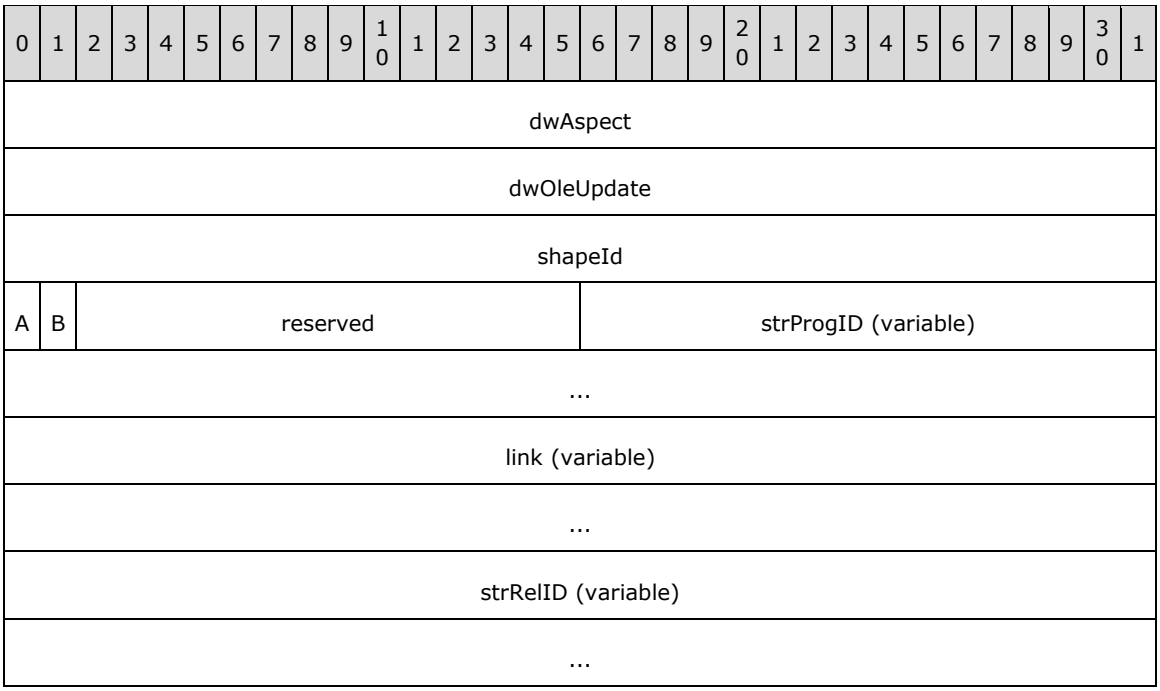

dwAspect (4 bytes): An unsigned integer that specifies how the object is represented when drawing or getting data. This value MUST be a value from the following table.

Name	Value	Meaning
DVASPECT_CONTENT	0x00000001	Provides a representation of an embedded object's content.
DVASPECT_ICON	0x00000004	Provides an iconic representation of an embedded object.

dwOleUpdate (4 bytes): An unsigned integer that specifies when to update the embedded object's cached data. This value MUST be 0 if **fLinked** is 0; otherwise, MUST be a value from the following table.

Name	Value	Meaning
OLEUPDATE_ALWAYS	0x00000001	Update the embedded object whenever possible.
OLEUPDATE_ONCALL	0x00000003	Update the embedded object only upon user request.

shapeId (4 bytes): An unsigned integer that corresponds to the **spid** attribute, as specified in [ISO/IEC29500-4:2016], section 19.1.2.19, of a **shape** element in the **VML Drawings** (section 2.1.7.59) part. This value MUST be greater than or equal to 0x00000001 and less than or equal to 0x03FFD7FF. The value of the **ObjectType** attribute of the **ClientData child element**, as specified in [ISO/IEC29500-4:2016], section 19.4.2.12, of the shape element MUST be "Pict" as specified in [ISO/IEC29500-4:2016], section 19.4.3.2. The total number of unique identifiers specified by **shapeId** and **BrtActiveX.shapeId** in a worksheet, macro sheet or dialog sheet MUST NOT exceed 65535.

A - fLinked (1 bit): A bit that specifies whether this embedded object is linked.

B - fAutoLoad (1 bit): A bit that specifies whether the host application for the embedded object is called to load the object data automatically when the **workbook** is opened.

reserved (14 bits): This value MUST be 0, and MUST be ignored.

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strProgID (variable): An **XLWideString** (section 2.5.168) that specifies a programmatic identifier associated with this object. This string MUST comply with the following requirements:

- The string MUST have no more than 39 characters.
- The string MUST contain no punctuation (including underscores) except periods.
- The string MUST contain one or more periods.
- The string MUST NOT start with a digit.
- The string MUST be different from the class name of any **OLE1** application, including the OLE1 version of the same application, if there is one.

link (variable): An **ObjectParsedFormula** (section 2.5.97.13) that specifies the formula (section 2.2.2) that specifies where the data for this **linked object** can be found. This value MUST exist if and only if **fLinked** is nonzero.

strRelID (variable): A **RelID** (section 2.5.114) that specifies a relationship targeting an **OLE Object** (section 2.1.7.36) or an **OLE Package** (section 2.1.7.37) containing data for this object. This value MUST exist if and only if **fLinked** is 0.

2.4.708 BrtOleSize

The **BrtOleSize** record specifies the **range** of **cells** to be displayed when this **workbook** is displayed as an **embedded object** in another document.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rfx (16 bytes)																															
...																															
...																															

rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the range of cells to be displayed by the embedded object.

2.4.709 BrtPageSetup

The **BrtPageSetup** record specifies page layout and printing settings for a **sheet**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iPaperSize																															
iScale																															
iRes																															
iVRes																															
iCopies																															

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iPaperSize (4 bytes): An unsigned integer that specifies the paper size according to the following table. This value MUST be greater than or equal to 0 and less than 2147483647. The value 0 or values greater than or equal to 256 specify custom printer paper sizes that can optionally be stored in a **DEVMODE** structure, as described in [DEVMODE]. The **DEVMODE** structure allows printer drivers to save height and width information.

Values 119 through 256 are reserved for future use.

Value	Meaning
1	US Letter 8 1/2 x 11 in
2	US Letter Small 8 1/2 x 11 in
3	US Tabloid 11 x 17 in
4	US Ledger 17 x 11 in
5	US Legal 8 1/2 x 14 in
6	US Statement 5 1/2 x 8 1/2 in
7	US Executive 7 1/4 x 10 1/2 in
8	A3 297 x 420 mm
9	A4 210 x 297 mm
10	A4 Small 210 x 297 mm
11	A5 148 x 210 mm
12	B4 (JIS) 250 x 354
13	B5 (JIS) 182 x 257 mm
14	Folio 8 1/2 x 13 in
15	Quarto 215 x 275 mm
16	10 x 14 in
17	11 x 17 in
18	US Note 8 1/2 x 11 in
19	US Envelope #9 3 7/8 x 8 7/8
20	US Envelope #10 4 1/8 x 9 1/2
21	US Envelope #11 4 1/2 x 10 3/8
22	US Envelope #12 4 3/4 x 11
23	US Envelope #14 5 x 11 1/2
24	C size sheet
25	D size sheet
26	E size sheet
27	Envelope DL 110 x 220mm
28	Envelope C5 162 x 229 mm
29	Envelope C3 324 x 458 mm
30	Envelope C4 229 x 324 mm

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Value	Meaning
31	Envelope C6 114 x 162 mm
32	Envelope C65 114 x 229 mm
33	Envelope B4 250 x 353 mm
34	Envelope B5 176 x 250 mm
35	Envelope B6 176 x 125 mm
36	Envelope 110 x 230 mm
37	US Envelope Monarch 3.875 x 7.5 in
38	6 3/4 US Envelope 3 5/8 x 6 1/2 in
39	US Std Fanfold 14 7/8 x 11 in
40	German Std Fanfold 8 1/2 x 12 in
41	German Legal Fanfold 8 1/2 x 13 in
42	B4 (ISO) 250 x 353 mm
43	Japanese Postcard 100 x 148 mm
44	9 x 11 in
45	10 x 11 in
46	15 x 11 in
47	Envelope Invite 220 x 220 mm
48	RESERVED--DO NOT USE
49	RESERVED--DO NOT USE
50	US Letter Extra 9 1/2 x 12 in
51	US Legal Extra 9 1/2 x 15 in
52	US Tabloid Extra 11.69 x 18 in
53	A4 Extra 9.27 x 12.69 in
54	Letter Transverse 8 1/2 x 11 in
55	A4 Transverse 210 x 297 mm
56	Letter Extra Transverse 9 1/2 x 12 in
57	SuperA/A4 227 x 356 mm
58	SuperB/A3 305 x 487 mm
59	US Letter Plus 8.5 x 12.69 in
60	A4 Plus 210 x 330 mm
61	A5 Transverse 148 x 210 mm
62	B5 (JIS) Transverse 182 x 257 mm
63	A3 Extra 322 x 445 mm
64	A5 Extra 174 x 235 mm
65	B5 (ISO) Extra 201 x 276 mm
66	A2 420 x 594 mm
67	A3 Transverse 297 x 420 mm
68	A3 Extra Transverse 322 x 445 mm
69	Japanese Double Postcard 200 x 148 mm
70	A6 105 x 148 mm
71	Japanese Envelope Kaku #2
72	Japanese Envelope Kaku #3
73	Japanese Envelope Chou #3
74	Japanese Envelope Chou #4
75	Letter Rotated 11 x 8 1/2 11 in
76	A3 Rotated 420 x 297 mm
77	A4 Rotated 297 x 210 mm

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Value	Meaning
78	A5 Rotated 210 x 148 mm
79	B4 (JIS) Rotated 364 x 257 mm
80	B5 (JIS) Rotated 257 x 182 mm
81	Japanese Postcard Rotated 148 x 100 mm
82	Double Japanese Postcard Rotated 148 x 200 mm
83	A6 Rotated 148 x 105 mm
84	Japanese Envelope Kaku #2 Rotated
85	Japanese Envelope Kaku #3 Rotated
86	Japanese Envelope Chou #3 Rotated
87	Japanese Envelope Chou #4 Rotated
88	B6 (JIS) 128 x 182 mm
89	B6 (JIS) Rotated 182 x 128 mm
90	12 x 11 in
91	Japanese Envelope You #4
92	Japanese Envelope You #4 Rotated
93	PRC 16K 146 x 215 mm
94	PRC 32K 97 x 151 mm
95	PRC 32K(Big) 97 x 151 mm
96	PRC Envelope #1 102 x 165 mm
97	PRC Envelope #2 102 x 176 mm
98	PRC Envelope #3 125 x 176 mm
99	PRC Envelope #4 110 x 208 mm
100	PRC Envelope #5 110 x 220 mm
101	PRC Envelope #6 120 x 230 mm
102	PRC Envelope #7 160 x 230 mm
103	PRC Envelope #8 120 x 309 mm
104	PRC Envelope #9 229 x 324 mm
105	PRC Envelope #10 324 x 458 mm
106	PRC 16K Rotated
107	PRC 32K Rotated
108	PRC 32K(Big) Rotated
109	PRC Envelope #1 Rotated 165 x 102 mm
110	PRC Envelope #2 Rotated 176 x 102 mm
111	PRC Envelope #3 Rotated 176 x 125 mm
112	PRC Envelope #4 Rotated 208 x 110 mm
113	PRC Envelope #5 Rotated 220 x 110 mm
114	PRC Envelope #6 Rotated 230 x 120 mm
115	PRC Envelope #7 Rotated 230 x 160 mm
116	PRC Envelope #8 Rotated 309 x 120 mm
117	PRC Envelope #9 Rotated 324 x 229 mm
118	PRC Envelope #10 Rotated 458 x 324 mm

iScale (4 bytes): An unsigned integer that specifies the **print scale**. The value MUST be greater than or equal to 10 and less than or equal to 400, or be equal to 0.

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iRes (4 bytes): An unsigned integer that specifies the horizontal resolution to use when printing, in DPI.

iVRes (4 bytes): An unsigned integer that specifies the vertical resolution to use when printing, in DPI.

iCopies (4 bytes): An unsigned integer that specifies the number of copies to print. This value MUST be greater than or equal to 0 and less than or equal to 32767.

iPageStart (4 bytes): A signed integer that specifies the page number for the first page being printed. For example, if the value is 6, the first page number will be 6. This value MUST be greater than or equal to -32765 and less than or equal to 32767. This value MUST be ignored if the value of **fUsePage** is 0.

iFitWidth (4 bytes): An unsigned integer that specifies the number of horizontal pages to fit the printed output into. For example, if the value is 6, the printed output is fit to a width of 6 pages. If the value is 0, then the printed output is not fit to a specific number of horizontal pages. This value MUST be greater than or equal to 0 or less than or equal to 32767.

iFitHeight (4 bytes): An unsigned integer that specifies the number of vertical pages to fit the printed output into. For example, if the value is 6, the printed output is fit to a height of 6 pages. If the value is 0, then the printed output is not fit to a specific number of vertical pages. This value MUST be greater than or equal to 0 or less than or equal to 32767.

A - fLeftToRight (1 bit): A bit that specifies the order that multiple pages are sent to the printer for a single sheet, as specified in the following table.

Value	Meaning
0	Pages are printed top-to-bottom first and then left-to-right.
1	Pages are printed left-to-right first and then top-to-bottom.

B - fLandscape (1 bit): A bit that specifies the orientation of the printed page. This bit MUST be ignored if **fNoOrient** has a value of 1. Otherwise, this value is specified in the following table.

Value	Meaning
0	Portrait orientation, in which the longest edge of the page is vertical.
1	Landscape orientation, in which the longest edge of the page is horizontal.

C - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

D - fNoColor (1 bit): A bit that specifies the color setting of the printed page, as specified in the following table.

Value	Meaning
0	The printer is instructed to print the page in color.
1	The printer is instructed to print the page in black and white.

E - fDraft (1 bit): A bit that specifies whether graphics are included on the printed page, as specified in the following table.

Value	Meaning
0	Graphics are included in the printed page.
1	Graphics are omitted in the printed page.

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F - fNotes (1 bit): A bit that specifies **print settings** for **comments**, as specified in the following table.

Value	Meaning
0	The comments are not printed.
1	The comments are printed. The location of the comments is specified by **fEndNotes**.

G - fNoOrient (1 bit): A bit that specifies whether orientation of the printed page is determined by fLandscape or by the printer, as specified in the following table.

Value	Meaning
0	The value of **fLandscape** is used to specify the orientation of the printed page.
1	Application-specific and printer-specific behavior is used to determine the orientation of the printed page.

H - fUsePage (1 bit): A bit that specifies whether **iPageStart** is used to specify the page number of the first page being printed, as specified in the following table.

Value	Meaning
0	The page numbering will start with a value of 1.
1	The value of **iPageStart** is used to specify the page number of the first page being printed.

I - fEndNotes (1 bit): A bit that specifies the location of printed comments, as specified in the following table. This bit MUST be ignored if **fNotes** has a value of 0.

Value	Meaning
0	Comments print as displayed.
1	Comments print after the **workbook** is printed.

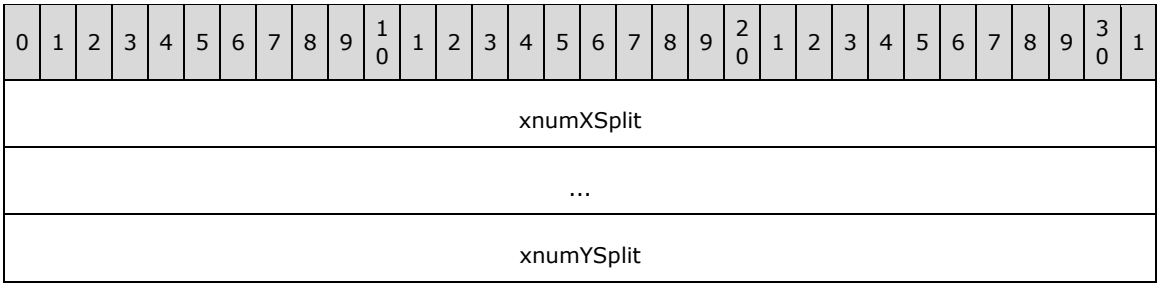
J - iErrors (2 bits): A **PrintErrorsAs** (section 2.5.109) that specifies how to represent **cells** that contain errors when printing.

reserved2 (5 bits): This value MUST be 0, and MUST be ignored.

szRelID (variable): An **XLNullableWideString** (section 2.5.166) that specifies the link to the **Printer Settings** (section 2.1.7.41) part. The length of the **XLNullableWideString** MUST be less than or equal to 260 characters.

2.4.710 BrtPane

The **BrtPane** record specifies the **sheet panes**.



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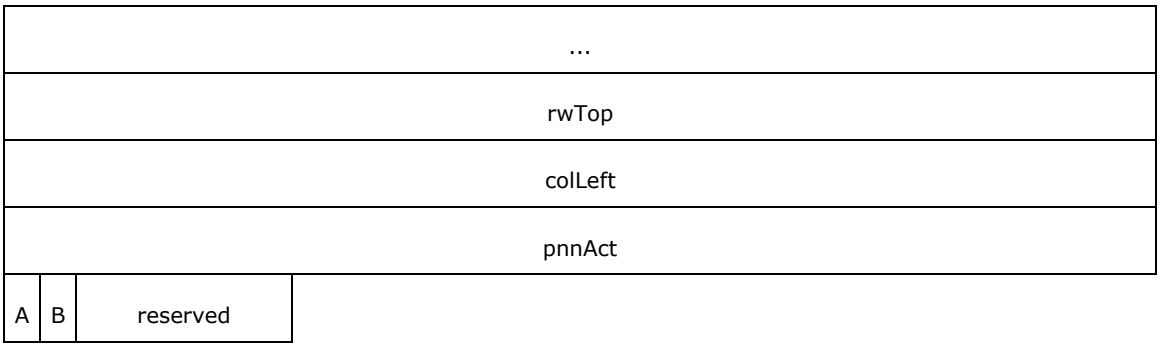

xnumXSplit (8 bytes): An **Xnum** (section 2.5.171) that specifies the position of the horizontal split, in **twips**. If **fFrozen** is equal to one or **fFrozenNoSplit** is equal to one, then this value specifies the number of **rows** in the **frozen panes** and MUST be less than the maximum value of **Rw** (section 2.5.125).

xnumYSplit (8 bytes): An **Xnum** that specifies the position of the vertical split, in twips. If **fFrozen** is equal to one or **fFrozenNoSplit** is equal to one, then this value specifies the number of **columns (1)** in the frozen panes and MUST be less than the maximum value of **Col** (section 2.5.22).

rwTop (4 bytes): An **UncheckedRw** (section 2.5.154) that specifies the row of the upper left **visible cell** in the lower right pane.

colLeft (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies the column (1) of the upper left visible cell in the lower right pane.

pnnAct (4 bytes): A **Pnn** (section 2.5.107) that specifies the active pane.

A - fFrozen (1 bit): A bit that specifies whether the panes are frozen panes and **split panes**, as specified in the following table. This value MUST NOT be 1 if **fFrozenNoSplit** is 1.

Value	Meaning
0	Whether the panes are frozen panes or split panes is not specified.
1	The panes are frozen panes and split panes.

B - fFrozenNoSplit (1 bit): A bit that specifies whether the panes are frozen panes but not split panes, as specified in the following table. This value MUST NOT be 1 if **fFrozen** is 1.

Value	Meaning
0	Whether the panes are frozen panes or split panes is not specified.
1	The panes are frozen panes but not split panes.

reserved (6 bits): This value MUST be 0, and MUST be ignored.

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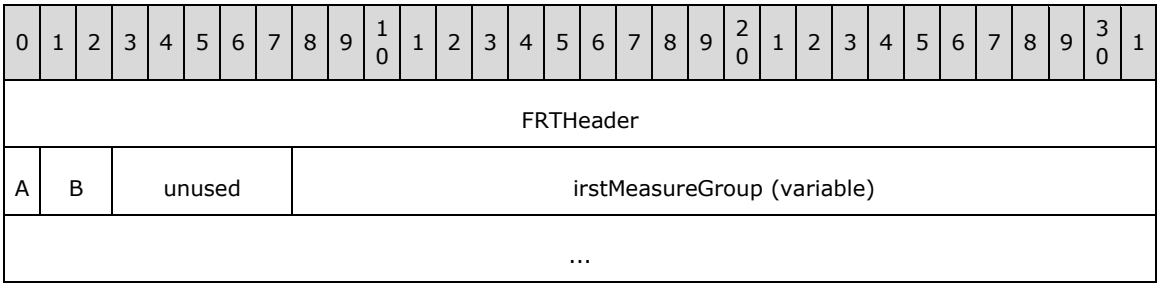
2.4.711 BrtPCDCalcMem15

The **BrtPCDCalcMem15** (section 2.4.711) record specifies extended properties of an OLAP calculated **member** specified by **BrtBeginPCDCalcMem** (section 2.4.125) or **BrtBeginPCDCalcMemExt** (section 2.4.127) that immediately precedes this record and specifies the beginning of a collection of records as defined by the **Common Productions** part (section 2.1.8) **ABNF**.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

A - fMeasure (1 bit): A bit that specifies whether a calculated member belongs to the measure hierarchy of a cube. This field MUST be ignored if the **pcdCalcMemCommon.fSet** field in the **BrtBeginPCDCalcMem** or the **BrtBeginPCDCalcMemExt** record that immediately precedes this record is 1. The possible values for this field are listed in the following table.

Value	Meaning
0	The member does not belong to a measure hierarchy.
1	The member does belong to a measure hierarchy.

B - iNumberFormat (2 bits): Two bits that specify whether the numeric formatting of a calculated member will be overridden or not. This field MUST be ignored if the **pcdCalcMemCommon.fSet** field in the **BrtBeginPCDCalcMem** or the **BrtBeginPCDCalcMemExt** record that immediately precedes this record is 1. The possible values for this field are listed in the following table.

Value	Meaning
0	The numeric formatting of the member will not be overridden.
1	The numeric formatting of the member will be overridden to display with a thousands separator and no decimal places.
2	The numeric formatting of the member will be overridden to display as a percentage with two decimal places.
3	Not valid. **iNumberFormat** will be ignored and numeric formatting will not be overridden.

unused (5 bits): This field is unused and MUST be ignored.

irstMeasureGroup (variable): An **XLWideString** (section 2.5.168) that specifies the **measure group** of this calculated measure. The length of this value MUST be less than 65,536 characters. This field MUST be ignored if the **pcdCalcMemCommon.fSet** field in the **BrtBeginPCDCalcMem**

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or **BrtBeginPCDCalcMemExt** record that immediately precedes this record is 1. This field MUST be ignored if the **fMeasure** field is 0.

2.4.712 BrtPCDField14

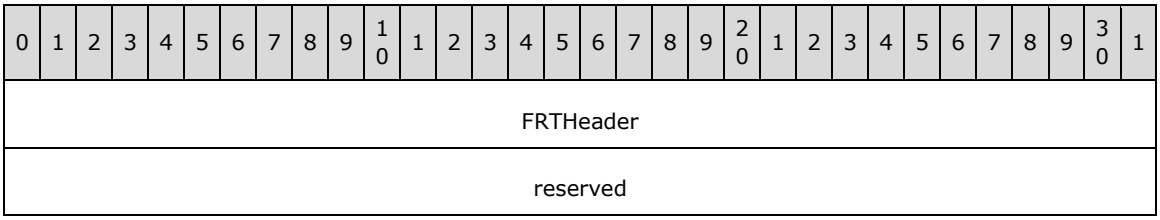
The **BrtPCDField14** record specifies that the preceding **BrtBeginPCDField** (section 2.4.135) record SHOULD<38> be ignored.

If this record exists, there MUST exist an **SXDI** (section 2.1.7.40) rule in the PivotTable view (section 2.2.5.3) that is associated with this **PivotCache** (section 2.2.5.2) as specified in section 2.2.5.3.1. This SXDI rule MUST have a **BrtBeginSXDI** (section 2.4.241) record with an **isxvdData** field equal to the pivot field (section 2.2.5.3.2) index of a pivot field (section 2.2.5.3.2) associated with this cache field (section 2.2.5.2.2). Additionally, this SXDI rule MUST contain a **BrtSXDI14** (section 2.4.800) record with an **isxvd** field greater than or equal to 0.

The preceding **BrtBeginPCDField** record MUST have the values set as specified in the following table.

Name	Value
fServerBased	0
fCantGetUniqueItems	0
fSrcField	1
fCaption	0
fOlapMemPropField	0
fLoadFmla	0
fLoadPropName	0
Ifmt	0
wTypeSql	0
isxtl	0x00007FFF
cIsxtmps	0

For more details, see sections 2.2.5.2.7.1 (**Measures**) and 2.4.800 (**BrtSXDI14)**.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

reserved (4 bytes): This value MUST be 1, and MUST be ignored.

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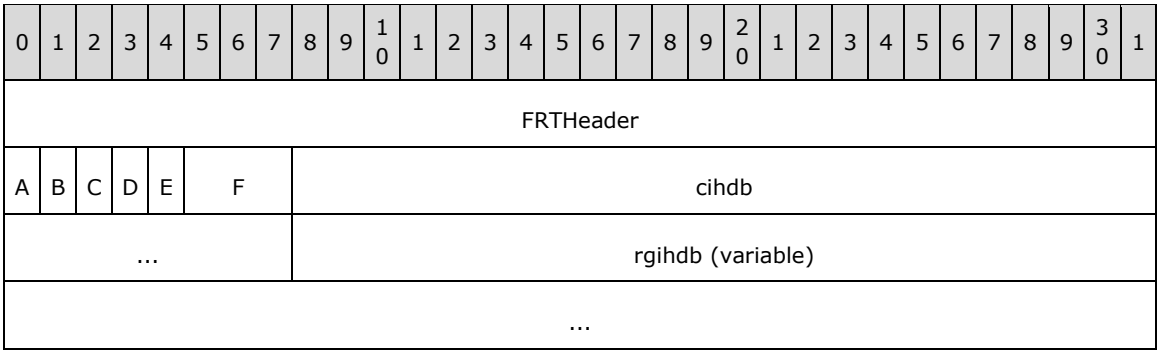
2.4.713 BrtPCDH14

The **BrtPCDH14** record specifies the extended properties of a named set (section 2.2.5.2.7.3) as specified by the **PCDHIERARCHY** rule (defined in section 2.1.7.38). When this record is present the **fSet** field of the associated **BrtBeginPCDHierarchy** (section 2.4.145) record MUST be 1.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

A - fFlattenHierarchies (1 bit): A bit that specifies whether to display **members** from different levels of the same cache hierarchy (section 2.2.5.2.7) of this named set in the same pivot field (section 2.2.5.3.2). This value MUST be 0 if **fIgnorable** is 1. If a **BrtBeginPCDCalcMem14** (section 2.4.126) record that corresponds to the named set exists, this value MUST be equal to the value of **fFlattenHierarchies** field of the BrtBeginPCDCalcMem14 record, as specified in the following table.

fIgnorable	fFlattenHierarchies	Meaning
1	0	The cache hierarchy associated with this named set as specified by the **PCDHIERARCHY** rule is discarded.
0	0	Each member from a different level of the same cache hierarchy of this named set is displayed in a separate pivot field.
0	1	All members from different levels of the same cache hierarchy of this named set are displayed in the same pivot field.

B - fMeasureSet (1 bit): A bit that specifies whether this named set contains measure (section 2.2.5.2.7.1) cache hierarchies (section 2.2.5.2.7) as specified in the following table. This value MUST be 0 if **fIgnorable** is 1.

fIgnorable	fMeasureSet	Meaning
1	0	The cache hierarchy associated with this named set as specified by the **PCDHIERARCHY** rule is discarded.
0	0	The named set does not contain measure cache hierarchies.
0	1	The named set contains measure cache hierarchies.

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C - fHierarchizeDistinct (1 bit): A bit that specifies whether to automatically order and remove duplicates from this named set, as specified in the following table. This value MUST be 0 if **fIgnorable** is 1. If a BrtBeginPCDCalcMem14 record that corresponds to the named set exists, this value MUST be equal to the value of **fHierarchizeDistinct** field of the **BrtBeginPCDCalcMem14** record.

fIgnorable	fHierarchizeDistinct	Meaning
1	0	The cache hierarchy associated with this named set as specified by the **PCDHIERARCHY** rule is discarded.
0	0	Do not automatically order and remove duplicates from this named set.
0	1	Automatically order and remove duplicates from this named set.

D - fIgnorable (1 bit): A bit that specifies whether the associated cache hierarchy as specified by the **PCDHIERARCHY** rule SHOULD<39> be ignored. If **fIgnorable** is 1 the **BrtBeginPCDHierarchy** record of this cache hierarchy MUST have the field values as specified in the following table.

Field	Value
fMeasure	1
fSet	0
fAttributeHierarchy	0
fMeasureHierarchy	0
fOnlyOneField	0
fTimeHierarchy	0
fKeyAttributeHierarchy	0
fAttributeMemberValueTypeKnown	0
fUnbalancedRealKnown	0
fUnbalancedReal	0
fUnbalancedGroupKnown	0
fUnbalancedGroup	0
fHidden	0
cLevels	0
isetParent	-1
iconSet	0
fLoadDimUnq	0
fLoadDefaultUnq	0
fLoadAllUnq	0
fLoadAllDisp	0
fLoadDispFld	0
fLoadMeasGrp	0
wAttributeMemberValueType	0
stUnique	"DummyN", where N is the text string representing in decimal form the 0-based index of the current **BrtBeginPCDHierarchy** record among other **BrtBeginPCDHierarchy** records with **fIgnorable** bit of the associated **BrtPCDH14** record equal to 1 in the collection specified by the **BrtBeginPCDHierarchies** (section 2.4.144) rule. Within the collection all **BrtBeginPCDHierarchy** records with **fIgnorable** bit of the associated **BrtPCDH14** record equal to 0

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Field	Value
	MUST precede all **BrtBeginPCDHierarchy** records with **fIgnorable** bit of the associated **BrtPCDH14** record equal to 1.

If this field is equal to 1, there MUST exist an **SXDI** (section 2.1.7.40) rule in the **PivotTable** view (section 2.2.5.3) that is associated with this **PivotCache** (section 2.2.5.2). This SXDI rule MUST have a **BrtBeginSXDI** (section 2.4.241) record with an **isxvdData** field equal to the pivot field index of a pivot field associated with a cache field (section 2.2.5.2.2) associated with this cache hierarchy (as specified in section 2.2.5.2.7). Additionally, this SXDI rule MUST contain a **BrtSXDI14** (section 2.4.800) record with an **isxvd** field greater than or equal to 0.

For more details, see **Measures** (section 2.2.5.2.7.1) and **BrtSXDI14** (section 2.4.800).

E - unused (1 bit): This value is undefined, and MUST be ignored.

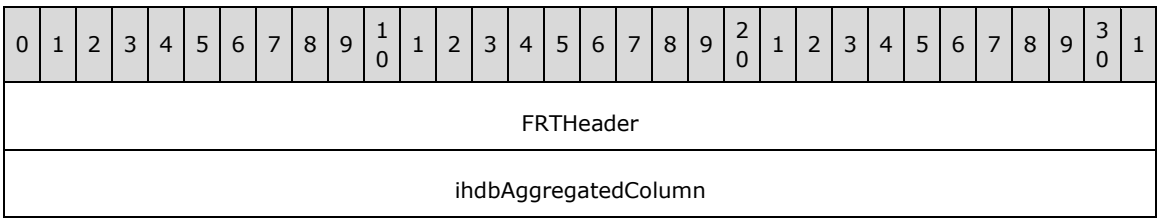
F - reserved (3 bits): This value MUST be 0, and MUST be ignored.

cihdb (4 bytes): An unsigned integer that specifies the count of items in the **rgihdb** array. **cihdb** MUST be equal to the sum of the **cLevels** fields of the **BrtBeginPCDHierarchy** records in the cache hierarchy of this named set.

rgihdb (variable): An array of **IHDB** (section 2.5.77) that specifies the collection of references to cache hierarchies. The count of items in this array MUST be equal to **cihdb**.

2.4.714 BrtPCDH15

The **BrtPCDH15** record specifies extensions to the **BrtBeginPCDHierarchy** (section 2.4.145) record where a measure cache hierarchy can aggregate another cache hierarchy. For this record to be present, **fMeasure** field of the **BrtBeginPCDHierarchy** MUST be 1.

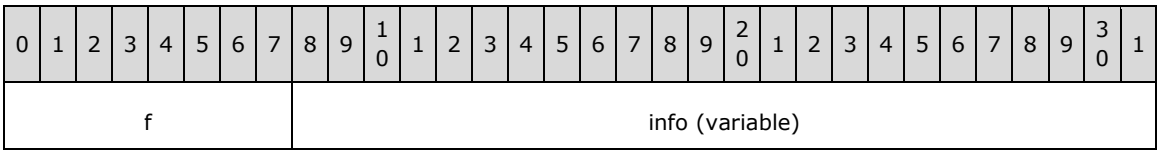


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

ihdbAggregatedColumn (4 bytes): An **IHDB** (section 2.5.77) which specifies the cache hierarchy that this measure cache hierarchy aggregates. **fAttributeHierarchy** of the referenced cache hierarchy MUST be 1.

2.4.715 BrtPCDIABoolean

The **BrtPCDIABoolean** record specifies a cache item (section 2.2.5.2.3) that contains a **Boolean** (section 2.5.97.3) and additional data.



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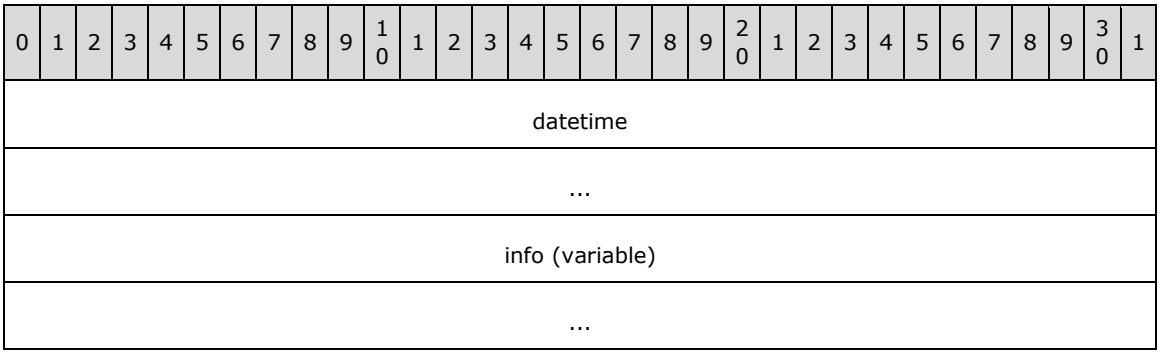
...

f (1 byte): A **Boolean** (section 2.5.97.3) that specifies the value of this cache item.

info (variable): A **PCDIAddlInfo** (section 2.5.99) that specifies additional data associated with this cache item.

2.4.716 BrtPCDIADatetime

The **BrtPCDIADatetime** record specifies a cache item (section 2.2.5.2.3) that contains date, time, and additional data.

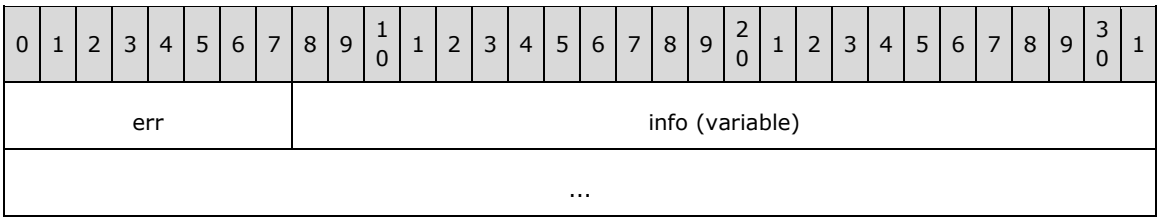


datetime (8 bytes): A **PCDIDateTime** (section 2.5.100) that specifies the value of this cache item.

info (variable): A **PCDIAddlInfo** (section 2.5.99) that specifies additional data associated with this cache item.

2.4.717 BrtPCDIAError

The **BrtPCDIAError** record specifies a cache item (section 2.2.5.2.3) that contains an error and additional data.



err (1 byte): A **BErr** (section 2.5.97.2) that specifies the value of this cache item.

info (variable): A **PCDIAddlInfo** (section 2.5.99) that specifies additional data associated with this cache item.

2.4.718 BrtPCDIAMissing

The **BrtPCDIAMissing** record specifies a cache item (section 2.2.5.2.3) with no value and additional data.

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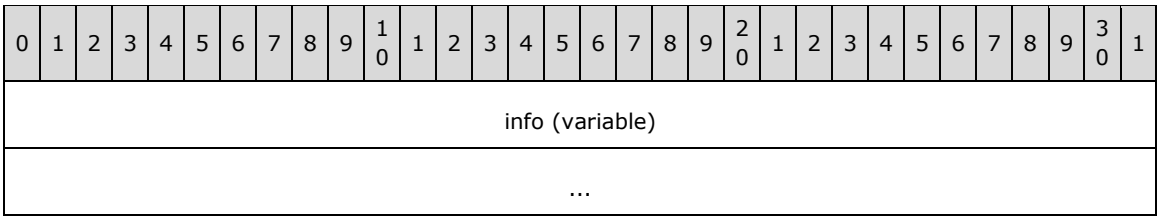
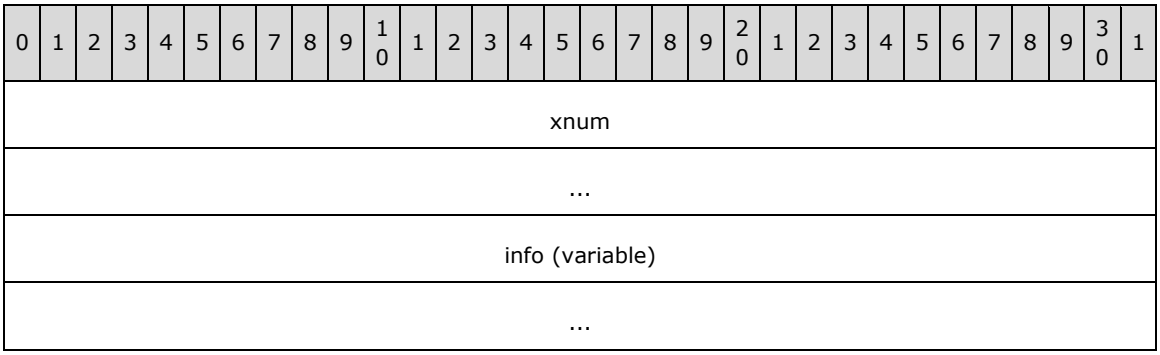


info (variable): A **PCDIAddlInfo** (section 2.5.99) that specifies additional data associated with this cache item (section 2.2.5.2.3).

2.4.719 BrtPCDIANumber

The **BrtPCDIANumber** record specifies a cache item (section 2.2.5.2.3) that contains a number and additional data.

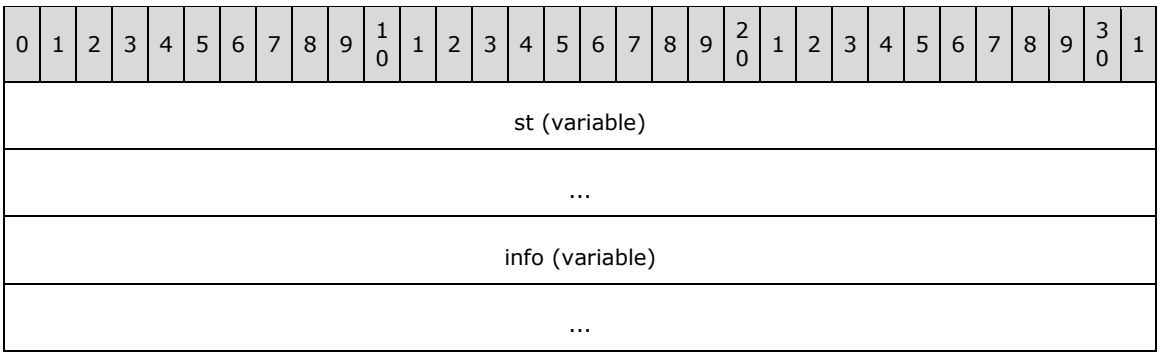


xnum (8 bytes): An **Xnum** (section 2.5.171) that specifies the value of this cache item.

info (variable): A **PCDIAddlInfo** (section 2.5.99) that specifies additional data associated with this cache item.

2.4.720 BrtPCDIAString

The **BrtPCDIAString** record specifies a cache item (section 2.2.5.2.3) that contains a string and additional data.



st (variable): An **XLWideString** (section 2.5.168) that specifies the value of this cache item. If the **bVerCacheCreated** field of the **BrtBeginPivotCacheDef** (section 2.4.167) record preceding this record is less than 0x03, then the length of the string specified by this field MUST be less than or equal to 255 characters; otherwise the length of the string specified by this field MUST be less than or equal to 32767 characters.

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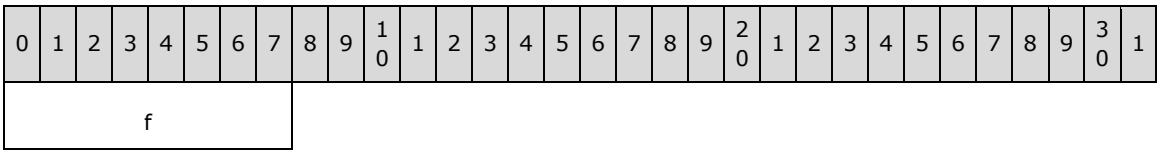
info (variable): A **PCDIAddlInfo** (section 2.5.99) that specifies additional data associated with this cache item.

2.4.721 BrtPCDIBoolean

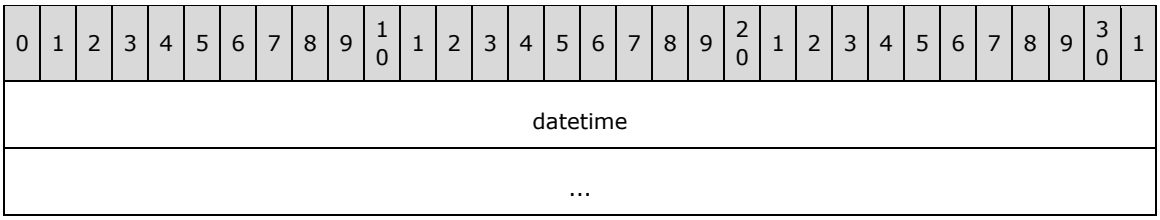
The **BrtPCDIBoolean** record specifies a cache item (section 2.2.5.2.3) that contains a **Boolean** (section 2.5.97.3).



f (1 byte): A **Boolean** that specifies the value of this record.

2.4.722 BrtPCDIDatetime

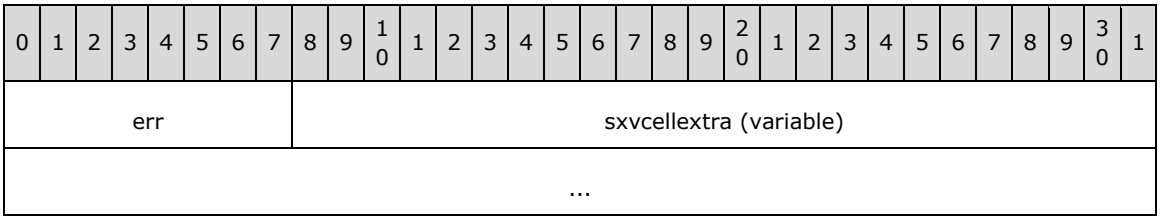
The **BrtPCDIDatetime** record specifies a cache item (section 2.2.5.2.3) that contains a date-time.



datetime (8 bytes): A **PCDIDateTime** (section 2.5.100) that specifies the value of this record.

2.4.723 BrtPCDIError

The **BrtPCDIError** record specifies a cache item (section 2.2.5.2.3) that contains an error and any server formatting information.



err (1 byte): A **BErr** (section 2.5.97.2) that specifies the value of this record.

sxvcellextra (variable): A **PCDISrvFmt** (section 2.5.101) that specifies server formatting information associated with this record. This value MUST exist if and only if this record is part of a collection of records specified by **BrtBeginPCDSDTCEntries** (section 2.4.158) and **BrtEndPCDSDTCEntries** (section 2.4.506).

2.4.724 BrtPCDIIndex

The **BrtPCDIIndex** record specifies a reference to a cache item (section 2.2.5.2.3) or an HTML table.

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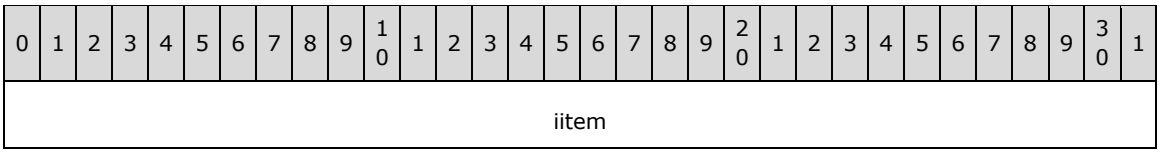
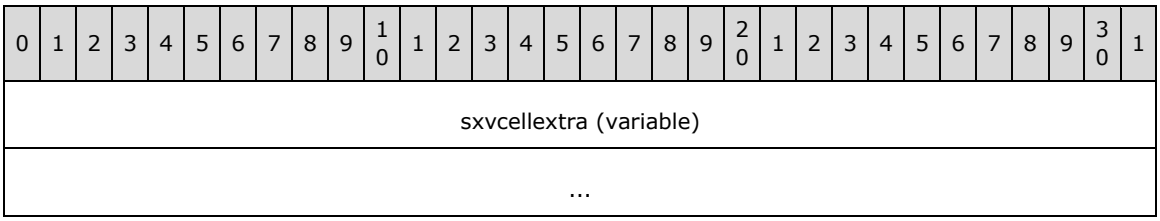


iitem (4 bytes): If this record is part of a collection specified by **BrtBeginEcWpTables** (section 2.4.71), then this is an unsigned integer that specifies an HTML table by its zero-based index (in order of the <table> tags in the HTML page); otherwise, this is an unsigned integer that specifies a zero-based index of the cache item, in the collection of cache items specified by the **BrtBeginPCDFAtbl** (section 2.4.130) record in the cache field (section 2.2.5.2.2) associated with this **BrtPCDIIndex**, as specified by the **PivotCache** (section 2.2.5.2) overview.

2.4.725 BrtPCDIMissing

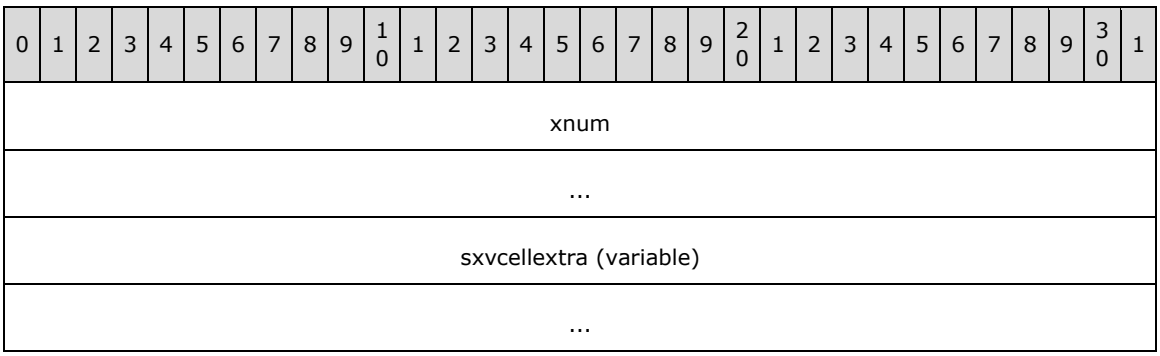
The **BrtPCDIMissing** record specifies a cache item (section 2.2.5.2.3) that has no value and any server formatting information.



sxvcellextra (variable): A **PCDISrvFmt** (section 2.5.101) that specifies server formatting information associated with this record. This value MUST exist if and only if this record is part of a collection of records specified by **BrtBeginPCDSDTCEntries** (section 2.4.158) and **BrtEndPCDSDTCEntries** (section 2.4.506).

2.4.726 BrtPCDINumber

The **BrtPCDINumber** record specifies a cache item (section 2.2.5.2.3) that contains a number and any server formatting information.



xnum (8 bytes): An **Xnum** (section 2.5.171) that specifies the value of this record.

sxvcellextra (variable): A **PCDISrvFmt** (section 2.5.101) that specifies server formatting information associated with this record. This value MUST exist if and only if this record is part of a collection of records specified by **BrtBeginPCDSDTCEntries** (section 2.4.158) and **BrtEndPCDSDTCEntries** (section 2.4.506).

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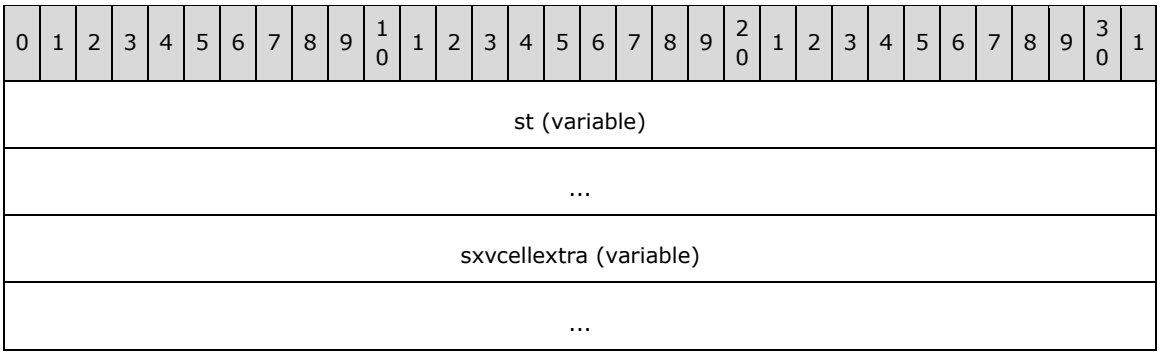
2.4.727 BrtPCDIString

The **BrtPCDIString** record specifies an HTML table name, or a cache item (section 2.2.5.2.3) that contains a string, and any server formatting information.

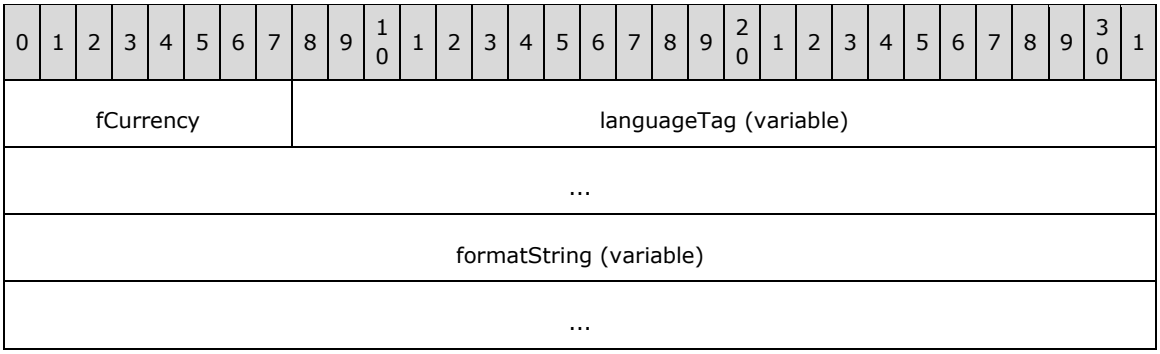


st (variable): If this record is part of a collection specified by **BrtBeginEcWpTables** (section 2.4.71), then this is an **XLWideString** (section 2.5.168) that specifies the name of an HTML table to be retrieved when a **Web query** is refreshed. The length of this string MUST be less than or equal to 255 characters. If this record is not part of a collection specified by **BrtBeginEcWpTables**, then this is an **XLWideString** that specifies the value of this record. If the **bVerCacheCreated** of the preceding **BrtBeginPivotCacheDef** (section 2.4.167) is less than 3, the length of this string MUST be less than or equal to 255 characters; otherwise the length of this string MUST be less than or equal to 32767 characters.

sxvcellextra (variable): A **PCDISrvFmt** (section 2.5.101) that specifies server formatting information associated with this record. This value MUST exist if and only if this record is part of a collection of records specified by **BrtBeginPCDSDTCEntries** (section 2.4.158) and **BrtEndPCDSDTCEntries** (section 2.4.506).

2.4.728 BrtPCDSFCIEntry

The **BrtPCDSFCIEntry** record specifies the **number format** provided by the **OLAP** server for a **cube** value. The number format is either provided in the **formatString** field or by a currency format defined by the application based on the language information specified by the **languageTag** field.



fCurrency (1 byte): A **Boolean** (section 2.5.97.3) that specifies whether this is specified by a currency format or a number format, as specified in the following table.

Value	Meaning
0x00	Specifies that the number format is provided in the **formatString** field.
0x01	Specifies that the currency format is provided in the **languageTag** field.

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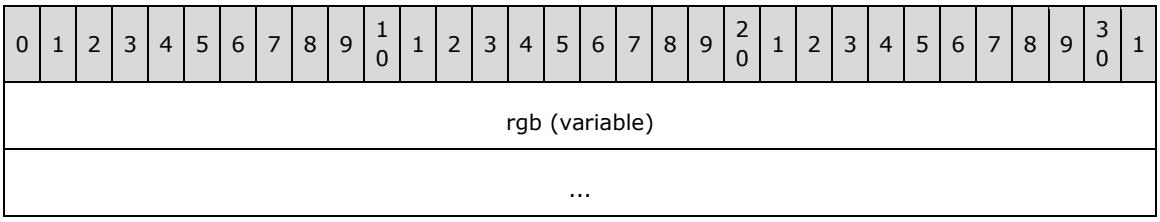
languageTag (variable): An **XLWideString** (section 2.5.168) that specifies the language of the currency format to use. This field MUST exist if and only if the value of **fCurrency** is 1. The length of this string MUST be less than 32 characters. The contents of this string MUST<40> be a language tag as specified by [RFC3066].

formatString (variable): An **XLWideString** that specifies the number format to use. This field MUST exist if and only if the value of **fCurrency** is 0. The length of this string MUST be less than 65536 characters.

For information about the syntax of this number format of this field, see [MSDN-MDXFS].

2.4.729 BrtPCRRecord

The **BrtPCRRecord** record specifies a single cache records (section 2.2.5.2.10).



rgb (variable): A sequence of items that can be values or indexes to cache items (section 2.2.5.2.3). This sequence specifies a single **row** in the source data (section 2.2.5.2.1).

An item in this sequence is a 4-byte unsigned integer that specifies a zero-based index of a cache item in the collection of cache items specified by the **BrtBeginPCDFAtbl** (section 2.4.130) record in the cache field (section 2.2.5.2.2) corresponding to this item, if the cache field corresponding to this item contains cache items. Otherwise, the source data value is stored in this item.

If an item in this sequence is not an index to a cache item, and if the **fNumField** field of the **BrtBeginPCDFAtbl** record for the cache field that corresponds to the source data value of the cache record is equal to 1, then the source data value is stored as an **Xnum** (section 2.5.171).

If an item in this sequence is not an index to a cache item, and if the **fDateInField** field of the **BrtBeginPCDFAtbl** record for the cache field that corresponds to the source data value of the cache record is equal to 1, and the **fHasTextItem** field of the same **BrtBeginPCDFAtbl** record is equal to 0, then the source data value is stored as a **PCDIDateTime** (section 2.5.100).

Otherwise, the source data value of the cache record is stored as an **XLWideString** (section 2.5.168). If the **bVerCacheCreated** of the **BrtBeginPivotCacheDef** (section 2.4.167) of a **PivotCache** (section 2.2.5.2) that this cache record is associated with is less than 3, the length of this string MUST be less than or equal to 255 characters; otherwise the length of this string MUST be less than or equal to 32767 characters.

2.4.730 BrtPCRRecordDt

The **BrtPCRRecordDt** record specifies the beginning of a collection of records as defined by the **PivotCache** Records (section 2.1.7.39) part **ABNF**. This collection of records specifies a single cache record (section 2.2.5.2.10).

2.4.731 BrtPhoneticInfo

The **BrtPhoneticInfo** record specifies the default formatting for **phonetic information** in a **sheet**.

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0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iFnt																phType															
...																phAli															
...																															

iFnt (2 bytes): An unsigned integer that specifies a zero-based index of a **BrtFont** (section 2.4.677) record in the collection of all records directly following **BrtBeginFonts** (section 2.4.88). The referenced **BrtFont** specifies the default **font** for **phonetic text runs** in a sheet.

phType (4 bytes): An unsigned integer that specifies the default **character set** used to display phonetic text runs in a sheet. This value MUST be a value from the following table.

Value	Meaning
0x00000000	The phonetic text run is displayed using the narrow katakana character set. This value is ignored if the text is not Japanese.
0x00000001	The phonetic text run is displayed using the wide katakana character set. This value is ignored if the text is not Japanese.
0x00000002	The phonetic text run is displayed using the hiragana character set. This value is ignored if the text is not Japanese.
0x00000003	No character set conversion is performed to the phonetic text run. Text is displayed as entered.

phAli (4 bytes): An unsigned integer that specifies the default alignment of phonetic text runs in the sheet. This value MUST be a value from the following table.

Value	Meaning
0x00000000	Left justify all characters of all phonetic text runs above the entire base text.
0x00000001	Left justify the characters of each phonetic text run above its **text run**.
0x00000002	Center the characters of each phonetic text run above its text run.
0x00000003	Distribute the characters of each phonetic text run above its text run.

2.4.732 BrtPivotCacheConnectionName

The **BrtPivotCacheConnectionName** record specifies the connection as specified by the record **BrtBeginExtConnection** (section 2.4.79) associated with the pivot cache. The pivot cache MUST be associated with an **OLAP** slicer cache (section 2.2.14.1).

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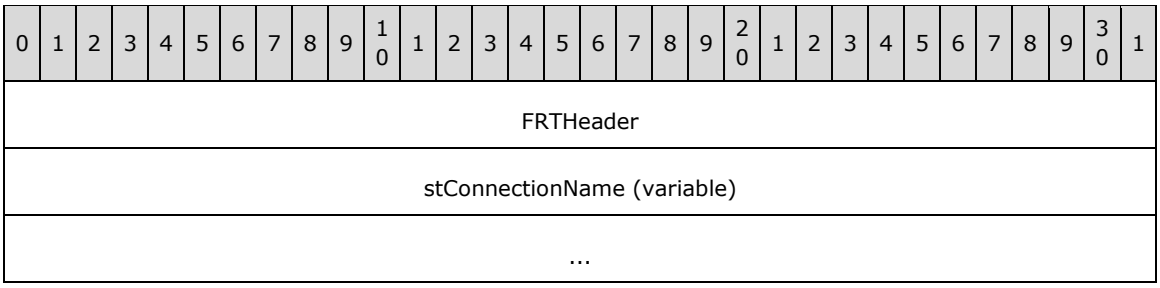


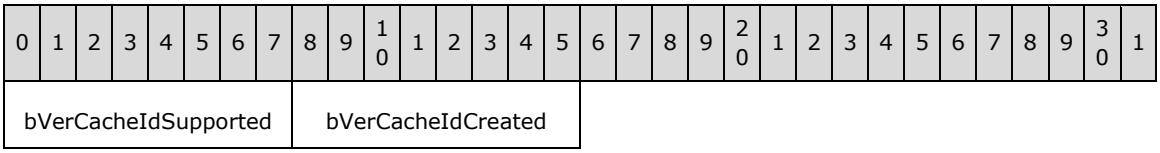
FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

stConnectionName (variable): The name of the connection associated with the pivot cache. It MUST be the same that the field **stConnName** of the **BrtBeginExtConnection** record of the connection associated with this pivot cache.

2.4.733 BrtPivotCacheIdVersion

The **BrtPivotCacheIdVersion** record specifies the application version specific properties of the **PivotCache Definition** (section 2.1.7.38) part type. If this record exists it MUST be preceded by a **BrtBeginPCD2.4.117** (section 2.4.122) record and the **icacheId** field of the preceding **BrtBeginPCD2.4.117** record MUST be equal to one of the following:

- The **pivotCacheId** attribute of the **CT_TimelineState** ([MS-XLSX] section 2.6.116) child element of a **CT_TimelineCacheDefinition** ([MS-XLSX] section 2.6.112) element that specifies a Timeline cache.
- The value of the **cacheId** field of a **BrtBeginSxvcells (**section 2.4.269) record in a PivotTable part that specifies a Non-Worksheet PivotTable (section 2.2.5.5).

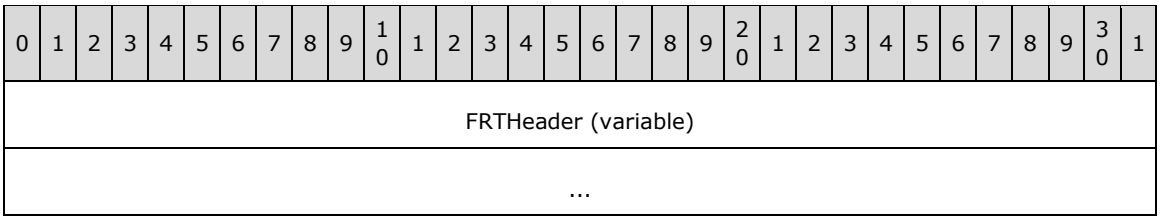


bVerCacheIdSupported (1 byte): A **DataFunctionalityLevel** (section 2.5.28) structure that specifies the minimum data functionality level (section 2.2.5.1) that the applications is required to support to ensure uniqueness of the PivotCache (section 2.2.5.2) identifier.

bVerCacheIdCreated (1 byte): A **DataFunctionalityLevel** (section 2.5.28) structure that specifies the data functionality level (section 2.2.5.1) that the PivotCache (section 2.2.5.2) was created with.

2.4.734 BrtPivotTableRef

The **BrtPivotTableRef** record specifies both a reference to a **PivotTable** (section 2.1.7.40) structure and the beginning of an empty collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF** rules.



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FRTHeader (variable): An **FRTHeader** (section 2.5.60) structure that specifies the future record (section 2.1.6) information for this record.

The **FRTHeader** fields MUST have the values that are listed in the following table.

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	0
FRTHeader.fFormula	0
FRTHeader.fRelID	1

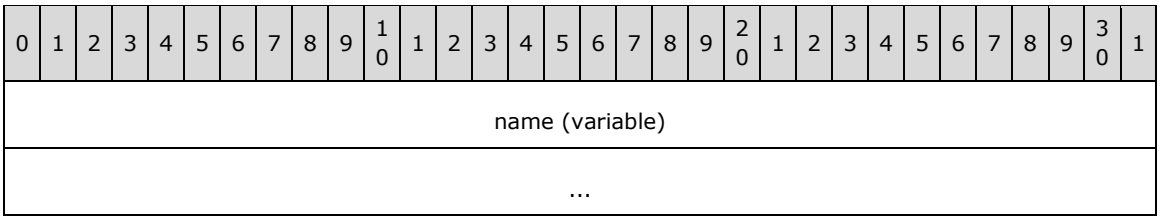
The **FRTHeader.RelID** specifies a relationship (section 2.1.3) that specifies a **PivotCache** part containing a **PivotCache** structure that is used by a Non-Worksheet PivotTable (section 2.2.5.5).

2.4.735 BrtPlaceholderName

The **BrtPlaceholderName** record specifies the name of a **defined name** or an **add-in function** defined by an **XLL** or **COM** automation **add-in**. For COM automation add-in functions only, it also specifies the **ProgID** of the COM **object** that implements the add-in function. (XLL add-in functions do not have their implementing libraries uniquely specified.)

If this record is in a sequence that follows a **BrtSupSame** (section 2.4.797) record, it specifies the name of a defined name. This name is to be matched to the name of a defined name, as specified by a **BrtName** (section 2.4.705) record, that is in the scope of the **active sheet** in the context of the evaluation of the formula (section 2.2.2).

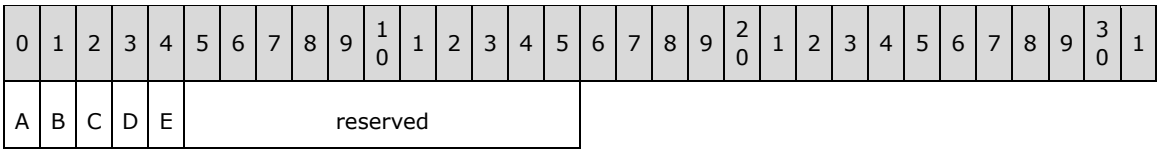
If this record is in a sequence that follows a **BrtSupAddin** (section 2.4.784) record, it specifies the name of a **function** defined by a XLL or COM automation add-in.



name (variable): An **XLNameWideString** (section 2.5.165) that contains the name of a defined name or an add-in function. If this is the name of an add-in function that is implemented by a COM automation add-in, the name MUST be prefixed by the concatenation of the ProgID of that add-in and the Unicode character 0x002E (FULL STOP).

2.4.736 BrtPrintOptions

The **BrtPrintOptions** record specifies options for printing the **sheet**.



A - fHCenter (1 bit): A bit that specifies whether to center the printed content horizontally on the page.

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B - fVCenter (1 bit): A bit that specifies whether to center the printed content vertically on the page.

C - fPrintHeaders (1 bit): A bit that specifies whether to print **row** and **column (1) headers**. If this record is within the **Dialog Sheet** (section 2.1.7.20) part, this value MUST be 0.

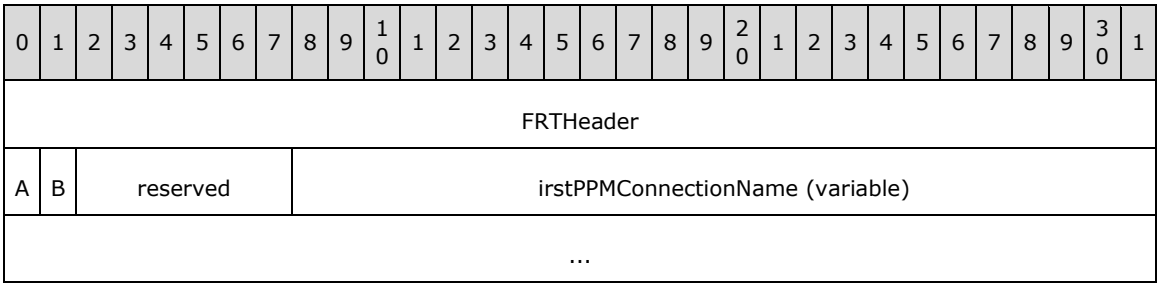
D - fPrintGrid (1 bit): A bit that specifies whether to print **gridlines**.

E - unused (1 bit): This value is undefined and MUST be ignored.

reserved (11 bits): This value MUST be 0, and MUST be ignored.

2.4.737 BrtQsi15

The **BrtQsi15** record specifies the extended properties of **query table**.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

A - fClipped (1 bit): A bit that specifies whether query table did not fit to worksheet and was clipped.

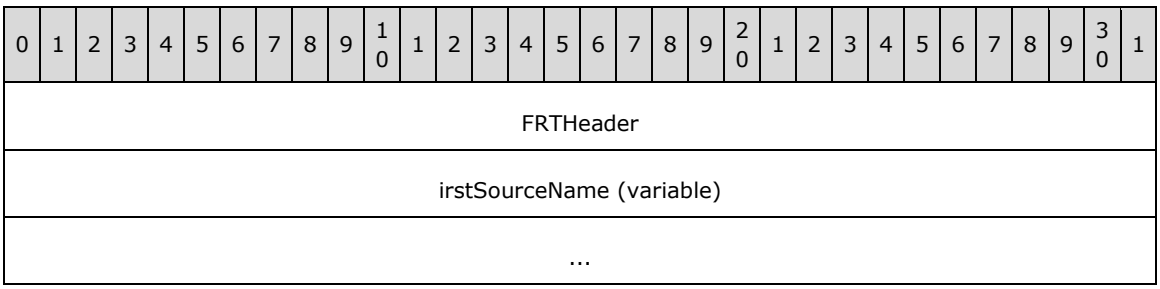
B - fDrillThrough (1 bit): A bit that specifies whether a query table is a result of **drillthrough** operation on **OLAP data source**.

reserved (6 bits): This value MUST be 0, and MUST be ignored.

irstPPMConnectionName (variable): An **XLWideString** (section 2.5.168) that contains the name of the model data source connection (section 2.2.8.9) associated with this query table.

2.4.738 BrtRangePr15

The **BrtRangePr15** record specifies properties of a **model data source worksheet connection** (section 2.2.8.9.3).



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record information (section 2.1.6) for this record.

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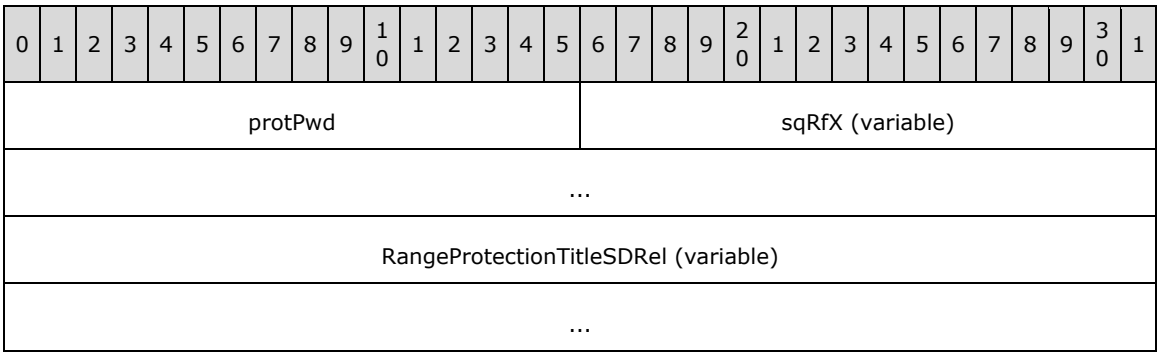
irstSourceName (variable): An **XLNullableWideString** (section 2.5.166) that specifies the string identifier of the source cell range for this connection. The string length MUST be less than or equal to 65,535 characters.

2.4.739 BrtRangeProtection

The **BrtRangeProtection** record specifies a **cell range** to be protected. The cell range is editable with a password or proper **credentials** when **sheet protection** is on and the cell is **locked**.



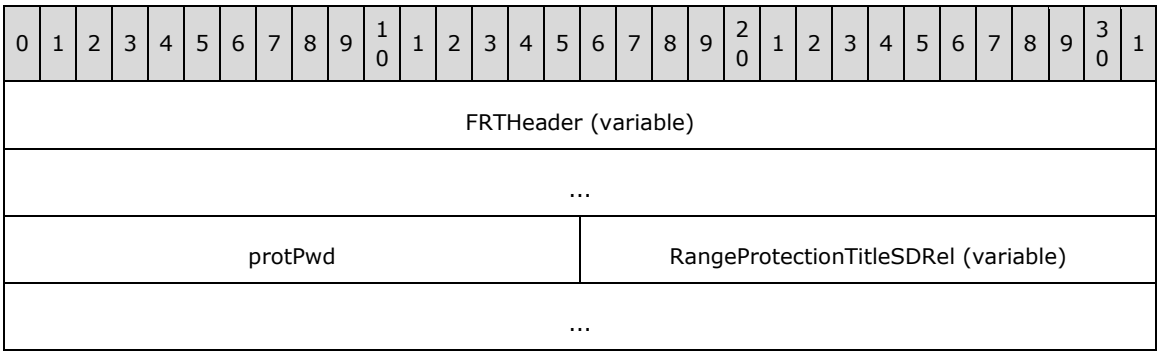
protPwd (2 bytes): An unsigned integer that specifies the verifier value of the password required for editing the cell range. If the value is 0x0000 then there is no password. For details on the algorithm to generate the value, see Password Verifier Algorithm (section 2.2.9).

sqRfX (variable): An **UncheckedSqRfX** (section 2.5.155) that specifies the cell range to be protected. **sqRfX.crfx** MUST be greater than 0 and less than 8192.

RangeProtectionTitleSDRel (variable): A **RangeProtectionTitleSDRel** (section 2.5.112) that specifies the title of the cell range and the **security descriptor**.

2.4.740 BrtRangeProtection14

The **BrtRangeProtection14** record specifies a **cell range** to be unprotected. The cell range is editable with a password or proper **credentials** when **sheet protection** is on and the cell is **locked**. This record is equivalent to **BrtRangeProtection** (section 2.4.739) record but allows for 8192 or more cell ranges to be specified.



FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the future record (section 2.1.6) information for this record.

The **FRTHeader** field flags MUST have the values listed in the following table:

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Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	1
FRTHeader.fFormula	0
FRTHeader.fRelID	0

The **FRTHeader.rgSqrefs.csqref** MUST equal 1.

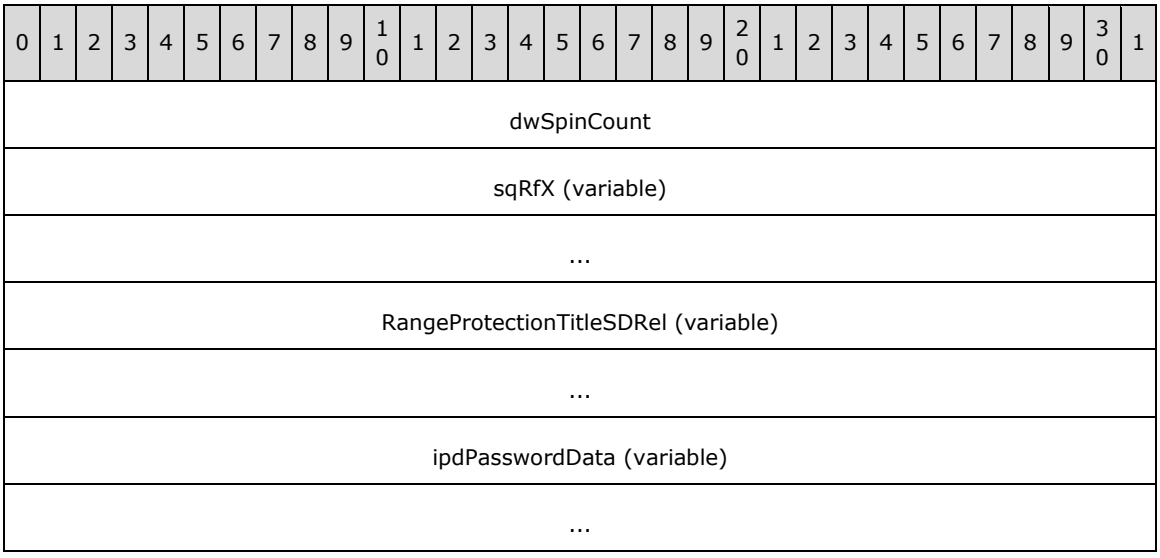
The **sqrfx** of the single **FRTSqref** (section 2.5.65) field comprising the **array** of the **FRTHeader.rgSqrefs** specifies the cell range to be unprotected and the value of the **sqrfx.crfx** field MUST be equal to or greater than 8192.

protPwd (2 bytes): An unsigned integer that specifies the verifier value of the password required for editing the cell range. If the field value is 0x0000 then there is no password. For details on the algorithm to generate the value, see Password Verifier Algorithm (section 2.2.9).

RangeProtectionTitleSDRel (variable): A **RangeProtectionTitleSDRel** (section 2.5.112) that specifies the title of the cell range and the **security descriptor**.

2.4.741 BrtRangeProtectionIso

The **BrtRangeProtectionIso** record specifies a **cell range** that can be unprotected in a format compatible with ISO/IEC 29500 cell range protection records as specified in [ISO/IEC29500-1:2016], section 18.3.1.71. The cell range is editable with a password or proper **credentials** when **sheet protection** is on and the cell is **locked**. A **BrtRangeProtectionIso** record MUST be immediately followed by a **BrtRangeProtection** (section 2.4.739) record whose **protPwd** field value MUST be set to 0x0000 and whose **sqRfX** and **RangeProtectionTitleSDRel** field values MUST be the same as the values of the fields with the same names in the **BrtRangeProtectionIso** record.



dwSpinCount (4 bytes): An unsigned 32-bit integer that specifies the number of times that the hash function was iterated over the password to generate the **rgbHash** field of **ipdPasswordData**, as described in the Strong Password Verifier Algorithm (section 2.2.10). The value of the **dwSpinCount** field MUST NOT be greater than 10,000,000.

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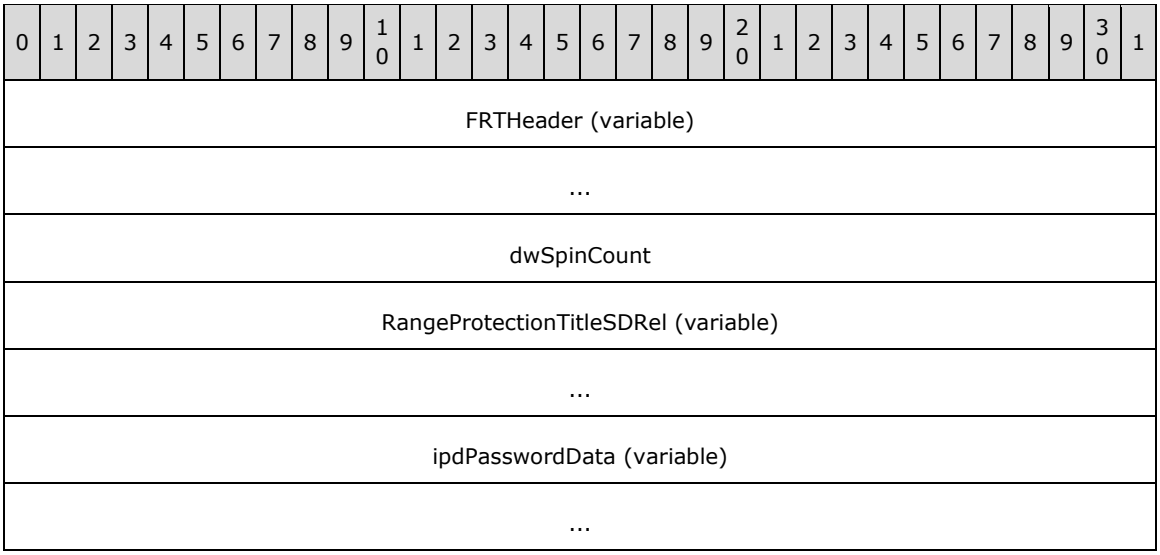
sqRfX (variable): An **UncheckedSqRfX** (section 2.5.155) that specifies the cell range to be protected. The value of the **sqRfX.crfx** field MUST be greater than 0. It MUST have the same value as the **sqRfX** field in the following **BrtRangeProtection** (section 2.4.739) record.

RangeProtectionTitleSDRel (variable): A **RangeProtectionTitleSDRel** (section 2.5.112) that specifies the title of the cell range and the **security descriptor**.

ipdPasswordData (variable): An **IsoPasswordData** (section 2.5.79) that specifies the **salt**, hash algorithm and password hash of the password required for editing the cell range, calculated using the Strong Password Verifier Algorithm (section 2.2.10). The size of the **rgbHash** member of this field MUST NOT be zero.

2.4.742 BrtRangeProtectionIso14

The **BrtRangeProtectionIso14** record specifies a **cell range** that can be unprotected in a format compatible with ISO/IEC 29500 cell range protection records as specified in [ISO/IEC29500-1:2016], section 18.3.1.71. The cell range is editable with a password or proper **credentials** when **sheet protection** is on and the cell is **locked**. A **BrtRangeProtectionIso14** record MUST be immediately followed by a **BrtRangeProtection14** (section 2.4.740) record whose **protPwd** field value MUST be set to 0x0000 and whose **FRTHeader** and **RangeProtectionTitleSDRel** fields MUST have the same values as the fields of the same names in the **BrtRangeProtectionIso14** record.



FRTHeader (variable): An **FRTHeader** that specifies the future record (section 2.1.6) information for this record.

The **FRTHeader** flags MUST have the values listed in the following table:

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	1
FRTHeader.fFormula	0
FRTHeader.fRelID	0

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The **FRTHeader.rgSqrefs.csqref** MUST equal 1.

The **sqrfx** field of the single **FRTSqref** (section 2.5.65) structure, which comprises an **array** of **FRTHeader.rgSqrefs** fields, specifies the cell range that can be unprotected. The value of the **sqrfx.crfx** MUST be equal to or greater than 8192.

dwSpinCount (4 bytes): An unsigned 32-bit integer that specifies the number of times that the hash function was iterated over the password to generate the **rgbHash** field of **ipdPasswordData**, as described in the Strong Password Verifier Algorithm (section 2.2.10). It MUST NOT be greater than 10,000,000.

RangeProtectionTitleSDRel (variable): A **RangeProtectionTitleSDRel** (section 2.5.112) that specifies the title of the cell range and the **security descriptor**.

ipdPasswordData (variable): An **IsoPasswordData** (section 2.5.79) that specifies the **salt**, hash algorithm and password hash of the password required for editing the cell range, calculated using the Strong Password Verifier Algorithm. The size of the **rgbHash** member of this field MUST NOT be zero.

2.4.743 brtRevisionPtr

The **brtRevisionPtr** record specifies metadata supporting runtime scenarios for Microsoft Excel. It MUST be ignored and MUST NOT be written by all others.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
xrevidLastSaved																															
...																															
documentId (variable)																															
...																															
CoauthVersionLast																															
CoauthVersionMax																															
uidLastSave (16 bytes)																															
...																															
...																															

xrevidLastSaved (8 bytes): An unsigned integer value that SHOULD be ignored.

documentId (variable): An **XLWideString** (section 2.5.168) that SHOULD be ignored.

CoauthVersionLast (4 bytes): An unsigned integer value that SHOULD be ignored.

CoauthVersionMax (4 bytes): An unsigned integer value that SHOULD be ignored.

uidLastSave (16 bytes): A **GUID** as specified by [MS-DTYP] section 2.3.4 that SHOULD be ignored.

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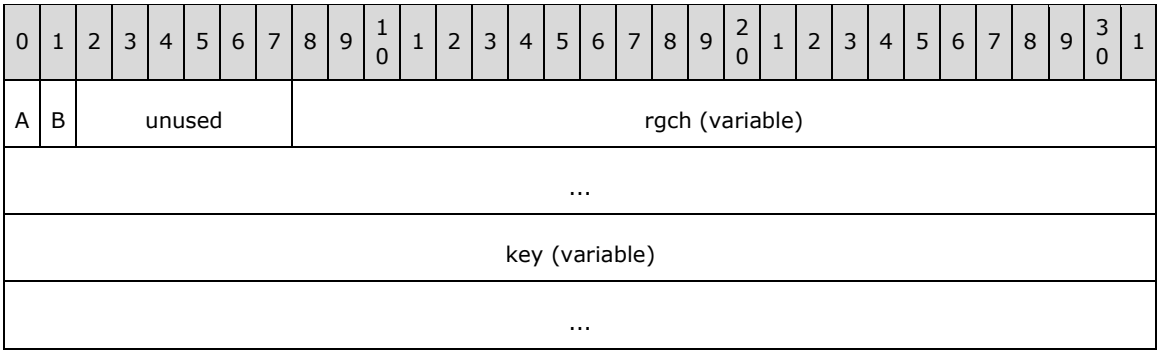
2.4.744 BrtRichFilter

The **BrtRichFilter** record specifies a **filter** associated with **rich values**.



A - fNoData (1 bit): A bit that specifies whether the filter includes values that do not have the specified **key**.

B - fBlank (1 bit): A bit that specifies whether the filter criterion includes blank values.

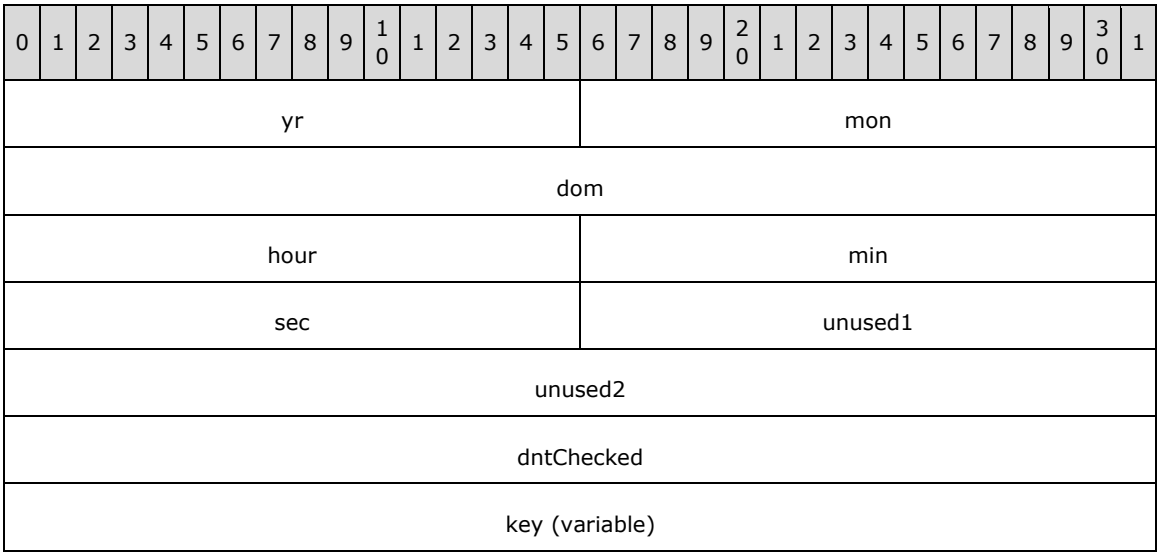
unused (6 bits): This value is undefined and MUST be ignored.

rgch (variable): An **XLWideString** (section 2.5.168) that specifies the criteria string used in the filter. The value of this field MUST be greater than or equal to 1 character in length and less than or equal to 32767 characters in length.

key (variable): An **XLWideString** (section 2.5.168) that specifies the **rich value key** for which the filter is defined. This string MUST be less than or equal to 255 characters in length.

2.4.745 BrtRichFilterDateGroupItem

The BrtRichFilterDateGroupItem record specifies information about a criterion for a date **filter** associated with **rich values**.



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…

yr (2 bytes): An unsigned integer that specifies the year for the filter. This value MUST be greater than or equal to 1000 and less than or equal to 9999.

mon (2 bytes): An unsigned integer that specifies the month for the filter. If **dntChecked** is greater than or equal to 0x00000001, this value MUST be greater than or equal to 1 and less than or equal to 12.

dom (4 bytes): An unsigned integer that specifies the day of the month for the filter. If **dntChecked** is greater than or equal to 0x00000002, this value MUST be greater than or equal to 1 and less than or equal to 31.

hour (2 bytes): An unsigned integer that specifies the hour for the filter. If **dntChecked** is greater than or equal to 0x00000003, this value MUST be less than or equal to 23.

min (2 bytes): An unsigned integer that specifies the minute for the filter. If **dntChecked** is greater than or equal to 0x00000004, this value MUST be less than or equal to 59.

sec (2 bytes): An unsigned integer that specifies the second for the filter. If **dntChecked** is equal to 0x00000005, this value MUST be less than or equal to 59.

unused1 (2 bytes): Undefined and MUST be ignored.

unused2 (4 bytes): Undefined and MUST be ignored.

dntChecked (4 bytes): An unsigned integer that specifies what comparisons are made to determine if a cell is displayed. For example, if this value is equal to DNTMONTH, only values with the same year and month specified in this record are displayed. **dntChecked** MUST be equal to a value from the following table.

Name	Value	Meaning
DNTYEAR	0x00000000	Group by year
DNTMONTH	0x00000001	Group by month and year
DNTDAY	0x00000002	Group by day, month, and year
DNTHOUR	0x00000003	Group by hour, day, month, and year
DNTMINUTE	0x00000004	Group by minute, hour, day, month, and year
DNTSECOND	0x00000005	Group by second, minute, hour, day, month, and year

key (variable): An **XLWideString** (section 2.5.168) that specifies the **rich value key** for which the filter is defined. This string MUST be less than or equal to 255 characters in length.

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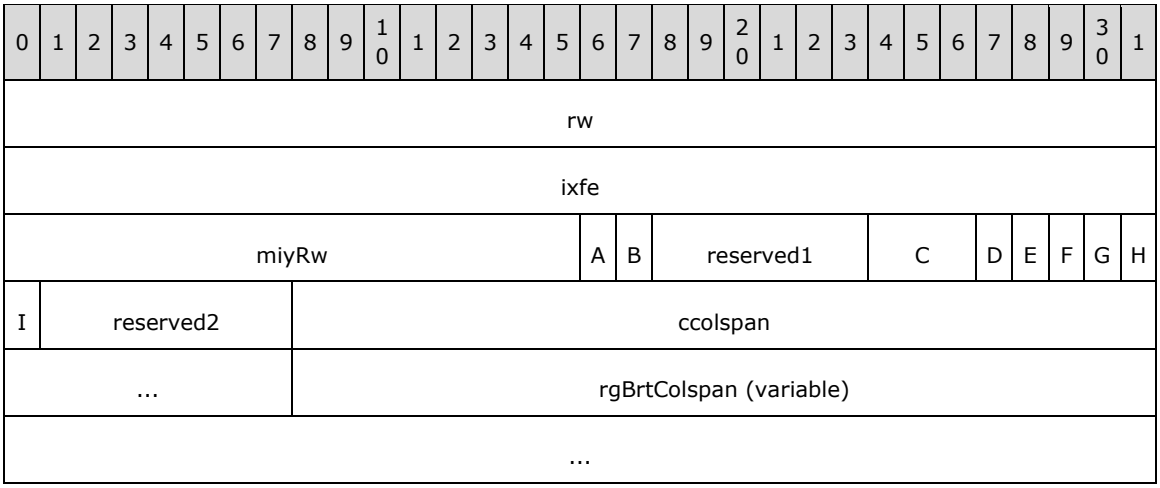
2.4.746 BrtRowHdr

The **BrtRowHdr** record specifies **row** information and specifies the beginning of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62) and **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies the beginning of a new row.



rw (4 bytes): A **Rw** (section 2.5.125) that specifies the index of the row this record represents. The value of this field MUST be less than 0x00100000 (1048576) and MUST be greater than the value of the **rw** field in any other **BrtRowHdr** (section 2.4.746) records on the same **sheet** that are specified before this record.

ixfe (4 bytes): An unsigned integer that specifies a zero-based index of a **BrtXF** (section 2.4.845) record in the collection of all records directly following the **BrtBeginCellXFs** (section 2.4.21) record in the styles (section 2.1.7.50) part. The referenced **BrtXF** specifies the format to apply as the default format for the row. This value MUST be less than the value of the **cxfs** field of the **BrtBeginCellXFs** record in the styles part. MUST be ignored if the value of the **fGhostDirty** field is 0.

miyRw (2 bytes): An unsigned integer that specifies the height of the row in **twips**. The value of this field MUST be less than or equal to 0x2000 (8192) and MUST be ignored if the value of the **fUnsynced** field is 0.

A - fExtraAsc (1 bit): A bit that specifies whether to allocate padding for the top of this row for a thick top **cell border**.

B - fExtraDsc (1 bit): A bit that specifies whether to allocate padding for the bottom of this row. This padding is for either a medium or thick bottom cell border.

reserved1 (6 bits): The value of this field MUST be 0, and MUST be ignored.

C - iOutLevel (3 bits): An unsigned integer that specifies the **outline level** for this row.

D - fCollapsed (1 bit): A bit that specifies whether the preceding rows, which have an **iOutLevel** field value greater than the **iOutLevel** field value of this row, are in the **collapsed outline state**.

E - fDyZero (1 bit): A bit that specifies whether this row is **hidden**.

F - fUnsynced (1 bit): A bit that specifies whether the row height has been manually specified.

G - fGhostDirty (1 bit): A bit that specifies whether the row **style** as specified by the **ixfe** field is applied.

H - fReserved (1 bit): The value of this field MUST be 0, and MUST be ignored.

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I - fPhShow (1 bit): A bit that specifies whether the cells in this row default to having the **phonetic guide** enabled.<41>

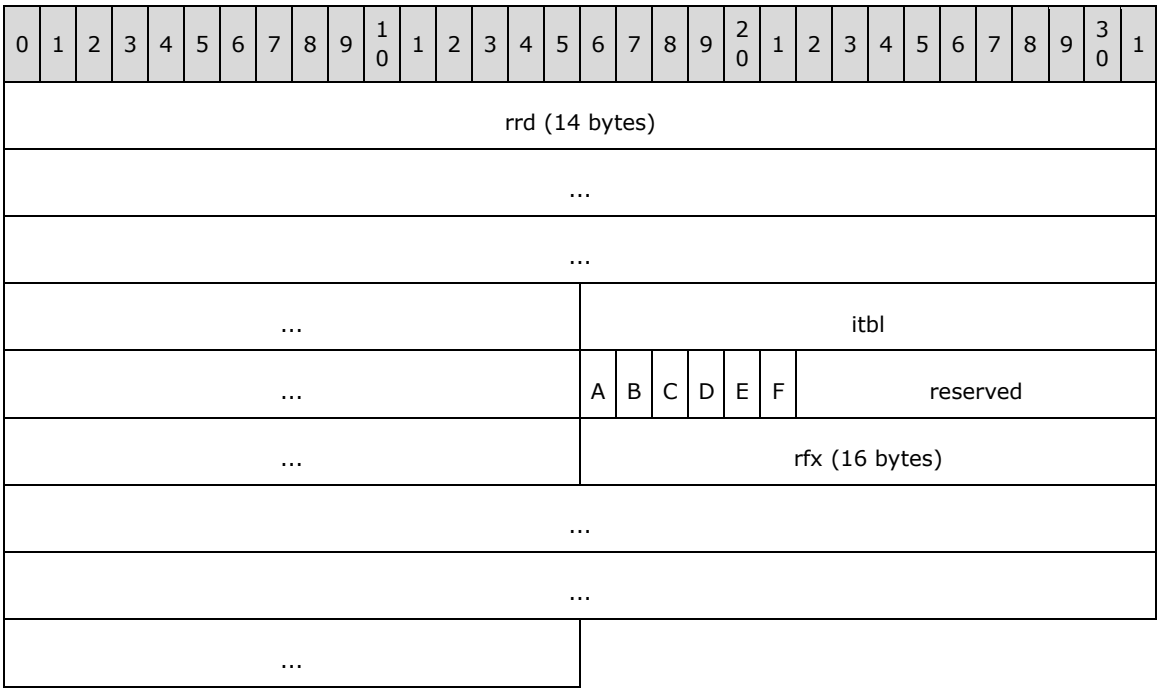
reserved2 (7 bits): The value of this field MUST be 0, and MUST be ignored.

ccolspan (4 bytes): An unsigned integer that specifies the number of **BrtColSpan** (section 2.5.8) elements in **rgBrtColspan**. The value of this field MUST be less than or equal to 16.

rgBrtColspan (variable): An array of **BrtColSpan** structures that specify the permissible locations for cells within this row. Cells within this row MUST have a **column (1)** value within the **range** specified by the union of all of the elements of this array.

2.4.747 BrtRRAutoFmt

The **BrtRRAutoFmt** record specifies a revision record (section 2.2.12.4) of a change in **AutoFormat** information for a **table**.



rrd (14 bytes): An **RRd** (section 2.5.123) record with the following stipulation:

Field	Restriction
rrd.revt	MUST be 0x000C (**REVTAUTOFMT**). See section 2.5.116 for definition.

itbl (4 bytes): A signed integer that specifies which table AutoFormat to apply. The value corresponds to the values specified by **AutoFormatID** (section 2.5.3). The value of this field MUST be greater than or equal to 0, and it MUST be less than or equal to 20.

A - fAtrNum (1 bit): A bit that specifies whether to apply legacy table AutoFormat number properties.

B - fAtrFnt (1 bit): A bit that specifies whether to apply legacy table AutoFormat **font** properties.

C - fAtrAlc (1 bit): A bit that specifies whether to apply legacy table AutoFormat alignment properties.

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D - fAtrBdr (1 bit): A bit that specifies whether to apply legacy table AutoFormat **border** properties.

E - fAtrPat (1 bit): A bit that specifies whether to apply legacy table AutoFormat pattern properties.

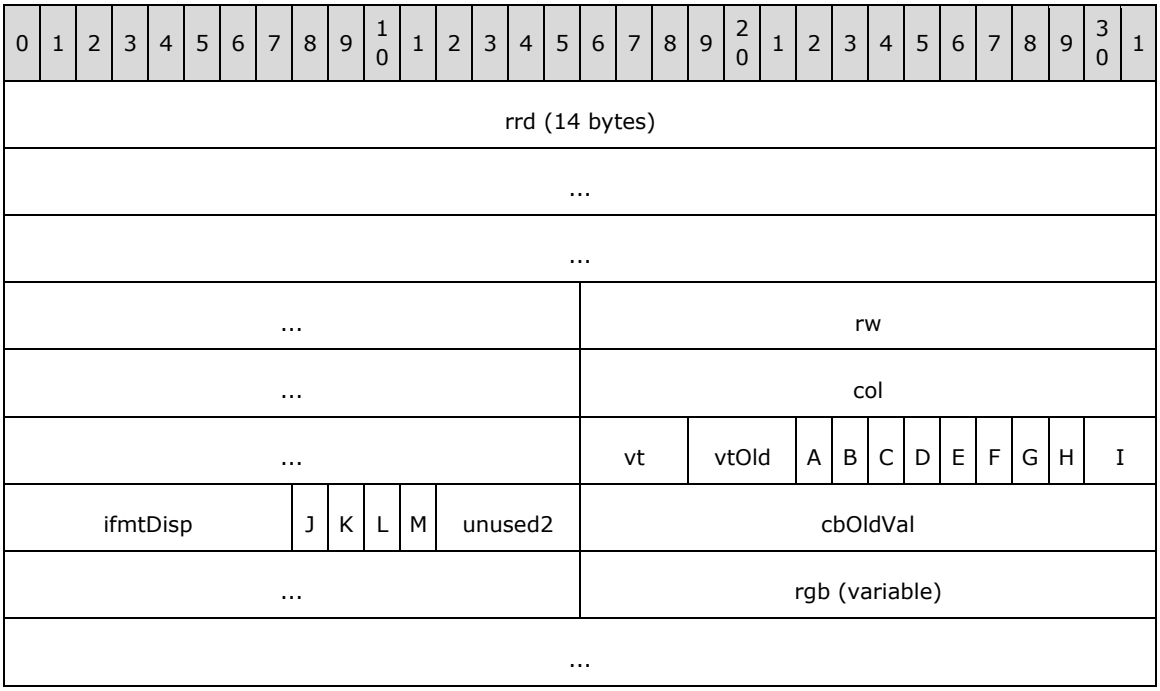
F - fAtrWidth (1 bit): A bit that specifies whether to apply legacy table AutoFormat width and height properties.

reserved (26 bits): The value of this field MUST be 0 and MUST be ignored.

rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the **range** of **cells** this record applies to.

2.4.748 BrtRRChgCell

The **BrtRRChgCell** record specifies properties of changes to a **cell** that have moved and specifies the beginning of a collection of records as defined by the **Revision Log** (section 2.1.7.44) part **ABNF**. The collection of records specifies changes to a cell.



rrd (14 bytes): An **RRd** (section 2.5.123) record with the following stipulations:

Field	Restrictions
rrd.revt	MUST be 0x0008 (**REVTCHANGECELL**). See section 2.5.116 for definition.
rrd.reserved2	MUST be 0 and MUST be ignored.

rw (4 bytes): An **UncheckedRw** (section 2.5.154) structure that specifies the **row** of the cell.

col (4 bytes): An **UncheckedCol** (section 2.5.152) structure that specifies the **column (1)** of the cell.

vt (3 bits): An unsigned integer that specifies the type of value in the new cell contents. The value of this field MUST be one of the following values:

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Value	Description
0x0	Specifies a blank cell
0x1	Specifies a **RkNumber** (section 2.5.122) value
0x2	Specifies a constant real number value
0x3	Specifies a string value
0x4	Specifies a Boolean or error value
0x5	Specifies an **expression**

vtOld (3 bits): An unsigned integer that specifies the type of value in the old cell contents. The value of this field MUST be one of the values as specified by the **vt** field.

A - f123Prefix (1 bit): A bit that specifies whether a single quote prefix is used. A single quote prefix causes the cell contents to be treated as a string. This value applies only if **vt** is 0x3.

B - reserved (1 bit): The value of this field MUST be 0 and MUST be ignored.

C - fOldFmt (1 bit): A bit that specifies whether old formatting information is available for this cell. If this value is 1 and **fOldFmtNull** is 0, then the next **BrtBeginDXFs** (section 2.4.57) record specifies the old formatting.

D - fOldFmtNull (1 bit): A bit that specifies if the old formatting information is empty. The value of this field MUST be ignored if the value of the **fOldFmt** field is 0. If the value of the **fOldFmt** field is 1 and this value is 0, then the next **BrtBeginDXFs** record specifies the old formatting.

E - fXfDxf (1 bit): A bit that specifies that the affected cells have their format reset to the format defined by the current **style** before applying any format from the **BrtDXF** (section 2.4.354) record, if present.

F - fStyXfDxf (1 bit): A bit that specifies that the format of the cell needs to be cleared before applying any format from the **BrtDXF** record, if present.

G - fDxf (1 bit): A bit that specifies whether there was a formatting change for this cell. If this value is 1 and **fDxfNull** is 0, then there MUST be a **BrtBeginDXFs** record sequence that specifies the new formatting. If **fOldFmt** is 1 and **fOldFmtNull** is 0, then the formatting change will be the second **BrtBeginDXFs** record sequence. Otherwise, it will be the next **BrtBeginDXFs** record sequence.

H - fDxfNull (1 bit): A bit that specifies whether the new formatting information is empty. The value of this field MUST be ignored if value of the **fDxf** field is 0. If the value of the **fDxf** field is 1, and this value is 0, then there MUST be a **BrtBeginDXFs** record sequence that specifies the new formatting. If the value of the **fOldFmt** field is 1 and the value of the **fOldFmtNull** field is 0, then the formatting change will be the second **BrtBeginDXFs** record sequence. Otherwise, it will be the next **BrtBeginDXFs** record sequence.

I - unused1 (2 bits): Undefined and MUST be ignored.

ifmtDisp (8 bits): An **Ifmt** (section 2.5.76) that specifies the **number format** for this cell. MUST be one of the built-in number formats whose identifier is less than or equal to 59.

J - fPhShow (1 bit): A bit that specifies whether the new contents of the cell contain **phonetic information**.

K - fPhShowOld (1 bit): A bit that specifies whether the old contents of the cell contain phonetic information.

L - fEOLFmlaUpdate (1 bit): A bit that specifies whether this cell was changed because of an automatic update to the formula (section 2.2.2).

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M - fHaveOldCell (1 bit): A bit that specifies whether the old cell contents are specified by the next set of records. If this value is 0, then the next record represents the new cell contents. Otherwise, there will be two sets of cell records, of which the first is the old cell contents and the second is the new cell contents.

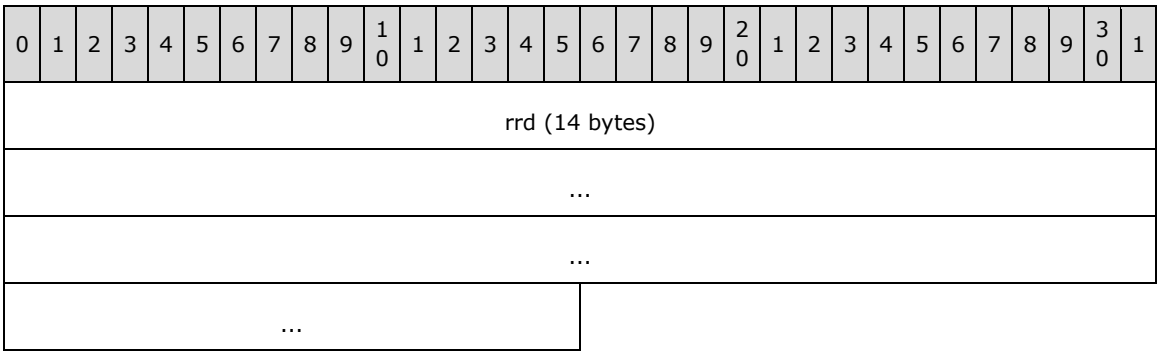
unused2 (4 bits): Undefined and MUST be ignored.

cbOldVal (4 bytes): A signed integer that MUST be ignored. If this value is greater than 0, the value of the **fHaveOldCell** field MUST be 1.

rgb (variable): An **SqEtxp** (section 2.5.137) that specifies **font** information for this record.

2.4.749 BrtRRConflict

The **BrtRRConflict** record specifies that the revision log (section 2.1.7.44) entry which has the same **rrd.revid** as this **BrtRRConflict** record was undone as the result of a conflict resolution.

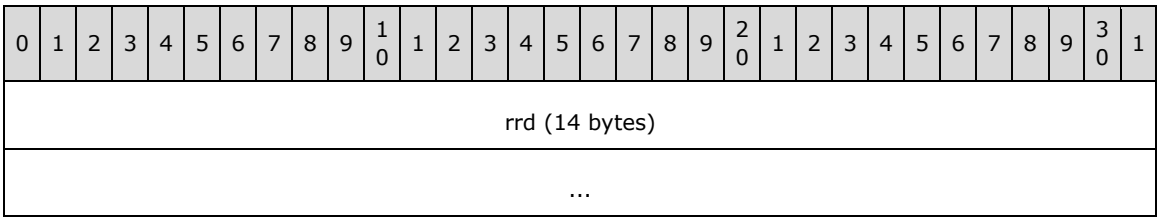


rrd (14 bytes): An **RRd** (section 2.5.123) that specifies common **revision** information for this record. **rrd** has the following additional stipulations:

Field	Restrictions
rrd.revt	MUST be 0x0025 (**REVTCONFLICT**). See section 2.5.116 for definition.
rrd.revid	MUST be greater than 0.
rrd.fAccepted	MUST be the same as **fUndoAction**<42>.
rrd.fUndoAction	When true, specifies this revision occurred because another revision was rejected, and therefore undone.
rrd.reserved1	MUST be 0 and MUST be ignored.
rrd.reserved2	MUST be 0 and MUST be ignored.
rrd.tabid	MUST NOT be 0xFFFF.

2.4.750 BrtRRDefName

The **BrtRRDefName** record specifies a revision record (section 2.2.12.4) associated with a change to a **defined name**.



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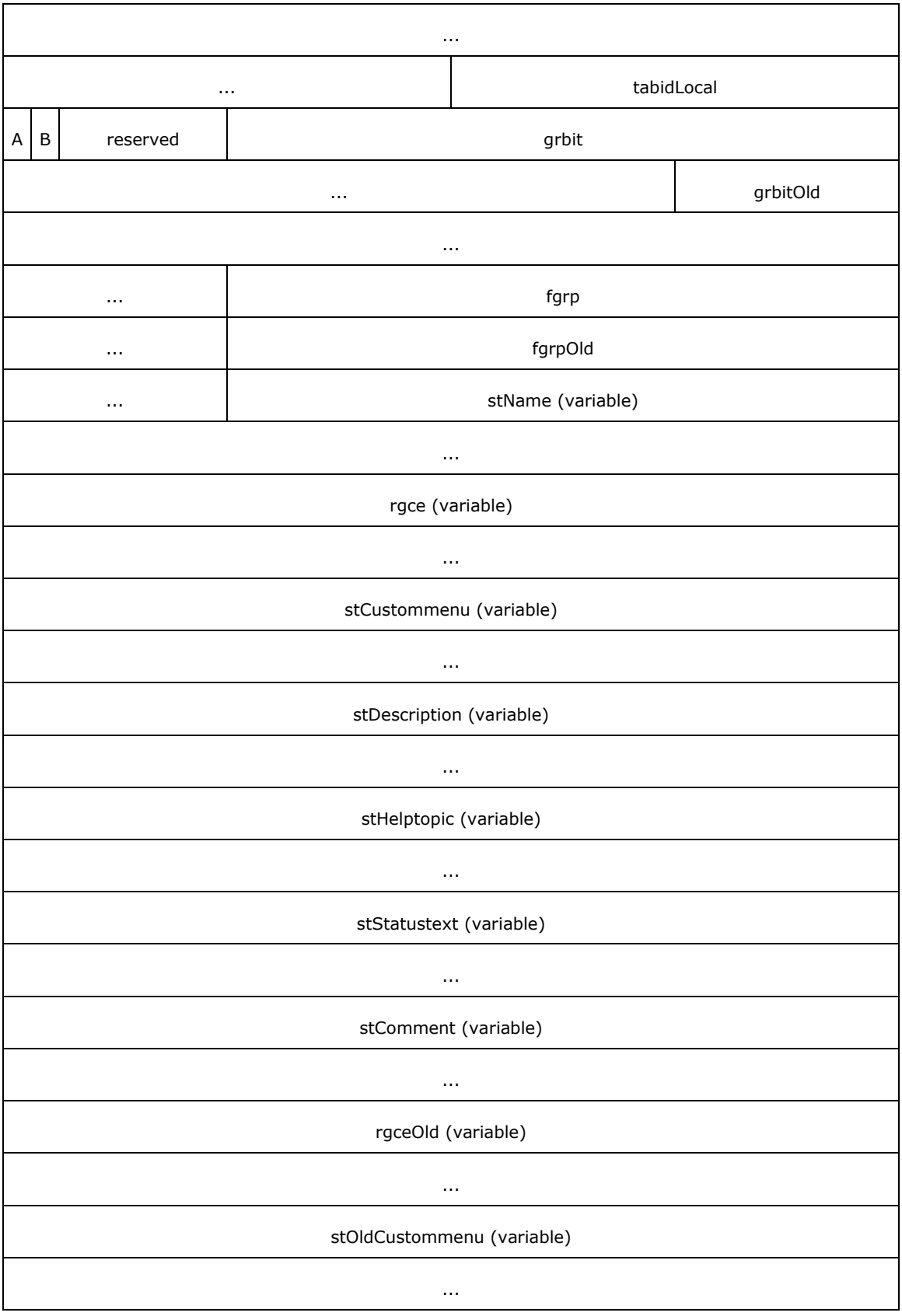

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stOldDescription (variable)
...
stOldHelptopic (variable)
...
stOldStatustext (variable)
...
stOldComment (variable)
...

rrd (14 bytes): A **RRd** (section 2.5.123) that specifies shared **revision** data for this revision record (section 2.2.12.4). The **rrd** field has the following additional stipulations:

Field	Restrictions
rrd.revt	Field value MUST be 0x000A (**REVTDEFNAME**) or 0x0022 (**REVTOLDNAME**). See section 2.5.116 for definitions.
rrd.revid	Field value MUST be greater than or equal to 0.
rrd.reserved2	Field value MUST be 0 and MUST be ignored.

tabidLocal (2 bytes): A signed integer that specifies the identifier of the **sheet** to which this defined name belongs. If the value of this field is not equal to 0xFFFF, then this value is defined in a sheet scope and MUST be equal to an **iTabID** field value from the **BrtBeginBundleShs** (section 2.4.13) collection. The value 0xFFFF means that the defined name does not belongs to any sheet.

A - fViewName (1 bit): A bit that specifies whether this **named range** belongs to a **custom view**.

B - fBuiltin (1 bit): A bit that specifies whether the name is a **built-in name**.

reserved (6 bits): The value of this field MUST be 0 and MUST be ignored.

grbit (6 bytes): A **RRdDnGrbit** (section 2.5.124) that specifies data for the new state of the defined name for this record.

grbitOld (6 bytes): A **RRdDnGrbit** that specifies data for the old state of the defined name for this record.

fgrp (4 bytes): A **FnGroupID** (section 2.5.51) that specifies the **fgrp** field of **RRdDnGrbit**. The value of this field MUST be the same as the value of the **fgrp** field from **grbit**.

fgrpOld (4 bytes): A **FnGroupID** that specifies the function group identifier of the old name, which corresponds to the **fgrp** field of **RRdDnGrbit**. The value of this field MUST be the same as the value of the **fgrp** field from **grbitOld**.

stName (variable): An **XLWideString** (section 2.5.168) that specifies the name for the new defined name. The length of this string MUST be less than or equal to 255. This field has the same meaning as the **name** field of **BrtName** (section 2.4.705).

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rgce (variable): A **NameParsedFormula** (section 2.5.97.12) that specifies the formula (section 2.2.2) of the new name.

stCustommenu (variable): A **XLNullableWideString** (section 2.5.166) that specifies the new custom menu text. The length of this string MUST be less than or equal to 32767. This field MUST be NULL if the value of the **fCustommenu** field from **grbit** is 0.

stDescription (variable): An **XLNullableWideString** that specifies the new description text. The length of this field MUST be less than or equal to 32767. This field MUST be NULL if the value of the **fDescription** field from **grbit** is 0.

stHelptopic (variable): An **XLNullableWideString** that specifies the new help text. The length of this field MUST be less than or equal to 32767. This field MUST be NULL if the value of the **fHelptopic** field from **grbit** is 0.

stStatustext (variable): An **XLNullableWideString** that specifies the new status bar text. The length of this field MUST be less than or equal to 32767. This field MUST be NULL if the value of the **fStatustext** field from **grbit** is 0.

stComment (variable): An **XLNullableWideString** that specifies the new **comment** text. The length of this field MUST be less than or equal to 255.

rgceOld (variable): A **NameParsedFormula** that specifies the formula of the old name.

stOldCustommenu (variable): An **XLNullableWideString** that specifies the old custom menu text. The length of this field MUST be less than or equal to 32767. This field MUST be NULL if the value of the **fCustommenu** field from **grbitOld** is 0.

stOldDescription (variable): An **XLNullableWideString** that specifies the old description text. The length of this field MUST be less than or equal to 32767. This field MUST be NULL if the value of the **fDescription** field from **grbitOld** is 0.

stOldHelptopic (variable): An **XLNullableWideString** that specifies the old help text. The length of this field MUST be less than or equal to 32767. This field MUST be NULL if the value of the **fHelptopic** field from **grbitOld** is 0.

stOldStatustext (variable): An **XLNullableWideString** that specifies the old status bar text. The length of this field MUST be less than or equal to 32767. This field MUST be NULL if the value of the **fStatustext** field from **grbitOld** is 0.

stOldComment (variable): An **XLNullableWideString** that specifies the old comment text. The length of this field MUST be less than or equal to 255.

2.4.751 BrtRREndChgCell

The **BrtRREndChgCell** record specifies the end of a collection of records as defined by the **Revision Log** (section 2.1.7.44) part **ABNF**. The collection of records specifies changes to a **cell**.

2.4.752 BrtRREndFormat

The **BrtRREndFormat** record specifies the end of a collection of records as defined by the **Revision Log** (section 2.1.7.44) part **ABNF**. The collection of records specifies a formatting change that has been applied to a **shared workbook**.

2.4.753 BrtRREndInsDel

The **BrtRREndInsDel** record specifies the end of a collection of records as defined by the **Revision Log** (section 2.1.7.44) part **ABNF**. The collection of records specifies a row insert, row delete, column insert, or row delete operation.

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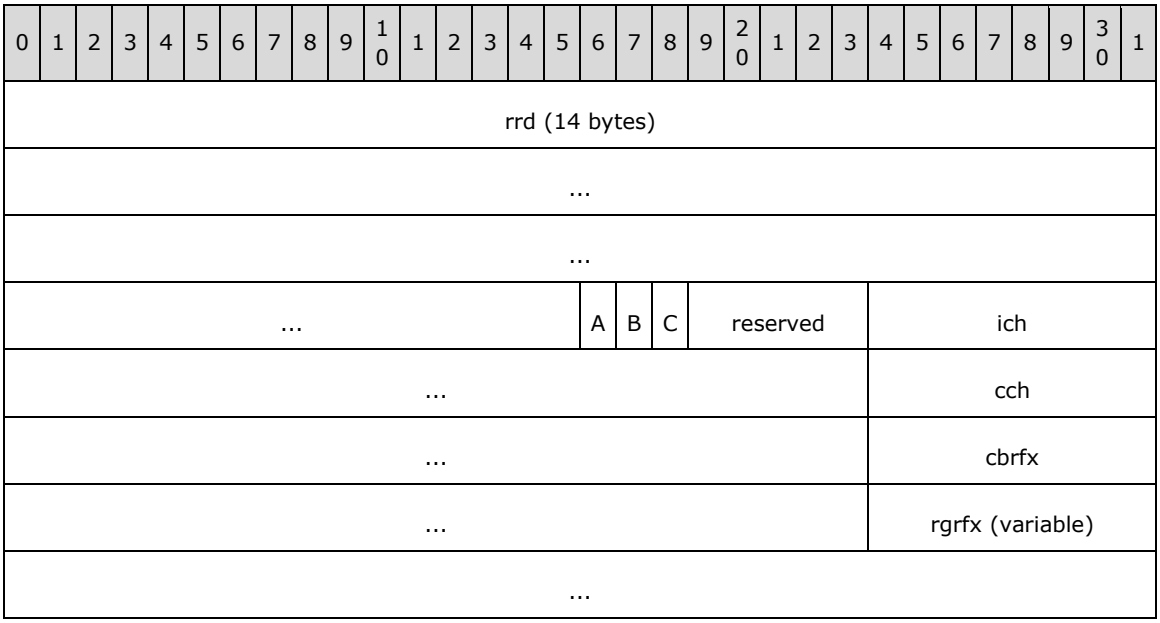
2.4.754 BrtRREndMove

The **BrtRREndMove** record specifies the end of a collection of records as defined by the **Revision Log** (section 2.1.7.44) part **ABNF**. The collection of records specifies revision record (section 2.2.12.4) information about **cells** that have moved.

2.4.755 BrtRRFormat

The **BrtRRFormat** record specifies a formatting change that has been applied to a **shared workbook** and specifies the beginning of a collection of records as defined by the **Revision Log** (section 2.1.7.44) part **ABNF**. The collection of records specifies a formatting change that has been applied to a shared workbook.



rrd (14 bytes): An **RRd** (section 2.5.123) record with the following stipulations:

Field	Restrictions
rrd.revt	MUST be 0x000B (**REVTFORMAT**). See section 2.5.116 for definition.
rrd.revid	MUST be 0.
rrd.reserved2	MUST be 0 and MUST be ignored.

A - fXfDxf (1 bit): A bit that specifies that the affected **cells** need to have their formats reset to the format defined by the current **style** before applying any format from the **BrtDXF** (section 2.4.354) record, if present.

B - fXfDxfNull (1 bit): A bit that specifies whether a format is associated with this record. MUST be 0 if **fXfDxf** is 0.

Value	Meaning
0	A format is associated with this record. The next record in the sequence MUST be **BrtBeginDXFs** (section 2.4.57).
1	The format associated with this record is null. If the next record in the sequence is **BrtBeginDXFs** the associated **BrtDXF** record MUST be exactly 6 bytes and all fields MUST be 0.

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C - fStyXfDxf (1 bit): A bit that specifies that the format of the cells needs to be cleared before applying any format from the **BrtDXF** record, if it is present.

reserved (5 bits): This value MUST be 0 and MUST be ignored.

ich (4 bytes):

Value	Meaning
0xFFFFFFFF	The formatting change does not affect the contents of the affected cells.
0x00000000	The formatting change affects the contents of the affected cells.<43>

cch (4 bytes):

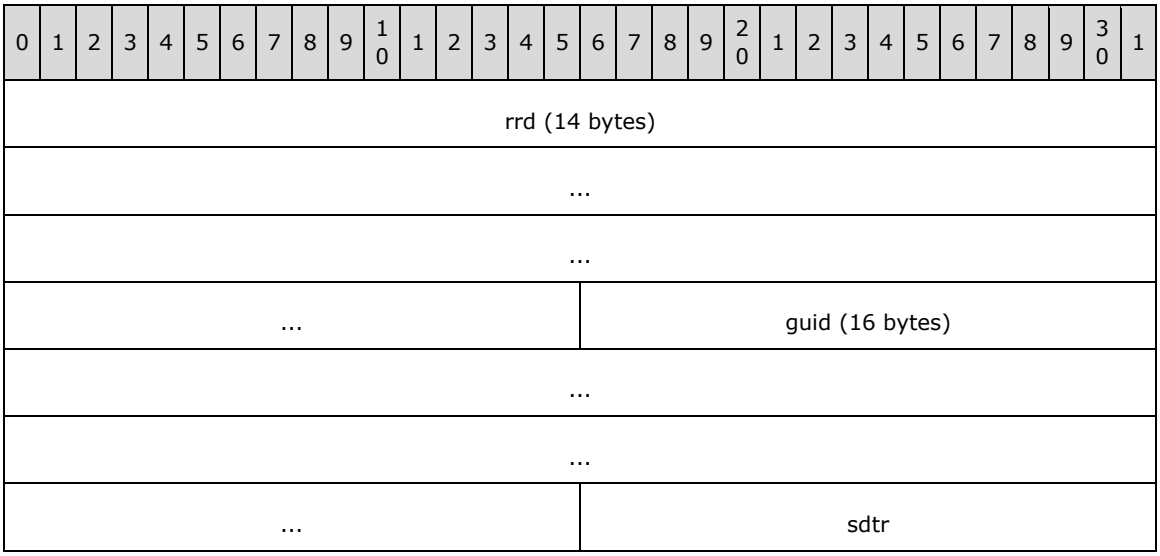
Value	Meaning
0xFFFFFFFF	The formatting change does not affect the contents of the affected cells.
0x00000000	The effect of the formatting change on cell contents was not evaluated. If the **BrtDXF** record describes content changes, treat this value as 0x7FFFFFFF; otherwise treat this value as 0xFFFFFFFF.
0x7FFFFFFF	The formatting change affects the contents of the affected cells.

cbrfx (4 bytes): An unsigned integer that specifies the number of bytes in **rgrfx**. This value MUST NOT be 0xFFFFFFFF, and MUST be the number of **UncheckedRfX** (section 2.5.153) elements in **rgrfx** multiplied by 16.

rgrfx (variable): An array of **UncheckedRfX** that specifies the cells to which this format change applies.

2.4.756 BrtRRHeader

The **BrtRRHeader** record specifies metadata about a list of revisions that have been made in shared workbook (section 2.2.12).



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...	
...	tabidMac
revidMin	
revidMax	
stUser (variable)	
...	
szRelId (variable)	
...	
ctabid	
rgtabid (variable)	
...	
crevid	
rgrevid (variable)	
...	

rrd (14 bytes): An **RRd** (section 2.5.123) that specifies shared **revision** data. **rrd** has the following additional stipulations:

Field	Restrictions
rrd.unused1	MUST be 0xFFFFFFFF.
rrd.revt	MUST be 0x0020 (**REVTHEADER**). See section 2.5.116 for definition.
rrd.tabid	MUST be 0xFFFF.

Additionally, all fields of **rrd** other than those specified in the preceding table MUST be 0 and all fields of **rrd** other than **revt** MUST be ignored.

guid (16 bytes): A **GUID** as specified by [MS-DTYP] section 2.3.4 that specifies this set of revisions.

sdtr (8 bytes): A **ShortDtr** (section 2.5.132) that specifies the date and time when this set of revisions was saved.

tabidMac (2 bytes): An unsigned integer that specifies the next unused **sheet** identifier when this set of revisions was saved. A sheet identifier corresponds to the **iTabID** field of a **BrtBundleSh** (section 2.4.311) record as specified by the **Workbook** (section 2.1.7.61) part **ABNF**. A value of 0xFFFF indicates that the next unused sheet identifier is not known.

revidMin (4 bytes): An unsigned integer that specifies the lowest revision identifier which is associated with this header. A revision identifier is the **rrd.revid** field of records which begin with an **RRd** (section 2.5.123). This value MUST be 0 if no reviewable revisions are associated with this

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header; otherwise MUST be greater than 0. A reviewable revision is any record on the revision log (section 2.2.12.3) that has the field **revid** of **RRd** greater than 0. MUST be less than 0xFFFFFFFF.

revidMax (4 bytes): An unsigned integer that specifies the highest revision identifier which is associated with this header. A revision identifier is the **rrd.revid** field of records which begin with an **RRd** (section 2.5.123). This value MUST be 0 if no reviewable revisions are associated with this header; otherwise MUST be greater than 0. A reviewable revision is any record on the revision log (section 2.2.12.3) that has the field **revid** of **RRd** (section 2.5.123) greater than 0. MUST be greater than or equal to the value of **revidMin**.

stUser (variable): An **XLWideString** (section 2.5.168) that specifies the name of the user responsible for this set of revisions. The length of this string MUST be greater than or equal to 1 and less than or equal to 54.

szRelId (variable): An **XLWideString** that specifies the relationship identifier of this set of revisions. A relationship identifier corresponds to RevisionHeaders.bin.rels. This string MUST NOT be null or empty.

ctabid (4 bytes): An unsigned integer that specifies the number of sheets present in the **workbook** when this set of revisions was saved. MUST be greater than 0 and MUST be less than 65536.

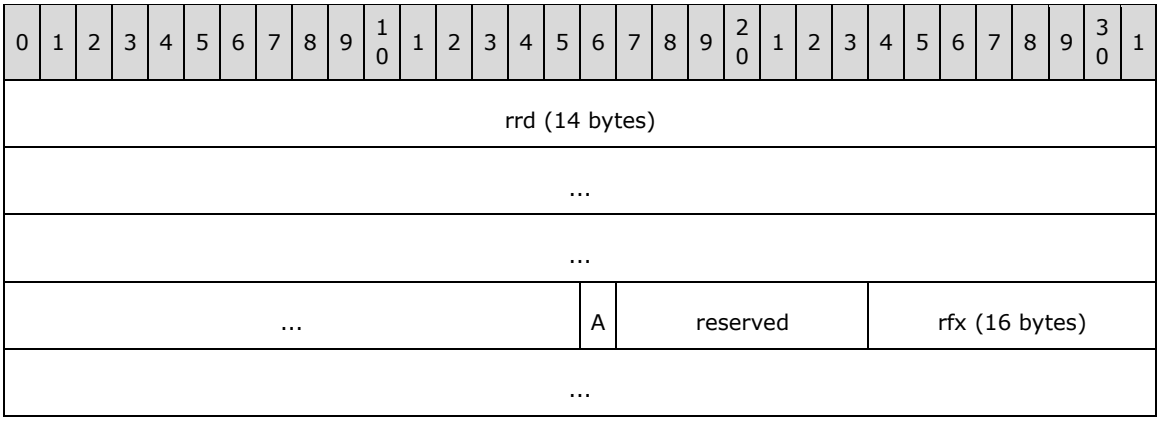
rgtabid (variable): An array of 2-byte unsigned integers that specifies sheet identifiers, which specify the display order of the sheets when this set of revisions was saved. A sheet identifier corresponds to the **iTabID** field of a **BrtBundleSh** (section 2.4.311) record as specified by the Workbook (section 2.1.7.61) part ABNF . MUST have length equal to **ctabid**. Elements of this array MUST NOT appear more than once and MUST have a value equal to the **iTabID** field of one of the **BrtBundleSh** records for the workbook.

crevid (4 bytes): An unsigned integer that specifies the number of revisions associated with this header that have been reviewed. If either **revidMin** or **revidMax** are 0, this value MUST be 0; otherwise it MUST be no greater than the value **revidMax** - **revidMin** + 1.

rgrevid (variable): An array of 32-bit unsigned integers that specifies the revision identifiers associated with this header that have been reviewed. A revision identifier is the **rrd.revid** field of records which begin with an **RRd** (section 2.5.123). The length of this array MUST be **crevid**. The elements of this array MUST NOT appear more than once, each element MUST have a value greater than or equal to **revidMin**, and each element MUST have a value less than or equal to **revidMax**.

2.4.757 BrtRRInsDel

The **BrtRRInsDel** record specifies properties of a revision record (section 2.2.12.4) and specifies the beginning of a collection of records as defined by the **Revision Log** (section 2.1.7.44) part **ABNF**. The collection of records specifies a row insert, row delete, column insert, or column delete operation.



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...
...

rrd (14 bytes): An **RRd** (section 2.5.123) for this revision record (section 2.2.12.4). **rrd** has the following additional stipulations:

Field	Restrictions
rrd.revt	MUST be 0x0000 (**REVTINSRW**) or 0x0001 (**REVTINSCOL**) or 0x0002 (**REVTDELRW**) or 0x0003 (**REVTDELCOL**). See section 2.5.116 for definitions.
rrd.revid	MUST be greater than or equal to 0.
rrd.tabid	Specifies the **sheet** identifier for the current sheet.

A - fEndOfList (1 bit): A bit that specifies that a **row** was inserted at the bottom of the filled cells **range**. This field has meaning only if **revt** field of this record is **REVTINSRW**. MUST be 1 if data was inserted at the bottom of the filled cells range. This value MUST be 0 if data was inserted or deleted in any other place.

reserved (7 bits): This value MUST be 0, and MUST be ignored.

rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies a location of rows or **columns (1)** that were inserted or deleted. If the delete or insert operation affects a full row, then **colFirst** MUST be 0 and **colLast** MUST be 16383. If the delete or insert operation affects a full column (1), then **rwFirst** MUST be 0 and **rwLast** MUST be 1048575.

2.4.758 BrtRRInsertSh

The **BrtRRInsertSh** record specifies that a **sheet** has been inserted in a shared workbook (section 2.2.12).

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rrd (14 bytes)																															
...																															
...																															
...																				itabPos											
stName (variable)																															
...																															

rrd (14 bytes): An **RRd** (section 2.5.123) that specifies common **revision** information for this record. **Rrd** has the following additional stipulations:

Field	Restrictions
rrd.revt	MUST be 0x0005 (**REVTINSERTSH**) See section 2.5.116). for definition.
rrd.revid	MUST be greater than 0.

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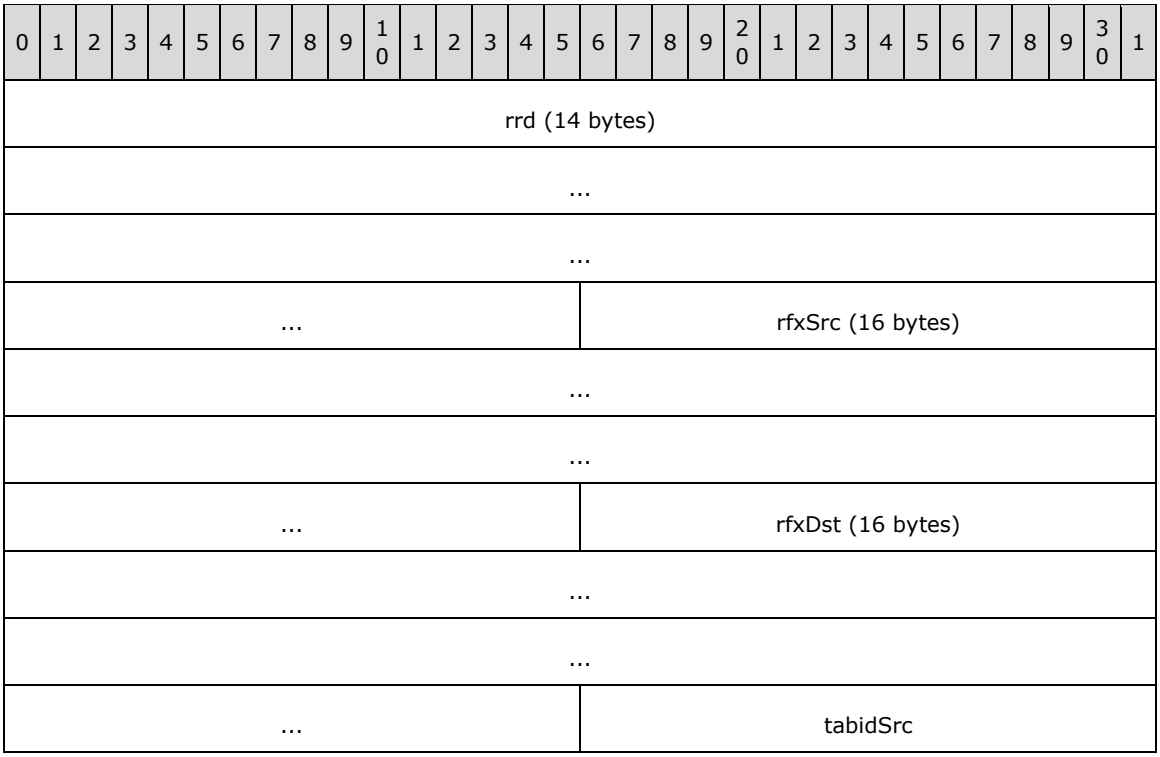
Field	Restrictions
rrd.reserved2	MUST be 0 and MUST be ignored.
rrd.tabid	Specifies the sheet identifier for the newly inserted sheet. MUST NOT be 0xFFFF.

itabPos (2 bytes): An unsigned integer that specifies the **sheet tab** position of the sheet when it was created.

stName (variable): A **RevisionLogSheetName** (section 2.5.115) that specifies the name of the sheet when the **workbook** was first saved. Any subsequent renaming operations on this sheet before the first save will alter the **stName** field of this record as well as generate **BrtRRRenSheet** (section 2.4.761) records.

2.4.759 BrtRRMove

The **BrtRRMove** record specifies properties of a **range** of **cells** that have moved and specifies the beginning of a collection of records as defined by the **Revision Log** (section 2.1.7.44) part **ABNF**. The collection of records specifies revision record (section 2.2.12.4) information about cells that have moved.



rrd (14 bytes): An **RRd** (section 2.5.123) that specifies shared **revision** data for this revision record. **rrd** has the following additional stipulations:

Field	Restrictions
rrd.revt	MUST be 0x0004 (**REVTMOVE**). See section 2.5.116) for definition.
rrd.revid	MUST be greater than or equal to 0.
rrd.reserved2	MUST be 0 and MUST be ignored.

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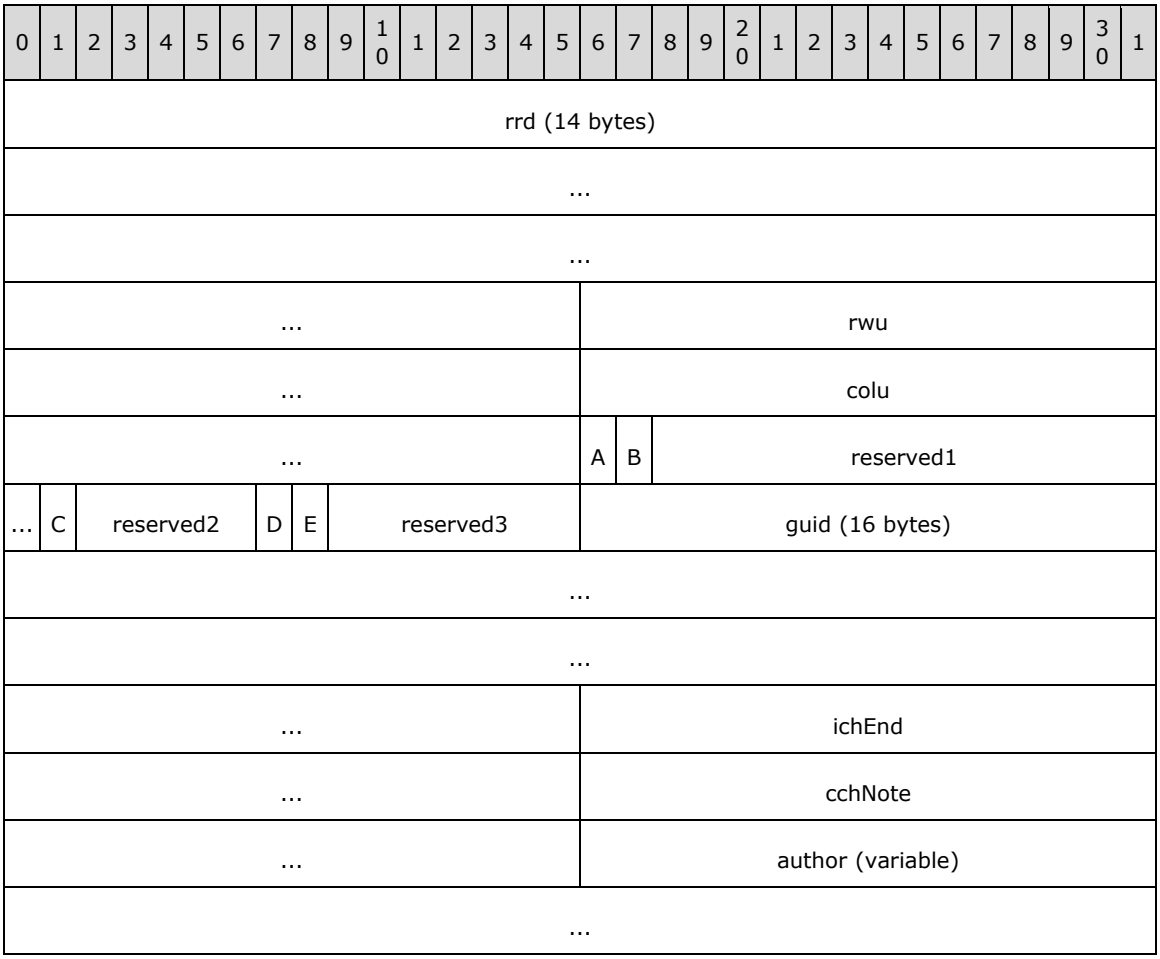
rfxSrc (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the original location of the range of cells that have moved. The size of **rfxSrc** MUST be the same as size of **rfxDst**.

rfxDst (16 bytes): An **UncheckedRfX** that specifies the location of the range of cells that have moved. Size of **rfxDst** MUST be the same as size of **rfxSrc**.

tabidSrc (2 bytes): A signed integer that specifies the identifier of the source **sheet**. The source sheet is the sheet where the range of cells originally resided. The value of this field MUST be equal to an **itabid** value from the **BrtBeginBundleShs** (section 2.4.13) collection.

2.4.760 BrtRRNote

The **BrtRRNote** record specifies a revision record (section 2.2.12.4) for a **comment**.



rrd (14 bytes): An **RRd** (section 2.5.123) that specifies information about the revision record (section 2.2.12.4). The **revt** field of **RRd** MUST be 0x000D

rwu (4 bytes): An **UncheckedRw** (section 2.5.154) that specifies the **row** that contains the comment.

colu (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies the **column (1)** that contains the comment.

A - bitfDelNote (1 bit): A bit that specifies whether the comment is being deleted.

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B - bitfAddNote (1 bit): A bit that specifies whether the comment is being added.

reserved1 (15 bits): This value MUST be 0 and MUST be ignored.

C - fShow (1 bit): A bit that specifies whether the comment is shown.

reserved2 (5 bits): This value MUST be 0 and MUST be ignored.

D - fRwHidden (1 bit): A bit that specifies whether the row that contains the comment is **hidden**.

E - fColHidden (1 bit): A bit that specifies whether the column (1) that contains the comment is hidden.

reserved3 (7 bits): This value MUST be 0 and MUST be ignored.

guid (16 bytes): A **GUID** as specified by [MS-DTYP] section 2.3.4 that identifies the comment. If the **guid** field of **BrtBeginComment** (section 2.4.29) matches this, then this is referring to the same comment.

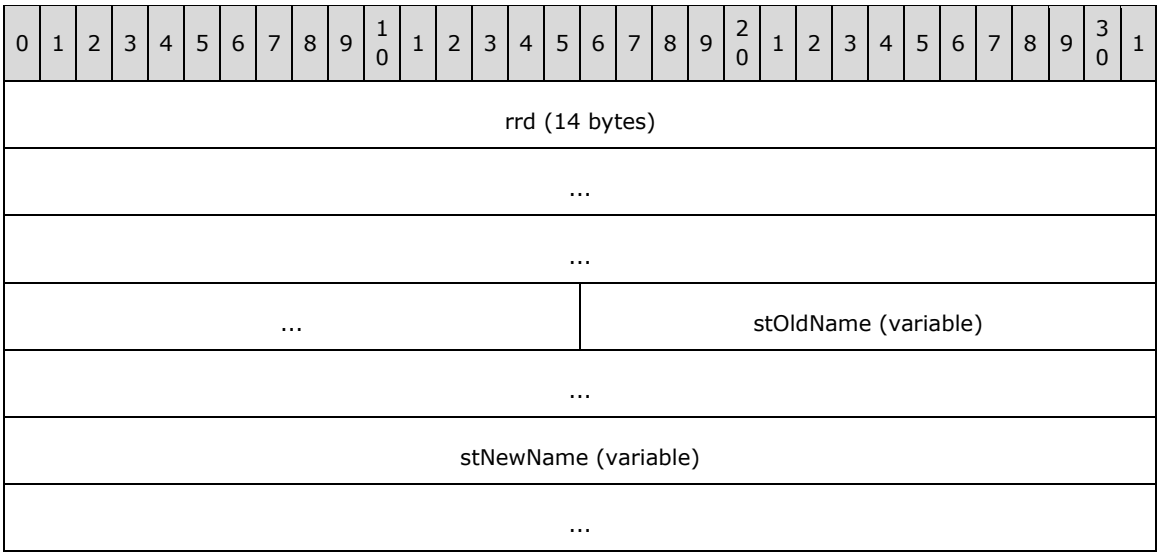
ichEnd (4 bytes): A signed integer that specifies the length of the comment before the **revision**.

cchNote (4 bytes): A signed integer that specifies the length of the string that was added to the comment.

author (variable): An **XLWideString** (section 2.5.168) that specifies the author of the comment.

2.4.761 BrtRRRenSheet

The **BrtRRRenSheet** record specifies that a **sheet** has been renamed in a shared workbook (section 2.2.12).



rrd (14 bytes): An **RRd** (section 2.5.123) that specifies common **revision** information for this record. **rrd** has the following additional stipulations:

Field	Restrictions
rrd.revt	MUST be 0x0009 (**REVTRENSHEET**). See section 2.5.116 for definition.
rrd.revid	MUST be greater than 0.
rrd.reserved2	MUST be 0 and MUST be ignored.
rrd.tabid	MUST NOT be 0xFFFF.

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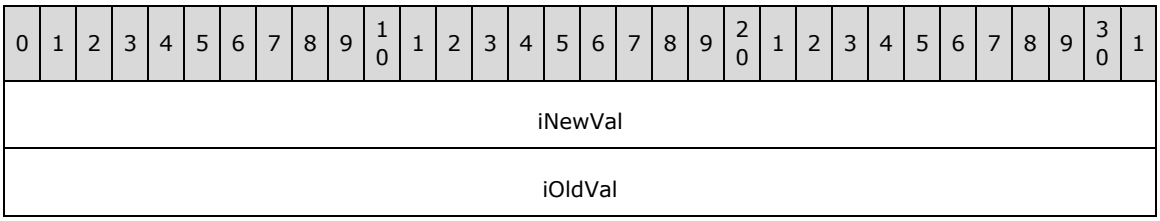
stOldName (variable): A **RevisionLogSheetName** (section 2.5.115) that specifies the old name of the sheet.

stNewName (variable): A **RevisionLogSheetName** that specifies the new name of the sheet.

2.4.762 BrtRRSortItem

The **BrtRRSortItem** record specifies a single **row** or **column (1)** mapping in a sort map (section 2.2.12.10).

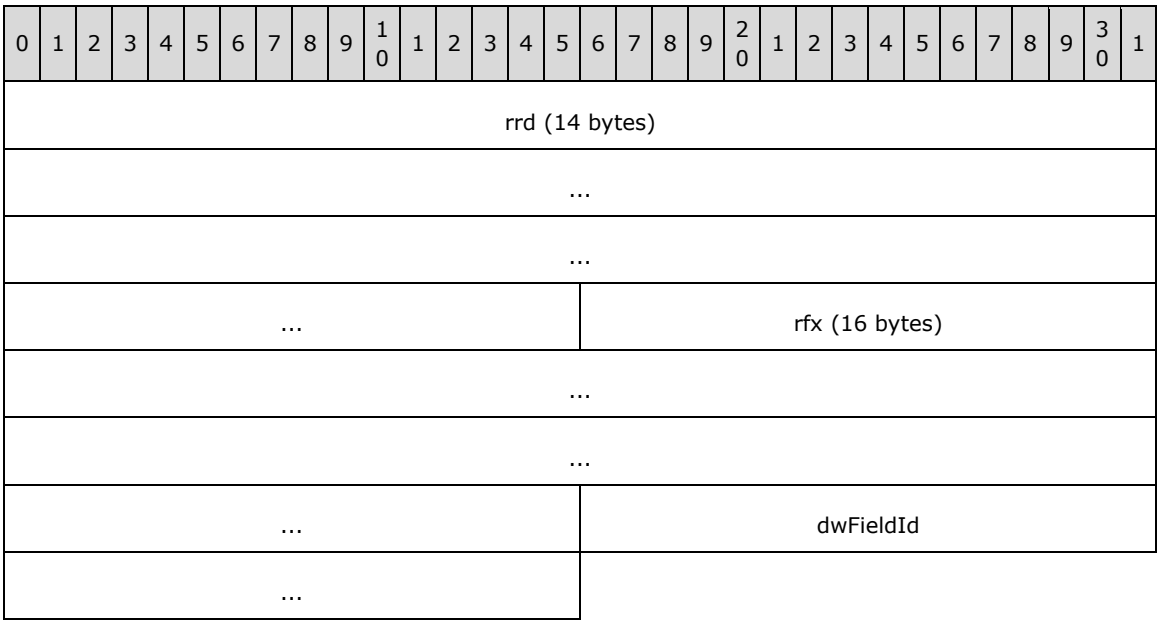


iNewVal (4 bytes): An unsigned integer that specifies the new row or column (1). If the **fCol** field of the preceding **BrtBeginRRSort** (section 2.4.193) is 0, then this value specifies a row and MUST be less than 1048576. Otherwise, this value specifies a column (1) and MUST be less than 16384.

iOldVal (4 bytes): An unsigned integer that specifies the old row or column (1). If the **fCol** field of the preceding **BrtBeginRRSort** is 0, then this value specifies a row index and MUST be less than 1048576. Otherwise, this value specifies a column (1) and MUST be less than 16384.

2.4.763 BrtRRTQSIF

The **BrtRRTQSIF** record specifies a revision record (section 2.2.12.4) of a changed field in a **query table**.



rrd (14 bytes): A **RRd** (section 2.5.123) that specifies common **revision** information for this record. **rrd** has the following additional stipulations:

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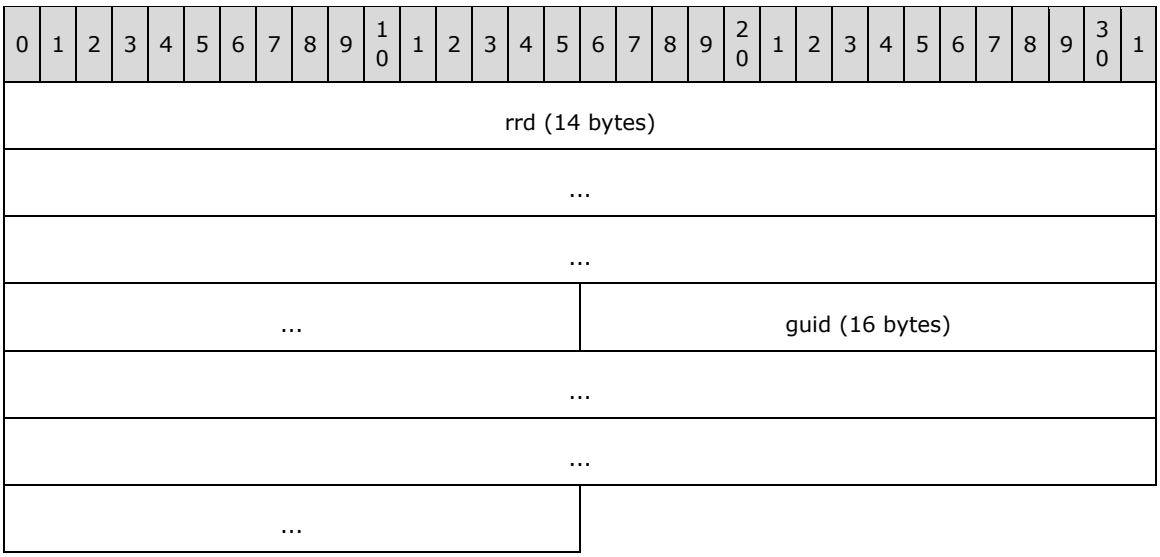
Field	Restrictions
rrd.revt	MUST be 0x002E (**REVTTRASHQTFIELD**). See section 2.5.116 for definition.
rrd.revid	MUST be greater than or equal to 0.
rrd.reserved2	MUST be 0 and MUST be ignored.
rrd.tabid	MUST NOT be 0xFFFF.

rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the location of the affected query table.

dwFieldId (4 bytes): An unsigned integer that specifies the identifier of the specific field of the query table that was removed. The value of **dwFieldId** MUST be greater than 0x00000000. The value of this field MUST be equal to one of the **idField** values from the collection of **BrtBeginQSIF** (section 2.4.186) records defined for this query table.

2.4.764 BrtRRUserView

The **BrtRRUserView** record specifies a revision record (section 2.2.12.4) of adding or removing a **custom view** to the **workbook**.



rrd (14 bytes): A **RRd** (section 2.5.123) value for this revision record (section 2.2.12.4).

Field	Restrictions
revt	MUST be 0x002B (**REVTADDVIEW**) or 0x002C (**REVTDELVIEW**). See section 2.5.116 for definitions.
revid	MUST be greater than or equal to 0.
reserved2	MUST be 0 and MUST be ignored.

guid (16 bytes): A **GUID** as specified by [MS-DTYP] section 2.3.4 that specifies the custom view defined by the user. MUST be globally unique. The value of this field MUST be equal to one of the **guid** fields of **BrtBeginUserShView** (section 2.4.292) items in the **BrtBeginUserShViews** (section 2.4.293) collection in the **sheet**.

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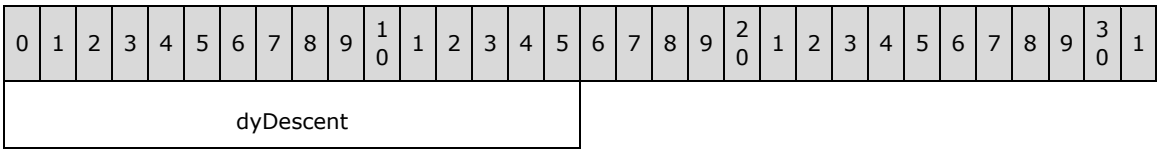
2.4.765 BrtRwDescent

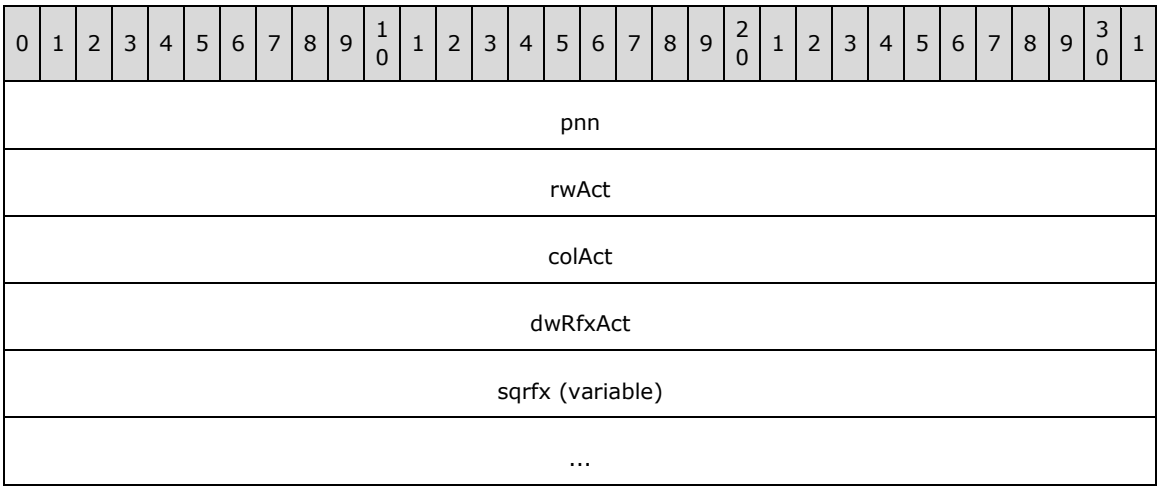
The **BrtRwDescent** record specifies the vertical distance in **pixels** from the bottom of the **cell** to the typographical baseline of the cell contents for the current **row**. This record MUST be present for every non-empty row in all **Macro Sheet** (section 2.1.7.32) and **Worksheet** parts (see section 2.2.1 for more information) in the **workbook** if and only if the **BrtKnownFonts** (section 2.4.689) record is present in the workbook, as defined by the **Styles** (section 2.1.7.50) part **ABNF**.



dyDescent (2 bytes): An unsigned integer that specifies the vertical distance in pixels from the bottom of the cells in the current row to the typographical baseline of the cell content, if hypothetically the **zoom level** for the **sheet** containing this row is 100 and the cell has bottom alignment formatting (see **alcv** in section 2.4.845). For example, if a cell with a particular font has bottom alignment formatting, is viewed at a zoom level of 100, and has a corresponding **dyDescent** value of 5 pixels, then the **dyDescent** value is still 5 pixels if the cell actually has different alignment formatting applied (such as top alignment), or is viewed at a zoom level not equal to 100, but uses the same font, even though the vertical distance onscreen from the typographical baseline to the bottom of the cell is not necessarily 5 pixels. MUST be greater than or equal to 0 and less than or equal to 255. For rows with cells containing different fonts, this value specifies the maximum of all vertical distances in pixels from the bottom to the typographical baseline of each of the cells in the current row. For more information about how cells are stored in rows, see section 2.2.1.

2.4.766 BrtSel

The **BrtSel** record specifies **cell selection** for a **sheet**.



pnn (4 bytes): A **Pnn** (section 2.5.107) that specifies the **pane** to which this selection belongs.

rwAct (4 bytes): An **UncheckedRw** (section 2.5.154) that specifies the **row** of the **active cell**. The value MUST be the index of a row in the **range** in **sqrfx** that is specified by **dwRfxAct**.

colAct (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies the **column (1)** of the active cell. The value MUST be the index of a column (1) in the range in **sqrfx** that is specified by **dwRfxAct**.

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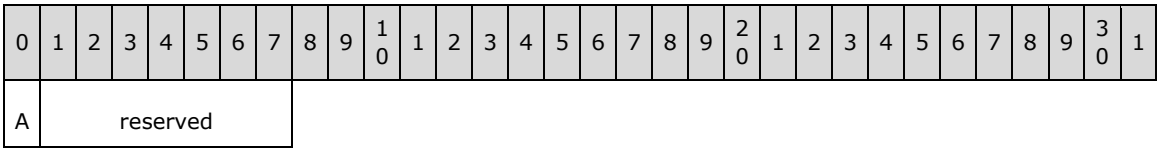
dwRfxAct (4 bytes): An unsigned integer that specifies a zero-based index of a **RfX** (section 2.5.117) structure in the array of **RfX** specified by **sqrfx**. The referenced **RfX** specifies the range that contains the active cell within the collection of all **non-contiguous ranges** within **sqrfx**. MUST be less than **sqrfx.crfx**.

sqrfx (variable): An **UncheckedSqRfX** (section 2.5.155) that specifies a collection of all non-contiguous ranges within the selection. **sqrfx.crfx** MUST be less than or equal to 32767.

2.4.767 BrtSheetCalcProp

The **BrtSheetCalcProp** record specifies **sheet** calculation properties.

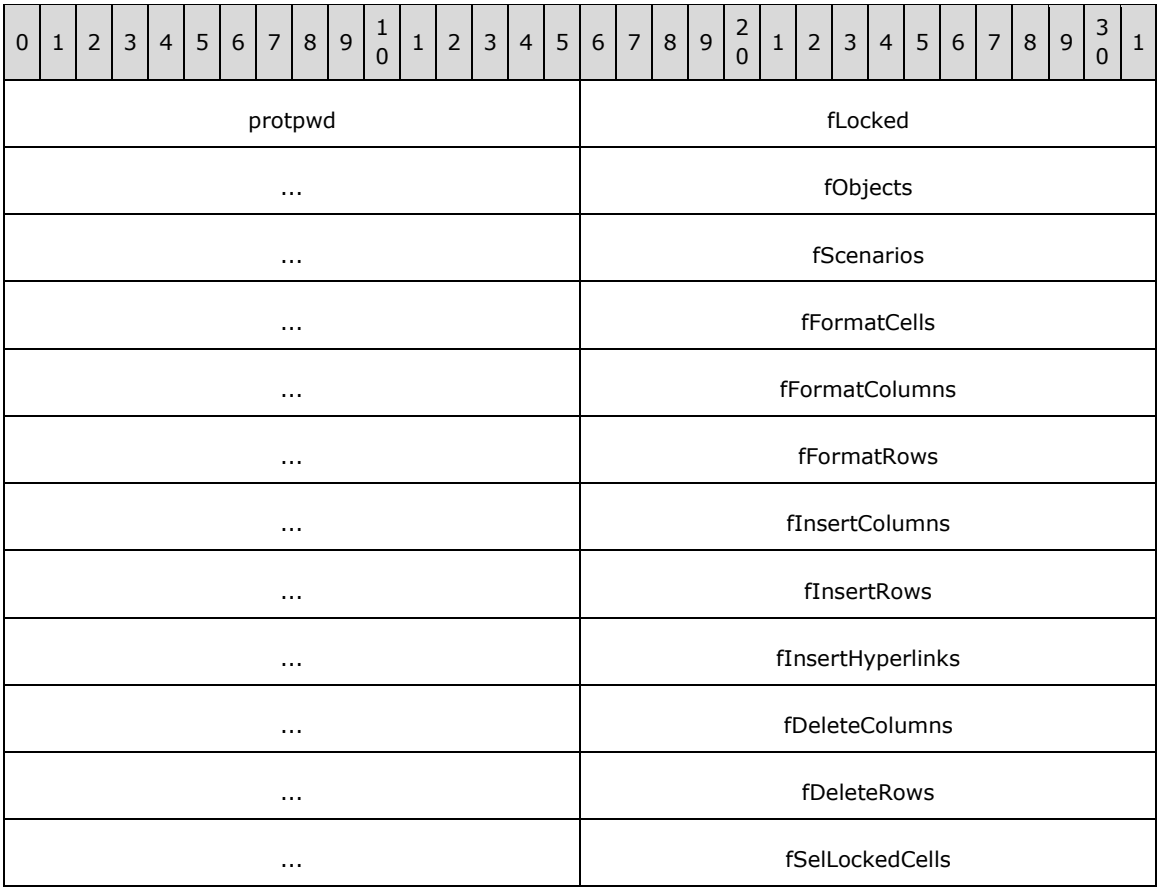


A - fFullCalcOnLoad (1 bit): A bit that specifies whether the application recalculates the results of all formulas on this sheet immediately after loading the file.

reserved (7 bits): This value MUST be 0, and MUST be ignored.

2.4.768 BrtSheetProtection

The **BrtSheetProtection** record specifies **protection** options for a Worksheet, **Dialog Sheet** (section 2.1.7.20), or **Macro Sheet** (section 2.1.7.32).



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...	fSort
...	fAutoFilter
...	fPivotTables
...	fSelUnlockedCells
...	

protpwd (2 bytes): An unsigned integer that specifies the verifier value of the password required for editing the **sheet**. If the value is 0x0000, then there is no password. The algorithm to generate the verifier value is documented in Password Verifier Algorithm (section 2.2.9).

fLocked (4 bytes): A **Boolean** (section 2.5.97.3) with a meaning that depends on the type of sheet. For a worksheet the value specifies whether the worksheet and the contents of **locked cells** are **protected**. For a macro sheet the value specifies whether the macro sheet is protected. For a dialog sheet it is undefined and MUST be ignored.

For worksheets and macro sheets it MUST be a value from the following table:

Value	Meaning
0x00000000	The worksheet and contents of locked cells are not protected. The macro sheet is not protected.
0x00000001	The worksheet and contents of locked cells are protected. The macro sheet is protected.

fObjects (4 bytes): A **Boolean** with a meaning that depends on the type of sheet. When the sheet is a worksheet or macro sheet and the value of **fLocked** is 0x00000001, this field specifies whether editing of objects is allowed. Undefined and MUST be ignored if the sheet is a worksheet or macro sheet and **fLocked** is 0x00000000.

When the sheet is a dialog sheet, this field specifies whether the dialog sheet is protected. The value of **fScenarios** MUST be the same as the value of this field.

MUST be a value from the following table:

Value	Meaning
0x00000000	Editing of **objects** is not allowed in the worksheet or macro sheet when the value of **fLocked** is 0x00000001. The dialog sheet is protected.
0x00000001	Editing of objects is allowed in the worksheet or macro sheet when the value of **fLocked** is 0x00000001. The dialog sheet is not protected.

fScenarios (4 bytes): A **Boolean** with a meaning that depends on the type of sheet. When the sheet is a worksheet or macro sheet and the value of **fLocked** is 0x00000001, this field specifies whether editing of **scenarios** is allowed. Undefined and MUST be ignored if the sheet is a worksheet or macro sheet and **fLocked** is 0x00000000.

When the sheet is a dialog sheet, this field specifies whether the dialog sheet is protected. The value of **fObjects** MUST be the same as the value of this field.

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MUST be a value from the following table:

Value	Meaning
0x00000000	Editing of scenarios is not allowed in the worksheet or macro sheet when the value of **fLocked** is 0x00000001. The dialog sheet is protected.
0x00000001	Editing of scenarios is allowed in the worksheet or macro sheet when the value of **fLocked** is 0x00000001. The dialog sheet is not protected.

fFormatCells (4 bytes): A **Boolean** that specifies whether formatting of cells is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Formatting of cells is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Formatting of cells is allowed when the value of **fLocked** is 0x00000001.

fFormatColumns (4 bytes): A **Boolean** that specifies whether formatting of **columns (1)** is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Formatting of columns (1) is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Formatting of columns (1) is allowed when the value of **fLocked** is 0x00000001.

fFormatRows (4 bytes): A **Boolean** that specifies whether formatting of **rows** is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Formatting of rows is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Formatting of rows is allowed when the value of **fLocked** is 0x00000001.

fInsertColumns (4 bytes): A **Boolean** that specifies whether insertion of columns (1) is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. For a macro sheet or dialog sheet, it MUST have a

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value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Insertion of columns (1) is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Insertion of columns (1) is allowed when the value of **fLocked** is 0x00000001.

fInsertRows (4 bytes): A **Boolean** that specifies whether insertion of rows is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Insertion of rows is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Insertion of rows is allowed when the value of **fLocked** is 0x00000001.

fInsertHyperlinks (4 bytes): A **Boolean** that specifies whether insertion of hyperlinks is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Insertion of hyperlinks is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Insertion of hyperlinks is allowed when the value of **fLocked** is 0x00000001.

fDeleteColumns (4 bytes): A **Boolean** that specifies whether deletion of columns (1) is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Deletion of columns (1) is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Deletion of columns (1) is allowed when the value of **fLocked** is 0x00000001.

fDeleteRows (4 bytes): A **Boolean** that specifies whether deletion of rows is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

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Value	Meaning
0x00000000	Deletion of rows is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Deletion of rows is allowed when the value of **fLocked** is 0x00000001.

fSelLockedCells (4 bytes): A **Boolean** that specifies whether **selection** of locked cells is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. For a macro sheet or dialog sheet, it MUST have a value of 0x00000001 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Selection of locked cells is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Selection of locked cells is allowed when the value of **fLocked** is 0x00000001.

fSort (4 bytes): A **Boolean** that specifies whether sorting is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Sorting is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Sorting is allowed when the value of **fLocked** is 0x00000001.

fAutoFilter (4 bytes): A **Boolean** that specifies whether use of **AutoFilters** is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Use of AutoFilters is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Use of AutoFilters is allowed when the value of **fLocked** is 0x00000001.

fPivotTables (4 bytes): A **Boolean** that specifies whether use of **PivotTable** (section 2.1.7.40) reports is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Use of **PivotTable** reports is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Use of **PivotTable** reports is allowed when the value of **fLocked** is 0x00000001.

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fSelUnlockedCells (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether selection of unlocked cells is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. For a macro sheet or dialog sheet, it MUST have a value of 0x00000001 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Selection of unlocked cells is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Selection of unlocked cells is allowed when the value of **fLocked** is 0x00000001.

2.4.769 BrtSheetProtectionIso

The **BrtSheetProtectionIso** record specifies **protection** options for a Worksheet, **Dialog Sheet** (section 2.1.7.20), or **Macro Sheet** (section 2.1.7.32) in a manner compatible with ISO/IEC 29500 **sheet** protection records as specified in [ISO/IEC29500-1:2016], section 18.3.1.85. A **BrtSheetProtectionIso** record MUST be immediately followed by a **BrtSheetProtection** (section 2.4.768) record whose **protpwd** field value MUST be set to 0x0000 and whose **fLocked**, **fObjects**, **fScenarios**, **fFormatCells**, **fFormatColumns**, **fFormatRows**, **fInsertColumns**, **fInsertRows**, **fInsertHyperlinks**, **fDeleteColumns**, **fDeleteRows**, **fSelLockedCells**, **fSort**, **fAutoFilter**, **fPivotTables** and **fSelUnlockedCells** fields MUST have the same values as the fields of the same names in the **BrtSheetProtectionIso** record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
dwSpinCount																															
fLocked																															
fObjects																															
fScenarios																															
fFormatCells																															
fFormatColumns																															
fFormatRows																															
fInsertColumns																															
fInsertRows																															
fInsertHyperlinks																															
fDeleteColumns																															
fDeleteRows																															

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fSelLockedCells
fSort
fAutoFilter
fPivotTables
fSelUnlockedCells
ipdPasswordData (variable)
...

dwSpinCount (4 bytes): An unsigned 32-bit integer that specifies the number of times that the hash function was iterated over the password to generate the **rgbHash** field of **ipdPasswordData**, as described in the Strong Password Verifier Algorithm (section 2.2.10). It MUST NOT be greater than 10,000,000.

fLocked (4 bytes): A **Boolean** (section 2.5.97.3) with a meaning that depends on the type of sheet. For a worksheet the value specifies whether the worksheet and the contents of **locked cells** are **protected**. For a macro sheet the value specifies whether the macro sheet is protected. For a dialog sheet it is undefined and MUST be ignored. It MUST have the same value as the **fLocked** field in the following **BrtSheetProtection** record.

For worksheets and macro sheets it MUST be a value from the following table:

Value	Meaning
0x00000000	The worksheet and contents of locked cells are not protected. The macro sheet is not protected.
0x00000001	The worksheet and contents of locked cells are protected. The macro sheet is protected.

fObjects (4 bytes): A **Boolean** with a meaning that depends on the type of sheet. When the sheet is a worksheet or macro sheet and the value of **fLocked** is 0x00000001, this field specifies whether editing of objects is allowed. Undefined and MUST be ignored if the sheet is a worksheet or macro sheet and **fLocked** is 0x00000000. It MUST have the same value as the **fObjects** field in the following **BrtSheetProtection** record.

When the sheet is a dialog sheet, this field specifies whether the dialog sheet is protected. The value of **fScenarios** MUST be the same as the value of this field.

MUST be a value from the following table:

Value	Meaning
0x00000000	Editing of objects is not allowed in the worksheet or macro sheet when the value of **fLocked** is 0x00000001. The dialog sheet is protected.
0x00000001	Editing of objects is allowed in the worksheet or macro sheet when the value of **fLocked** is 0x00000001. The dialog sheet is not protected.

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fScenarios (4 bytes): A **Boolean** with a meaning that depends on the type of sheet. When the sheet is a worksheet or macro sheet and the value of **fLocked** is 0x00000001, this field specifies whether editing of **scenarios** is allowed. Undefined and MUST be ignored if the sheet is a worksheet or macro sheet and **fLocked** is 0x00000000. It MUST have the same value as the **fScenarios** field in the following **BrtSheetProtection** record.

When the sheet is a dialog sheet, this field specifies whether the dialog sheet is protected. The value of **fObjects** MUST be the same as the value of this field.

MUST be a value from the following table:

Value	Meaning
0x00000000	Editing of scenarios is not allowed in the worksheet or macro sheet when the value of **fLocked** is 0x00000001. The dialog sheet is protected.
0x00000001	Editing of scenarios is allowed in the worksheet or macro sheet when the value of **fLocked** is 0x00000001. The dialog sheet is not protected.

fFormatCells (4 bytes): A **Boolean** that specifies whether formatting of cells is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. It MUST have the same value as the **fFormatCells** field in the following **BrtSheetProtection** record. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet it MUST have a value from the following table:

Value	Meaning
0x00000000	Formatting of cells is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Formatting of cells is allowed when the value of **fLocked** is 0x00000001.

fFormatColumns (4 bytes): A **Boolean** that specifies whether formatting of **columns (1)** is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. It MUST have the same value as the **fFormatColumns** field in the following **BrtSheetProtection** record. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet it MUST have a value from the following table:

Value	Meaning
0x00000000	Formatting of columns (1) is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Formatting of columns (1) is allowed when the value of **fLocked** is 0x00000001.

fFormatRows (4 bytes): A **Boolean** that specifies whether formatting of **rows** is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. It MUST have the same value as the **fFormatRows** field in the following **BrtSheetProtection** record. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet it MUST have a value from the following table:

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Value	Meaning
0x00000000	Formatting of rows is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Formatting of rows is allowed when the value of **fLocked** is 0x00000001.

fInsertColumns (4 bytes): A **Boolean** that specifies whether insertion of columns (1) is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. It MUST have the same value as the **fInsertColumns** field in the following **BrtSheetProtection** record. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet it MUST have a value from the following table:

Value	Meaning
0x00000000	Insertion of columns (1) is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Insertion of columns (1) is allowed when the value of **fLocked** is 0x00000001.

fInsertRows (4 bytes): A **Boolean** that specifies whether insertion of rows is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. It MUST have the same value as the **fInsertRows** field in the following **BrtSheetProtection** record. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Insertion of rows is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Insertion of rows is allowed when the value of **fLocked** is 0x00000001.

fInsertHyperlinks (4 bytes): A **Boolean** that specifies whether insertion of hyperlinks is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. It MUST have the same value as the **fInsertHyperlinks** field in the following **BrtSheetProtection** record. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Insertion of hyperlinks is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Insertion of hyperlinks is allowed when the value of **fLocked** is 0x00000001.

fDeleteColumns (4 bytes): A **Boolean** that specifies whether deletion of columns (1) is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. It MUST have the same value as the **fDeleteColumns** field in the following **BrtSheetProtection** record. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

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Value	Meaning
0x00000000	Deletion of columns (1) is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Deletion of columns (1) is allowed when the value of **fLocked** is 0x00000001.

fDeleteRows (4 bytes): A **Boolean** that specifies whether deletion of rows is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. It MUST have the same value as the **fDeleteRows** field in the following **BrtSheetProtection** record. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Deletion of rows is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Deletion of rows is allowed when the value of **fLocked** is 0x00000001.

fSelLockedCells (4 bytes): A **Boolean** that specifies whether **selection** of locked cells is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. It MUST have the same value as the **fSelLockedCells** field in the following **BrtSheetProtection** record. For a macro sheet or dialog sheet, it MUST have a value of 0x00000001 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Selection of locked cells is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Selection of locked cells is allowed when the value of **fLocked** is 0x00000001.

fSort (4 bytes): A **Boolean** that specifies whether sorting is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. It MUST have the same value as the **fSort** field in the following **BrtSheetProtection** record. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Sorting is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Sorting is allowed when the value of **fLocked** is 0x00000001.

fAutoFilter (4 bytes): A **Boolean** that specifies whether use of **AutoFilters** is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. It MUST have the same value as the **fAutoFilter** field in the following **BrtSheetProtection** record. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST be a value from the following table:

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Value	Meaning
0x00000000	Use of AutoFilters is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Use of AutoFilters is allowed when the value of **fLocked** is 0x00000001.

fPivotTables (4 bytes): A **Boolean** that specifies whether use of **PivotTable** (section 2.1.7.40) reports is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. It MUST have the same value as the **fPivotTables** field in the following **BrtSheetProtection** record. For a macro sheet or dialog sheet, it MUST have a value of 0x00000000 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Use of **PivotTable** reports is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Use of **PivotTable** reports is allowed when the value of **fLocked** is 0x00000001.

fSelUnlockedCells (4 bytes): A **Boolean** that specifies whether selection of unlocked cells is allowed in the worksheet when the value of **fLocked** is 0x00000001, and undefined and MUST be ignored when the value of **fLocked** is 0x00000000. It MUST have the same value as the **fSelUnlockedCells** field in the following **BrtSheetProtection** record. For a macro sheet or dialog sheet, it MUST have a value of 0x00000001 and MUST be ignored. For a worksheet, it MUST have a value from the following table:

Value	Meaning
0x00000000	Selection of unlocked cells is not allowed when the value of **fLocked** is 0x00000001.
0x00000001	Selection of unlocked cells is allowed when the value of **fLocked** is 0x00000001.

ipdPasswordData (variable): An **IsoPasswordData** (section 2.5.79) that specifies the **salt**, hash algorithm and password hash of the password required for editing the sheet, calculated using the Strong Password Verifier Algorithm (section 2.2.10). The size of the **rgbHash** member of this field MUST NOT be zero.

2.4.770 BrtShrFmla

The **BrtShrFmla** record specifies a shared formula (section 2.2.2) as specified in **Worksheet** part **ABNF** (section 2.1.7.62) and **Macro Sheet** (section 2.1.7.32) part ABNF. A shared formula specifies a formula that is shared across multiple **cells**. Cells that share this formula each have a formula record that contains a **PtgExp** (section 2.5.97.40) that specifies the **row** of this cell and a corresponding **PtgExtraCol** (section 2.5.97.42) with a **col** field equal to the **column (1)** of this cell. It is preceded by a single **BrtFmlaString** (section 2.4.674), **BrtFmlaNum** (section 2.4.673), **BrtFmlaBool** (section 2.4.671), or **BrtFmlaError** (section 2.4.672) record that specifies the first cell in the **range** that uses this shared formula. This record is used with the preceding **BrtFmlaString**, **BrtFmlaNum**, **BrtFmlaBool**, or **BrtFmlaError** record to optimize storage and memory required for the shared formula.

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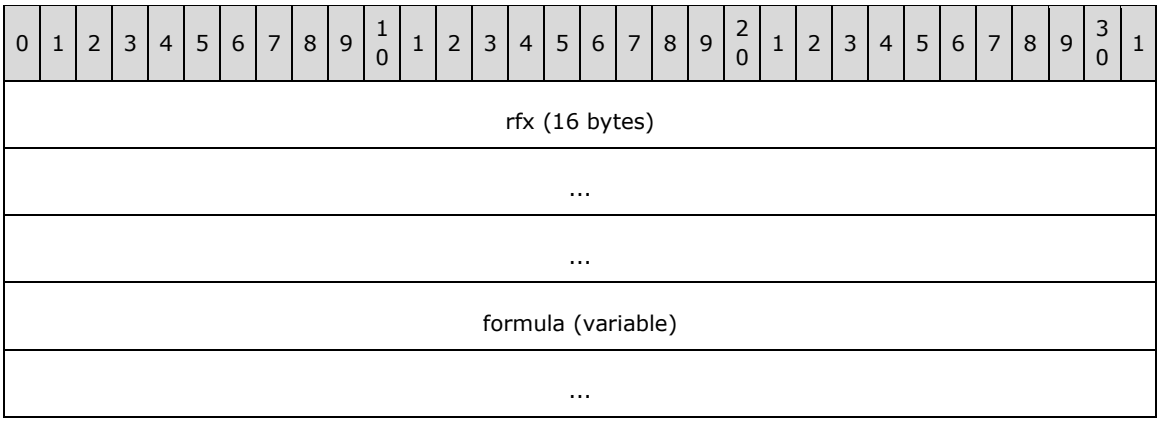
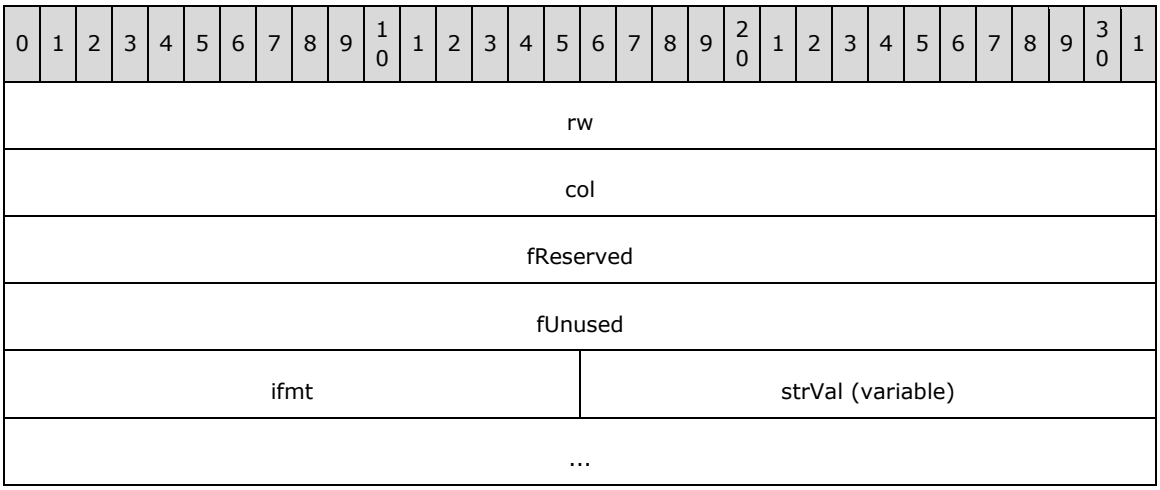


rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the row and column (1) bounds for this shared formula.

formula (variable): A **SharedParsedFormula** (section 2.5.97.98) that contains this shared formula.

2.4.771 BrtSlc

The **BrtSlc** record specifies a **cell** in a **scenario**.



rw (4 bytes): An **UncheckedRw** (section 2.5.154) that specifies the **row** of the cell.

col (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies the **column (1)** of the cell.

fReserved (4 bytes): This value MUST be 0, and MUST be ignored.

fUnused (4 bytes): This value is unused and MUST be ignored.

ifmt (2 bytes): An **Ifmt** (section 2.5.76) that specifies the **number format** used when displaying the value of the cell.

strVal (variable): An **XLWideString** (section 2.5.168) used to specify the value of the cell. MUST contain less than 256 characters.

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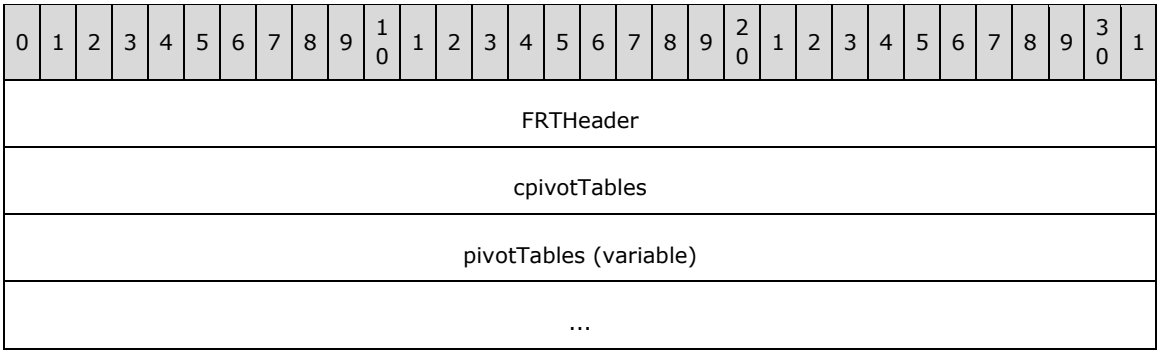
2.4.772 BrtSlicerCacheBookPivotTables

The **BrtSlicerCacheBookPivotTables** record specifies the Non-Worksheet PivotTables (section 2.2.5.5) that will be filtered by the slicer cache (section 2.2.14.1) as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF**.



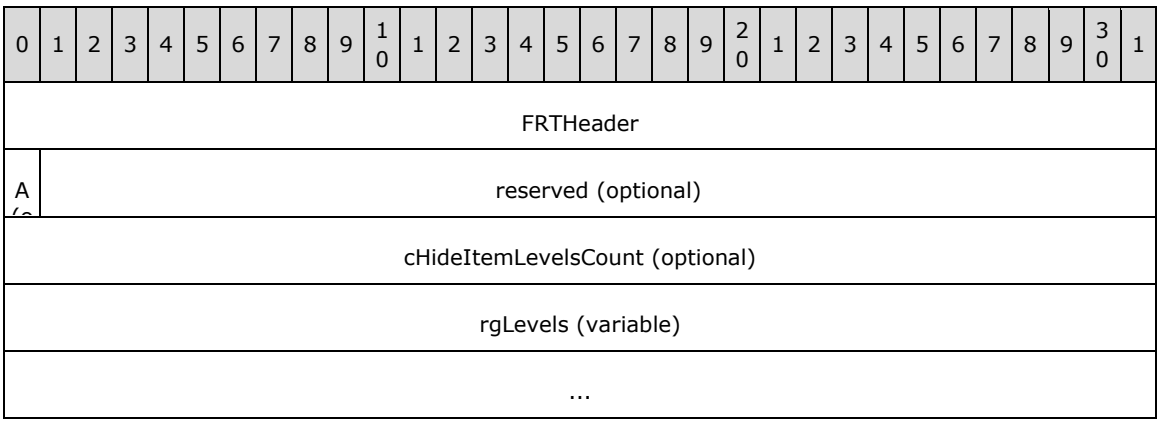
FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

cpivotTables (4 bytes): An unsigned integer that specifies the count of PivotTable views specified by this record. MUST match the number of **SlicerCachePivotTable** (section 2.5.136) structures within the **pivotTables** array.

pivotTables (variable): An array of **SlicerCachePivotTable** structures that specify the Non-Worksheet PivotTables (section 2.2.5.5) of this record. The array MUST NOT contain duplicate structures. Field **bVerSxMacro** of **BrtBeginSXView** (section 2.4.273) of each PivotTable view in this array MUST be greater than or equal to 3. Field **fNotViewCalculatedMembers** of **BrtBeginSXView** of all PivotTable view in this array MUST have the same value. Field of **fCalcMembersInAdvFilters** of **BrtBeginSXView14** in all PivotTable view MUST have the same value. The **PivotTable** (section 2.1.7.40) part specified by each **SlicerCachePivotTable** structure of this array MUST have an explicit relationship, specified by the **BrtPivotTableRef** (section 2.4.734), record with the **workbook**.

2.4.773 BrtSlicerCacheHideItemsWithNoData

The **BrtSlicerCacheHideItemsWithNoData** record specifies the extended properties of the slicer cache for how the slicer items that are used in slicer cross filtering (section 2.2.14.1.5) are displayed.



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FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

A - fHideItemsWithNoData (1 bit): A **Boolean** (section 2.5.97.3) that specifies whether the non-OLAP slicer items that are used in slicer cross filtering (section 2.2.14.1.5) are displayed. This value is only used for non-**OLAP** slicer cache and MUST be a value from the following table.

Value	Meaning
0x00	The non-OLAP slicer items are displayed.
0x01	The non-OLAP slicer items are not displayed.

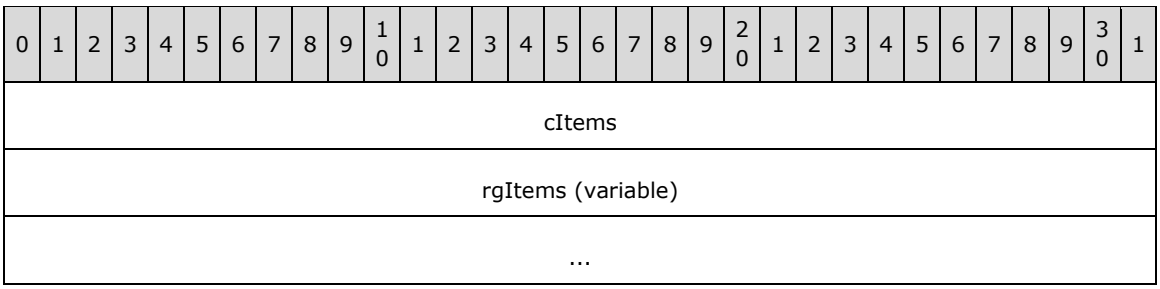
reserved (31 bits): MUST be 0 and MUST be ignored.

cHideItemLevelsCount (4 bytes): An unsigned integer that specifies the number of **OLAP levels** in this slicer cache, whose OLAP members with no data are not displayed. This value is only used for **OLAP** slicer cache and MUST match the number of **SlicerCacheLevelData** (section 2.5.134) records in the collection.

rgLevels (variable): An array of **SlicerCacheLevelData** (section 2.5.134). The number of items in this array MUST be equal to the value of **cHideItemLevelsCount**.

2.4.774 BrtSlicerCacheNativeItem

The **BrtSlicerCacheNativeItem** record specifies non- OLAP slicer items (section 2.2.14.1.4.1) for a slicer cache (section 2.2.14.1).



cItems (4 bytes): An unsigned integer that specifies the number of non-OLAP slicer items in the slicer cache.

rgItems (variable): An array of **SlicerCacheNativeItem** (section 2.5.135) structures that specifies non-OLAP slicer items for the slicer cache. The number of elements in this array MUST be equal to the value of the **cItems** field. Every **SlicerCacheNativeItem** in this array MUST have a unique **iCache** field. At least one **SlicerCacheNativeItem** in this array MUST have the **fSelected** field value equal to 1.

2.4.775 BrtSlicerCacheOlapItem

The **BrtSlicerCacheOlapItem** record specifies an OLAP slicer item (section 2.2.14.1.4.1) of the **OLAP level** in the **OLAP hierarchy** specified by the **BrtBeginSlicerCacheLevelData** (section 2.4.205) that precedes this record as defined by the slicer cache (section 2.2.14.1) part **ABNF**. This record contains a list of all ancestor **OLAP members** of this OLAP member in the OLAP hierarchy.

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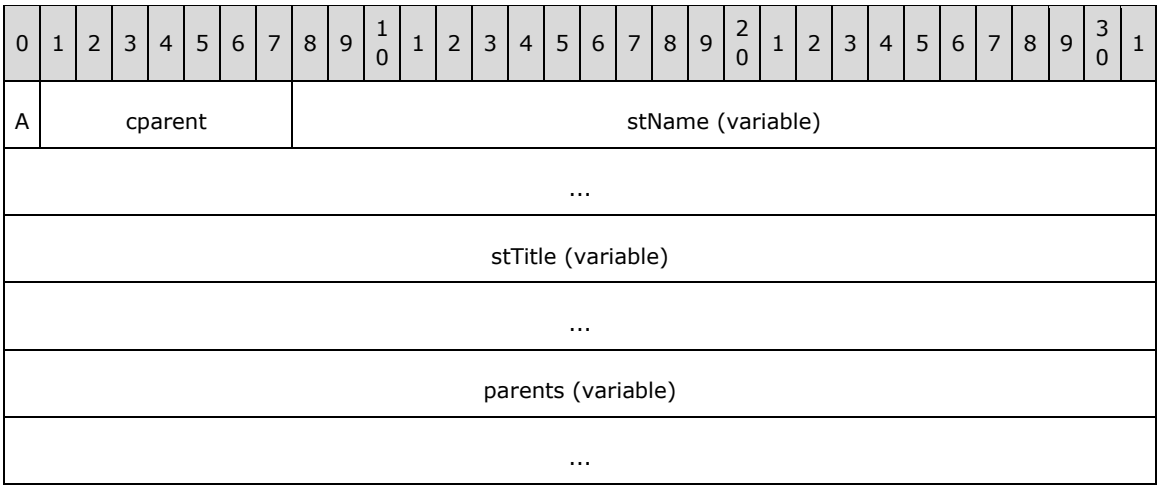


A - fNoData (1 bit): A bit that specifies whether the OLAP member specified by this record does not have data associated with it. For more information, see section 2.2.14.1.5. This bit MUST be 0 if the value of the **fCrossFilter** field of the **BrtBeginSlicerCacheLevelData** (section 2.4.205) record is equal to 0x0.

cparent (7 bits): An unsigned integer that specifies the count of OLAP members that are ancestors of the OLAP member specified by this record in the OLAP hierarchy. For OLAP hierarchies that are not **attribute hierarchies** this count does not include the **OLAP All member**.

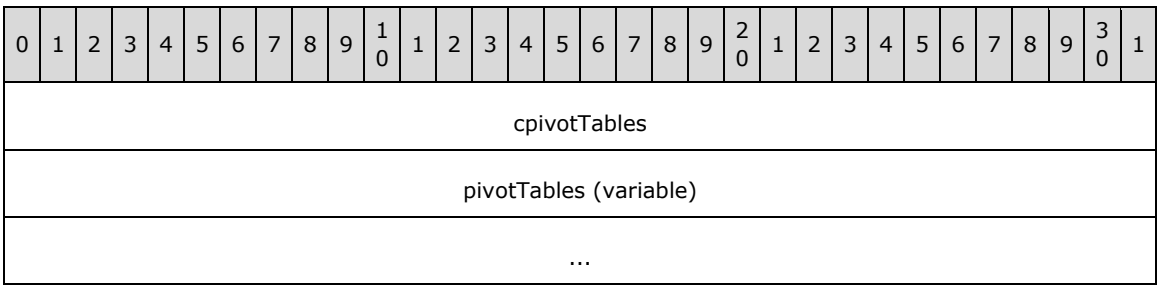
stName (variable): An **XLWideString** (section 2.5.168) that specifies the **MDX unique name** of the OLAP member specified by this record.

stTitle (variable): An **XLWideString** that specifies the caption of the OLAP member specified by this record.

parents (variable): An array of **XLWideString** that specifies the MDX unique names of the OLAP members that are ancestors of the OLAP member specified by this record. The first element of this array specifies the OLAP member that is the parent of the OLAP member specified by this record in the OLAP hierarchy. Each subsequent element in this array specifies an ancestor OLAP member in the next level up the OLAP hierarchy. The number of elements in this array MUST be equal to **cparent**.

2.4.776 BrtSlicerCachePivotTables

The **BrtSlicerCachePivotTables** record specifies the **PivotTable** views (section 2.2.5.3) that will be filtered by the slicer cache (section 2.2.14.1) as defined by the **Slicer Cache** (section 2.1.7.47) part **ABNF** rules.



cpivotTables (4 bytes): An unsigned integer that specifies the count of **PivotTable** views specified by this record. The value MUST match the number of **SlicerCachePivotTable** (section 2.5.136) structures within the **pivotTables** array.

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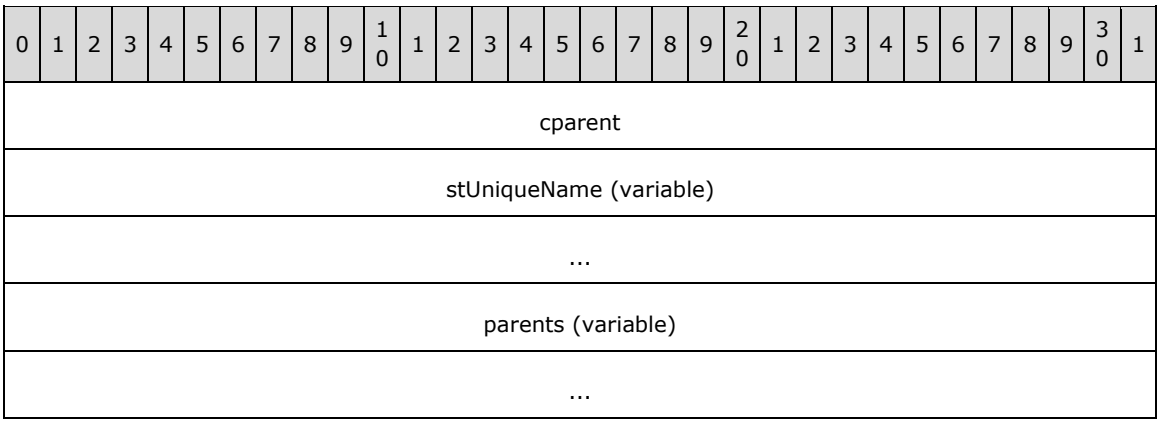
pivotTables (variable): An array of **SlicerCachePivotTable** structures that specify the **PivotTable** views of this record. The array MUST NOT contain duplicate structures. The **bVerSxMacro** field of the **BrtBeginSXView** (section 2.4.273) record of each **PivotTable** view in this array MUST be greater than or equal to 3. The **fNotViewCalculatedMembers** field of the **BrtBeginSXView** record of all **PivotTable** views in this array MUST have the same value. The **fCalcMembersInAdvFilters** field of the **BrtBeginSXView14** (section 2.4.274) record in all **PivotTable** views MUST have the same value.

2.4.777 BrtSlicerCacheSelection

The **BrtSlicerCacheSelection** record specifies an **OLAP member** in the **OLAP hierarchy** specified by the **BrtBeginSlicerCacheLevelsData** (section 2.4.206) of the slicer cache (section 2.2.14.1) that is **selected**. This record also specifies the ancestor OLAP members of this OLAP member in the OLAP hierarchy.



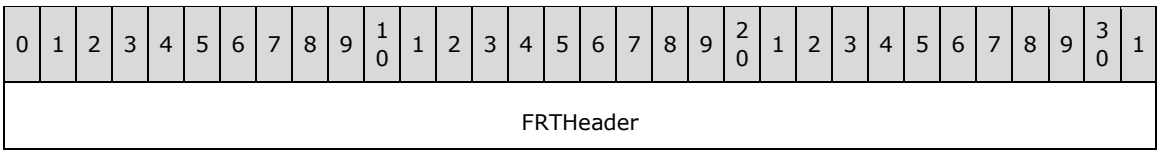
cparent (4 bytes): An integer that specifies the count of OLAP members that are ancestors of the OLAP member specified by this record in the OLAP hierarchy. For OLAP hierarchies that are not **attribute hierarchies** this count does not include the **OLAP All member**. MUST be greater than or equal to 0. MUST equal the number of items in the **parents** array.

stUniqueName (variable): An **XLWideString** (section 2.5.168) that specifies the **MDX unique name** of the OLAP member specified by this record.

parents (variable): An array of **XLWideString** that specifies the MDX unique names of the OLAP member that are ancestors of the OLAP member specified by this record. The first element of the array specifies the OLAP member that is the parent of the OLAP member specified by this record in the OLAP hierarchy. Each subsequent element in this array specifies an ancestor OLAP member in the next level up the OLAP hierarchy, excluding OLAP All member for OLAP hierarchies that are not attribute hierarchies. The number of elements in this array MUST be equal to **cparent**.

2.4.778 BrtSlicerStyleElement

The **BrtSlicerStyleElement** record specifies a table style element (section 2.2.6.2.2) specific to slicer styles (section 2.2.6.3.1).



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tseType
dxfId

FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

tseType (4 bytes): A **TSEType** (section 2.5.149) specifying the portion of the slicer view (section 2.2.14.2) to which this table style element applies. MUST be greater than or equal to 0x0000001C. This field MUST be unique within the SLICERSTYLE rule as specified the **Styles** (section 2.1.7.50) part **ABNF**.

dxfId (4 bytes): A **DXFId14** (section 2.5.38) that specifies the differential formatting (section 2.2.6.2) applied to this table style element. The **fNewBorder** field of **BrtDXF14** (section 2.4.355) referenced by this **dxfId** MUST be ignored.

2.4.779 BrtSmartTagType

The **BrtSmartTagType** record specifies the properties for a **smart tag** type that contains the identification information for the smart tag.<44>

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
NameSpaceUri (variable)																															
...																															
Name (variable)																															
...																															
Url (variable)																															
...																															

NameSpaceUri (variable): An **XLWideString** (section 2.5.168) that specifies the **Uniform Resource Identifier (URI)** for this smart tag type used by this application. The length of this string MUST be less than or equal to 2084 characters.

Name (variable): An **XLWideString** that specifies the name of this smart tag type. The length of string MUST be less than 256 characters.

Url (variable): An **XLNullableWideString** (section 2.5.166) that specifies the **URL** for a smart tag provided by the smart tag creator, which can be shown in the application to get more information about the smart tag. The length of this string MUST be less than or equal to 2084 characters.

2.4.780 BrtSparkline

The **BrtSparkline** record specifies information for a single **sparkline**.

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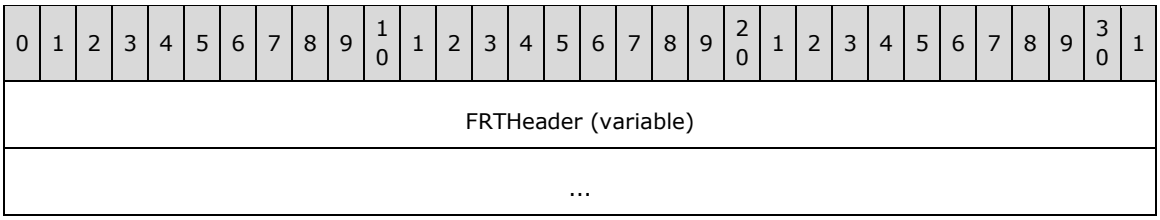


FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the future record (section 2.1.6) information for this record.

The **FRTHeader** fields MUST have the values listed in the following table:

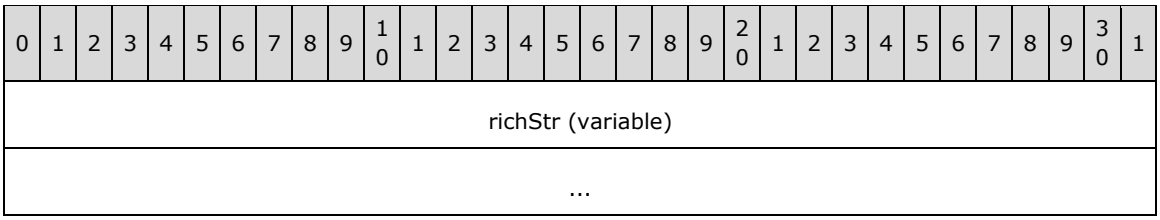
Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	1
FRTHeader.fFormulas	0 or 1
FRTHeader.fRelID	0

The **FRTHeader.rgSqrefs** specifies the **cell** in which the sparkline is located. The **csqref** of **FRTHeader.rgSqrefs** MUST equal 1. The **crfx** of the **sqrfx** of the single **FRTSqref** (section 2.5.65) comprising the **array** of the **FRTHeader.rgSqrefs** MUST equal 1. The single **UncheckedRfX** (section 2.5.153) comprising the **sqrfx** of the single **FRTSqref** comprising the **array** of **FRTHeader.rgSqrefs** MUST have its **rwFirst** equal to its **rwLast**, and MUST have its **colFirst** equal to its **colLast**.

The **FRTHeader.rgFormulas** specifies the data **range** for this sparkline. If **FRTHeader.fFormulas** equals 1, then **cformula** of the **FRTHeader.rgFormulas** MUST equal 1 and the formula (section 2.2.2) of the single **FRTFormula** (section 2.5.58) comprising the **array** of the **FRTHeader.rgFormulas** MUST contain only one **Ptg** (section 2.5.97.16) structure, and that **Ptg** structure MUST be either **PtgName** (section 2.5.97.60), **PtgNameX** (section 2.5.97.61), **PtgRef3d** (section 2.5.97.69), or **PtgArea3d** (section 2.5.97.19). If the **Ptg** structure is a **PtgRef3d** or **PtgArea3d**, then the **ixti** of the **PtgRef3d** or **PtgArea3d** MUST specify an **Xti** (section 2.5.172) that MUST have **firstSheet** greater than or equal to 0, and MUST have **lastSheet** equal to **firstSheet**. If the **Ptg** structure is a **PtgArea3d**, then the **area** of the **PtgArea3d** MUST either have **rowFirst** equal to **rowLast** and **columnFirst.fRwRel** equal to **columnLast.fRwRel**, or **columnFirst.col** equal to **columnLast.col** and **columnFirst.fColRel** equal to **columnLast.fColRel**.

2.4.781 BrtSSTItem

The **BrtSSTItem** record specifies an individual string in the shared string table.



richStr (variable): A **RichStr** (section 2.5.121) that specifies an individual string in the shared string table.

2.4.782 BrtStr

The **BrtStr** (section 2.4.782) record specifies a shared text string referenced by other records in the cell metadata (section 2.2.4.2) and value metadata (section 2.2.4.3) part.

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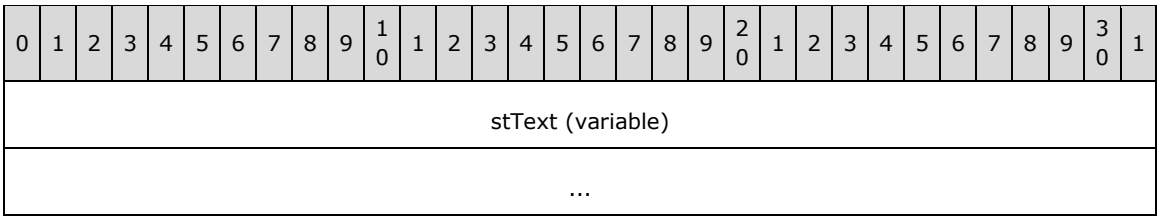
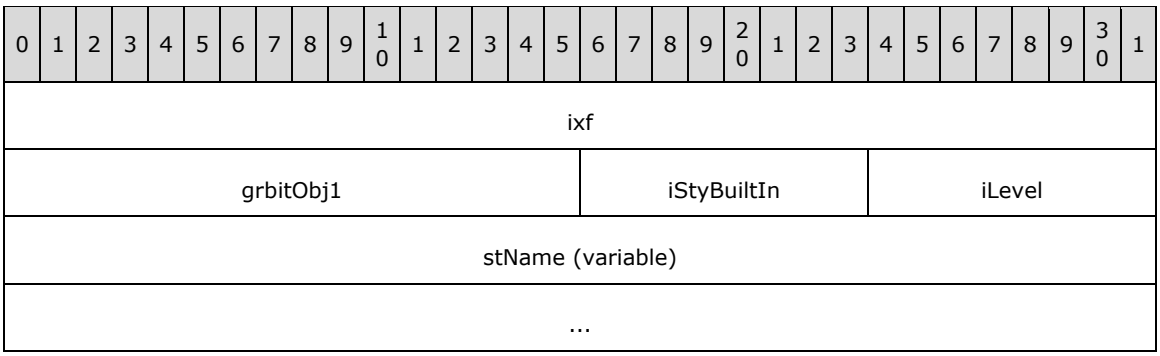


stText (variable): An **XLWideString** (section 2.5.168) that specifies the content of the **BrtStr** record. **BrtStr** records within the collection specified by **BrtBeginEsstr** (section 2.4.76) and **BrtEndEsstr** (section 2.4.425) records MUST be unique subject to the content's bitwise comparison.

2.4.783 BrtStyle

The **BrtStyle** record specifies a cell style (section 2.2.6.1.2). A record of this type exists for each cell style used in the **workbook**.



ixf (4 bytes): An unsigned integer that specifies a zero-based index of a **BrtXF** (section 2.4.845) record in the collection of all records directly following **BrtBeginCellStyleXFs** (section 2.4.19). The referenced **BrtXF** specifies the cell formatting for this cell style.

This value MUST be unique with respect to the value of **ixf** in all other **BrtStyle** records in the workbook.

grbitObj1 (2 bytes): A **StyleFlags** (section 2.5.144) structure which specifies properties for this cell style.

iStyBuiltIn (1 byte): An unsigned integer that specifies a built-in cell style. If this value is nonzero, this cell style is a built-in cell style and **grbitObj1.fBuiltIn** MUST equal 1. If this value is equal to 1 or 2, the value of **iLevel** is needed to specify the built-in cell style. For all other values, **iStyBuiltIn** is sufficient to identify the built-in cell style. To see a list of all built-in cell styles, refer to [ISO/IEC29500-1:2016], section 18.8.7.

iLevel (1 byte): An unsigned integer that specifies, in conjunction with **iStyBuiltIn**, a built-in cell style. If **iStyBuiltIn** is equal to 1, the specified built-in cell style is **RowLevel_n** [ISO/IEC29500-1:2016], section 18.8.7, where n is an integer equal to the value of **iLevel** + 1. Similarly, if **iStyBuiltIn** is equal to 2, the specified built-in cell style is **ColLevel_n** [ISO/IEC29500-1:2016], section 18.8.7. If **iStyBuiltIn** is equal to 1 or 2, the value of **iLevel** MUST be between 0 and 6 inclusive. If **iStyBuiltIn** is equal to any other value, **iLevel** MUST be ignored.

stName (variable): A **CellStyleName** (section 2.5.10) which specifies the name of this cell style. If this cell style is built-in, the name of the cell style is defined by the built-in cell style identified by **iStyBuiltIn** and **iLevel** instead of this value.

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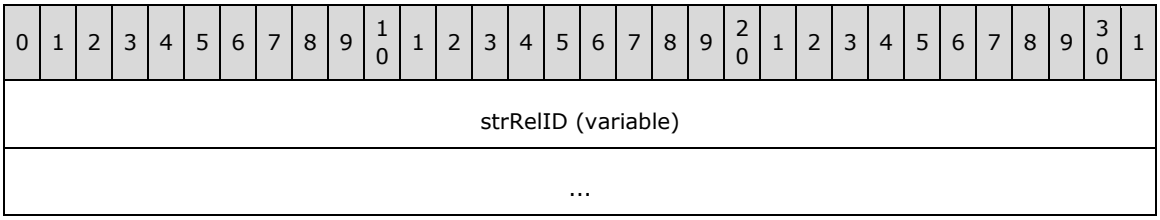
2.4.784 BrtSupAddin

The **BrtSupAddin** record specifies an **Add-in** Referencing type of Supporting Link (section 2.2.7.2). The names of all **add-in functions** implemented by **XLL** or **COM** automation add-ins that are referenced by formulas in this **workbook** MUST be specified in the **BrtPlaceholderName** (section 2.4.735) records that follow this record.

2.4.785 BrtSupBookSrc

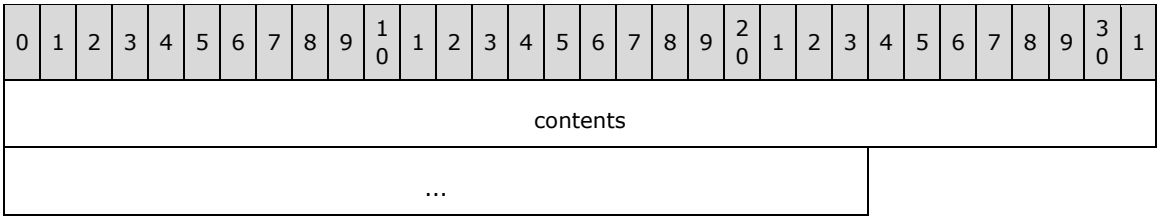
The **BrtSupBookSrc** record specifies an External Link Referencing type of Supporting Link (section 2.2.7.2).



strRelID (variable): A **RelID** (section 2.5.114) that specifies an **External Link** (section 2.1.7.25) part **ABNF**.

2.4.786 BrtSupNameBits

The **BrtSupNameBits** record specifies properties of an External Defined Name (section 2.2.7.4.1.1), a DDE Data Item (section 2.2.7.4.2.1), or an OLE Data Item (section 2.2.7.4.3.1).



contents (7 bytes): A structure that specifies properties of an External Defined Name, a DDE Data Item, or an OLE Data Item. The structure used is dependent on the type of **External Link** (section 2.1.7.25) specified by the **sbt** field in the preceding **BrtBeginSupBook** (section 2.4.232) record.

Type of external link	Format of contents
External Defined Name	**ExternalNameProperties** (section 2.5.42)
DDE Data Item	**DDEItemProperties** (section 2.5.33)
OLE Data Item	**OLEItemProperties** (section 2.5.96)

2.4.787 BrtSupNameBool

The **BrtSupNameBool** record specifies a DDE Data Item (section 2.2.7.4.2.1) or OLE Data Item (section 2.2.7.4.3.1) value that contains a **Boolean** (section 2.5.97.3).

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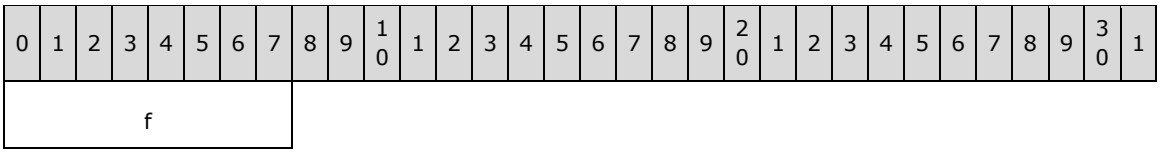


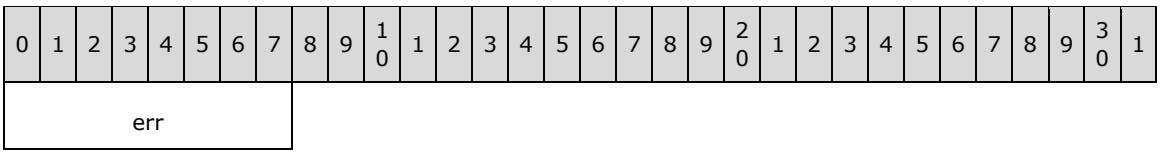
f (1 byte): A **Boolean** (section 2.5.97.3) that specifies the value.

2.4.788 BrtSupNameEnd

The **BrtSupNameEnd** record specifies the end of a collection of records as defined by the **External Link** (section 2.1.7.25) part **ABNF**. The collection of records specifies an external defined name (section 2.2.7.4.1.1), a DDE Data Item (section 2.2.7.4.2.1), or an OLE Data Item (section 2.2.7.4.3.1).

2.4.789 BrtSupNameErr

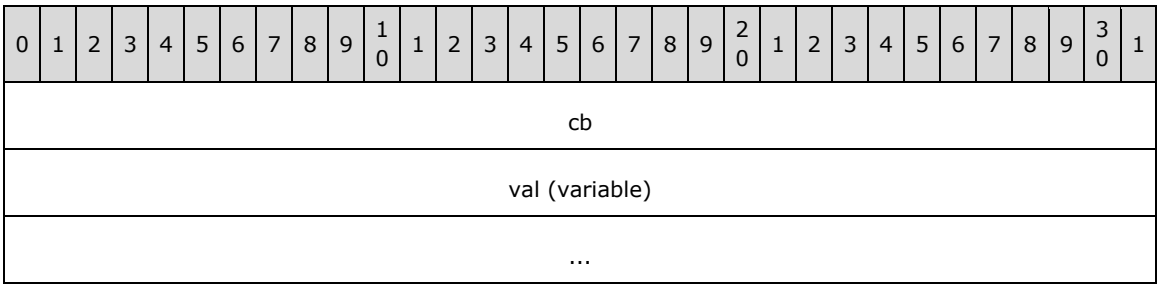
The **BrtSupNameErr** record specifies a DDE Data Item (section 2.2.7.4.2.1) or OLE Data Item (section 2.2.7.4.3.1) value that contains an error.



err (1 byte): A **BErr** (section 2.5.97.2) enumeration that specifies an error value.

2.4.790 BrtSupNameFmla

The **BrtSupNameFmla** record specifies the formula (section 2.2.2) of an external defined name (section 2.2.7.4.1.1). The formula of an external defined name, if defined, is restricted to the formula types specified by the **val** field.



cb (4 bytes): An unsigned integer that specifies the size of **val** in bytes. If the external defined name, as specified by the previous **BrtSupNameStart** (section 2.4.794) record, is not defined in the external workbook (section 2.1.10), this value MUST be 0 and **val** MUST NOT exist.

val (variable): An optional variant of a **Ptg** (section 2.5.97.16) that specifies the formula of an external defined name. This field exists if and only if **cb** is greater than 0. If this field exists, the contents of this field MUST be one and only one of the following structures:

- **ExtPtgRef3D** (section 2.5.47)
- **ExtPtgArea3D** (section 2.5.44)
- **ExtPtgRefErr3D** (section 2.5.48)

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- **ExtPtgAreaErr3D** (section 2.5.45)
- **ExtPtgErr** (section 2.5.46)

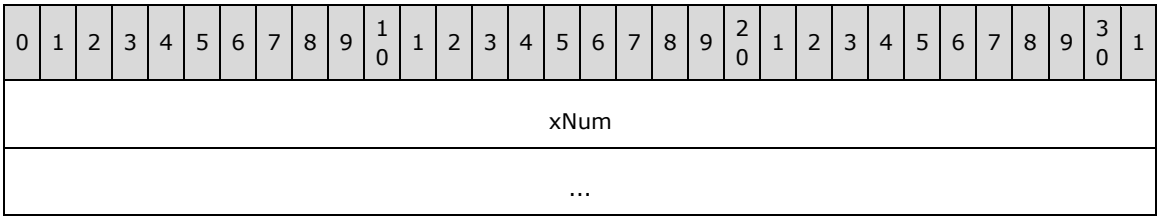
  If the formula cannot be represented correctly with one of the previous variant structures of a **Ptg**, then **val** MUST contain an **ExtPtgErr**.

2.4.791 BrtSupNameNil

The **BrtSupNameNil** record specifies a DDE Data Item (section 2.2.7.4.2.1) or OLE Data Item (section 2.2.7.4.3.1) value that represents a null value.

2.4.792 BrtSupNameNum

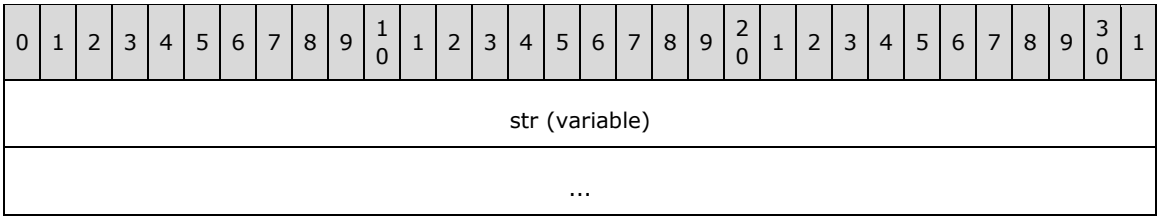
The **BrtSupNameNum** record specifies a DDE Data Item (section 2.2.7.4.2.1) or OLE Data Item (section 2.2.7.4.3.1) value that contains a number.



xNum (8 bytes): An **Xnum** (section 2.5.171) that specifies the value of the **DDE** data value.

2.4.793 BrtSupNameSt

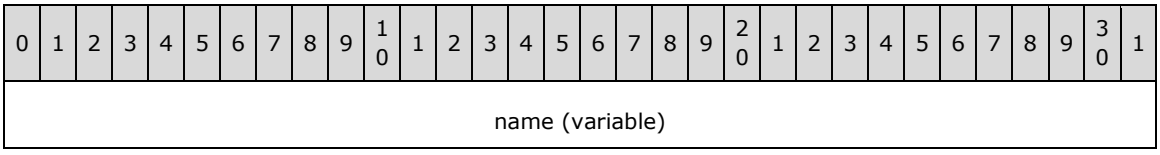
The **BrtSupNameSt** record specifies a DDE Data Item (section 2.2.7.4.2.1) or OLE Data Item (section 2.2.7.4.3.1) value that contains a string.



str (variable): An **XLWideString** (section 2.5.168) that specifies a string value. The length of this string MUST be less than 32768 characters.

2.4.794 BrtSupNameStart

The **BrtSupNameStart** record specifies the name of an external defined name (section 2.2.7.4.1.1) and specifies the beginning of a collection of records as defined by the **External Link** (section 2.1.7.25) part **ABNF**. The collection of records specifies an External Defined Name, a DDE Data Item (section 2.2.7.4.2.1), or an OLE Data Item (section 2.2.7.4.3.1). Which type is specified by the collection of records is dependent on the type of **External Link** specified by the **sbt** field of the preceding **BrtBeginSupBook** (section 2.4.232) record.



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...

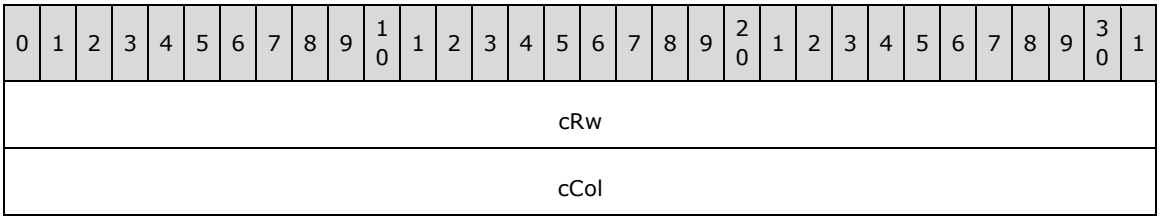
name (variable): An **XLNameWideString** (section 2.5.165) that specifies the name of an External Defined Name, the name of a DDE Data Item (section 2.2.7.4.2.1), or the name of an OLE Data Item (section 2.2.7.4.3.1).

2.4.795 BrtSupNameValueEnd

The **BrtSupNameValueEnd** record specifies the end of a collection of records as defined by the **External Link** (section 2.1.7.25) part **ABNF**. The collection of records specifies a two-dimensional array of cached DDE Data Item (section 2.2.7.4.2.1) or OLE Data Item (section 2.2.7.4.3.1) values.

2.4.796 BrtSupNameValueStart

The **BrtSupNameValueStart** record specifies properties for a two-dimensional array of cached values for a DDE Data Item (section 2.2.7.4.2.1) or OLE Data Item (section 2.2.7.4.3.1)<45>, and specifies the beginning of a collection of records as defined by the **External Link** (section 2.1.7.25) part **ABNF**. The collection of records specifies the values of the two-dimensional array of cached values. The **dimensions** of the array are specified by the **cRw** and **cCol** fields. The values MUST be stored in **row**-major order.



cRw (4 bytes): A **DRw** (section 2.5.34) that specifies the number of rows in a DDE data item or OLE data item value array. This value MUST be greater than or equal to 1 and MUST be less than 1048577.

cCol (4 bytes): A **DCol** (section 2.5.31) that specifies the number of **columns (1)** in a DDE data item or OLE data item value array. This value MUST be greater than or equal to 1 and MUST be less than 16385.

2.4.797 BrtSupSame

The **BrtSupSame** record specifies a Same-Sheet Referencing type of Supporting Link (section 2.2.7.2).

2.4.798 BrtSupSelf

The **BrtSupSelf** record specifies a Self-Referencing type of Supporting Link (section 2.2.7.2).

2.4.799 BrtSupTabs

The **BrtSupTabs** record specifies the names of the **sheets** in an external workbook (section 2.1.10).

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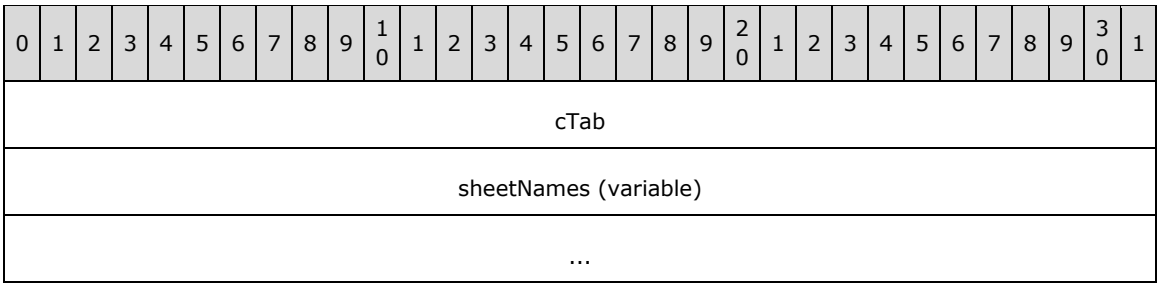
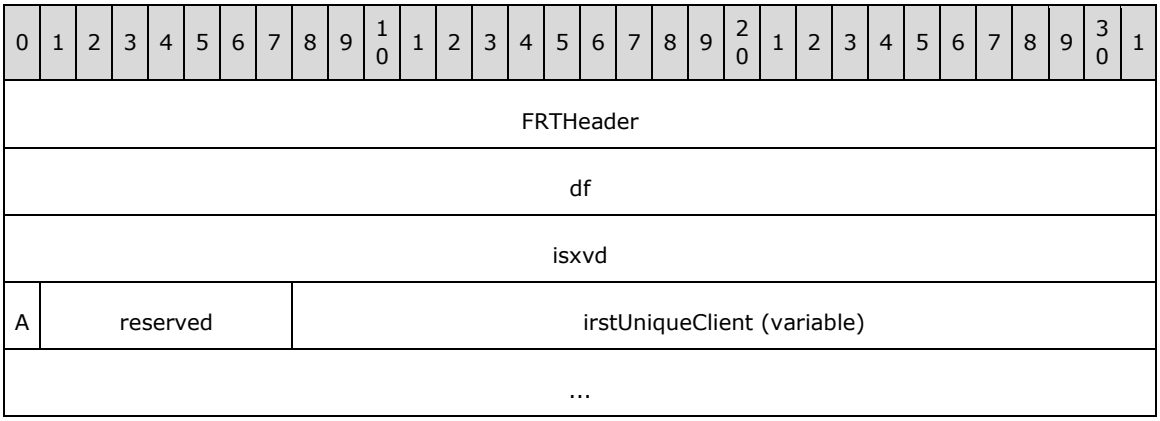


cTab (4 bytes): An unsigned integer that specifies the count of **XLWideString** (section 2.5.168) items in **sheetNames**.

sheetNames (variable): An array of **XLWideString** items. Each item specifies the name of a sheet in the external workbook. Each value MUST comply with the restrictions set on the **strName** field of **BrtBundleSh** (section 2.4.311). The count of items in this array MUST be less than 65535.

2.4.800 BrtSXDI14

The **BrtSXDI14** record specifies additional information about a data item (section 2.2.5.3.7.5.1).



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

df (4 bytes): A **ShowDataAs** (section 2.5.133) that specifies the data display format for this data item. If **isxvd** is equal to -1, then this field MUST be greater than or equal to 0x00000009. If this field is less than or equal to 0x00000008, then the **df** field of the immediately preceding **BrtBeginSXDI** (section 2.4.241) record MUST be equal to the value of this field and MUST be ignored. If this field is greater than or equal to 0x00000009, the **df** field of the immediately preceding **BrtBeginSXDI** record MUST be equal to 0 and MUST be ignored.

If this field is greater than 0x00000000 and less than 0x00000005, or if this field is greater than or equal to 0x0000000B, then the **isxvd** field of the immediately preceding **BrtBeginSXDI** record specifies the pivot field (section 2.2.5.3.2) that the calculations are based on, and the **isxvd** field of the immediately preceding **BrtBeginSXDI** record MUST NOT equal -1 or -2.

If this field is greater than 0x00000000 and less than 0x00000004, then the **isxvi** field of the immediately preceding **BrtBeginSXDI** record specifies the pivot item (section 2.2.5.3.3) that the calculations are based on.

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isxvd (4 bytes): An **ISXVD** (section 2.5.83) that specifies the pivot field summarized by this data item. A value of -1 specifies that the **isxvdData** field of the immediately preceding **BrtBeginSXDI** record specifies the pivot field summarized by this data item. This field MUST NOT be equal to -2. This field MUST be equal to -1 for non-**OLAP** PivotTable views.

If this field is not equal to -1, the pivot field specified by the **isxvdData** field of the immediately preceding **BrtBeginSXDI** record MUST contain a **BrtSXVD14** (section 2.4.814) record with an **fIgnorable** field equal to 1. The pivot hierarchy (section 2.2.5.3.4) associated with that pivot field (as specified in section 2.2.5.3.4)) MUST contain a **BrtSXTH14** (section 2.4.804) record. The cache field (section 2.2.5.2.2) associated with that pivot field MUST contain a **BrtPCDField14** (section 2.4.712) record. The cache hierarchy (section 2.2.5.2.7) associated with that cache field (as specified in section 2.2.5.2.7) MUST contain a **BrtPCDH14** (section 2.4.713) record with an **fIgnorable** field equal to 1.

If this field is not equal to -1, the **isxvdData** field of the immediately preceding **BrtBeginSXDI** record SHOULD<46> be ignored.

For more details, see section 2.2.5.2.7.1 (**Measures**).

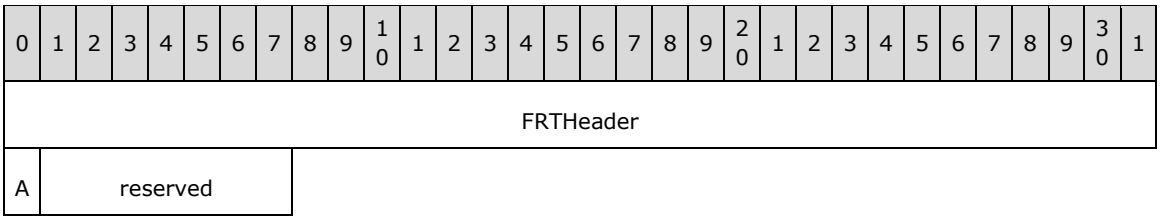
A - fUniqueClient (1 bit): A bit that specifies whether the **irstUniqueClient** field exists. This field MUST be equal to 1 if **isxvd** is not equal to -1.

reserved (7 bits): This value MUST be 0, and MUST be ignored.

irstUniqueClient (variable): An **XLWideString** (section 2.5.168) that specifies the unique name for duplicated **OLAP measures**. This field MUST exist if and only if the value of **fUniqueClient** is 1. This field MUST be unique within the **PivotTable** (section 2.1.7.40) part **ABNF**. If the string exists, the number of characters MUST be less than or equal to 65535.

2.4.801 BrtSXDI15

The **BrtSXDI15** record specifies additional information about a data item (section 2.2.5.3.7.5.1).



FRTHeader (4 bytes): An **FRTBlank** structure (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

A - fCountDistinct (1 bit): A bit that specifies that the aggregation function which applies to this data item (section 2.2.5.3.7.5.1) is the count of unique values. If this value is true, the **iiftab** field of the preceding **BrtBeginSXDI** (section 2.4.241) record is ignored.

reserved (7 bits): This value MUST be 0, and MUST be ignored.

2.4.802 BrtSxFilter15

The **BrtSxFilter15** record specifies additional information about a PivotTable (section 2.2.5) advanced filter (section 2.2.5.3.6.1) as specified by the **SXFILTER** rule (defined in section 2.1.7.40).

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0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	reserved																														

A - fWholeDay (1 bit): A bit that specifies whether the PivotTable (section 2.2.5) advanced filter (section 2.2.5.3.6.1) extended by this record uses whole days in its filtering criteria. MUST be false if the value of the **sxft** field of the preceding **BrtBeginSXFILTER** (section 2.4.245) record is not equal to any of the values specified in Value column of the table that follows. MUST be true if the value of the **irstName** field of the preceding **BrtBeginSXView** (section 2.4.273) record is equal to the value of the **name** ([MS-XLSX] section 2.6.114) attribute of at least one **CT_TimelineCachePivotTable** ([MS-XLSX] section 2.6.114) element in the **Timeline cache** ([MS-XLSX] section 2.1.7) and the value of the **sxft** field of the preceding **BrtBeginSXFILTER** record is one of the values specified in Value column of the following table.

Category	Value	Meaning
Date Filter	0x0000001A	"equals" filter for date values
Date Filter	0x0000001B	"older than" filter for date values
Date Filter	0x0000001C	"newer than" filter for date values
Date Filter	0x0000001D	"between" filter for date values
Date Filter	0x0000001E	"tomorrow" filter for date values
Date Filter	0x0000001F	"today" filter for date values
Date Filter	0x00000020	"yesterday" filter for date values
Date Filter	0x00000021	"next week" filter for date values
Date Filter	0x00000022	"this week" filter for date values
Date Filter	0x00000023	"last week" filter for date values
Date Filter	0x00000024	"next month" filter for date values
Date Filter	0x00000025	"this month" filter for date values
Date Filter	0x00000026	"last month" filter for date values
Date Filter	0x00000027	"next quarter" filter for date values
Date Filter	0x00000028	"this quarter" filter for date values
Date Filter	0x00000029	"last quarter" filter for date values
Date Filter	0x0000002A	"next year" filter for date values
Date Filter	0x0000002B	"this year" filter for date values
Date Filter	0x0000002C	"last year" filter for date values
Date Filter	0x0000002D	"year-to-date" filter for date values
Date Filter	0x0000002E	"first quarter" filter for date values
Date Filter	0x0000002F	"second quarter" filter for date values
Date Filter	0x00000030	"third quarter" filter for date values
Date Filter	0x00000031	"fourth quarter" filter for date values
Date Filter	0x00000032	"January" filter for date values
Date Filter	0x00000033	"February" filter for date values
Date Filter	0x00000034	"March" filter for date values
Date Filter	0x00000035	"April" filter for date values
Date Filter	0x00000036	"May" filter for date values
Date Filter	0x00000037	"June" filter for date values
Date Filter	0x00000038	"July" filter for date values
Date Filter	0x00000039	"August" filter for date values
Date Filter	0x0000003A	"September" filter for date values
Date Filter	0x0000003B	"October" filter for date values

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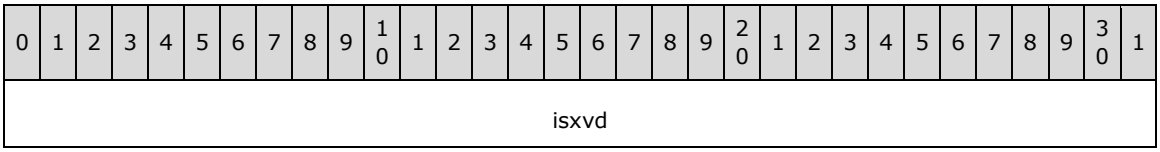
Category	Value	Meaning
Date Filter	0x0000003C	"November" filter for date values
Date Filter	0x0000003D	"December" filter for date values
Date Filter	0x0000003E	"not equal" filter for date values
Date Filter	0x0000003F	"older than or equal to" filter for date values
Date Filter	0x00000040	"newer than or equal to" filter for date values
Date Filter	0x00000041	"not between" filter for date values

reserved (7 bits): This value MUST be 0, and MUST be ignored.

2.4.803 BrtSXTDMPOrder

The **BrtSXTDMPOrder** record specifies a reference to a **member** property pivot field (section 2.2.5.3.2) for a pivot hierarchy (section 2.2.5.3.4). See Member Properties for more details. The order of these records is used for the order of the member properties.



isxvd (4 bytes): An **ISXVD** (section 2.5.83) that specifies the member property pivot field. This field MUST NOT be equal to -1 or -2.

2.4.804 BrtSXTH14

The **BrtSXTH14** record specifies that the preceding **BrtBeginSXTH** (section 2.4.261) record SHOULD<47> be ignored.

If this record exists, there MUST exist an **SXDI** (section 2.1.7.40) rule as specified by the **PivotTable** (section 2.1.7.40) part **ABNF** which has a **BrtBeginSXDI** (section 2.4.241) record with an **isxvdData** field equal to the pivot field (section 2.2.5.3.2) index of a pivot associated with this pivot hierarchy (section 2.2.5.3.4), as specified in section 2.2.5.3.4). Additionally, the **SXDI** rule MUST contain a **BrtSXDI14** (section 2.4.800) record with an **isxvd** field greater than or equal to 0.

The preceding **BrtBeginSXTH** record MUST have values set as specified in the following table.

Name	Value
fOutlineMode	0
fEnableMultiplePageItems	0
fSubtotalAtTop	0
fDontShowFList	0
fDragToRow	0
fDragToColumn	0
fDragToPage	0
fDragToHide	0

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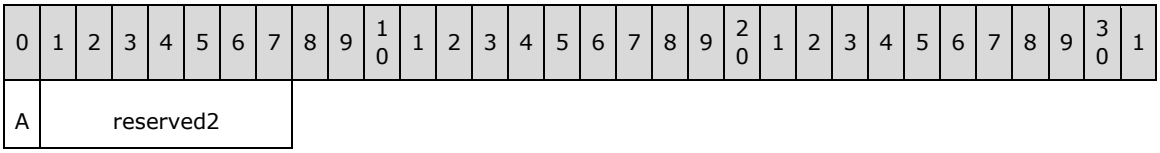
Name	Value
fDragToData	1
fFilterInclusive	0
fLoadCap	0

For more details, see sections 2.2.5.2.7.1 (**Measures**) and 2.4.800 (**BrtSXDI14)**.

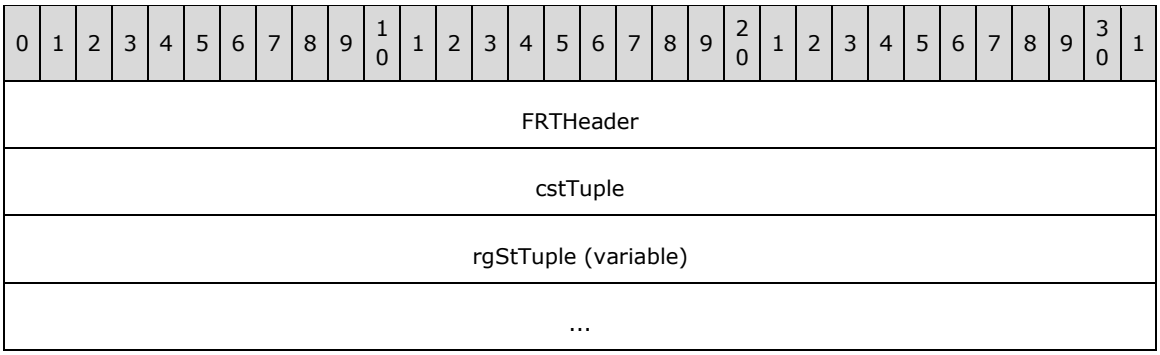


A - reserved1 (1 bit): This value MUST be 1, and MUST be ignored.

reserved2 (7 bits): This value MUST be 0, and MUST be ignored.

2.4.805 BrtSXTupleItems

The **BrtSXTupleItems** record specifies a collection of **MDX unique names** that identifies the value in the **OLAP** source data (section 2.2.5.2.1) using **PivotTable** What-if Analysis (section 2.2.5.3.10).



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

cstTuple (4 bytes): An unsigned integer that specifies the count of MDX unique names in the **rgStTuple** field. It MUST be greater than 0 and MUST be less than or equal to 0x7FFFFFFF.

rgStTuple (variable): An array of **XLWideString** (section 2.5.168). Each **XLWideString** in the array specifies a MDX unique name. The length of each **XLWideString** MUST be greater than 0 and MUST be less than or equal to 65535 characters.

2.4.806 BrtSXTupleSetHeaderItem

The 2**BrtSXTupleSetHeaderItem** record specifies the **MDX unique name** of the **OLAP hierarchy** and the MDX unique name of the **OLAP level** of the associated **OLAP named set**. The value of the **cCol** field in the **BrtBeginSXTupleSet** (section 2.4.265) record that immediately precedes this record MUST be equal to the number of **BrtSXTupleSetHeaderItem** records between the **BrtBeginSXTupleSetHeader** (section 2.4.267) record that immediately precedes this record and the **BrtEndSXTupleSetHeader** (section 2.4.615) record that immediately follows this record.

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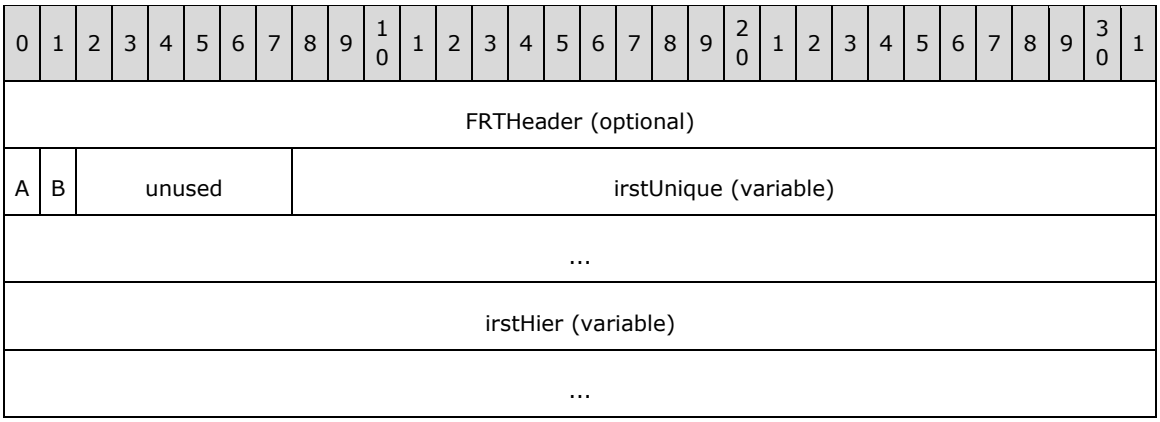


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record. This field exists if and only if the size of this record is greater than 4.

A - fUnique (1 bit): A bit that specifies whether the **irstUnique** field exists.

B - fHier (1 bit): A bit that specifies whether the **irstHier** field exists.

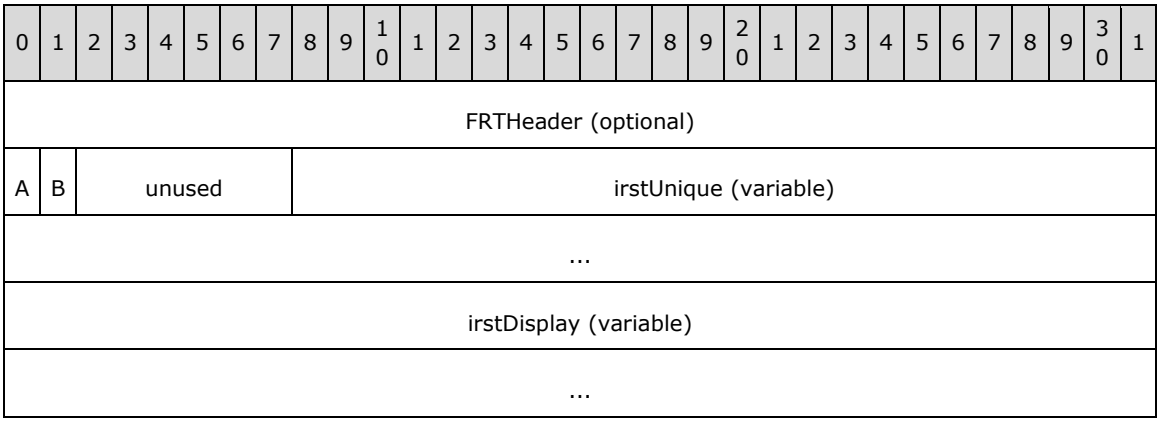
unused (6 bits): This field is undefined, and MUST be ignored.

irstUnique (variable): An **XLWideString** (section 2.5.168) that specifies the MDX unique name of the OLAP level. This field MUST exist if and only if **fUnique** is equal to 1. The length of this field MUST be less than or equal to 65535 characters.

irstHier (variable): An **XLWideString** that specifies the MDX unique name of the OLAP hierarchy. This field MUST exist if and only if **fHier** is equal to 1. The length of this field MUST be less than or equal to 65535 characters.

2.4.807 BrtSXTupleSetRowItem

The **BrtSXTupleSetRowItem** record specifies an **OLAP member** that is part of the **OLAP tuple** that is specified by the **BrtBeginSXTupleSetRow** (section 2.4.268) that immediately precedes this record. The value of the **cCol** field in the **BrtBeginSXTupleSet** (section 2.4.265) record that immediately precedes this record MUST be equal to the number of **BrtSXTupleSetRowItem** records between the **BrtBeginSXTupleSetRow** record that immediately precedes this record and the **BrtEndSXTupleSetRow** (section 2.4.616) record that immediately follows this record.



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FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record. This field exists if and only if the size of this record is greater than 4.

A - fUnique (1 bit): A bit that specifies whether the **irstUnique** field exists after the fixed sized portion of the record.

B - fDisplay (1 bit): A bit that specifies whether the **irstDisplay** field exists after the fixed sized portion of the record.

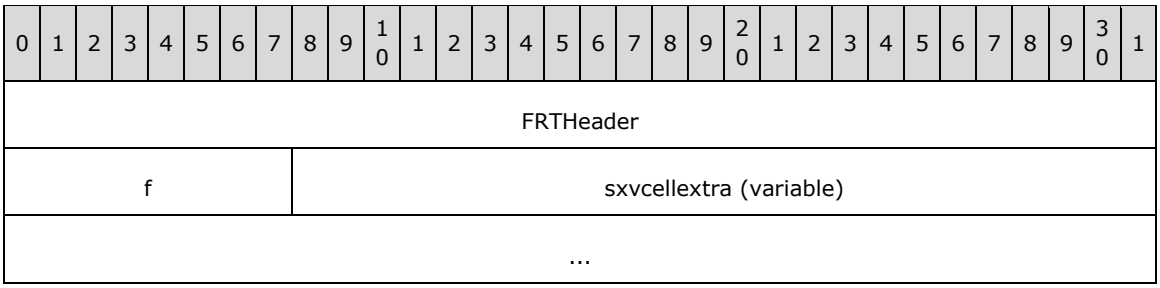
unused (6 bits): This field is undefined, and MUST be ignored.

irstUnique (variable): An **XLWideString** (section 2.5.168) that specifies the **MDX unique name** of this OLAP member. This field MUST exist if and only if The value of the **fUnique** field is equal to 1. The length of this field MUST be less than or equal to 65535 characters.

irstDisplay (variable): An **XLWideString** that specifies a display name for this OLAP member. This field MUST exist if and only if **fDisplay** is equal to 1. The length of this field MUST be less than or equal to 65535 characters.

2.4.808 BrtSxvcellBool

The **BrtSxvcellBool** record specifies a **PivotValueCell** (section 2.2.5.6.1) that contains a date and time as well as any server formatting information. If this record exists, it MUST be part of a collection of records that is specified by the **BrtBeginSxRow** (section 2.4.255) and **BrtEndSxRow** (section 2.4.603) records.



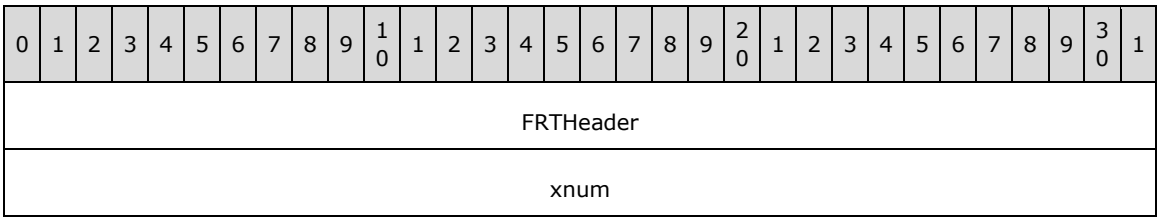
FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) structure that specifies the future record (section 2.1.6) information for this record.

f (1 byte): A **Boolean** (section 2.5.97.3) that specifies the value of this cache item.

sxvcellextra (variable): A **PCDISrvFmt** (section 2.5.101) that specifies server formatting information associated with this record.

2.4.809 BrtSxvcellDate

The **BrtSxvcellDate** record specifies a **PivotValueCell** (section 2.2.5.6.1) that contains a date and time as well as any server formatting information. If this record exists, it MUST be part of a collection of records that is specified by the **BrtBeginSxRow** (section 2.4.255) and **BrtEndSxRow** (section 2.4.603) records.



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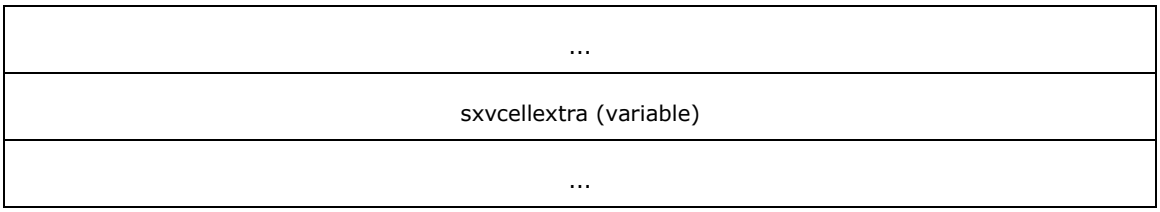


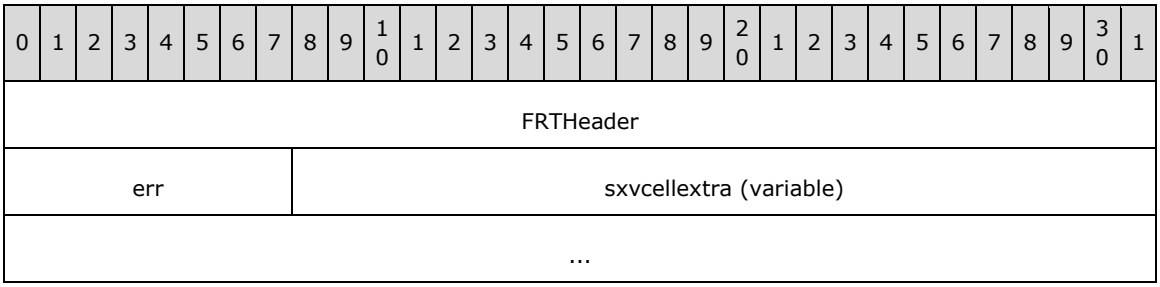
FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) structure that specifies the future record (section 2.1.6) information for this record.

xnum (8 bytes): A **DateAsXnum** (section 2.5.29) structure that specifies the date and time specified by this record.

sxvcellextra (variable): A **PCDISrvFmt** (section 2.5.101) structure that specifies server formatting information associated with this record.

2.4.810 BrtSxvcellErr

The **BrtSxvcellErr** record specifies a **PivotValueCell** (section 2.2.5.6.1) that contains an error value and any server formatting information. If this record exists, it MUST be part of a collection of records that is specified by the **BrtBeginSxRow** (section 2.4.255) and **BrtEndSxRow** (section 2.4.603) records.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) structure that specifies the future record (section 2.1.6) information for this record.

err (1 byte): An unsigned integer that specifies an error value. The value MUST be one of those listed in the following table.

Value	Meaning
0x07	#DIV/0!
0x0F	#VALUE!
0x24	#NUM!
0x2A	#N/A
0x2B	#GETTING_DATA
0x30	Blank

sxvcellextra (variable): A **PCDISrvFmt** (section 2.5.101) structure that specifies server formatting information associated with this record. This value MUST be 0 if the value of **err** is 0x30.

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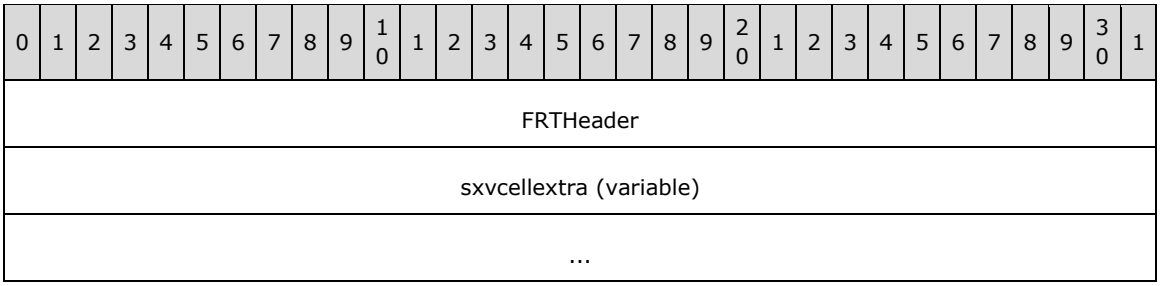
2.4.811 BrtSxvcellNil

The **BrtSxvcellNil** record specifies an empty **PivotValueCell** (section 2.2.5.6.1) and any server formatting information. If this record exists, it MUST be part of a collection of records that is specified by the **BrtBeginSxRow** (section 2.4.255) and **BrtEndSxRow** (section 2.4.603) records.

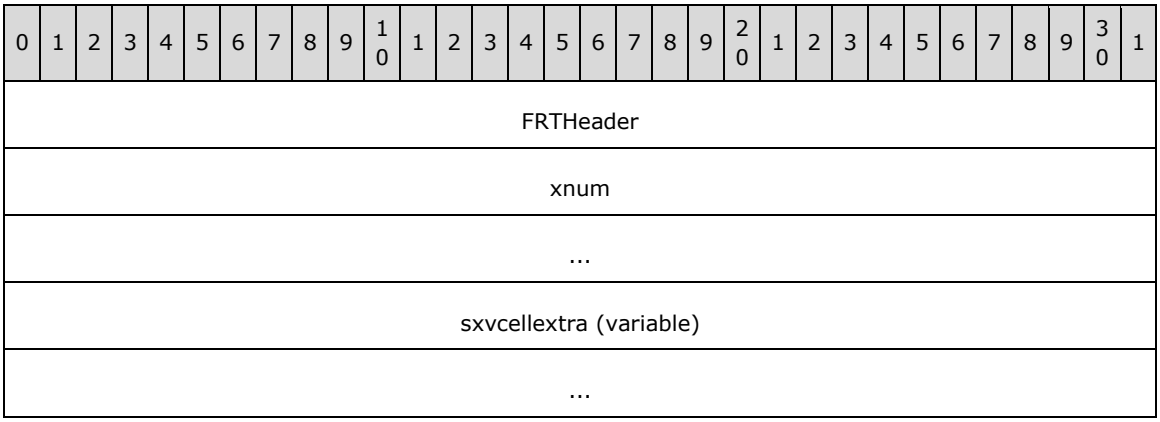


FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) structure that specifies the future record (section 2.1.6) information for this record.

sxvcellextra (variable): A **PCDISrvFmt** (section 2.5.101) structure that specifies server formatting information associated with this record.

2.4.812 BrtSxvcellNum

The **BrtSxvcellNum** record specifies a **PivotValueCell** (section 2.2.5.6.1) that contains an **Xnum** (section 2.5.171) value and any server formatting information. If this record exists, it MUST be part of a collection of records that is specified by the **BrtBeginSxRow** (section 2.4.255) and **BrtEndSxRow** (section 2.4.603) records.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) structure that specifies the future record (section 2.1.6) information for this record.

xnum (8 bytes): An **Xnum** (section 2.5.171) that specifies the numeric value specified by this record.

sxvcellextra (variable): A **PCDISrvFmt** (section 2.5.101) structure that specifies server formatting information associated with this record.

2.4.813 BrtSxvcellStr

The **BrtSxvcellStr** record specifies a **PivotValueCell** (section 2.2.5.6.1) that contains an **XLWideString** (section 2.5.168) value and any server formatting information. If this record exists, it

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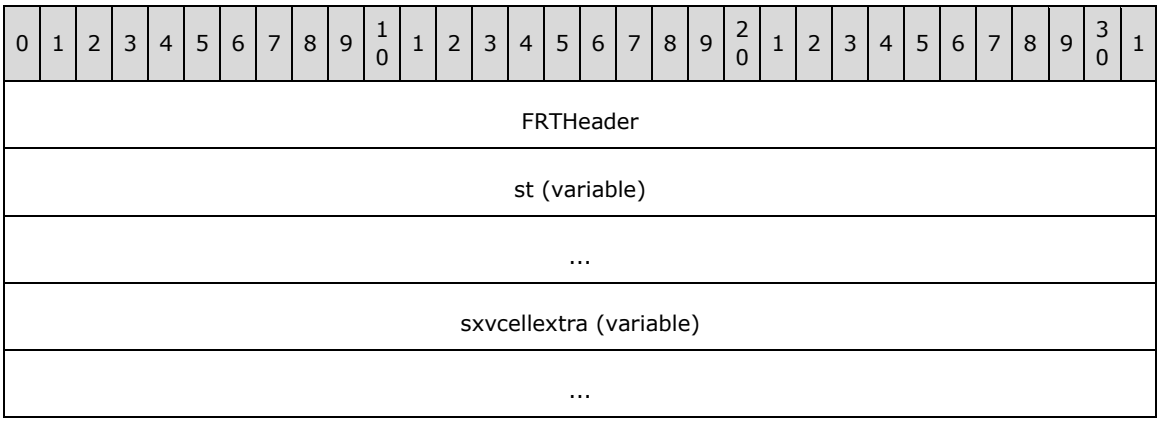
MUST be part of a collection of records that is specified by the **BrtBeginSxRow** (section 2.4.255) and **BrtEndSxRow** (section 2.4.603) records.



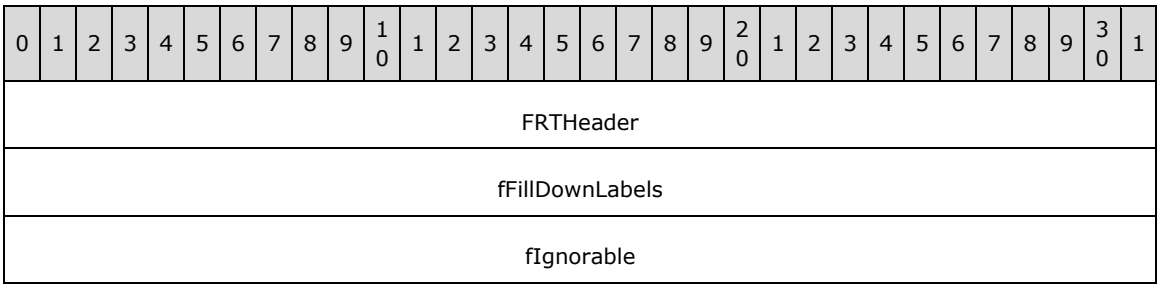
FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) structure that specifies the future record (section 2.1.6) information for this record.

st (variable): An **XLWideString** (section 2.5.168) structure that specifies the string value specified by this record. The length of this string MUST be less than or equal to 32,767 characters.

sxvcellextra (variable): A **PCDISrvFmt** (section 2.5.101) structure that specifies server formatting information associated with this record.

2.4.814 BrtSXVD14

The **BrtSXVD14** record specifies additional properties of a pivot field (section 2.2.5.3.2) as specified by the **SXVD** rule (defined in section 2.1.7.40).



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

fFillDownLabels (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether the pivot item labels are repeated for this pivot field. This field is ignored when **fCompactData** field and the **fOutlineData** field of the **BrtBeginSXView** (section 2.4.273) record are both equal to 0x1. This field is ignored if the pivot field is not on the **row** axis or the **column (1)** axis. For more details, see section 2.2.5.3.8.3. This value MUST be one of the values specified in the following table.

Value	Meaning
0x00000000	The item labels are not repeated.
0x00000001	The item labels are repeated for each nested item.

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fIgnorable (4 bytes): A **Boolean** that specifies whether the pivot field as specified by the instance of the **SXVD** rule (defined in section 2.1.7.40) that contains this record SHOULD<48> be ignored.

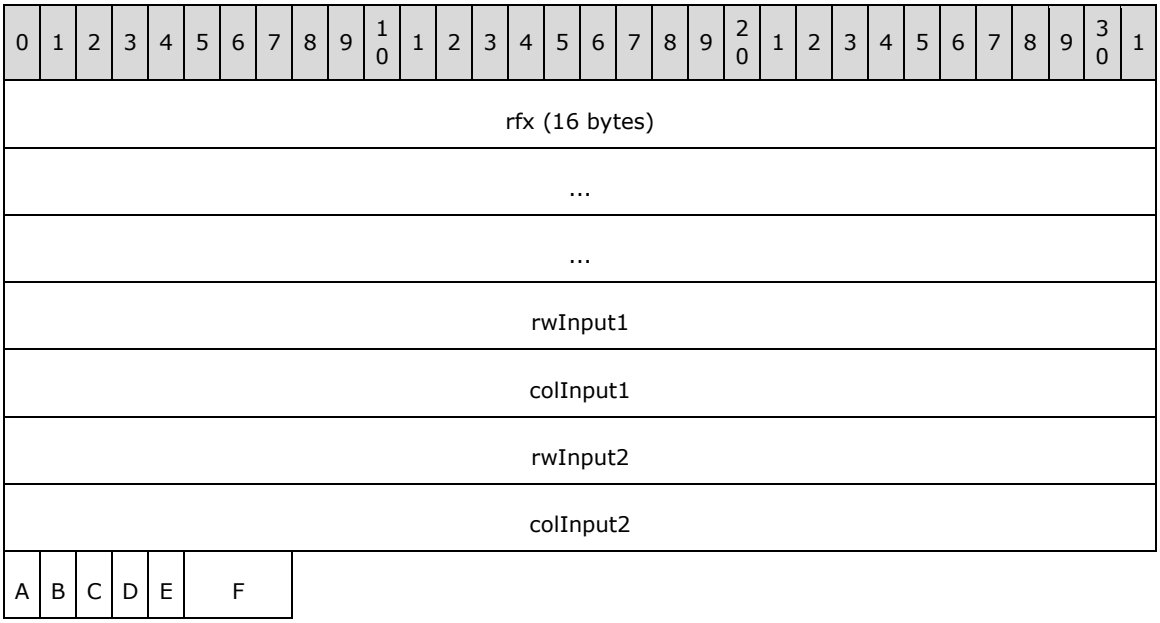
If this field is equal to 1, there MUST exist an **SXDI** (section 2.1.7.40) rule as specified by the **PivotTable** (section 2.1.7.40) part **ABNF** which has a **BrtBeginSXDI** (section 2.4.241) record with an **isxvdData** field equal to the pivot field index of this pivot field. Additionally, this **SXDI** rule MUST contain a **BrtSXDI14** (section 2.4.800) record with an **isxvd** field greater than or equal to 0.

The preceding **BrtBeginSXVD** record (section 2.4.270) MUST have an **sxaxis.sxaxisData** field equal to 1, and all other fields MUST be equal to 0.

For more details, see sections 2.2.5.2.7.1 (**Measures**) and 2.4.800 (**BrtSXDI14**).

2.4.815 BrtTable

The **BrtTable** record specifies properties of a **data table** and specifies the beginning of a collection of records as defined by the **Worksheet** part **ABNF** (section 2.1.7.62) and the **Macro Sheet** (section 2.1.7.32) part ABNF. The collection of records specifies a **one-variable data table** or a **two-variable data table**.



rfx (16 bytes): An **RfX** (section 2.5.117) that specifies the **row** and **column (1)** bounds of the **cells** in the data table. Every cell in the **range** specified by **rfx** MUST be a data table **member**. **rfx.rwFirst** MUST be greater than 0, and **rfx.ColFirst** MUST be greater than 0.

rwInput1 (4 bytes): An **UncheckedRw** (section 2.5.154) that specifies the row of the first **input cell** for the data table.

This field MUST be ignored if **fDeleted1** is 1.

If **fTable2** is 1, then **rwInput1** and **colInput1** MUST specify a cell outside the bounds specified by **rfx.rwFirst** – 1, **rfx.rwLast**, **rfx.colFirst** – 1, and **rfx.colLast**.

If **fTable2** is 0, then exactly one of the following statements applies:

- **rwInput1** and **colInput1** MUST specify a cell outside the bounds specified by **rfx.rwFirst** – 1, **rfx.rwLast**, **rfx.colFirst** – 1, and **rfx.colLast**.

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- **rwInput1** and **colInput1** MUST be equal to **rfx.rwFirst** -1 and **rfx.colFirst** – 1 respectively.

colInput1 (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies the column (1) of the first input cell for the data table. This field MUST be ignored if **fDeleted1** is 1.

rwInput2 (4 bytes): An **UncheckedRw** that specifies the row of the second input cell for a two-variable data table. **rwInput2** and **colInput2** MUST specify a cell outside the bounds specified by **rfx.rwFirst** – 1, **rfx.rwLast**, **rfx.colFirst** – 1, and **rfx.colLast**. This field MUST be ignored if **fDeleted2** is 1 or if **fTable2** is 0.

colInput2 (4 bytes): An **UncheckedCol** that specifies the column (1) of the second input cell for a two-variable data table. This field MUST be ignored if **fDeleted2** is 1 or if **fTable2** is 0.

A - fRow (1 bit): A bit that specifies whether the first input cell is a row input cell or a column (1) input cell. The value of this field MUST be one of the values specified in the following table.

Value	Meaning
0	The input cell is a column (1) input cell.
1	The input cell is a row input cell.

This value MUST be 1 if **fTable2** is 1.

B - fTable2 (1 bit): A bit that specifies if the data table is a two-variable data table or a one-variable data table. This field MUST be one of the values specified in the following table.

Value	Meaning
0	This is a one-variable data table.
1	This is a two-variable data table.

C - fDeleted1 (1 bit): A bit that specifies whether the first input cell for the data table has been deleted.

D - fDeleted2 (1 bit): A bit that specifies whether the second input cell for a two-variable data table has been deleted. This value MUST be 0 if **fTable2** is 0.

E - fAlwaysCalc (1 bit): A bit that specifies whether the data table formula (section 2.2.2) needs to be calculated as part of the next recalculation. This field MUST be one of the values from the following table.

Value	Meaning
0	The data table formula does not need to be calculated as part of the next recalculation.
1	The data table formula needs to be calculated as part of the next recalculation.

F - reserved (3 bits): This value MUST be 0 and MUST be ignored.

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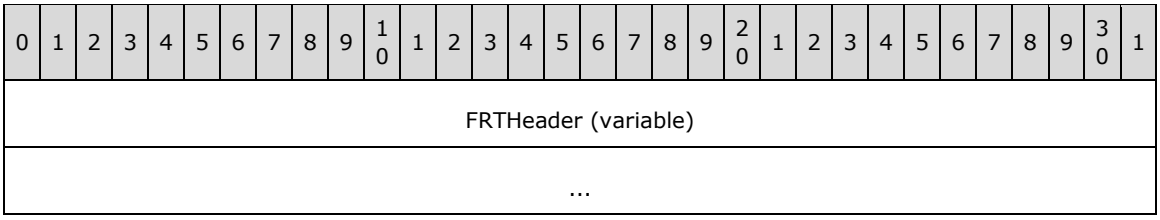
2.4.816 BrtTableSlicerCacheID

The **BrtTableSlicerCacheID** record specifies a reference to a slicer cache (section 2.2.14.1) in this **workbook** and specifies the beginning of an empty collection of records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**.



FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the future record (section 2.1.6) information for this record.

The **FRTHeader** fields MUST have the values listed in the following table.

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	0
FRTHeader.fFormula	0
FRTHeader.fRelID	1

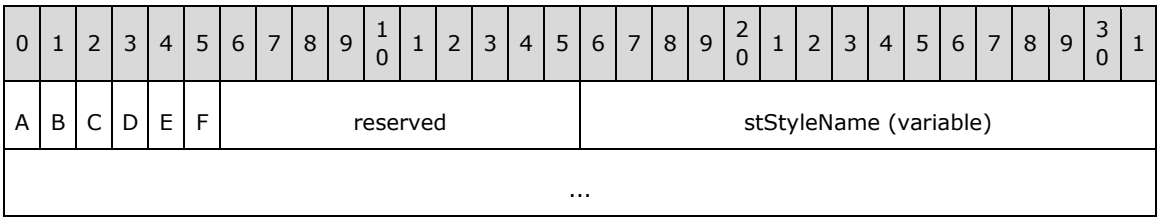
The **FRTHeader.RelID** specifies a relationship (section 2.1.3) that specifies a slicer cache part in this workbook.

2.4.817 BrtTableSlicerCacheIDs

The **BrtTableSlicerCacheIDs** record specifies the beginning of a collection of slicer cache identifier records as defined by the **Workbook** (section 2.1.7.61) part **ABNF**. The collection of records specifies the slicer cache identifiers for the **workbook**.

2.4.818 BrtTableStyleClient

The **BrtTableStyleClient** record specifies information about the table style applied to a **table** or **PivotTable** (section 2.1.7.40).



A - fFirstColumn (1 bit): A bit that specifies whether any table style elements (section 2.2.6.2.2) (as specified by **BrtTableStyleElement** in section 2.4.819) with a **tseType** field equal to 0x00000003 will be applied. This field MUST be ignored for PivotTables.

B - fLastColumn (1 bit): A bit that specifies whether any table style elements (as specified by **BrtTableStyleElement**) with a **tseType** field equal to 0x00000004 will be applied.

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C - fRowStripes (1 bit): A bit that specifies whether any table style elements (as specified by **BrtTableStyleElement**) with a **tseType** field equal to 0x00000005 or 0x00000006 will be applied.

D - fColumnStripes (1 bit): A bit that specifies whether any table style elements (as specified by **BrtTableStyleElement**) with a **tseType** field equal to 0x00000007 or 0x00000008 will be applied.

E - fRowHeaders (1 bit): A bit that specifies whether any table style elements (as specified by **BrtTableStyleElement**) with a **tseType** field equal to 0x00000003, 0x00000017, 0x00000018, or 0x00000019 will be applied. This field MUST be ignored for tables.

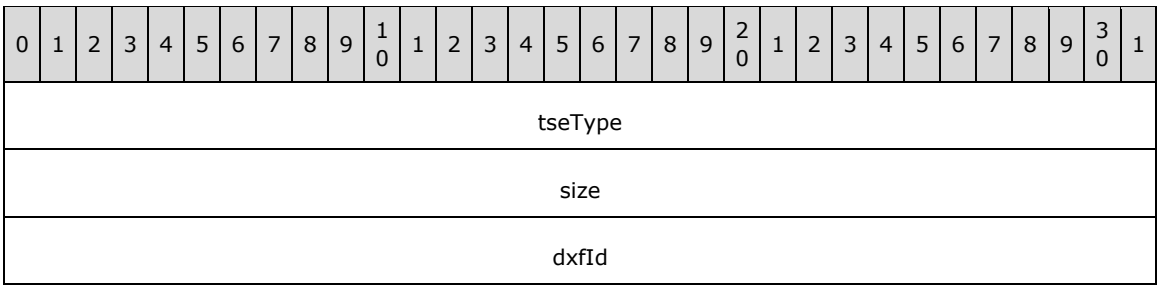
F - fColumnHeaders (1 bit): A bit that specifies whether any table style elements (as specified by **BrtTableStyleElement**) with a **tseType** field equal to 0x00000001, 0x00000014, 0x00000015, or 0x00000016 will be applied. This field MUST be ignored for tables.

reserved (10 bits): This value MUST be 0, and MUST be ignored.

stStyleName (variable): An **XLNullableWideString** (section 2.5.166) that specifies the name of the table style applied to this table or **PivotTable**. This field MUST be less than 256 characters long. This field MUST be either null, equal to the **strName** field of one of the **BrtBeginTableStyle** (section 2.4.278) records in the **Styles** (section 2.1.7.50) part **ABNF**, or equal to a built-in table style name as specified in [ISO/IEC29500-1:2016], section 18.8.40.

2.4.819 BrtTableStyleElement

The **BrtTableStyleElement** record specifies a table style element (section 2.2.6.2.2).



tseType (4 bytes): A **TSEType** (section 2.5.149) that specifies the bounds of this table style element. This field MUST be less than or equal to 0x0000001B. This field MUST be unique within the TABLESTYLE rule as specified the **Styles** (section 2.1.7.50) part **ABNF**.

size (4 bytes): An unsigned integer that specifies the number of **rows** or **columns (1)** to include in a single **stripe band** of **stripe formatting** if **tseType** is equal to 0x00000005, 0x00000006, 0x00000007, or 0x00000008. For other values of **tseType**, this value is undefined and MUST be ignored. This field MUST be greater than or equal to 1, and MUST be less than or equal to 9.

dxfId (4 bytes): A **DXFId** (section 2.5.37) that specifies the differential formatting (section 2.2.6.2) applied to this table style element.

2.4.820 BrtTextPr15

The **BrtTextPr15** record specifies additional properties of a **model data source text importation connection**, as specified in section 2.2.8.9.4.

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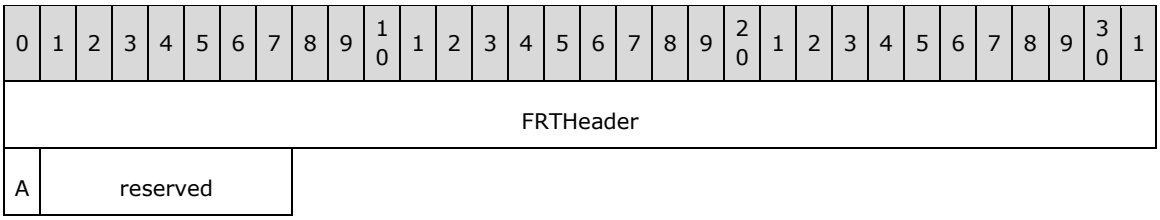


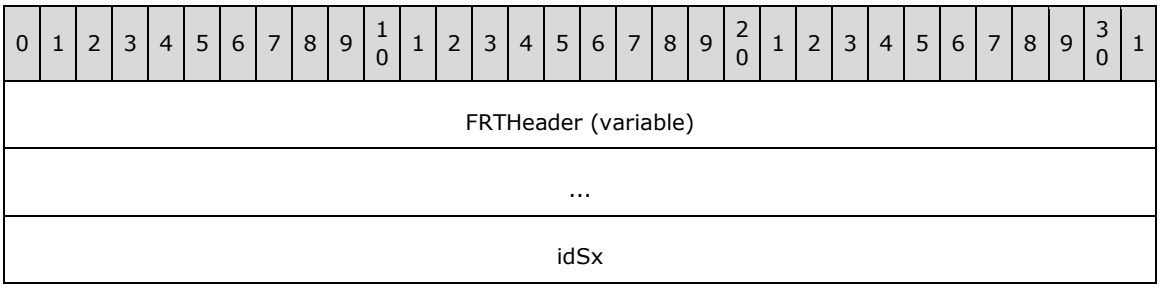
FRTHeader (4 bytes): An **FRTHeader** (section 2.5.60) that specifies the future record information (section 2.1.6) for this record.

A - fDataHasHeaders (1 bit): Specifies whether data imported by this connection has column headers.

reserved (7 bits): This value MUST be zero, and MUST be ignored.

2.4.821 BrtTimelineCachePivotCacheID

The **BrtTimelineCachePivotCacheID** record specifies a reference to a **PivotCache** (section 2.2.5.2) used by a **Timeline cache** (section 2.2.15.1).



FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the future record (section 2.1.6) information for this record.

The **FRTHeader** fields MUST have the values listed in the following table.

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	0
FRTHeader.fFormula	0
FRTHeader.fRelID	1

The **FRTHeader.RelID** specifies a relationship (section 2.1.3) that specifies a **PivotCache** part containing a **PivotCache** used by a **Timeline cache** with **OLAP Timeline source data** (section 2.2.15.1.1).

idSx (4 bytes): An unsigned integer that specifies the identifier for the **PivotCache Definition** (section 2.1.7.38) used by a **Timeline cache**.

2.4.822 BrtTimelineStyleElement

The **BrtTimelineStyleElement** record specifies a table style element (section 2.2.6.2.2) specific to timeline styles (section 2.2.6.3.2).

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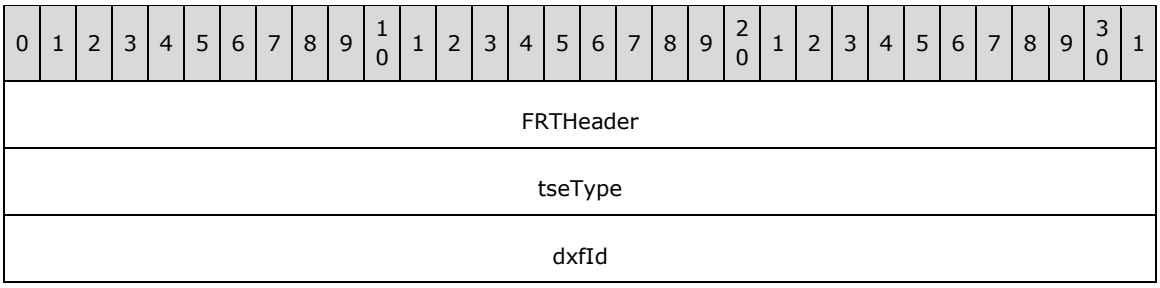


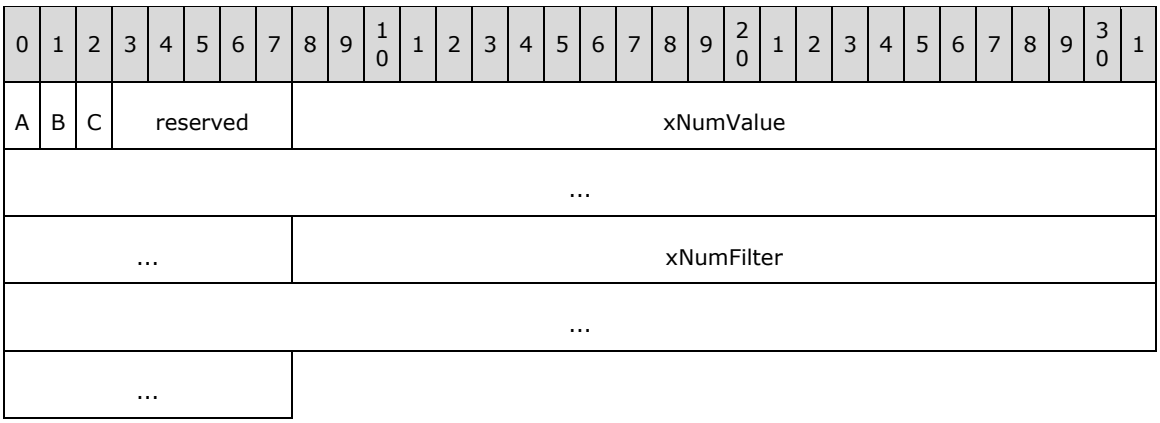
FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

tseType (4 bytes): A **TSEType** (section 2.5.149) specifying the portion of the timeline view(see section 2.2.15.2) to which this table style element applies. MUST be 0x00000000, 0x00000001, greater than or equal to 0x00000024. This field MUST be unique within the TIMELINESTYLE rule as specified the **Styles** (section 2.1.7.50) part **ABNF**.

dxfId (4 bytes): A **DXFId14** (section 2.5.38) that specifies the differential formatting (section 2.2.6.2) applied to this table style element. The **fNewBorder** field of **BrtDXF15** (section 2.4.356) referenced by this **dxfId** MUST be ignored.

2.4.823 BrtTop10Filter

The **BrtTop10Filter** record specifies the criteria for a **top N filter**.



A - fTop (1 bit): A bit that specifies whether the top or bottom items are displayed. This field MUST be one of the values specified in the following table.

Value	Meaning
0	Bottom items are displayed.
1	Top items are displayed.

B - fPercent (1 bit): A bit that specifies whether a percentage of top or bottom items are displayed, or a set number of top or bottom items are displayed. This field MUST be one of the values specified in the following table.

Value	Meaning
0	Top or bottom n items are displayed.
1	Top or bottom n percent of items are displayed.

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C - fApplied (1 bit): A bit that specifies whether the **filter** has been applied. This field MUST be one of the values specified in the following table.

Value	Meaning
0	**xNumFilter** needs to be recalculated, and the filter is not applied.
1	**xNumFilter** exists among the **range** of **cells** and is correctly calculated value, and the filter is applied.

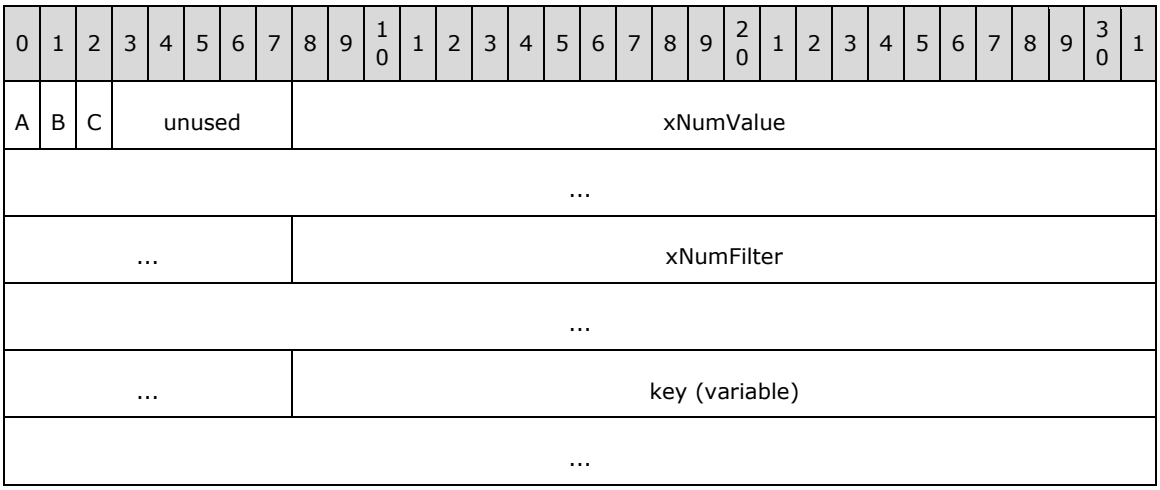
reserved (5 bits): This value MUST be 0, and MUST be ignored.

xNumValue (8 bytes): An **Xnum** (section 2.5.171) that specifies the value applied in the filter. This value specifies the top or bottom **xNumValue** number or percent of items that will be displayed when the filter is applied. For example, if this filter is a "top 13 items" filter, then the value of this field would be 13. If this filter is applied to a **PivotTable** (section 2.1.7.40) then this value MUST be greater than or equal to 0. Otherwise this value MUST be greater than or equal to 1 and less than or equal to 500.

xNumFilter (8 bytes): An **Xnum** that specifies the **cell value** in the range of cells that is used to perform the comparison for this filter. This value is calculated at the time the filter is applied. For example, if the filter is a top filter, then all items greater than or equal to the value stored in this field are displayed. If it is a bottom filter, all items less than or equal to this value are displayed. If **fApplied** is 1, this value MUST be a valid value in the range of cells which the filter is applied to.

2.4.824 BrtTop10RichFilter

The **BrtTop10RichFilter** record specifies the criteria for **top N filter** associated with rich values.



A - fTop (1 bit): A bit that specifies whether the top or bottom items are displayed. This field MUST be one of the values specified in the following table.

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Value	Meaning
0	Bottom items are displayed.
1	Top items are displayed.

B - fPercent (1 bit): A bit that specifies whether a percentage of top or bottom items are displayed, or a set number of top or bottom items are displayed. This field MUST be one of the values specified in the following table.

Value	Meaning
0	Top or bottom n items are displayed.
1	Top or bottom n percent items are displayed.

C - fApplied (1 bit): A bit that specifies whether the **filter** has been applied. This field MUST be one of the values in the following table.

Value	Meaning
0	**XNumFilter** needs to be recalculated, and the filter is not applied.
1	**XNumFilter** exists among the **range** of **cells** and is correctly calculated value, and the filter is applied.

unused (5 bits): This value MUST be 0 and MUST be ignored.

xNumValue (8 bytes): An **Xnum** (section 2.5.171) that specifies the value applied in the filter. This value specifies the top or bottom **XNumValue** number or percent of items that will be displayed when the filter is applied. For example, if this filter is a "top 13 items" filter, then the value of this field would be 13. If this filter is applied to a **PivotTable** (section 2.1.7.40) then this value MUST be greater than or equal to 0. Otherwise this value MUST be greater than or equal to 1 or less than or equal to 500.

xNumFilter (8 bytes): An **Xnum** that specifies the **cell value** in the range of cells that is used to perform the comparison for this filter. This value is calculated at the time the filter is applied. For example, if the filter is a top filter, then all items greater than or equal to the value stored in this field are displayed. If it is a bottom filter, all items less than or equal to this value are displayed. If **fApplied** is 1, this value MUST be a valid value in the range of cells which the filter is applied to.

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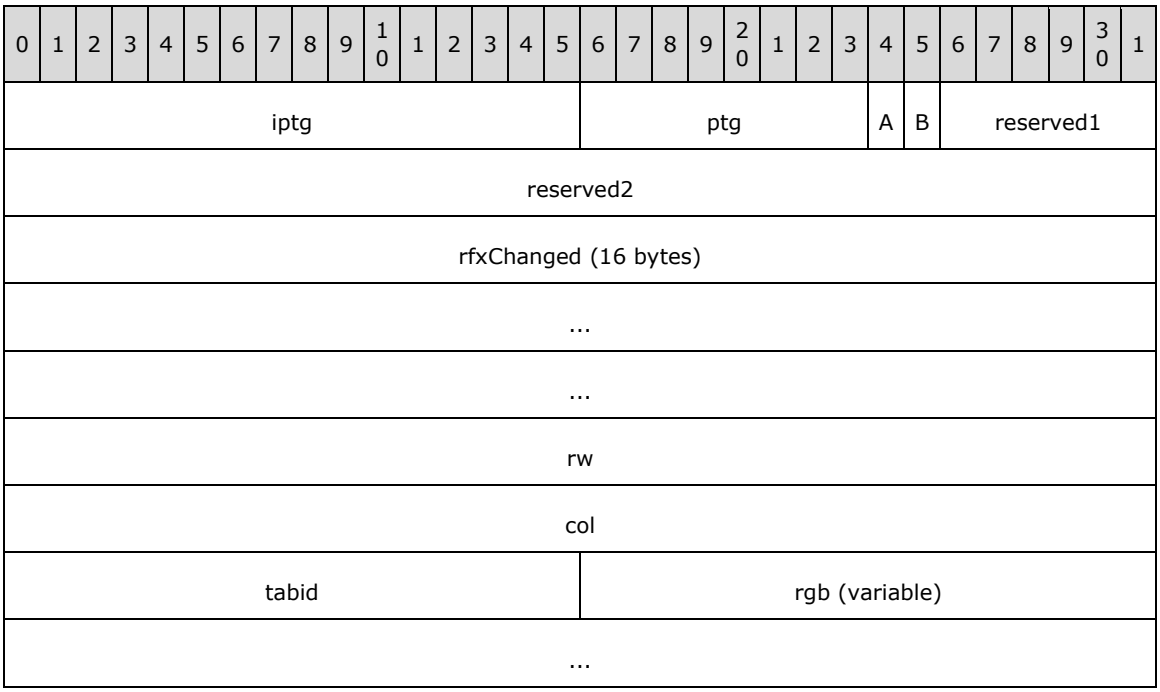
key (variable): An XLWideString (section 2.5.168) that specifies the **rich value key** for which the filter is defined. The string MUST be less than or equal to 255 characters in length.

2.4.825 BrtUCR

The **BrtUCR** record specifies undo information for **row** or **column (1)** deletion and move operations when affected formulas (section 2.2.2) (section 2.2.2) or **named ranges** reference the deleted rows, columns (1), or moved **range**. This record is not applicable for insert revisions.



iptg (16 bits): An unsigned integer that specifies a zero-based index of a **Ptg** (section 2.5.97.16) record in the **Rgce** (section 2.5.97.88) **Ptg** of the affected formula. The referenced **Ptg** specifies the affected element of the formula. If **fLbl** is 1, this value MUST be 0 and MUST be ignored.

ptg (8 bits): An unsigned integer that specifies the type of **expression** that was adjusted in the affected formula or named range. The value MUST be one of the values specified in the following table.

Value	Meaning
0x24	Specifies a reference to a single **cell**.
0x25	Specifies a reference to a rectangular area of cells.
0x26	Specifies a reference to a fixed set of cells.
0x2A	Specifies an invalid reference to a cell.
0x2B	Specifies an invalid reference to a cell range.
0x3A	Specifies a reference to a single cell on the referenced **sheet**.
0x3B	Specifies a reference to a rectangular area of cells on the referenced sheet.
0x3C	Specifies an invalid reference to a single cell on the referenced sheet.
0x3D	Specifies an invalid reference to a rectangular area of cells on the referenced sheet.
0x44	Specifies a value-typed reference to a single cell.
0x45	Specifies a value-typed reference to a rectangular area of cells.

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Value	Meaning
0x46	Specifies a value-typed reference to a fixed set of cells.
0x4A	Specifies a value-typed invalid reference to a cell.
0x4B	Specifies a value-typed invalid reference to a cell range.
0x5A	Specifies a value-typed reference to a single cell on the referenced sheet.
0x5B	Specifies a value-typed reference to a rectangular area of cells on the referenced sheet.
0x5C	Specifies a value-typed invalid reference to a single cell on the referenced sheet.
0x5D	Specifies a value-typed invalid reference to a rectangular area of cells on the given sheet.
0x64	Specifies an array-typed reference to a single cell.
0x65	Specifies an array-typed reference to a rectangular area of cells.
0x66	Specifies an array-typed reference to a fixed set of cells.
0x6A	Specifies an array-typed invalid reference to a cell.
0x6B	Specifies an array-typed invalid reference to a cell range.
0x7A	Specifies an array-typed reference to a single cell on the given sheet.
0x7B	Specifies an array-typed reference to a rectangular area of cells on the given sheet.
0x7C	Specifies an array-typed invalid reference to a single cell on the given sheet.
0x7D	Specifies an array-typed invalid reference to a rectangular area of cells on the given sheet.

A - fLbl (1 bit): A bit that specifies whether this record applies to a formula or a named range. If this value is 0, then this record applies to a formula. Otherwise, this record applies to a named range.

B - fUseSh2 (1 bit): A bit that specifies whether the expression was on a different sheet.

reserved1 (6 bits): This value MUST be 0 and MUST be ignored.

reserved2 (4 bytes): This value MUST be 0 and MUST be ignored.

rfxChanged (16 bytes): An **RfXRel** (section 2.5.118) that specifies the range that is referenced by the affected formula or named range.

rw (4 bytes): A **RwNullable** (section 2.5.127) that specifies the row of the cell of the formula that referenced the deleted cell range. If **fLbl** equals 1, then this value MUST be 0xFFFFFFFF and MUST be ignored.

col (4 bytes): A **ColNullable** (section 2.5.23) that specifies the column (1) of the cell of the formula that referenced the deleted cell range. If **fLbl** equals 1, then this value MUST be 0xFFFFFFFF and MUST be ignored.

tabid (2 bytes): A signed integer that specifies the identifier of the sheet that contained the formula that referenced the deleted cell range. If **tabid** equals -1, then **tabid** is ignored. This value MUST be greater than or equal to -1.

rgb (variable): An **XLNameWideString** (section 2.5.165) that specifies the named range that references the deleted cells. This value MUST NOT be present if **fLbl** equals 0. This value MUST be present if **fLbl** equals 1.

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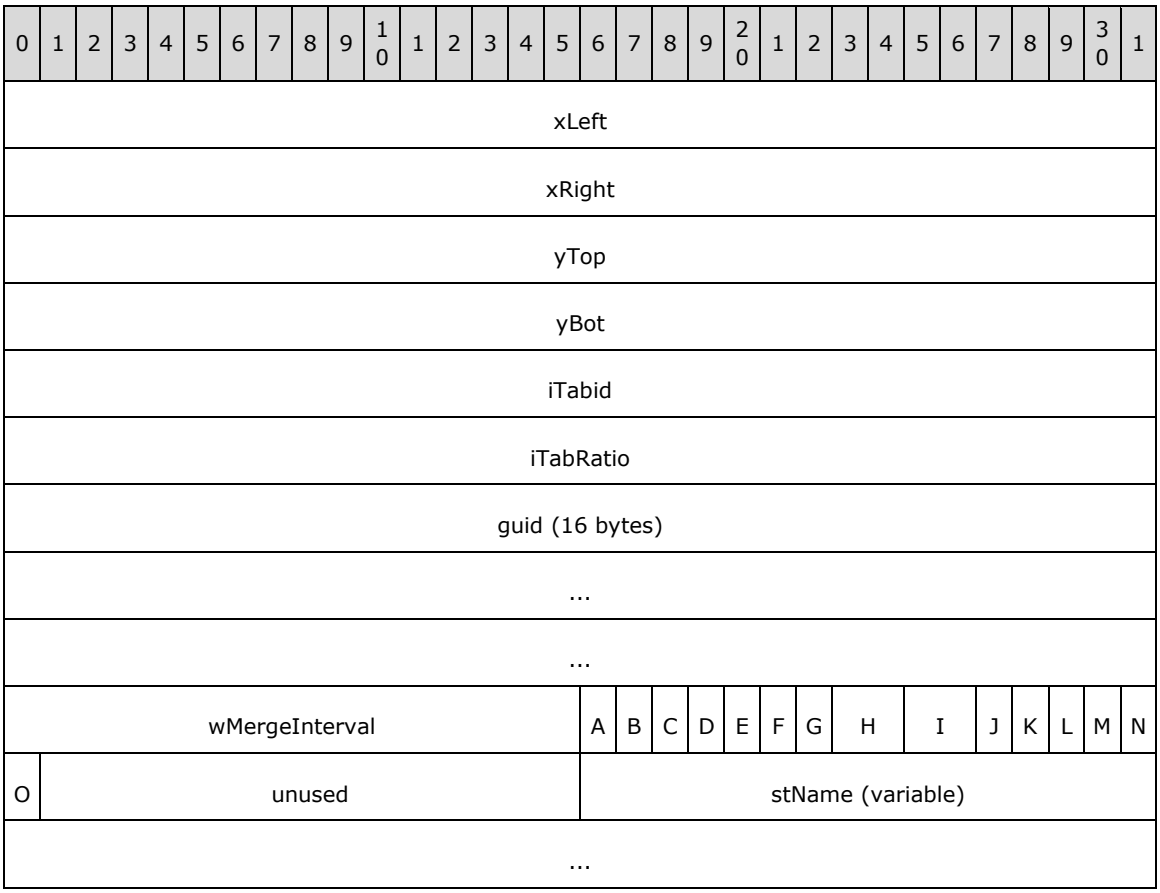
2.4.826 BrtUserBookView

The **BrtUserBookView** record specifies the general **custom view** settings that apply to a whole **workbook**. There are accompanying **BrtBeginUserShView** (section 2.4.292) and **BrtBeginUserCsView** (section 2.4.289) records that specify individual custom view settings of each **sheet**. The set of this record and the accompanying **BrtBeginUserShView** and **BrtBeginUserCsView** records share the same **GUID**.



xLeft (4 bytes): A signed integer that specifies the X coordinate for the left side of the window that contains the workbook, relative to the left side of the workbook window. The unit of measurement for this value is **twips**.

xRight (4 bytes): A signed integer that specifies the X coordinate for the right side of the window that contains the workbook, relative to the left side of the workbook window. The unit of measurement for this value is twips.

yTop (4 bytes): A signed integer that specifies the Y coordinate for the top of the window that contains the workbook, relative to the top of the workbook window. The unit of measurement for this value is twips.

yBot (4 bytes): A signed integer that specifies the Y coordinate for the bottom of the window that contains the workbook, relative to the top of the workbook window. The unit of measurement for this value is twips.

iTabid (4 bytes): An unsigned integer that specifies the **active sheet** in this custom view. **iTabid** MUST be equal to the value of the **iTabID** in a **BrtBundleSh** (section 2.4.311) in this workbook. This field MUST be greater than or equal to one and less than or equal to 65535.

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iTabRatio (4 bytes): An unsigned integer that specifies the ratio of the window area used to display **sheet tabs** and the window area used to display the horizontal scroll bar. **iTabRatio** MUST be greater than or equal to 0 and less than or equal to 1000. A value of 0 specifies that only the horizontal scroll bar is displayed. A value of 1000 specifies that only sheet tabs are displayed.

guid (16 bytes): A GUID as specified by [MS-DTYP] section 2.3.4 that specifies the identity of this custom view.

wMergeInterval (2 bytes): A signed integer that specifies the automatic-update interval in minutes. This field is undefined and MUST be ignored if **fTimedUpdate** equals 0. This field MUST be greater than or equal to 5 and less than or equal to 1440 when **fTimedUpdate** equals 1.

A - fIconic (1 bit): A bit that specifies whether the window that contains the workbook is minimized. **fIconic** and **fZoom** MUST NOT both be 1. This field MUST be one of the values specified in the following table.

Value	Meaning
0	The window that contains the workbook is not minimized.
1	The window that contains the workbook is minimized.

B - fDspHScroll (1 bit): A bit that specifies whether the horizontal scrollbar is displayed in the window that contains the workbook. This field MUST be one of the values specified in the following table.

Value	Meaning
0	Horizontal scrollbar is not displayed.
1	Horizontal scrollbar is displayed.

C - fDspVScroll (1 bit): A bit that specifies whether the vertical scrollbar is displayed in the window that contains the workbook. This field MUST be one of the values specified in the following table.

Value	Meaning
0	Vertical scrollbar is not displayed.
1	Vertical scrollbar is displayed.

D - fBotAdornment (1 bit): A bit that specifies whether sheet tabs are displayed in the window that contains the workbook. This field MUST be one of the values specified in the following table.

Value	Meaning
0	Sheet tabs are not displayed.
1	Sheet tabs are displayed.

E - fZoom (1 bit): A bit that specifies whether the window that contains the workbook is maximized. **fIconic** and **fZoom** MUST NOT both be 0x1. This field MUST be one of the values specified in the following table.

Value	Meaning
0	The window that contains the workbook is not maximized.
1	The window that contains the workbook is maximized.

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F - fDspFmlaBar (1 bit): A bit that specifies whether the **formula bar** is displayed. This field MUST be one of the values specified in the following table.

Value	Meaning
0	Formula bar is not displayed.
1	Formula bar is displayed.

G - fDspStatus (1 bit): A bit that specifies whether the status bar is displayed. This field MUST be one of the values specified in the following table.

Value	Meaning
0	Status bar is not displayed.
1	Status bar is displayed.

H - mdDspNote (2 bits): An unsigned integer that specifies how comments are displayed in the window that contains the workbook. This field MUST be one of the values specified in the following table.:

Value	Meaning
0	Comments are not displayed in this custom view.
1	Comments are displayed in this custom view.
2	**Comment** indicators are displayed in the window that contains the workbook.

I - mdHideObj (2 bits): An unsigned integer that specifies whether **ActiveX objects**, **OLE objects**, and **drawing objects** are displayed in the window that contains the workbook. This field MUST be one of the values specified in the following table.:

Value	Meaning
0	ActiveX objects, OLE objects, and drawing objects are displayed in the window that contains the workbook.
1	Placeholders are displayed in place of ActiveX objects, OLE objects, and drawing objects in the window that contains the workbook.
2	ActiveX objects, OLE objects, and drawing objects are not displayed in the window that contains the workbook.

J - fPrintIncl (1 bit): A bit that specifies that custom **print settings** are included in this custom view. This field MUST be one of the values specified in the following table.

Value	Meaning
0	No custom print settings exist for this custom view.
1	Custom print settings exist in a **BrtBeginUserShView** (section 2.4.292) record that has a **guid** field value equal to the **guid** of this **BrtUserBookView** record. Additionally, **print titles** and **print areas** are specified by **BrtName** (section 2.4.705) records, each of which has a **name** containing the **guid** of this **BrtUserBookView**, using the following form, where guid matches the value of **guid** with each occurrence of the characters left brace ("{"), right brace ("}"), and dash ("-") in **guid** replaced by an underscore ("_") character:

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Value	Meaning
	▪ Print titles: Zguid.wvu.PrintTitles ▪ Print area: Zguid.wvu.PrintArea

K - fRowColIncl (1 bit): A bit that specifies that **hidden rows**, **hidden columns**, or **filter** settings are included in this custom view. MUST be one of the following:

Value	Meaning
0	No hidden rows, hidden columns, or filter settings exist for this custom view.
1	Hidden rows, hidden columns, or filter settings exist in a **BrtBeginUserShView** (section 2.4.292) record that has a **guid** field value equal to the **guid** of this **BrtUserBookView** record. Additionally, hidden rows and hidden columns are specified by **BrtName** records, each of which has a **name** containing the **guid** of this **BrtUserBookView**, using the following form, where guid matches the value of **guid** with each occurrence of the characters left brace ("{"), right brace ("}"), and dash ("-") in **guid** replaced by an underscore ("_") character: ▪ Hidden rows: Zguid.wvu.Rows ▪ Hidden columns: Zguid.wvu.Cols Filter settings are also specified by **BrtName** records, each of which has a **name** containing the value of **guid** for this **BrtUserBookView** record, and by **BrtBeginAFilter** (section 2.4.8) in a **BrtBeginUserShView** (section 2.4.292) with a **guid** field value equal to the **guid** of this **BrtUserBookView** record, using the following form, where guid matches the value of **guid** with each occurrence of the characters left brace ("{"), right brace ("}"), and dash ("-") in **guid** replaced by an underscore ("_") character: ▪ **Range** being filtered: Zguid.wvu.FilterData ▪ Range containing filter criteria: Zguid.wvu.FilterCriteria

L - fTimedUpdate (1 bit): A bit that specifies whether changes to the workbook will be automatically saved and changes made to the workbook by other users will be automatically loaded at the interval specified by the **wMergeInterval**. This value MUST be 0 and MUST be ignored if **fPersonalView** equals 0. This field MUST be one of the values specified in the following table.

Value	Meaning
0	Changes to the shared workbook (section 2.2.12) will not be automatically saved or updated.
1	Changes to the shared workbook will be automatically saved and updated.

M - fAllMemChanges (1 bit): A bit that specifies that changes made to the workbook in the current **session** take precedence over conflicting changes that exist in the persisted version of the workbook when the current session is persisted to disk. This value MUST be 0 and MUST be

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ignored if **fPersonalView** equals 0. This field MUST be one of the values specified in the following table.

Value	Meaning
0	Changes to the current session do not take precedence.
1	Changes to the current session do take precedence.

N - fOnlySync (1 bit): A bit that specifies whether the workbook will only be synchronized at the interval specified by **wMergeInterval**. This value MUST be 0 and MUST be ignored if **fPersonalView** equals 0. This field MUST be one of the values specified in the following table.

Value	Meaning
0	Save changes from the current session and synchronize the shared workbook (section 2.2.12).
1	Only synchronize the shared workbook.

O - fPersonalView (1 bit): A bit that specifies that this custom view is a personal custom view for a shared workbook (section 2.2.12) user. A personal custom view specifies print and filter settings for a single user of a shared workbook. This field is undefined and MUST be ignored if this is not a shared workbook. This field MUST be one of the values specified in the following table.

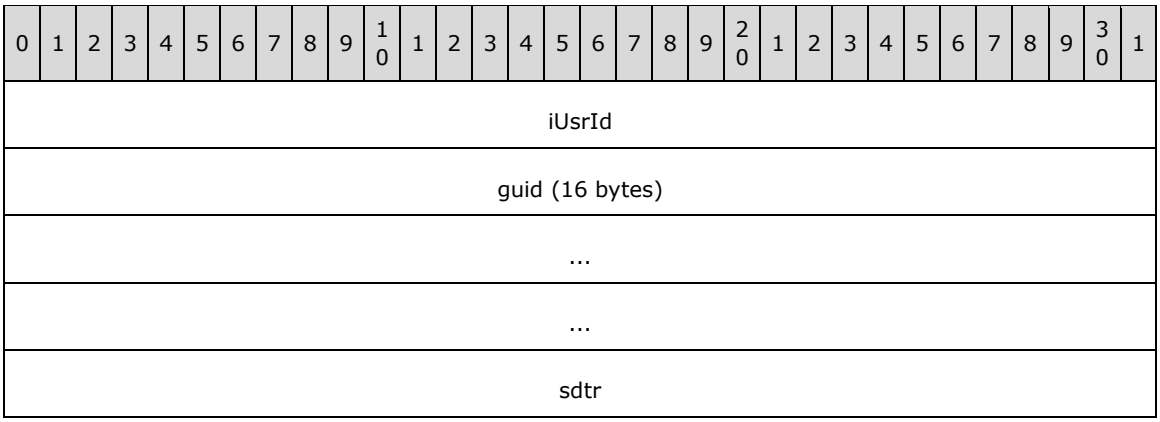
Value	Meaning
0	This custom view is not a personal custom view.
1	This custom view is a personal custom view.

unused (15 bits): This value is undefined and MUST be ignored.

stName (variable): An **XLWideString** (section 2.5.168) that specifies the name of the custom view. The length of this field MUST be greater than or equal to 1 and less than or equal to 255 characters.

2.4.827 BrtUsr

The **BrtUsr** record specifies information about a user that is currently editing the shared workbook (section 2.2.12).



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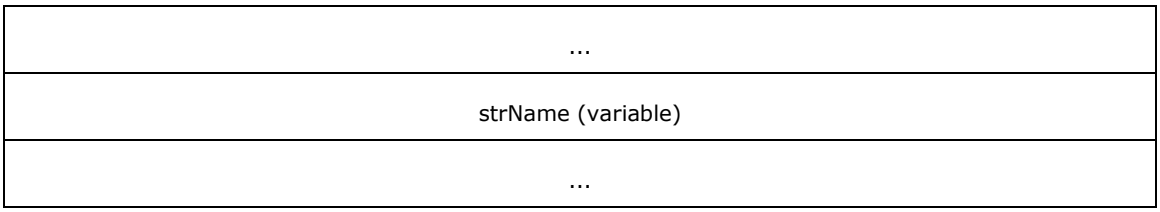


iUsrId (4 bytes): An unsigned integer that specifies a unique identifier for this user. The **iUsrId** value MUST be distinct from the **iUsrId** value in every other **BrtUsr** (section 2.4.827) in the document.

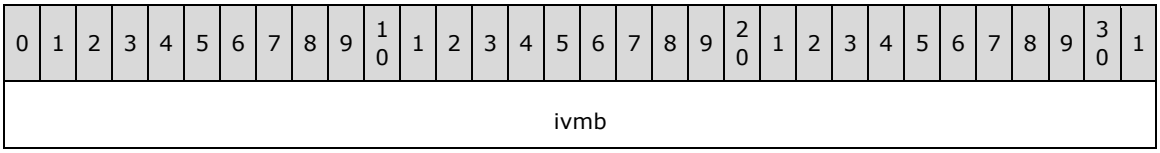
guid (16 bytes): A **GUID** as specified by [MS-DTYP] section 2.3.4 that specifies the **revision** of the shared workbook (section 2.2.12) to which the user is currently synchronized.

sdtr (8 bytes): A **ShortDtr** (section 2.5.132) that specifies the date and time the user opened the shared workbook (section 2.2.12). The date and time are stored in the user's local time.

strName (variable): An **XLWideString** (section 2.5.168) that specifies the display name of the user. This field MUST be greater than 0 characters and less than or equal to 54 characters.

2.4.828 BrtValueMeta

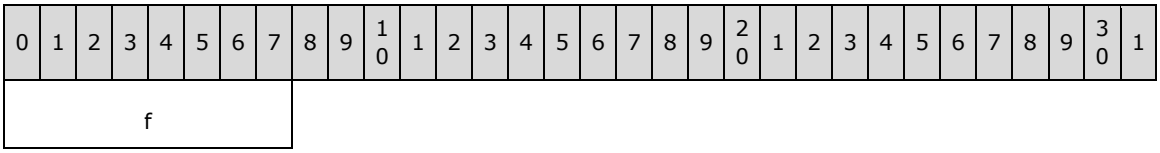
The **BrtValueMeta** record specifies a reference to a value metadata (section 2.2.4.3) metadata block (section 2.2.4.5) in the **Metadata** part (section 2.1.7.34) **ABNF**.



ivmb (4 bytes): A signed integer that specifies a one-based index of a **BrtMdb** (section 2.4.697) record in the collection of all records directly following the **BrtBeginEsmdb** (section 2.4.73) record whose **fCellMeta** field equals 0x00000000. The referenced **BrtMdb** specifies a value metadata block that is associated with the **BrtCellBlank** (section 2.4.314), **BrtCellRk** (section 2.4.322), **BrtCellError** (section 2.4.316), **BrtCellBool** (section 2.4.315), **BrtCellReal** (section 2.4.321), **BrtCellIsst** (section 2.4.319), **BrtCellSt** (section 2.4.325), **BrtFmlaString** (section 2.4.674), **BrtFmlaNum** (section 2.4.673), **BrtFmlaBool** (section 2.4.671), or **BrtFmlaError** (section 2.4.672) record that follows **BrtValueMeta** (section 2.4.828).

2.4.829 BrtVolBool

The **BrtVolBool** record specifies a cached returned value (section 2.2.13.4) that is a **Boolean** (section 2.5.97.3).



f (1 byte): A **Boolean** that specifies the value.

2.4.830 BrtVolErr

The **BrtVolErr** record specifies a cached returned value (section 2.2.13.4) that is an error.

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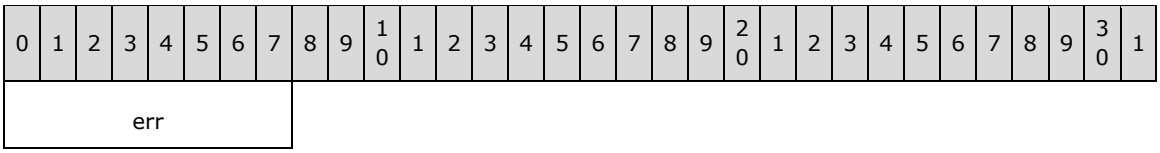
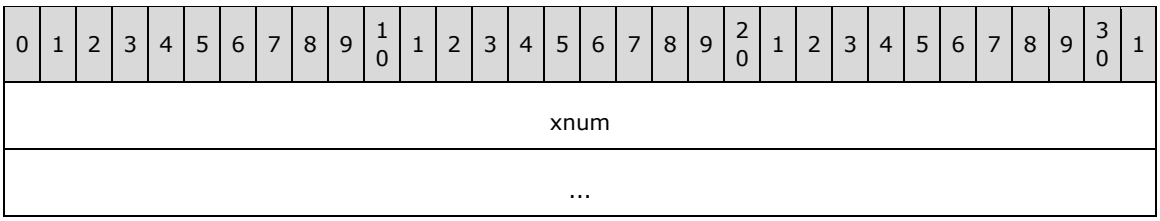


err (1 byte): A **BErr** (section 2.5.97.2) that specifies the error.

2.4.831 BrtVolNum

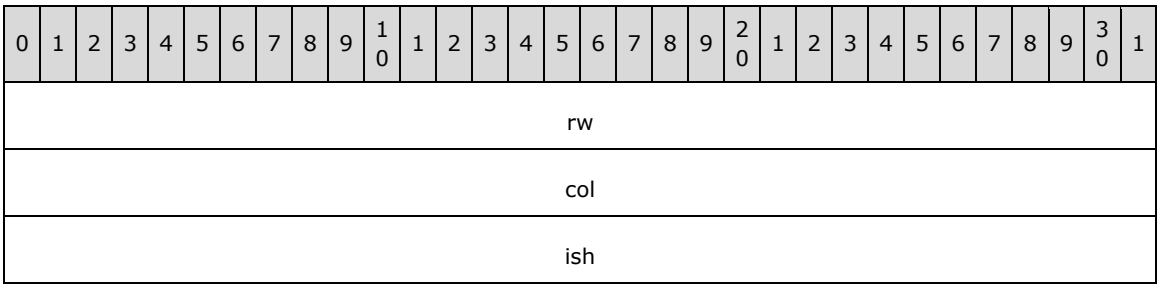
The **BrtVolNum** record specifies a cached returned value (section 2.2.13.4) that is a number.



xnum (8 bytes): An **Xnum** (section 2.5.171) that specifies the number.

2.4.832 BrtVolRef

The **BrtVolRef** record specifies a **cell** that is specified by the volatile dependency (section 2.2.13) containing this record as defined by the **Volatile Dependencies** (section 2.1.7.60) part **ABNF**.



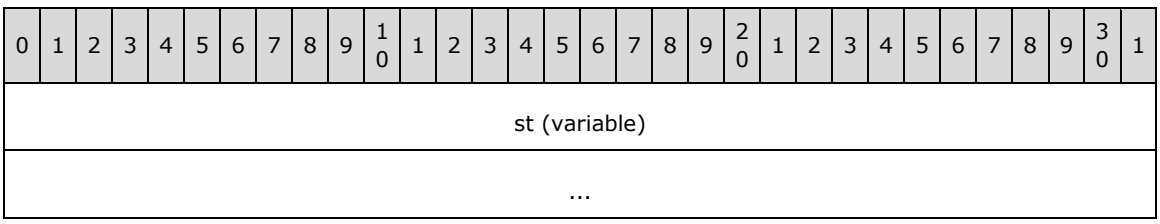
rw (4 bytes): An **UncheckedRw** (section 2.5.154) that specifies the **row** of the dependent cell.

col (4 bytes): An **UncheckedCol** (section 2.5.152) that specifies the **column (1)** of the dependent cell.

ish (4 bytes): An unsigned integer that specifies a zero-based index of a **BrtBundleSh** (section 2.4.311) record in the collection of all records directly following **BrtBeginBundleShs** (section 2.4.13). The referenced **BrtBundleSh** specifies the **sheet** that contains the dependent cell.

2.4.833 BrtVolStr

The **BrtVolStr** record specifies a cached returned value (section 2.2.13.4) that is a text string.



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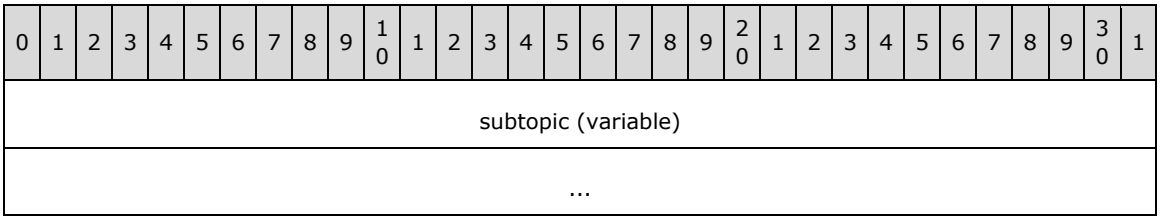
st (variable): An **XLWideString** (section 2.5.168) that specifies the string.

2.4.834 BrtVolSubtopic

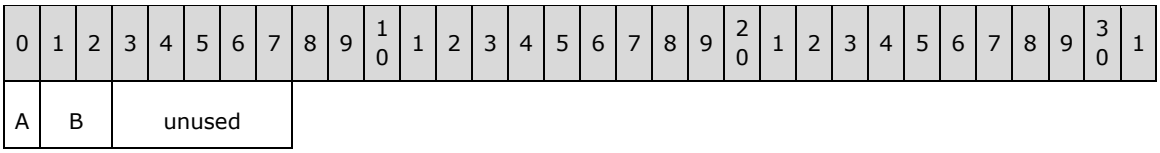
The **BrtVolSubtopic** record specifies a subtopics (section 2.2.13.3).



subtopic (variable): An **XLWideString** (section 2.5.168) that specifies the subtopic string.

2.4.835 BrtWbFactoid

The **BrtWbFactoid** record specifies a collection of properties for **smart tags** that control the run-time visibility and save-time persistence of smart tags in the **workbook**.<49>



A - fEmbedFactoids (1 bit): A bit that specifies whether smart tags are saved with the workbook. **BrtBeginSmartTags** (section 2.4.220) is present if and only if this bit is set to 0.

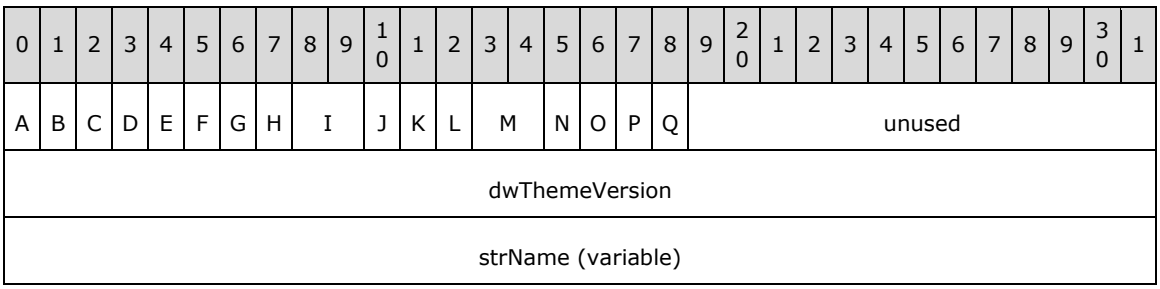
B - mdFactoidDisplay (2 bits): An unsigned integer that specifies whether a **smart tag actions button** or **smart tag indicator** is **visible** at run-time. This field MUST be one of the values specified in the following table.

Value	Meaning
0x0	The application will display the smart tag actions button and the smart tag indicator.
0x1	The application will display the smart tag actions button only. The smart tag indicators will not be displayed.
0x2	The application will not display the smart tag actions button or the smart tag indicator.

unused (5 bits): This field is undefined and MUST be ignored.

2.4.836 BrtWbProp

The **BrtWbProp** record specifies properties of a **workbook**.



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A - f1904 (1 bit): A bit that specifies the **date system** used in the workbook. This field MUST be one of the values specified in the following table.

Value	Meaning
0x0	Workbook uses the 1900 date base system as specified by [ISO/IEC29500-1:2016] section 18.17.4.
0x1	Workbook uses the 1904 backwards-compatibility date system as specified by [ISO/IEC29500-1:2016] section 18.17.4.

B - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

C - fHideBorderUnselLists (1 bit): A bit that specifies whether **table borders** are **visible** when a table is not active.

D - fFilterPrivacy (1 bit): A bit that specifies whether personally identifying information is removed from the workbook when it is saved.

E - fBuggedUserAboutSolution (1 bit): A bit that specifies whether a warning is requested before loading a **smart document** manifest file.

F - fShowInkAnnotation (1 bit): A bit that specifies whether **ink** comments are visible in the workbook.

G - fBackup (1 bit): A bit that specifies whether the backup feature is enabled for the workbook.

H - fNoSaveSup (1 bit): A bit that specifies whether **external link** values are cached with the workbook when it is saved.

I - grbitUpdateLinks (2 bits): An unsigned integer that specifies how embedded **OLE** links in the workbook are to be updated. This field MUST be one of the values specified in the following table.

Value	Meaning
0x0	The link update behavior is application specific.
0x1	The links are not automatically updated.
0x2	The links are automatically updated<50> .

J - fHidePivotTableFList (1 bit): A bit that specifies whether the **PivotTable field list** is **hidden**.

K - fPublishedBookItems (1 bit): A bit that specifies whether this workbook is **published**. This field MUST be one of the values specified in the following table.

Value	Meaning
0x0	Each **sheet** is published according to its own publishing state as specified by the field **fPublish** of the **BrtWsProp** (section 2.4.844) structure.
0x1	Individual items in a sheet specify their own publishing states.

L - fCheckCompat (1 bit): A bit that specifies whether the **file format compatibility checker** is enabled for the workbook.

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M - mdDspObj (2 bits): An unsigned integer that specifies how **shapes** in the workbook are displayed. The meaning of each value is specified in the following table.

Value	Meaning
0x0	The shapes are visible.
0x1	**Placeholders** are shown in place of the shapes.
0x2	The shapes are not visible.

N - fShowPivotChartFilter (1 bit): A bit that specifies whether the **PivotChart filter pane** is visible.

O - fAutoCompressPictures (1 bit): A bit that specifies whether pictures in the workbook are compressed when the workbook is saved.

P - reserved2 (1 bit): This value MUST be 0, and MUST be ignored.

Q - fRefreshAll (1 bit): A bit that specifies whether all **external data** in the workbook are refreshed when the workbook is opened.

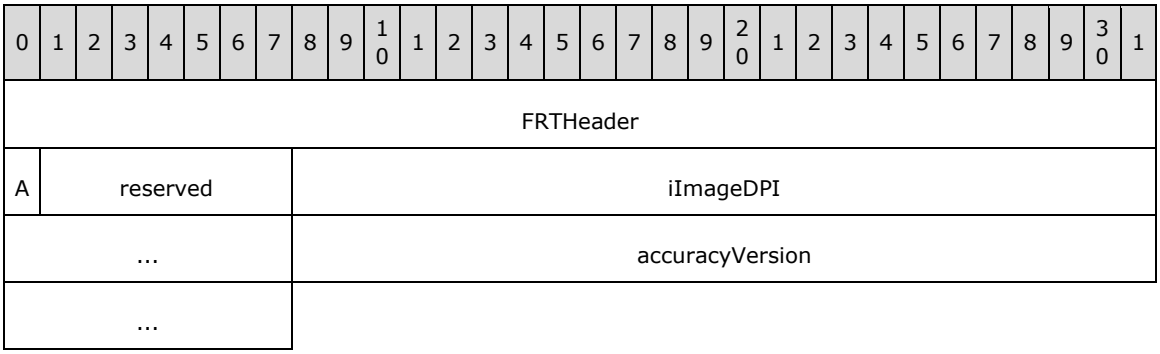
unused (13 bits): This field is undefined and MUST be ignored.

dwThemeVersion (4 bytes): An unsigned integer that specifies the version number of the **theme** applied to the workbook. When the value is 0, the version number of the theme is specified by the **Theme** (section 2.1.7.52) part **ABNF**.

strName (variable): A **CodeName** (section 2.5.21) for the workbook<51>.

2.4.837 BrtWbProp14

The **BrtWbProp14** record specifies options for a **workbook**.



FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record.

A - fDiscardImgEditData (1 bit): A bit that specifies whether all **imgProps** elements as defined in [MS-ODRAWXML] section 2.3.1.9, and cropped out areas of images in the workbook are not saved.

reserved (7 bits): This value MUST be 0, and MUST be ignored.

iImageDPI (4 bytes): An unsigned integer that specifies the default resolution in which images in the workbook are saved, in DPI, when the **fAutoCompressPictures** field of **BrtWbProp** is

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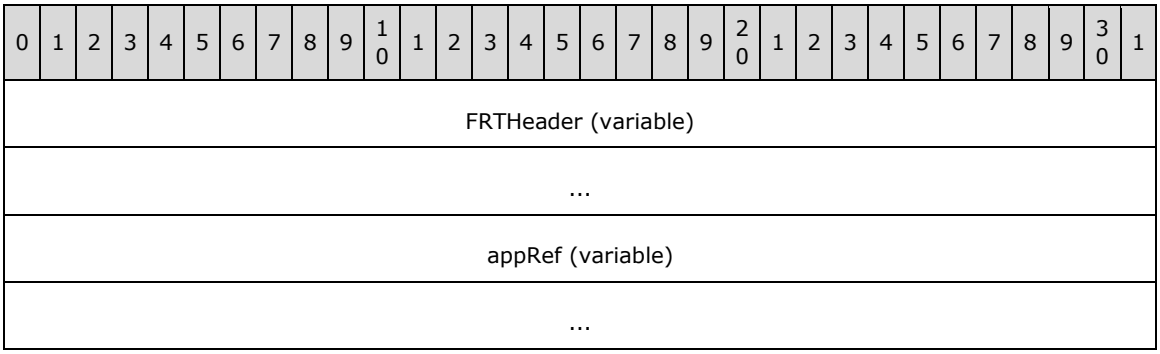
"TRUE" and the **useLocalDpi** element as defined in [MS-ODRAWXML] section 2.3.1.13 is "FALSE". This field MUST be equal to 96, 150, or 220.

accuracyVersion (4 bytes): An unsigned integer that specifies how functions are calculated in the workbook. This field SHOULD be equal to 0.<52>

2.4.838 BrtWebExtension

The **BrtWebExtension** record specifies a binding for a web extension ([MS-OWEXML] section 1.3) on the **worksheet**. This record specifies additional properties for a **CT_OsfWebExtensionBinding** record specified by [MS-OWEXML] section 2.2.3.



FRTHeader (variable): An **FRTHeader** (section 2.5.60) that specifies the future record (section 2.1.6) information for this record.

The **FRTHeader** fields MUST have the values listed in the following table:

Field	Value
FRTHeader.fRef	0
FRTHeader.fSqref	0
FRTHeader.fFormulas	1
FRTHeader.fRelID	0

FRTHeader.rgFormulas specifies the data **range** for this Binding. The **cformula** of the **FRTHeader.rgFormulas** MUST equal 1 and the formula (section 2.2.2) of the single **FRTFormula** (section 2.5.58) comprising the **array** of the **FRTHeader.rgFormulas** MUST NOT contain any of the following **Ptg** (section 2.5.97.16) structures: **PtgArea** (section 2.5.97.18), **PtgAreaErr** (section 2.5.97.20), **PtgRef** (section 2.5.97.68), **PtgRefErr** (section 2.5.97.70). If the **Ptg** structure is a **PtgRef3d** (section 2.5.97.69) or **PtgArea3d** (section 2.5.97.19), then the **ixti** of the **PtgRef3d** or **PtgArea3d** MUST specify an **Xti** (section 2.5.172) that MUST have **firstSheet** greater than or equal to zero, and MUST have **lastSheet** equal to **firstSheet**.

The root node of the parse tree of this field MUST NOT be a VALUE_TYPE state, as described in section 2.5.97.88.

appRef (variable):): An **XLWideString** (section 2.5.168) value that specifies a unique identifier for the Binding. This value MUST be equal to the **appref** field of a **CT_OsfWebExtensionBinding** element as specified by [MS-OWEXML] section 2.3.3.

2.4.839 BrtWebOpt

The **BrtWebOpt** record specifies the options for saving the file as a Web page.

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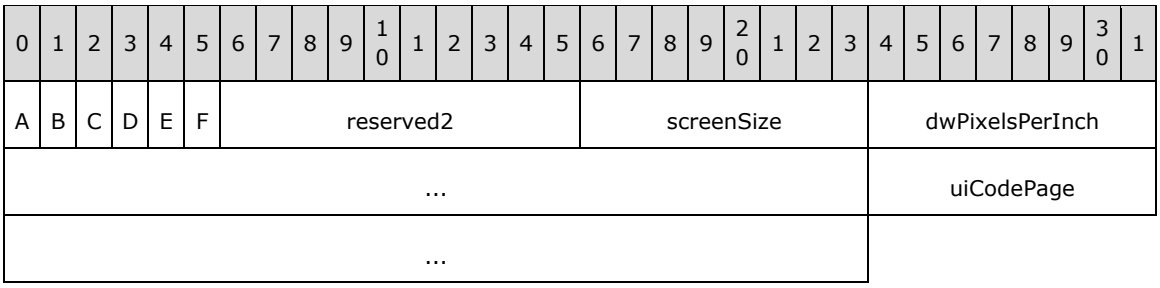

A - fRelyOnCSS (1 bit): A bit that specifies whether **cascading style sheets (CSS)** are used for **font** formatting when viewing the saved file in a Web browser.

B - fOrganizeInFolder (1 bit): A bit that specifies whether all supporting files, such as background textures and graphics, are organized in a separate **folder** when saving the file as a Web page. The value MUST be one of the values specified in the following table.

Value	Meaning
0	All supporting files are saved in the same folder as the Web page.
1	All supporting files are organized in a separate folder.

C - fUseLongFileNames (1 bit): A bit that specifies whether **long file names** are used when saving the file as a Web page.

D - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

E - fRelyOnVML (1 bit): A bit that specifies whether **VML** is to be used to display graphics in a Web browser.

F - fAllowPNG (1 bit): A bit that specifies whether Portable Network Graphics (PNG) format is allowed as an image format when saving file as a Web page.

reserved2 (10 bits): This value MUST be 0, and MUST be ignored.

screenSize (1 byte): A **WebScreenSizeEnum** as specified in [MS-OSHARED] section 2.2.1.4 that specifies the ideal minimum screen size of the target monitor used to view the saved file in a Web browser.

dwPixelsPerInch (4 bytes): An unsigned integer that specifies the resolution, in pixels per inch, of graphics images and **table** cells when saving the file as a Web page. The value MUST be greater than or equal to 19 and less than or equal to 480.

uiCodePage (4 bytes): An unsigned integer that specifies the **code page**. The value specifies the code page value to be used by the Web browser when viewing the saved file. For more information about code pages, see [CODEPG].

2.4.840 BrtWorkBookPr15

The **BrtWorkBookPr15** record specifies options for a **workbook**.

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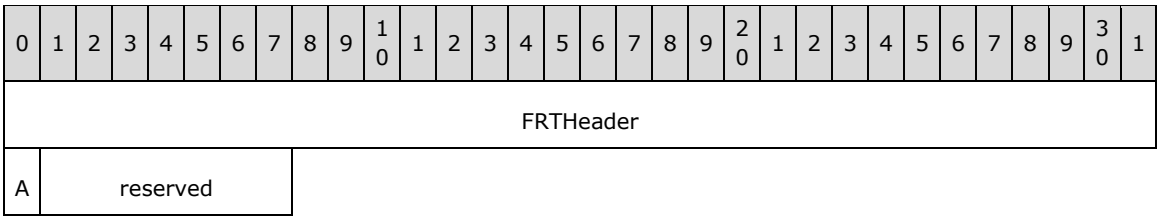


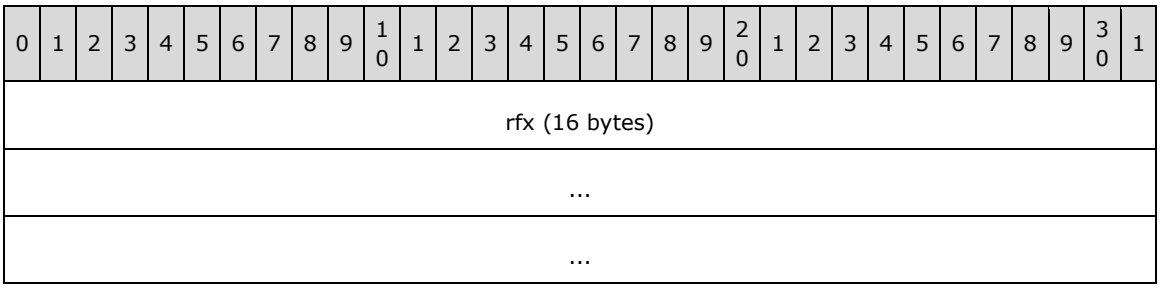
FRTHeader (4 bytes): An **FRTBlank** (section 2.5.54) that specifies the future record (section 2.1.6) information for this record

A - fChartTrackingRefBased (1 bit): A bit value that indicates if **data point** properties and formatting for all charts (section 2.2.3) in this workbook follow the cell reference of the point or the index of the point in the chart series.

reserved (7 bits): This value MUST be 0, and MUST be ignored

2.4.841 BrtWsDim

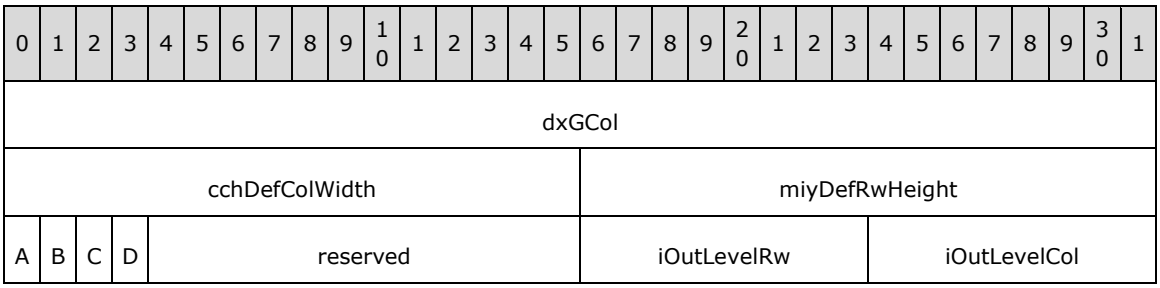
The **BrtWsDim** record specifies the used **range** of the **sheet**. It specifies the **row** and **column (1)** bounds of used **cells** in the sheet. Used cells include all cells that contain formulas (section 2.2.2) or data. Used cells also include all cells that have formatting applied directly to the cell. Cells can also be formatted by default row or column (1) formatting. If a row has default formatting, then the used range includes that row in its row bounds, but does not affect the used range column (1) bounds, unless the used range would otherwise be empty, in which case the column (1) bounds are set to include the first column (1). If a column (1) has default formatting, then the used range includes that column (1) in its column (1) bounds, but does not affect the used range row bounds, unless the used range would otherwise be empty, in which case the row bounds are set to include the first row.



rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the row and column (1) bounds of all the used cells in the sheet. If no cells are used in the sheet, then this value MUST be 0.

2.4.842 BrtWsFmtInfo

The **BrtWsFmtInfo** record specifies **sheet** formatting properties.



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dxGCol (4 bytes): An unsigned integer that specifies the default **column (1)** width. For the purposes of this field specification, a standard digit is defined to be the widest digit in the Normal style (section 2.2.6.1.2.2) **font**. The default column (1) width is measured in the number of standard digits that fit in the column (1) multiplied by 256 and rounded down. The value MUST be less than or equal to 65535 or be equal to 0xFFFFFFFF. If the value is 0xFFFFFFFF, this value MUST be ignored.

cchDefColWidth (2 bytes): An unsigned integer that specifies the default column (1) width when **dxGCol** is 0xFFFFFFFF. For the purposes of this field specification, a standard digit is defined to be the widest digit in the normal style font. This value is measured in number of standard digits. This value MUST be ignored if **dxGCol** is not 0xFFFFFFFF. This value MUST be less than or equal to 255. When this record is contained in a dialog sheet (section 2.1.7.20), this value MUST be less than 255 and MUST be ignored.

miyDefRwHeight (2 bytes): An unsigned integer that specifies the default **row** height, measured in **twips**. This value MUST be ignored if **fUnsynced** is 0.

A - fUnsynced (1 bit): A bit that specifies whether **miyDefRwHeight** has been manually set or is different from the default.

B - fDyZero (1 bit): A bit that specifies whether rows are **hidden** by default.

C - fExAsc (1 bit): A bit that specifies whether rows have a thick top **border** by default.

D - fExDesc (1 bit): A bit that specifies whether rows have a thick bottom border by default.

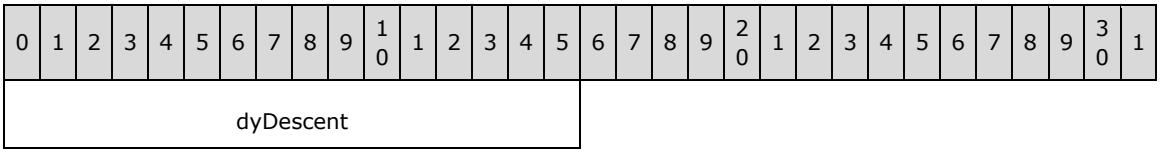
reserved (12 bits): This value MUST be 0, and MUST be ignored.

iOutLevelRw (8 bits): An unsigned integer that specifies the highest number of **outline levels** for rows in this sheet. This value MUST be greater than or equal to 0 and MUST be less than or equal to 7.

iOutLevelCol (8 bits): An unsigned integer that specifies the highest number of outline levels for columns (1) in this sheet. This value MUST be greater than or equal to 0 and MUST be less than or equal to 7.

2.4.843 BrtWsFmtInfoEx14

The **BrtWsFmtInfoEx14** record specifies, for a **cell** in the current **sheet** with Normal style (section 2.2.6.1.2.2) formatting applied, the vertical distance in **pixels** from the bottom of that cell to the typographical baseline of that cell's contents. This record MUST be present in all **Macrosheet** (section 2.1.7.32) and **Worksheet** part (section 2.1.7.62) in the **workbook** if and only if the **BrtKnownFonts** (section 2.4.689) record is present in the workbook, as defined by the **Styles** (section 2.1.7.50) part **ABNF**.



dyDescent (2 bytes): An unsigned integer that specifies the vertical distance in pixels from the bottom of a cell in the current sheet to the typographical baseline of the cell content if hypothetically the cell had normal style formatting applied, the **zoom level** for the sheet was 100, and the cell had bottom alignment formatting (see **alcv** in section 2.4.845). This value MUST be greater than or equal to 0 and less than or equal to 255.

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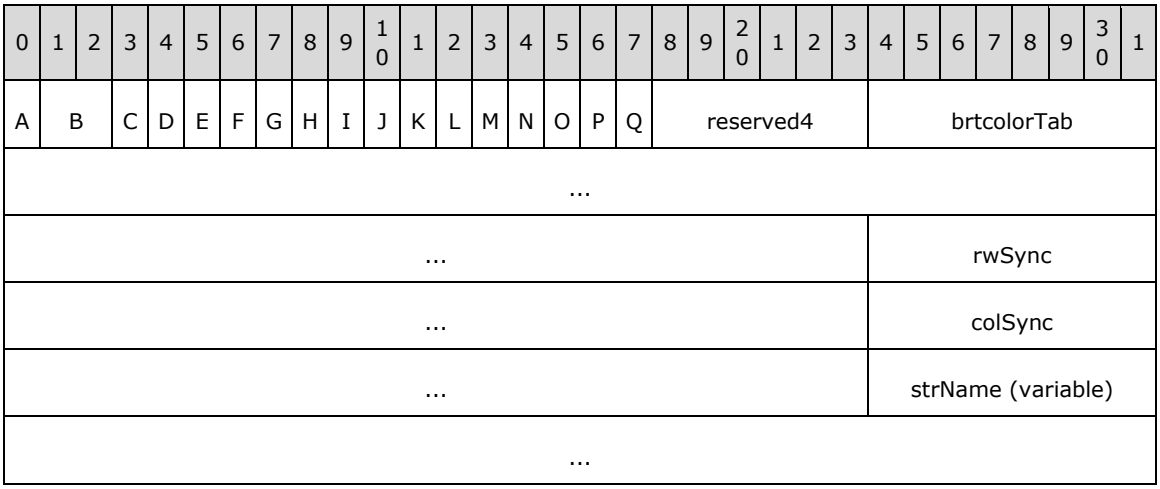
2.4.844 BrtWsProp

The **BrtWsProp** record specifies properties for a dialog sheet, a macro sheet, or a worksheet.



A - fShowAutoBreaks (1 bit): A bit that specifies whether automatic **page breaks** are **visible** on the **sheet**.

B - reserved1 (2 bits): This value MUST be 0, and MUST be ignored.

C - fPublish (1 bit): A bit that specifies whether the **published** feature is enabled for the sheet. If this record appears within a collection of records as defined by the **Dialog Sheet** (section 2.1.7.20) part **ABNF** or **Macro Sheet** (section 2.1.7.32) part ABNF, this value MUST be 1 and MUST be ignored.

D - fDialog (1 bit): A bit that specifies whether the sheet is a dialog sheet. This value MUST be 1, if this record appears within a collection of records as defined by the **Dialog Sheet** part ABNF; otherwise, this value MUST be 0.

E - fApplyStyles (1 bit): A bit that specifies whether to apply the built-in cell style (section 2.2.6.1.2) when an **outline** is applied. The **iOutLevel** field of each **BrtColInfo** (section 2.4.331) record specifies **column (1) outline level**. The built-in cell style for the column (1) outline level is specified by the **BrtStyle** (section 2.4.783) record with **iLevel** field equal to **iOutLevel** minus 1. The **iOutLevel** field of each **BrtRowHdr** (section 2.4.746) record specifies the **row** outline level. The built-in cell style for the outline level is specified by the **BrtStyle** record with **iLevel** field equal to **iOutLevel** minus 1.

F - fRowSumsBelow (1 bit): A bit that specifies the location of **summary** rows relative to detailed data rows when an outline is applied. If the value is 1, then a summary row appears below the detailed data rows. If the value is 0, then a summary row appears above the detailed data rows. If this record appears within a collection of records as defined by the **Dialog Sheet** part ABNF, this value MUST be 1 and MUST be ignored.

G - fColSumsRight (1 bit): A bit that specifies the location of summary columns (1) relative to detailed data columns (1) when an outline is applied. If the value is 1, then the summary columns (1) appear to the right, if the sheet is displayed **left-to-right**, or appear to the left, if the sheet is displayed **right-to-left**. If the value is 0, then the summary columns (1) appear to the left, if the sheet is displayed left-to-right, or appear to the right, if the sheet is displayed right-to-left. If this record appears within a collection of records as defined by the **Dialog Sheet** part ABNF, this value MUST be 1 and MUST be ignored.

H - fFitToPage (1 bit): A bit that specifies whether to fit the printable contents to a single page when printing the sheet.

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I - reserved2 (1 bit): This value MUST be 0, and MUST be ignored.

J - fShowOutlineSymbols (1 bit): A bit that specifies whether the **outline symbols** of the sheet are visible. If this record appears within a collection of records as defined by the **Dialog Sheet** part ABNF, this value MUST be 1 and MUST be ignored.

K - reserved3 (1 bit): This value MUST be 0, and MUST be ignored.

L - fSyncHoriz (1 bit): A bit that specifies whether horizontal scrolling is synchronized across multiple windows displaying the sheet.

M - fSyncVert (1 bit): A bit that specifies whether vertical scrolling is synchronized across multiple windows displaying the sheet.

N - fAltExprEval (1 bit): A bit that specifies whether the sheet uses **transition formula evaluation**.

O - fAltFormulaEntry (1 bit): A bit that specifies whether the sheet uses **transition formula entry**.

P - fFilterMode (1 bit): A bit that specifies whether the sheet has one or more **AutoFilters**. If this record appears within a collection of records as defined by the **Dialog Sheet** part ABNF or **Macro Sheet** part ABNF, this value MUST be 0 and MUST be ignored.

Q - fCondFmtCalc (1 bit): A bit that specifies whether the **conditional formatting** calculations are to be evaluated. This field MUST be one of the values specified in the following table.

Value	Meaning
0	Conditional formatting is not evaluated normally and all the existing conditional formatting will not be updated as **cells** associated with the conditional formatting change.
1	Conditional formatting is evaluated normally and all the existing conditional formatting will be updated as the cells associated with the conditional formatting change.

reserved4 (6 bits): This value MUST be 0, and MUST be ignored.

brtcolorTab (8 bytes): A **BrtColor** (section 2.4.332) that specifies a **background color** of the **sheet tab**.

rwSync (4 bytes): A **RwNullable** (section 2.5.127) that specifies an anchor row for synchronous vertical scrolling if **fSyncHoriz** or **fSyncVert** are 1; otherwise, MUST be 0xFFFFFFFF, and MUST be ignored.

colSync (4 bytes): A **ColNullable** (section 2.5.23) that specifies an anchor column (1) for synchronous horizontal scrolling if **fSyncHoriz** or **fSyncVert** are 1; otherwise, MUST be 0xFFFFFFFF, and MUST be ignored.

strName (variable): A **CodeName** (section 2.5.21) for the sheet. If this record appears within a collection of records as defined by the **Dialog Sheet** part ABNF or **Macro Sheet** part ABNF, this value MUST be a 32-bit zero (0x00000000) and MUST be ignored.

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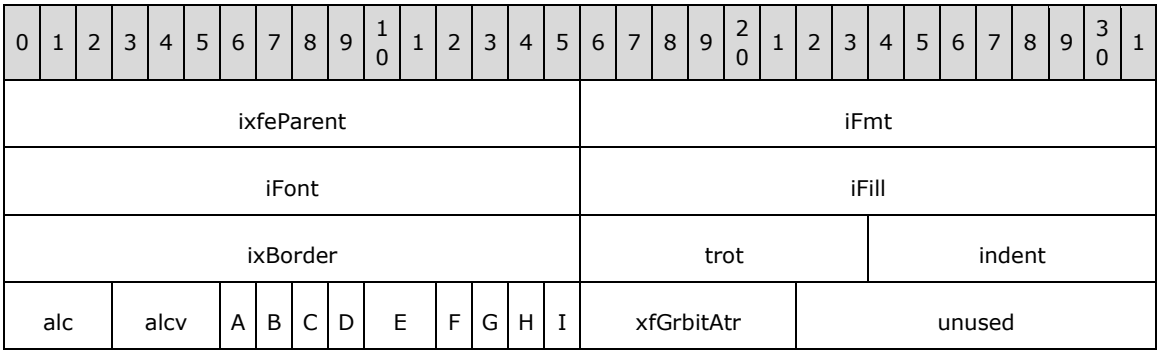
2.4.845 BrtXF

The **BrtXF** record specifies the formatting for **cells**. This record can specify a **cell XF** (section 2.2.6.1.1) or a cell style XF (section 2.2.6.1.2.1). The total number of **BrtXF** records in the **workbook** which are not built-in MUST NOT exceed 0xFF96. A **BrtXF** record is considered to be built-in if it is referenced by a built-in **BrtStyle** (section 2.4.783) record. A **BrtStyle** record is considered to be built-in if the **fBuiltIn** member of **grbitObj1** equals 1.



ixfeParent (2 bytes): An unsigned integer that specifies whether this record is a cell style XF or a cell XF. If this record specifies a cell style XF, the value MUST be 0xFFFF. If the record specifies a cell XF, the value is a zero-based index to another **BrtXF** record in the collection of all records directly following **BrtBeginCellStyleXFs** (section 2.4.19) which is a cell style XF.

iFmt (2 bytes): An **Ifmt** (section 2.5.76) that specifies the **number format** used when displaying the value of the cell.

iFont (2 bytes): An unsigned integer that specifies a zero-based index of a **BrtFont** (section 2.4.677) record in the collection of records directly following a **BrtBeginFonts** (section 2.4.88) record. The referenced **BrtFont** specifies the **font** properties for the cell.

iFill (2 bytes): An unsigned integer that specifies a zero-based index of a **BrtFill** (section 2.4.668) record in the collection of records directly following a **BrtBeginFills** (section 2.4.82) record. The referenced **BrtFill** specifies the **fill** properties for the cell.

ixBorder (2 bytes): An unsigned integer that specifies a zero-based index of a **BrtBorder** (section 2.4.309) record in the collection of records directly following a **BrtBeginBorders** (section 2.4.12) record. The referenced **BrtBorder** specifies the **border** properties for the cell.

trot (1 byte): An unsigned integer that specifies the text rotation in cells. This field represents an angle that is specified in degrees. The first letter of the text is considered the center-point of the arc. This field MUST be one of the values specified in the following table.

Value	Meaning
0-90	Text rotated counterclockwise 0 to 90 degrees
91-180	Text rotated clockwise 1 to 90 degrees
254	Text rotation is context dependent
255	Vertical text

indent (1 byte): An unsigned integer that specifies the **indentation level** for text in a cell. The **indent** value with respect to the number of space characters is calculated according to the following formula:

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```
indent = number of space characters / 3
```

indent MUST be greater than or equal to 0 and less than or equal to 250.

alc (3 bits): An unsigned integer that specifies the type of horizontal alignment for text in the cell. The possible values for this attribute are defined in the following table.

Value	Meaning
0	**General alignment**
1	Left alignment
2	Center alignment
3	Right alignment
4	**Fill alignment**
5	Justify alignment
6	**Center-across-selection alignment**
7	Distributed alignment

alcv (3 bits): An unsigned integer that specifies the type of vertical alignment for text in the cell. The possible values for this attribute are defined in the following table.

Value	Meaning
0	Top alignment
1	Center alignment
2	Bottom alignment
3	Justify alignment
4	Distributed alignment

A - fWrap (1 bit): A bit that specifies whether the text in a cell is line-wrapped within the cell.

B - fJustLast (1 bit): A bit that specifies whether the justified or **distributed alignment** of the cell is used on the last line of text. (Setting the value of this field to 1 is typical for East Asian text but not typical in other contexts.)

C - fShrinkToFit (1 bit): A bit that specifies whether the displayed text in the cell is **shrink to fit**.

D - fMergeCell (1 bit): A bit that specifies whether this cell is part of a **merged cell**.

E - iReadingOrder (2 bits): An unsigned integer that specifies the **reading order** of the cell. The possible values for this attribute are defined in the following table.

Value	Meaning
0	Context dependent
1	**Left-to-right**
2	**Right-to-left**

F - fLocked (1 bit): A bit that specifies whether the **locked protection** property is set to true.

G - fHidden (1 bit): A bit that specifies whether the **hidden protection** property is set to true.

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H - fSxButton (1 bit): A bit that specifies whether the cell has a **PivotTable** (section 2.1.7.40) dropdown button.

I - f123Prefix (1 bit): A bit that specifies whether the text string in a cell is prefixed by a single quote mark.

xfGrbitAtr (6 bits): An unsigned integer that specifies how to interpret the formatting properties defined in other fields. Each bit represents one set of related formatting properties. The meaning of the values of the bits varies based on whether this record specifies a cell XF or a cell style XF according to the following table.

Bit	Context	Value	Meaning
0	Cell Style XF	0	Number formatting, as specified in the **iFmt** field, is included in this cell style (section 2.2.6.1.2).
0	Cell Style XF	1	Number formatting, as specified in the **iFmt** field, MUST be ignored.
0	Cell XF	0	If the number format of the cell style XF record referenced by **ixfeParent** changes, that number format is set in this XF as well.
0	Cell XF	1	If the number format of the cell style XF record referenced by **ixfeParent** changes, the number format in this XF MUST NOT be changed.
1	Cell Style XF	0	Font formatting, as specified in the **iFont** field, is included in this cell style (section 2.2.6.1.2).
1	Cell Style XF	1	Font formatting, as specified in the **iFont** field, MUST be ignored.
1	Cell XF	0	If the font formatting of the cell style XF record referenced by **ixfeParent** changes, that font formatting is set in this XF as well.
1	Cell XF	1	If the font formatting of the cell style XF record referenced by **ixfeParent** changes, the font formatting in this XF MUST NOT be changed.
2	Cell Style XF	0	Alignment properties, as specified in the **trot**, **indent**, **alc**, **alcv**, **fWrap**, **fJustLast**, **fShrinkToFit**, **fMergeCell**, and **iReadingOrder** fields, are included in this cell style.
2	Cell Style XF	1	Alignment properties, as specified in the **trot**, **indent**, **alc**, **alcv**, **fWrap**, **fJustLast**, **fShrinkToFit**, **fMergeCell**, and **iReadingOrder** fields, MUST be ignored.
2	Cell XF	0	If the alignment properties of the cell style XF record referenced by **ixfeParent** change, those alignment properties are set in this XF as well.
2	Cell XF	1	If the alignment properties of the cell style XF record referenced by **ixfeParent** change, the alignment properties in this XF MUST NOT be changed.
3	Cell Style XF	0	**Border formatting**, as specified in the **ixBorder** field, is included in this cell style.
3	Cell Style XF	1	Border formatting, as specified in the **ixBorder** field, MUST be ignored.
3	Cell XF	0	If the border formatting of the cell style XF record referenced by **ixfeParent** changes, that border formatting is set is this XF as well.
3	Cell XF	1	If the border formatting of the cell style XF record referenced by **ixfeParent** changes, the border formatting in this XF MUST NOT be changed.
4	Cell Style XF	0	Fill formatting, as specified in the **iFill** field, is included in this cell style.
4	Cell Style XF	1	Fill formatting, as specified in the **iFill** field, MUST be ignored.
4	Cell XF	0	If the fill formatting of the cell style XF record referenced by **ixfeParent** changes, that fill formatting is set in this XF as well.
4	Cell XF	1	If the fill formatting of the cell style XF record referenced by **ixfeParent** changes, the fill formatting in this XF MUST NOT be changed.
5	Cell Style XF	0	Protection properties, as specified in the **fLocked** and **fHidden** fields, are included in this cell style.

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Bit	Context	Value	Meaning
5	Cell Style XF	1	Protection properties, as specified in the **fLocked** and **fHidden** fields, MUST be ignored.
5	Cell XF	0	If the protection properties of the cell style XF record referenced by **ixfeParent** change, those protection properties are set in this XF as well.
5	Cell XF	1	If the protection properties of the cell style XF record referenced by **ixfeParent** change, the protection properties in this XF MUST NOT be changed.

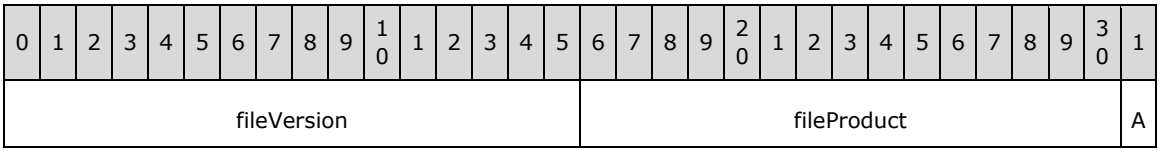
unused (10 bits): Undefined and MUST be ignored.

2.5 Structures

2.5.1 ACProductVersion

The **ACProductVersion** structure specifies an application and its version or versions that can process this alternate content block as specified by the future record (section 2.1.6).

The following packet diagram specifies this structure.



fileVersion (2 bytes): An unsigned integer that specifies the version of the application.<53>

fileProduct (15 bits): An unsigned integer that specifies the application.<54>

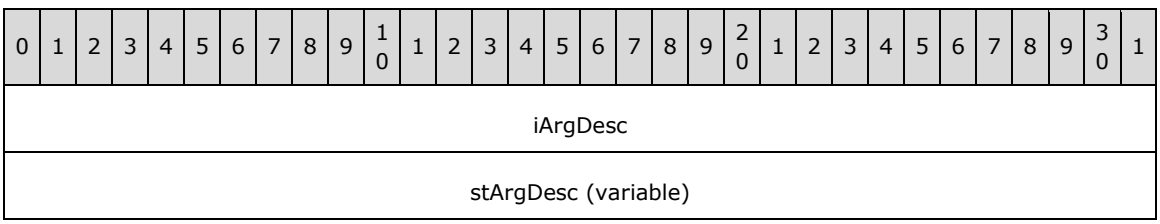
A - fileExtension (1 bit): Specifies which version of the application specified by **fileProduct** can process this alternate content block. The value of this field MUST be a value from the following table.

Value	Meaning
0	The application specified by **fileProduct** with a version specified by **fileVersion** can process this alternate content block.
1	The application specified by **fileProduct** with a version greater than or equal to **fileVersion** can process this alternate content block.

2.5.2 ArgDesc

The **ArgDesc** structure specifies an argument description for a **macro**.

The following packet diagram specifies this structure.



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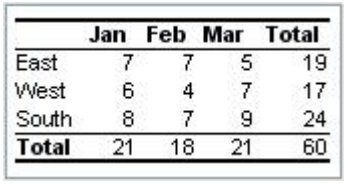
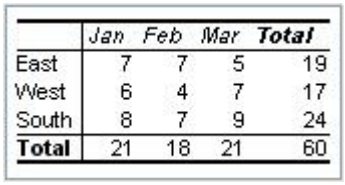
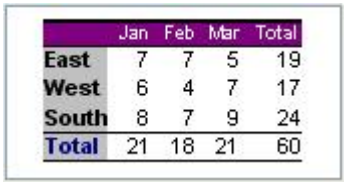
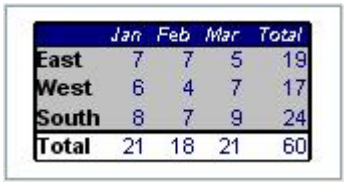
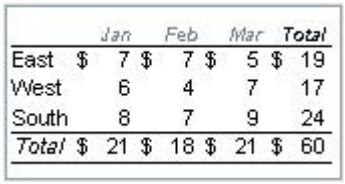
…

iArgDesc (4 bytes): An unsigned integer that specifies the zero-based index of the argument of the associated macro, the argument description of which is specified by **stArgDesc**. The value of this field MUST be less than the total number of arguments of the associated macro.

stArgDesc (variable): An **XLWideString** (section 2.5.168) string that specifies the description of the argument at zero-based index **iArgDesc** of the associated macro. MUST have length less than or equal to 255 and greater than or equal to 1.

2.5.3 AutoFormatID

The **AutoFormatID** structure is a 2-byte unsigned integer that specifies the **AutoFormat** to be applied. The value of this structure MUST be a value from the following table.<55>

Value	Meaning
0x0000	
0x0001	
0x0002	
0x0003	
0x0004	

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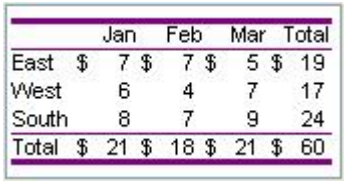
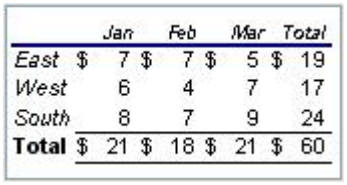
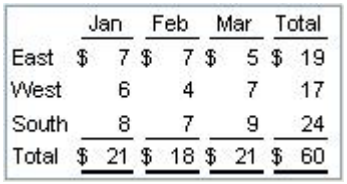
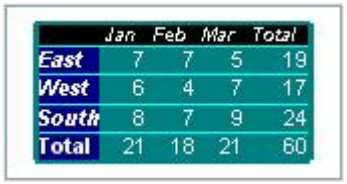
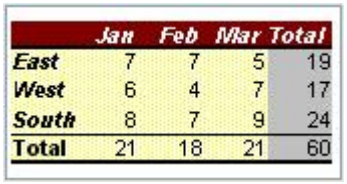
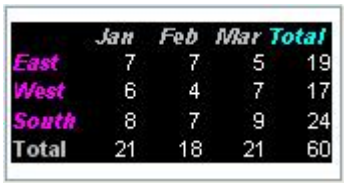
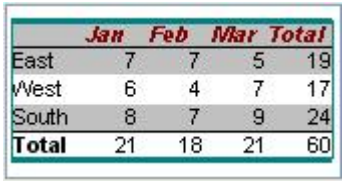
Value	Meaning
0x0005	
0x0006	
0x0007	
0x0008	
0x0009	
0x000A	
0x000B	

	Jan	Feb	Mar	Total
East	$ 7	$ 7	$ 5	$ 19
West	6	4	7	17
South	8	7	9	24
Total	$ 21	$ 18	$ 21	$ 60

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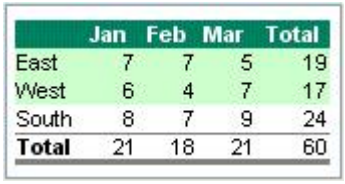
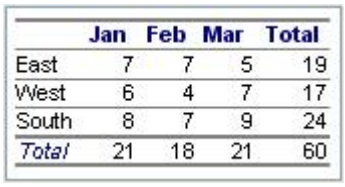
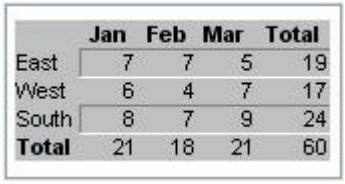
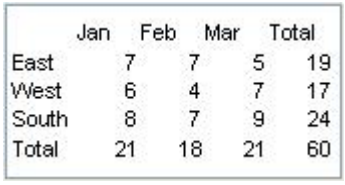
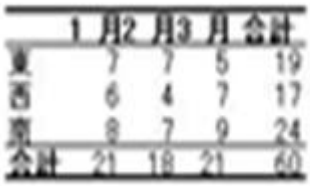
Value	Meaning
0x000C	
0x000D	
0x000E	
0x000F	
0x0010	
0x0011	

	Jan	Feb	Mar	Total
East	7	7	5	19
West	6	4	7	17
South	8	7	9	24
Total	21	18	21	60

	Jan	Feb	Mar	Total
East	7	7	5	19
West	6	4	7	17
South	8	7	9	24
Total	21	18	21	60

	Jan	Feb	Mar	Total
East	7	7	5	19
West	6	4	7	17
South	8	7	9	24
Total	21	18	21	60

	Jan	Feb	Mar	Total
East	7	7	5	19
West	6	4	7	17
South	8	7	9	24
Total	21	18	21	60

	Jan	Feb	Mar	Total
East	7	7	5	19
West	6	4	7	17
South	8	7	9	24
Total	21	18	21	60

	1月	2月	3月	合計
東	7	7	5	19
西	6	4	7	17
南	8	7	9	24
合計	21	18	21	60

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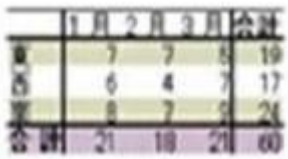
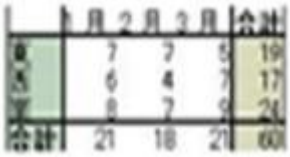
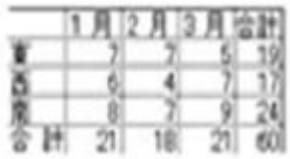
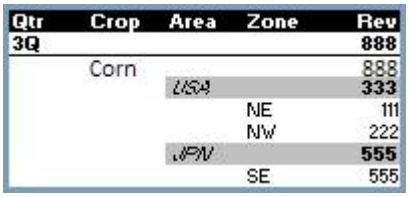
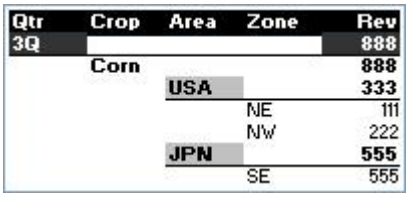
Value	Meaning
0x0012	
0x0013	
0x0014	
0x1000	
0x1001	
0x1002	

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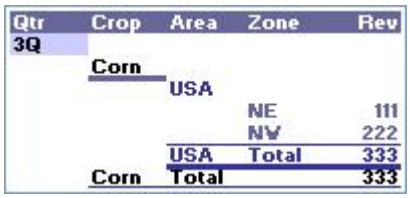
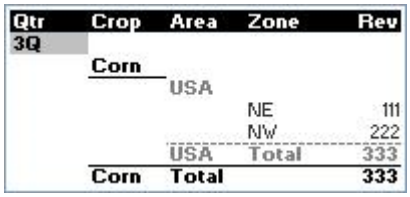
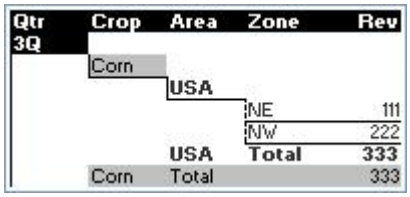
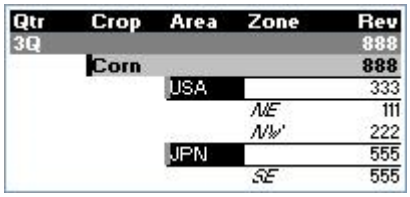
Value	Meaning
0x1003	
0x1004	
0x1005	
0x1006	
0x1007	
0x1008	

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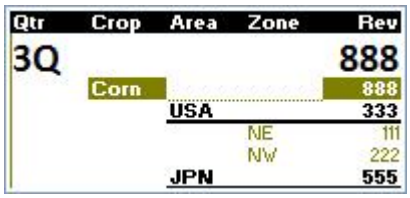
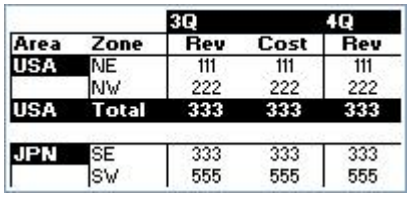
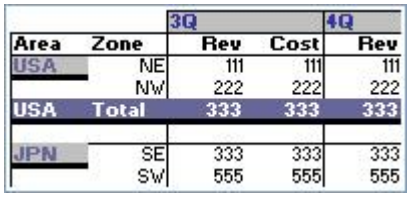
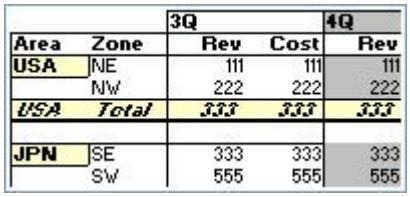
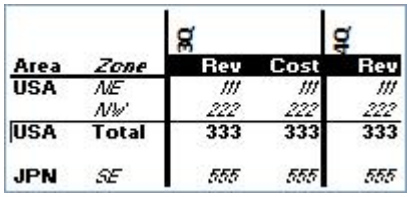
Value	Meaning
0x1009	
0x100A	
0x100B	
0x100C	
0x100D	
0x100E	

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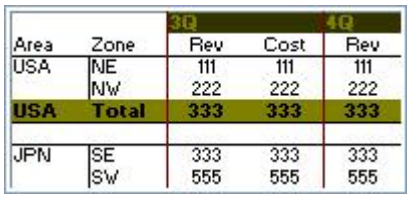
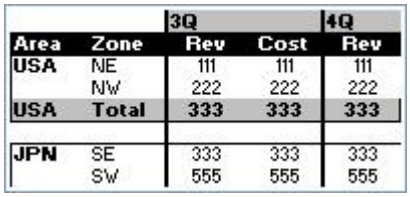
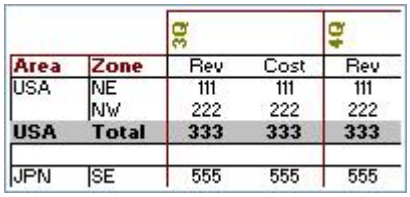
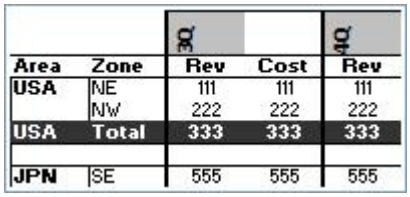
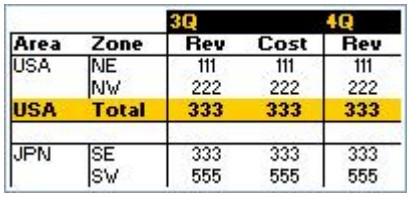
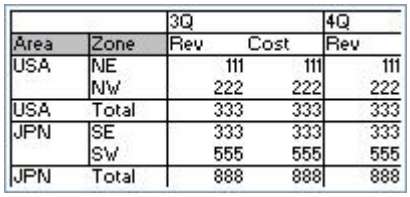
Value	Meaning
0x100F	
0x1010	
0x1011	
0x1012	
0x1013	
0x1014	

Area	Zone	3Q Rev	3Q Cost	4Q Rev
USA	NE	111	111	111
	NW	222	222	222
USA	Total	333	333	333
JPN	SE	333	333	333
	SW	555	555	555

Area	Zone	3Q Rev	3Q Cost	4Q Rev
USA	NE	111	111	111
	NW	222	222	222
USA	Total	333	333	333
JPN	SE	333	333	333
	SW	555	555	555

Area	Zone	3Q Rev	3Q Cost	4Q Rev
USA	NE	111	111	111
	NW	222	222	222
USA	Total	333	333	333
JPN	SE	555	555	555

Area	Zone	3Q Rev	3Q Cost	4Q Rev
USA	NE	111	111	111
	NW	222	222	222
USA	Total	333	333	333
JPN	SE	555	555	555

Area	Zone	3Q Rev	3Q Cost	4Q Rev
USA	NE	111	111	111
	NW	222	222	222
USA	Total	333	333	333
JPN	SE	333	333	333
	SW	555	555	555

Area	Zone	3Q Rev	3Q Cost	4Q Rev
USA	NE	111	111	111
	NW	222	222	222
USA	Total	333	333	333
JPN	SE	333	333	333
	SW	555	555	555
JPN	Total	888	888	888

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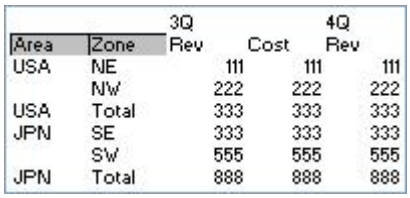
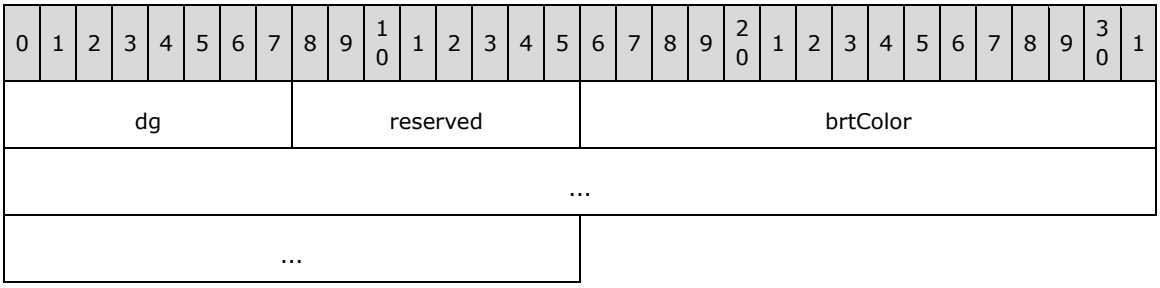
Value	Meaning
0x1015	

2.5.4 Blxf

The **Blxf** structure specifies a reference to a **border** definition.

The following packet diagram specifies this structure.



dg (1 byte): An unsigned integer that specifies the type of border. The value of this field MUST be a value from the following table.

Value	Meaning
0x00	None
0x01	Thin
0x02	Medium
0x03	Dashed
0x04	Dotted
0x05	Thick
0x06	Double
0x07	Hairline
0x08	Medium Dashed
0x09	Dash Dot
0x0A	Medium Dash Dot
0x0B	Dash Dot Dot
0x0C	Medium Dash Dot Dot
0x0D	Slant Dash Dot

reserved (1 byte): This value MUST be 0 and MUST be ignored.

brtColor (8 bytes): A **BrtColor** (section 2.4.332) structure that specifies the border color.

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2.5.5 Bold

The **Bold** enumeration specifies the **font face weight**.<56>

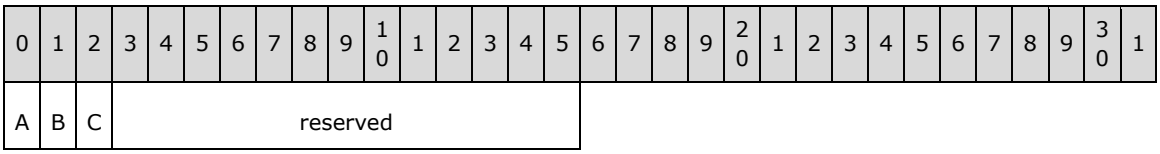
The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
BLSNORMAL	0x0190	Normal font weight
BLSBOLD	0x02BC	Bold font weight

2.5.6 BookProtectionFlags

The **BookProtectionFlags** structure specifies what aspects of a **workbook** are **protected**.

The following packet diagram specifies this structure.



A - fLockStructure (1 bit): A bit that specifies whether the structure of the workbook is protected from user change.

B - fLockWindow (1 bit): A bit that specifies whether the windows of the workbook are protected from user change.

C - fLockRevision (1 bit): A bit that specifies whether change-tracking information is protected from user change.

reserved (13 bits): This value MUST be 0 and MUST be ignored.

2.5.7 BorderStyle

The **BorderStyle** enumeration specifies the **border** line style.

The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
NONE	0x0000	No border
THIN	0x0001	Thin line
MEDIUM	0x0002	Medium line
DASHED	0x0003	Dashed line
DOTTED	0x0004	Dotted line
THICK	0x0005	Thick line
DOUBLE	0x0006	Double line
HAIR	0x0007	Hairline
MEDIUMDASHED	0x0008	Medium dashed line

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Name	Value	Meaning
DASHDOT	0x0009	Dash-dot line
MEDIUMDASHDOT	0x000A	Medium dash-dot line
DASHDOTDOT	0x000B	Dash-dot-dot line
MEDIUMDASHDOTDOT	0x000C	Medium dash-dot-dot line
SLANTDASHDOT	0x000D	Slanted dash-dot-dot line

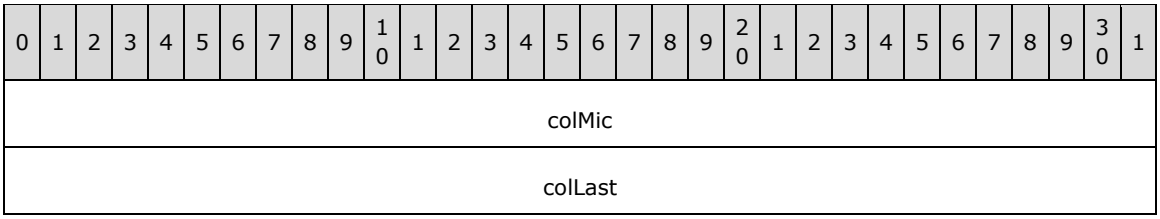
2.5.8 BrtColSpan

The **BrtColSpan** structure specifies the index of the first and last **columns (1)** that contain data for a single segment of the containing **BrtRowHdr** (section 2.4.746) structure. Each **BrtRowHdr** structure is divided into 16 segments; each segment contains 1,024 contiguous columns (1) where the **column** field of each **Cell** (section 2.5.9) record in the segment results in the same value for the following formula (section 2.2.2) via integer division:

column / 1024

A **BrtColSpan** structure exists only if a **Cell** record exists for one or more columns (1) within the segment.

The following packet diagram specifies this structure.



colMic (4 bytes): A **Col** (section 2.5.22) structure that specifies the column (1) index of the first **cell** logically contained in this segment. The value of this field MUST be less than 0x00004000 (16384), MUST be equal to the smallest value of the **column** field of the **Cell** records logically contained in this segment, and MUST be a value that satisfies the following condition under integer division:

colMic / 1024 = **colLast** / 1024

colLast (4 bytes): A **Col** structure that specifies the column (1) index of the last cell logically contained in this segment. The value of this field MUST be greater than or equal to the value of **colMic**, MUST be less than 0x00004000 (16384), MUST be equal to the largest value of the **column** field of the **Cell** records logically contained in this segment, and MUST be a value that satisfies the following condition under integer division:

colLast / 1024 **= colMic** / 1024

2.5.9 Cell

The **Cell** structure specifies some information for a **cell**, such as its **column (1)** number, **style**, and **phonetic information**. Many cell record types share this structure.

The following packet diagram specifies this structure.

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0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
column																															
iStyleRef																								A	reserved						

column (4 bytes): An **UncheckedCol** (section 2.5.152) structure that specifies the column (1) that contains this cell.

iStyleRef (24 bits): An unsigned integer that specifies a zero-based index of a **BrtXF** (section 2.4.845) record in the collection of all records directly following the **BrtBeginCellXFs** (section 2.4.21) record in the **Styles** (section 2.1.7.50) part **ABNF**. The referenced **BrtXF** record specifies the cell formatting for this cell. This value MUST be less than the total number of **BrtXF** records between **BrtBeginCellXFs** and **BrtEndCellXFs** (section 2.4.373).

A - fPhShow (1 bit): A bit that specifies whether the application shows phonetic information for this cell. The value of this field MUST be a value from the following table.

Value	Meaning
0	The cell does not show phonetic information.
1	The cell shows phonetic information.

This value MUST be 0 if the cell exists in the **Revision Log** (section 2.1.7.44) part ABNF.

reserved (7 bits): This value MUST be 0 and MUST be ignored.

2.5.10 CellStyleName

The **CellStyleName** structure is an **XLNullableWideString** (section 2.5.166) structure that specifies the name of a cell style (section 2.2.6.1.2). The length of the string MUST be less than or equal to 255. The value of this structure MUST be a null string or MUST match the name of a cell style defined by a **BrtStyle** (section 2.4.783) record.

2.5.11 CFDateOper

The **CFDateOper** enumeration specifies the valid types of date comparisons used in **conditional formatting** rules. All of these comparisons evaluate to False (0) if the **cell** does not contain a date.

The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
CF_TIMEPERIOD_TODAY	0x00000000	This rule evaluates to True (1) when the date specified by the cell is today's date.
CF_TIMEPERIOD_YESTERDAY	0x00000001	This rule evaluates to True (1) when the date specified by the cell is yesterday's date.
CF_TIMEPERIOD_LAST7DAYS	0x00000002	This rule evaluates to True (1) when the date specified by the cell is today's date or a day up to six days prior to today's date.
CF_TIMEPERIOD_THISWEEK	0x00000003	This rule evaluates to True (1) when the date specified by the cell is a day in the one-week period beginning with the previous Sunday.
CF_TIMEPERIOD_LASTWEEK	0x00000004	This rule evaluates to True (1) when the date specified by the

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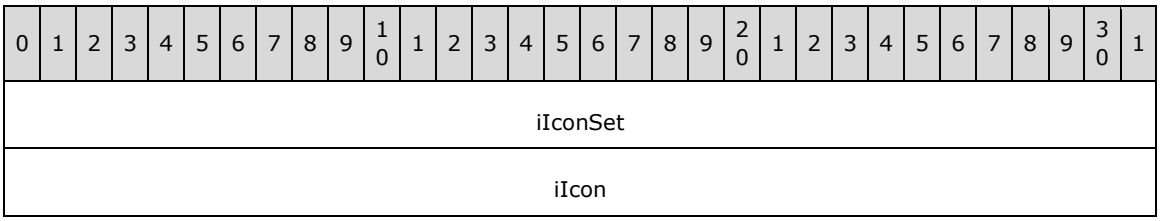
Name	Value	Meaning
		cell is a day in the one-week period ending with the previous Saturday.
CF_TIMEPERIOD_LASTMONTH	0x00000005	This rule evaluates to True (1) when the date specified by the cell is a day in the previous month.
CF_TIMEPERIOD_TOMORROW	0x00000006	This rule evaluates to True (1) when the date specified by the cell is tomorrow's date.
CF_TIMEPERIOD_NEXTWEEK	0x00000007	This rule evaluates to True (1) when the date specified by the cell is a day in the one-week period beginning with the next Sunday.
CF_TIMEPERIOD_NEXTMONTH	0x00000008	This rule evaluates to True (1) when the date specified by the cell is a day in the next month.
CF_TIMEPERIOD_THISMONTH	0x00000009	This rule evaluates to True (1) when the date specified by the cell is a day in the current month.

2.5.12 CFFlag

The **CFFlag** structure specifies an **icon** within an **icon set**.

The following packet diagram specifies this structure.



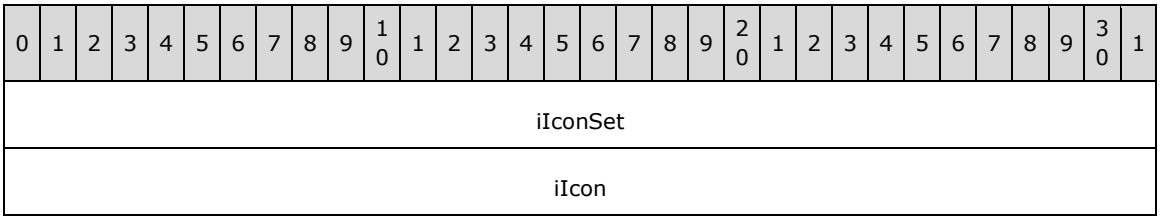
iIconSet (4 bytes): A **KPISets** (section 2.5.85) enumeration that specifies the icon set.

iIcon (4 bytes): An Icon (section 2.5.74) structure that specifies the icon. If **iIconSet** is equal to -1, this value MUST be -1. If **iIconSet** is not equal to -1, this value MUST be greater than or equal to 0. If the icon set specified by **iIconSet** has three icons, this value MUST be less than or equal to 2. If the icon set specified by **iIconSet** has four icons, this value MUST be less than or equal to 3. If the icon set specified by **iIconSet** has five icons, this value MUST be less than or equal to 4.

2.5.13 CFFlag14

The **CFFlag14** structure specifies an **icon** within an **icon set**.

The following packet diagram specifies this structure.



iIconSet (4 bytes): A **KPISets14** (section 2.5.86) enumeration that specifies the icon set.

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iIcon (4 bytes): An Icon (section 2.5.74) structure that specifies the icon. If **iIconSet** is equal to -1, this value MUST be -1. If **iIconSet** is not equal to -1, this value MUST be greater than or equal to 0. If the icon set specified by **iIconSet** has three icons, this value MUST be less than or equal to 2. If the icon set specified by **iIconSet** has four icons, this value MUST be less than or equal to 3. If the icon set specified by **iIconSet** has five icons, this value MUST be less than or equal to 4.

2.5.14 CFOper

The **CFOper** enumeration specifies the valid types of value comparisons used in **conditional formatting** rules. The value of the **cell** is compared against the value calculated by using the formulas (section 2.2.2) stored in the **rgce1** and **rgce2** fields of the **BrtBeginCFRule** (section 2.4.22) record or in the **FRTHeader** field of the **BrtBeginCFRule14** (section 2.4.23) record.

The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
CF_OPER_BN	0x00000001	This rule evaluates to True (1) when the cell's value is greater than or equal to the value specified by **rgce1** and less than or equal to the value specified by **rgce2**.
CF_OPER_NB	0x00000002	This rule evaluates to True (1) when the cell's value is less than the value specified by **rgce1** or greater than the value specified by **rgce2**.
CF_OPER_EQ	0x00000003	This rule evaluates to True (1) when the cell's value is equal to the value specified by **rgce1**.
CF_OPER_NE	0x00000004	This rule evaluates to True (1) when the cell's value is not equal to the value specified by **rgce1**.
CF_OPER_GT	0x00000005	This rule evaluates to True (1) when the cell's value is greater than the value specified by **rgce1**.
CF_OPER_LT	0x00000006	This rule evaluates to True (1) when the cell's value is less than the value specified by **rgce1**.
CF_OPER_GE	0x00000007	This rule evaluates to True (1) when the cell's value is greater than or equal to the value specified by **rgce1**.
CF_OPER_LE	0x00000008	This rule evaluates to True (1) when the cell's value is less than or equal to the value specified by **rgce1**.

2.5.15 CFTemp

The **CFTemp** enumeration specifies the type of condition that causes **conditional formatting** to be displayed in **cells** as part of a conditional formatting rule.

The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
CF_TEMPLATE_EXPR	0x00000000	Cells are formatted based on their values.
CF_TEMPLATE_FMLA	0x00000001	Cells are formatted based on the result of a formula (section 2.2.2).
CF_TEMPLATE_GRADIENT	0x00000002	A **color scale** is used to shade the cells based on their values.
CF_TEMPLATE_DATABAR	0x00000003	A **data bar** is drawn in each cell.

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Name	Value	Meaning
CF_TEMPLATE_MULTISTATE	0x00000004	An **icon** is displayed in the cell based on its value.
CF_TEMPLATE_FILTER	0x00000005	Cells are formatted when their values are in the top or bottom of the range of all values in the conditional formatting **range**.
CF_TEMPLATE_BANDEDTABLE	0x00000006	This value is not used.
CF_TEMPLATE_UNIQUEVALUES	0x00000007	Formatting is applied when a cell's value is unique among all other cells in the conditional formatting range.
CF_TEMPLATE_CONTAINSTEXT	0x00000008	Formatting is applied when the cell's value contains specific text.
CF_TEMPLATE_CONTAINSBLANKS	0x00000009	Formatting is applied when the cell's value is blank.
CF_TEMPLATE_CONTAINSNOBLANKS	0x0000000A	Formatting is applied when the cell's value is not blank.
CF_TEMPLATE_CONTAINSERRORS	0x0000000B	Formatting is applied when the cell contains an error.
CF_TEMPLATE_CONTAINSNOERRORS	0x0000000C	Formatting is applied when the cell does not contain an error.
CF_TEMPLATE_CONTAINSFORMULAS	0x0000000D	This value is not used.
CF_TEMPLATE_CONTAINSNOFORMULAS	0x0000000E	This value is not used.
CF_TEMPLATE_TIMEPERIODTODAY	0x0000000F	Formatting is applied when the cell contains a date and that date is today.
CF_TEMPLATE_TIMEPERIODTOMORROW	0x00000010	Formatting is applied when the cell contains a date and that date is tomorrow.
CF_TEMPLATE_TIMEPERIODYESTERDAY	0x00000011	Formatting is applied when the cell contains a date and that date is yesterday.
CF_TEMPLATE_TIMEPERIODLAST7DAYS	0x00000012	Formatting is applied when the cell contains a date and that date occurred within the last seven days.
CF_TEMPLATE_TIMEPERIODLASTMONTH	0x00000013	Formatting is applied when the cell contains a date and that date occurred last month.
CF_TEMPLATE_TIMEPERIODNEXTMONTH	0x00000014	Formatting is applied when the cell contains a date and that date occurs next month.
CF_TEMPLATE_TIMEPERIODTHISWEEK	0x00000015	Formatting is applied when the cell contains a date and that date occurs this week.
CF_TEMPLATE_TIMEPERIODNEXTWEEK	0x00000016	Formatting is applied when the cell contains a date and that date occurs next week.
CF_TEMPLATE_TIMEPERIODLASTWEEK	0x00000017	Formatting is applied when the cell contains a date and that date occurred last week.
CF_TEMPLATE_TIMEPERIODTHISMONTH	0x00000018	Formatting is applied when the cell contains a date and that date occurs this month.
CF_TEMPLATE_ABOVEAVERAGE	0x00000019	Formatting is applied when the cell's value is

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Name	Value	Meaning
		above the average value of other cells in the conditional formatting range.
CF_TEMPLATE_BELOWAVERAGE	0x0000001A	Formatting is applied when the cell's value is below the average value of other cells in the conditional formatting range.
CF_TEMPLATE_DUPLICATEVALUES	0x0000001B	Formatting is applied when the cell's value matches the value of other cells in the conditional formatting range.
CF_TEMPLATE_COMPARECOLUMNS	0x0000001C	This value is not used.
CF_TEMPLATE_EQUALABOVEAVERAGE	0x0000001D	Formatting is applied when the cell's value is equal to or greater than the average value of other cells in the conditional formatting range.
CF_TEMPLATE_EQUALBELOWAVERAGE	0x0000001E	Formatting is applied when the cell's value is equal to or less than the average value of other cells in the conditional formatting range.

2.5.16 CFTextOper

The **CFTextOper** enumeration specifies the valid types of text comparisons used in **conditional formatting** rules. The value of the **cell** is compared against the string stored in the **strParam** field of the **BrtBeginCFRule** (section 2.4.22) or **BrtBeginCFRule14** (section 2.4.23) record.

The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
CF_TEXTOPER_CONTAINS	0x00000000	This rule evaluates to True (1) when the cell contains the specified text.
CF_TEXTOPER_NOTCONTAINS	0x00000001	This rule evaluates to True (1) when the cell does not contain the specified text.
CF_TEXTOPER_BEGINSWITH	0x00000002	This rule evaluates to True (1) when the cell's text begins with the specified text.
CF_TEXTOPER_ENDSWITH	0x00000003	This rule evaluates to True (1) when the cell's text does not begin with the specified text.

2.5.17 CFType

The **CFType** enumeration specifies the type of **conditional formatting** rule applied to a **range**.

The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
CF_TYPE_CELLIS	0x00000001	**Cells** are formatted based on their values.
CF_TYPE_EXPRIS	0x00000002	Cells are formatted based on the result of a formula (section 2.2.2) or a **CFTemp** (section 2.5.15) **expression**.
CF_TYPE_GRADIENT	0x00000003	A **color scale** is used to shade the cells based on their values.
CF_TYPE_DATABAR	0x00000004	A **data bar** is drawn in each cell.

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Name	Value	Meaning
CF_TYPE_FILTER	0x00000005	Cells are formatted when their values are in the top or bottom of the range of all values in the conditional formatting range.
CF_TYPE_MULTISTATE	0x00000006	An **icon** is displayed in the cell based on its value.

2.5.18 CFVOtype

The **CFVOtype** enumeration specifies how the Conditional Formatting Value Object (CFVO) value is determined. In the following table, *X* represents a parameter value. If the **formula.cce** field of the containing **BrtCFVO** (section 2.4.329) record is greater than 0, *X* is the result of evaluating **formula**. Otherwise, *X* is equal to the value of the **numvalue** field of the containing **BrtCFVO** record. The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
CFVONUM	0x00000001	*X*
CFVOMIN	0x00000002	The minimum value from the **range** of **cells** that the **conditional formatting** rule applies to.
CFVOMAX	0x00000003	The maximum value from the range of cells that the conditional formatting rule applies to.
CFVOPERCENT	0x00000004	The minimum value in the range of cells that the conditional formatting rule applies to, plus *X* percent of the difference between the maximum and minimum values in the range of cells that the conditional formatting rule applies to. For example, if the minimum and maximum values in the range are 1 and 10 respectively, and *X* is 10, the CFVO value is 1.9.
CFVOPERCENTILE	0x00000005	The minimum value of the cell that is in the *X* percentile of the range of cells that the conditional formatting rule applies to.
CFVOFMLA	0x00000007	The result of evaluating **formula** of the containing **BrtCFVO** record.

2.5.19 CFVOType14

The **CFVOType14** enumeration specifies how the Conditional Formatting Value Object (CFVO) value is determined. In the following table, *X* represents a parameter value. If the **FRTHeader.fFormula** field of the containing **BrtCFVO14** (section 2.4.330) record is equal to 1, *X* is the result of evaluating the formula (section 2.2.2). Otherwise, *X* is equal to the value of the **numParam** field of the containing **BrtCFVO14** record. The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
CFVONUM_14	0x00000001	*X*
CFVOMIN_14	0x00000002	The minimum value from the **range** of **cells** that the **conditional formatting** rule applies to.
CFVOMAX_14	0x00000003	The maximum value from the range of cells that the conditional formatting rule applies to.
CFVOPERCENT_14	0x00000004	The minimum value in the range of cells that the conditional formatting rule applies to, plus *X* percent of the difference between the maximum and minimum values in the range of cells that the conditional

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Name	Value	Meaning
		formatting rule applies to. For example, if the minimum and maximum values in the range are 1 and 10 respectively, and *X* is 10, the CFVO value is 1.9.
CFVOPERCENTILE_14	0x00000005	The minimum value of the cell that is in the *X* percentile of the range of cells that the conditional formatting rule applies to.
CFVOFMLA_14	0x00000007	The result of evaluating the formula of the containing **BrtCFVO14** record.
CFVOAUTOMIN_14	0x00000008	The smaller of 0 or the minimum value from the range of cells that the conditional formatting rule applies to.
CFVOAUTOMAX_14	0x00000009	The larger of 0 or the maximum value from the range of cells that the conditional formatting rule applies to.

2.5.20 CmdType

The **CmdType** enumeration specifies the meaning of the **stCmd** field of the **BrtBeginECDbProps** (section 2.4.60) record.

The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
CMDNULL	0x00000000	The **stCmd** field of the **BrtBeginECDbProps** record is not specified.
CMDCUBE	0x00000001	The **stCmd** field of the **BrtBeginECDbProps** record specifies the name of a **cube** within an **OLAP** database.
CMDSQL	0x00000002	The **stCmd** field of the **BrtBeginECDbProps** record specifies a **Structured Query Language (SQL)** statement.
CMDTABLE	0x00000003	The **stCmd** field of the **BrtBeginECDbProps** record specifies a database table name.
CMDDEFAULT	0x00000004	The **stCmd** field of the **BrtBeginECDbProps** record specifies a statement in the default language of the database.
CMDSPLIST	0x00000005	The **stCmd** field of the **BrtBeginECDbProps** record specifies a list from a Web-based **data provider**.

2.5.21 CodeName

The **CodeName** structure is an **XLWideString** (section 2.5.168) structure that specifies a name to be used in a scripting application. The length of this string MUST NOT exceed 31 characters. If this string is not empty, it MUST contain only the characters that can be mapped from **Unicode** to a multibyte **American National Standards Institute (ANSI) character set** specified by the system locale. If the system locale is Chinese, Japanese, or Korean, the fullwidth characters in the resulting ANSI string are further mapped to corresponding halfwidth characters where applicable.

In the resulting ANSI string, the first character MUST be either a letter, a single-byte character with a code greater than 0x7F, or a multibyte character. The subsequent characters in the resulting ANSI string MUST be either a letter, a digit, an underscore, a single-byte character with a code greater than 0x7F, or a multibyte character.

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If the system locale is Japanese, the original Unicode string MUST NOT contain a character with a code equal to 0xFFE3.

2.5.22 Col

The **Col** structure is a signed 32-bit integer that specifies a single **column (1)** in a **sheet** by using a zero-based index. The value of this structure MUST be between 0 and 16383 (inclusive) and MUST be between **colFirst** and **colLast** (inclusive) on the **UncheckedRfX** (section 2.5.153) structure specified by the **rfx** field on the sheet's **BrtWsDim** (section 2.4.841) record.

2.5.23 ColNullable

The **ColNullable** structure is a signed 32-bit integer that specifies a single **column (1)** in a **sheet**.

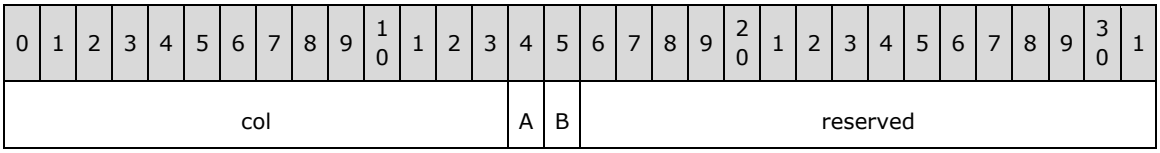
The following table specifies values of this structure.

Value	Meaning
0xFFFFFFFFL	Null value
	All other values are interpreted as an **UncheckedCol** (section 2.5.152) structure.

2.5.24 ColRel

The **ColRel** structure specifies a single **column (1)** in a **sheet**. There is a **row** associated with this column (1); it is determined in the context of the containing **RfXRel** (section 2.5.118) structure. This structure specifies whether the associated row/column (1) pair is a **relative reference** with respect to rows or columns (1).

The following packet diagram specifies this structure.



col (14 bits): An unsigned integer that specifies the zero-based index of the column (1).

A - fColRel (1 bit): A bit that specifies whether the associated row/column (1) pair is a relative reference with respect to columns (1).

B - fRwRel (1 bit): A bit that specifies whether the associated row/column (1) pair is a relative reference with respect to rows.

reserved (16 bits): This value MUST be 0 and MUST be ignored.

2.5.25 ColRelShort

The **ColRelShort** structure specifies a single **column (1)** in a **sheet**. There is a **row** associated with this column (1); it is determined in the context of the containing structure. This structure specifies whether the associated row/column (1) pair is a **relative reference** with respect to rows or columns (1).

The following packet diagram specifies this structure.

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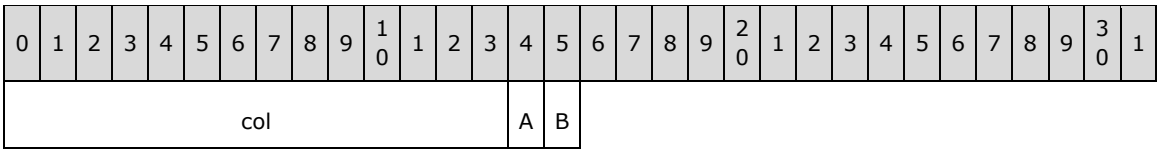


col (14 bits): An unsigned integer that specifies the zero-based index of the column (1).

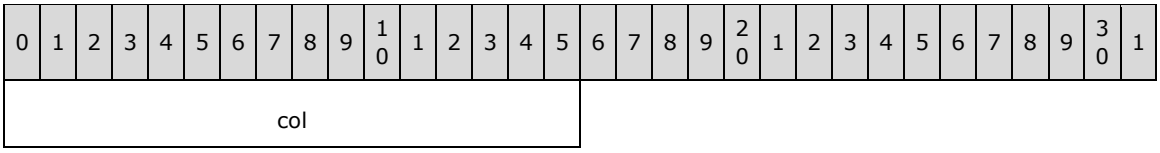
A - fColRel (1 bit): A bit that specifies whether the associated row/column (1) pair is a relative reference with respect to columns (1).

B - fRwRel (1 bit): A bit that specifies whether the associated row/column (1) pair is a relative reference with respect to rows.

2.5.26 ColShort

The **ColShort** structure specifies a single **column (1)** in a **sheet**.

The following packet diagram specifies this structure.



col (2 bytes): An unsigned integer that specifies a single column (1) in a sheet by using a zero-based index. The value of this field MUST be less than or equal to 16383.

2.5.27 DataConsolidationFunction

The **DataConsolidationFunction** enumeration specifies the valid values of the **data consolidation function** in the **BrtBeginSXDI** (section 2.4.241) record.

The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
SUM	0x00000000	The sum of the values.
COUNT	0x00000001	The count of data values.
AVERAGE	0x00000002	The average of the values.
MAX	0x00000003	The largest value.
MIN	0x00000004	The smallest value.
PRODUCT	0x00000005	The product of the values.
COUNTNUM	0x00000006	The count of data values that are numbers.
STDDEV	0x00000007	An estimate of the standard deviation of a population, where the data to be summarized is a subset of the entire population.
STDDEVP	0x00000008	The standard deviation of a population, where the population is all of the data to be summarized.
STDVAR	0x00000009	An estimate of the variance of a population, where the data to be summarized is a subset of the entire population.

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Name	Value	Meaning
STDVARP	0x0000000A	The variance of a population, where the population is all of the data to be summarized.

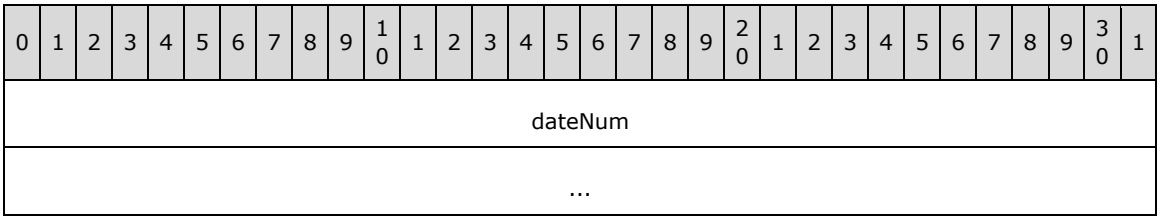
2.5.28 DataFunctionalityLevel

The **DataFunctionalityLevel** structure is a 1-byte unsigned integer that specifies a data functionality level (section 2.2.5.1).<57> The value of this structure MUST be greater than or equal to 0 and less than or equal to 4.

2.5.29 DateAsXnum

The **DateAsXnum** structure specifies a date and time.

The following packet diagram specifies this structure.



dateNum (8 bytes): An **Xnum** (section 2.5.171) structure that specifies a date and time. The value of this field MUST be greater than or equal to 0.

If the **f1904** field in the **BrtWbProp** (section 2.4.836) record is equal to 1, the value of **Xnum** MUST be less than 2958466, and the integer part of the **Xnum** specifies the date as a sequential number of days following January 1, 1904.

If the **f1904** field in the **BrtWbProp** record is equal to 0 and the value of **Xnum** is less than 60, the integer part of **Xnum** specifies the date as a sequential number of days following December 31, 1899.

If the **f1904** field in the **BrtWbProp** record is equal to 0 and the integer part of **Xnum** is greater than 60, the value of **Xnum** MUST be less than 2957004, and the integer part of **Xnum** specifies the date as a sequential number of days following December 30, 1899.

If the **f1904** field in the **BrtWbProp** record is equal to 0 and the integer part of **Xnum** is equal to 60, no date is specified.<58>

The fractional part of **Xnum** specifies the time of the day as a fraction of the 24-hour day.

2.5.30 DBType

The **DBType** enumeration specifies the **data source** type of an external connection (section 2.2.8). The **BrtBeginExtConnection** (section 2.4.79) record uses it.

The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
DBTODBC	0x00000001	**ODBC** data source.
DBTDAO	0x00000002	**DAO** data source.
DBTWEB	0x00000004	**HTML** data source.

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Name	Value	Meaning
DBTOLEDB	0x00000005	**OLE DB** data source.
DBTTEXT	0x00000006	Text data source.
DBTADO	0x00000007	**ActiveX Data Objects (ADO)** record set.
DBTOLEDBPP	0x00000064	OLE DB data source created by the **spreadsheet data model**.
DBTDATAFEED	0x00000065	Data feed data source created by the spreadsheet data model.
DBTWORKSHEET	0x00000066	**Worksheet** data source created by the spreadsheet data model.
DBTTEXTPP	0x00000067	Text data source created by the spreadsheet data model.

2.5.31 DCol

The **DCol** structure is a signed 32-bit integer that specifies a **column (1)** count or offset. The value of this structure MUST be between 0 and 16384, inclusive.

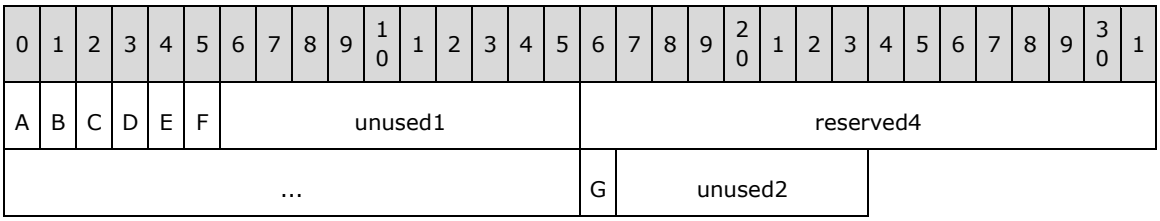
2.5.32 DColShort

The **DColShort** structure is a signed integer that specifies a **column (1)** count or offset. The value of this structure MUST be between 0 and 16384, inclusive.

2.5.33 DDEItemProperties

The **DDEItemProperties** structure specifies properties of a DDE Data Item (section 2.2.7.4.2.1).

The following packet diagram specifies this structure.



A - reserved1 (1 bit): MUST be 0 and MUST be ignored.

B - fWantAdvise (1 bit): A bit that specifies whether the application requests that the **data source** provide a notification when the data changes.

C - fWantPict (1 bit): A bit that specifies whether this DDE data item uses a picture-based data format.

D - fOLE (1 bit): A bit that specifies whether this DDE data item is used to support object linking. If the value is 1, the name of the DDE data item, as specified by the **name** attribute in the preceding **BrtSupNameStart** (section 2.4.794) record, MUST be "StdDocumentName" (this name is case-sensitive).

E - reserved2 (1 bit): MUST be 0 and MUST be ignored.

F - reserved3 (1 bit): MUST be 0 and MUST be ignored.

unused1 (10 bits): Undefined and MUST be ignored.

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reserved4 (4 bytes): MUST be 0x00000000 and MUST be ignored.

G - reserved5 (1 bit): MUST be 1 and MUST be ignored.

unused2 (7 bits): Undefined and MUST be ignored.

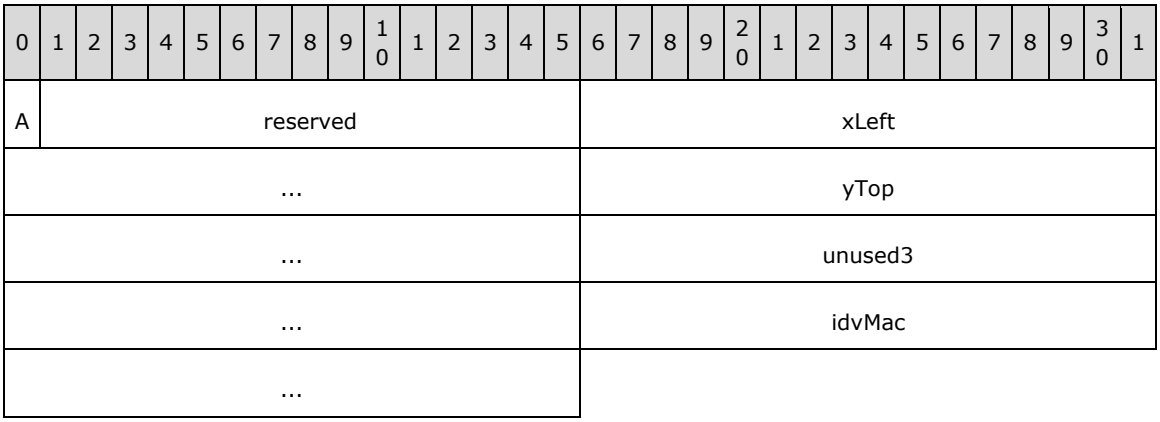
2.5.34 DRw

The **DRw** structure is a signed 32-bit integer that specifies a **row** count or offset. The value of this structure MUST be between 0 and 1048576, inclusive.

2.5.35 DVals

The **DVals** structure specifies **data validation** properties of a worksheet that are used by the user interface of the application.

The following packet diagram specifies this record.



A - fWnClosed (1 bit): A bit that specifies whether all data validation input prompts are disabled for this **sheet**.

reserved (15 bits): This value MUST be 0 and MUST be ignored.

xLeft (4 bytes): An unsigned integer that specifies the x-coordinate (relative to the Application window) of the top-left corner of the data validation input prompt, measured in pixels. This value MUST be less than or equal to 65535.<59>

yTop (4 bytes): An unsigned integer that specifies the y-coordinate (relative to the application window) of the top-left corner of the data validation input prompt, measured in pixels. This value MUST be less than or equal to 65535.<60>

unused3 (4 bytes): This value MUST be 0 and MUST be ignored.

idvMac (4 bytes): An unsigned integer that specifies the number of **BrtDVal** (section 2.4.351) records that follow the **BrtBeginDVals** (section 2.4.54) record, or **BrtDVal14** (section 2.4.352) records that follow the **BrtBeginDVals14** (section 2.4.55) record, as defined by **Worksheet** part **ABNF** (section 2.1.7.62). This value MUST be less than or equal to 65534.

2.5.36 DValStrings

The **DValStrings** record specifies the strings that **data validation** uses.

The following packet diagram specifies this record.

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0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
strErrorTitle (variable)																															
...																															
strError (variable)																															
...																															
strPromptTitle (variable)																															
...																															
strPrompt (variable)																															
...																															

strErrorTitle (variable): An **XLNullableWideString** (section 2.5.166) that specifies the text of the title bar of the error alert. If this is not the NULL string, the length of this string MUST be less than or equal to 32 characters.

strError (variable): An **XLNullableWideString** that specifies the message text of the error alert. If this is not the NULL string, the length of this string MUST be less than or equal to 225 characters.

strPromptTitle (variable): An **XLNullableWideString** that specifies the text of the title bar of the input prompt. If this is not the NULL string, the length of this string MUST be less than or equal to 32 characters.

strPrompt (variable): An **XLNullableWideString** that specifies the message text of the input prompt. If this is not the NULL string, the length of this string MUST be less than or equal to 255 characters.

2.5.37 DXFId

The **DXFId** structure is a 4-byte unsigned integer that specifies a zero-based index of a **BrtDXF** (section 2.4.354) record in the collection of all records directly following the **BrtBeginDXFs** (section 2.4.57) record in the **Styles** (section 2.1.7.50) part **ABNF**. A value of 0xFFFFFFFF means no **BrtDXF** record is used.

2.5.38 DXFId14

The **DXFId14** structure is a 4-byte unsigned integer that specifies a zero-based index of a **BrtDXF14** (section 2.4.355) record in the collection of all records directly following the **BrtBeginDxF14s** (section 2.4.56) record in the **Styles** (section 2.1.7.50) part **ABNF**. A value of 0xFFFFFFFF means no **BrtDXF14** record is used.

2.5.39 ECTwFldInfoData

The **ECTwFldInfoData** record specifies field settings for **text importation** common for **BrtBeginECTwFldInfo** (section 2.4.64) and **BrtBeginECTwFldInfo15** (section 2.4.65).

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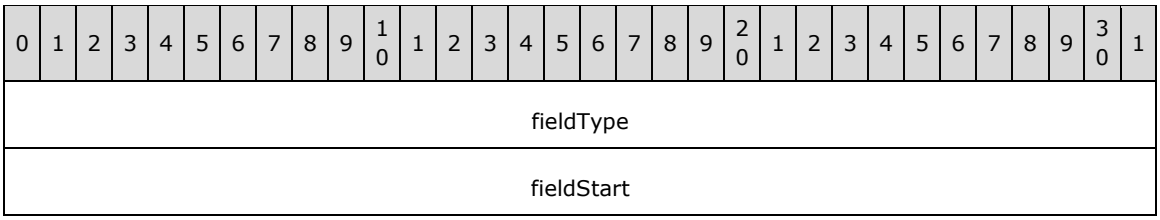


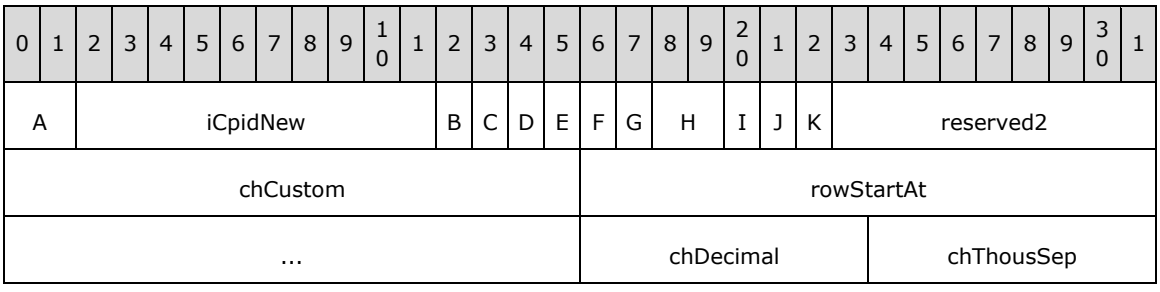
fieldType (4 bytes): An unsigned integer that specifies the field type. Types are specified by the user, or determined algorithmically via heuristics and text analysis. This value MUST be one of the values in the following table.

Value	Meaning
0x00000000	General: The application decides how to handle the field.
0x00000001	Text: The field contains strings.
0x00000002	MDY: The field contains a date in the order of month, day, and year.
0x00000003	DMY: The field contains a date in the order of day, month, and year.
0x00000004	YMD: The field contains a date in the order of year, month, and day.
0x00000005	MYD: The field contains a date in the order of month, year, and day.
0x00000006	DYM: The field contains a date in the order of day, year, and month.
0x00000007	YDM: The field contains a date in the order of year, day, and month.
0x00000008	Skip: Do not import this field.
0x00000009	EMD: This field contains an East Asian date in the order of EA era year, month, and day.

fieldStart (4 bytes): An unsigned integer that specifies, for fixed-length fields, the zero-based character position where the field begins. The subsequent **BrtBeginECTwFldInfo** (section 2.4.64) records or carriage return characters in the text stream separate the subsequent text fields.

2.5.40 ECTxtWizData

The **ECTxtWizData** record specifies **text importation** properties common for **BrtBeginECTxtWiz** (section 2.4.68) and **BrtBeginECTxtWiz15** (section 2.4.69) records.



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A - iCpid (2 bits): An unsigned integer that specifies the type of **character set** to use during importation. This value MUST be one of the values in the following table.

Value	Meaning
0x00	Macintosh
0x01	Windows (ANSI)
0x02	MS-DOS (PC-8)

The value of **iCpid** is used to determine the code page associated with the text file if **iCpidNew** is less than 3, otherwise **iCpidNew** is used.

iCpidNew (10 bits): An unsigned integer that specifies application-specific code page information that exists for text importation purposes.

B - fDelimited (1 bit): A bit that specifies whether the file is tab or character delimited. If the value is 0, then **fTab**, **fSpace**, **fComma**, **fSemiColon**, **fCustom**, and **chCustom** MUST be ignored. The following table specifies the meaning of each value.

Value	Meaning
0	The file is parsed according to fixed length fields.
1	The file is tab or character delimited.

C - fTab (1 bit): A bit that specifies whether tabs are used as field delimiters.

D - fSpace (1 bit): A bit that specifies whether space characters are used as field delimiters.

E - fComma (1 bit): A bit that specifies whether comma characters are used as field delimiters.

F - fSemiColon (1 bit): A bit that specifies whether semicolon characters are used as field delimiters.

G - fConsecutive (1 bit): A bit that specifies whether consecutive delimiters are treated as just one delimiter.

H - fTextDelim (2 bits): An unsigned integer that specifies the character used as the text string qualifier. The following table specifies the meaning of each value.

Value	Meaning
0x00	Double Quote
0x01	Single Quote
0x02	None
0x03	None

I - reserved1 (1 bit): MUST be 1 and MUST be ignored

J - fPromptForFile (1 bit): A bit that specifies whether the user selected to receive a prompt for the file name on refresh. This value MUST be 1 if the length of the string specified by **stFile** is equal to 0 characters.<61>

K - fCustom (1 bit): A bit that specifies whether the custom delimiter character **chCustom** is used as a field delimiter.

reserved2 (9 bits): This value MUST be 0, and MUST be ignored.

chCustom (2 bytes): An unsigned integer that specifies the **Unicode** character to be treated as a field delimiter.

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rowStartAt (4 bytes): An unsigned integer that specifies at what **row** of the file to start the data importation. This value MUST be greater than 0 and less than 100000000.

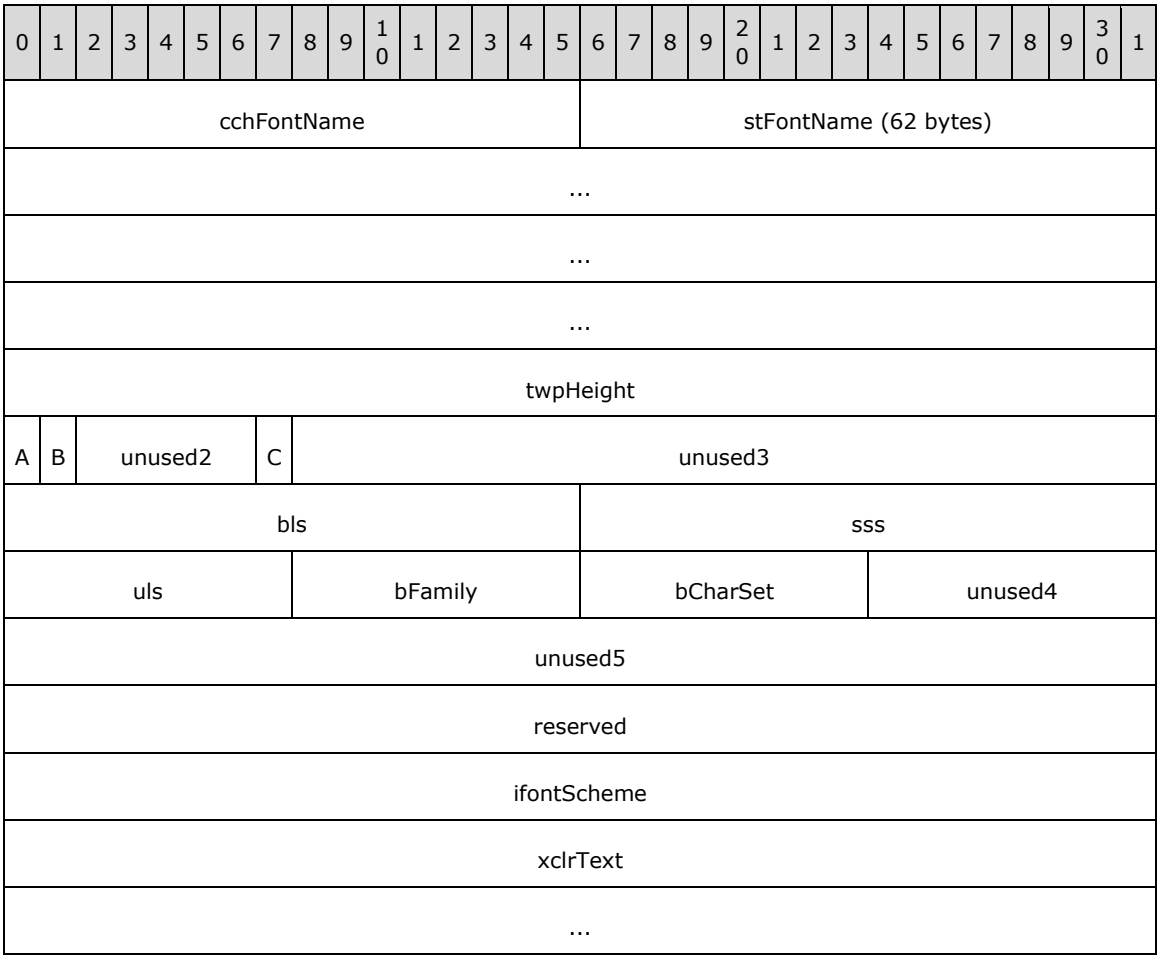
chDecimal (1 byte): An unsigned integer that specifies the decimal separator character in ISO-8859-1 [ISO-8859-1] encoding.

chThousSep (1 byte): An unsigned integer that specifies the thousands separator character in ISO-8859-1 [ISO-8859-1] encoding.

2.5.41 Etxp

The **Etxp** structure specifies **font** information for a **BrtRRChgCell** (section 2.4.748) record.

The following packet diagram specifies this structure.



cchFontName (2 bytes): An unsigned integer that specifies the length of **stFontName**. The value of this field MUST be less than or equal to 31.

stFontName (62 bytes): A **Unicode** string that specifies the name of the font. Only the number of characters specified by **cchFontName** are used. Other characters, if they exist, MUST be 0x0000 and MUST be ignored.

twpHeight (4 bytes): An unsigned integer that specifies the height of the font in **twips**. The value MUST be greater than or equal to 0x0014 and MUST be less than or equal to 0x1FFF.

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A - unused1 (1 bit): Undefined and MUST be ignored.

B - ftsItalic (1 bit): A bit that specifies whether the font is italic.

unused2 (5 bits): Undefined and MUST be ignored.

C - ftsStrikeout (1 bit): A bit that specifies whether a strikeout line is drawn through the horizontal middle of the text.

unused3 (24 bits): Undefined and MUST be ignored.

bls (2 bytes): An unsigned integer that specifies the weight of the font. The value MUST be greater than or equal to 0x0190 and less than or equal to 0x03E8. The value for normal text is 0x0190, and the value for bold text is 0x02BC.

sss (2 bytes): An unsigned integer that specifies whether subscript or superscript is used. The value of this field MUST be a value from the following table.

Value	Meaning
0x0000	None
0x0001	Superscript
0x0002	Subscript

uls (1 byte): An unsigned integer that specifies the type of underline to use. The value of this field MUST be a value from the following table.

Value	Meaning
0x00	None
0x01	Single
0x02	Double
0x21	**Single accounting**
0x22	**Double accounting**

bFamily (1 byte): An unsigned integer that specifies the **font family** that this font belongs to. The value of this field MUST be a value from the following table.

Value	Meaning
0x00	Not applicable
0x01	Roman
0x02	Swiss
0x03	Modern

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Value	Meaning
0x04	Script
0x05	Decorative

bCharSet (1 byte): An unsigned integer that specifies the **character set** of this font. The value of this field MUST be a value from the following table.

Value	Meaning
0x00	ANSI_CHARSET
0x01	DEFAULT_CHARSET
0x02	SYMBOL_CHARSET
0x4D	MAC_CHARSET
0x80	SHIFTJIS_CHARSET
0x81	HANGEUL_CHARSET
0x81	HANGUL_CHARSET
0x82	JOHAB_CHARSET
0x86	GB2312_CHARSET
0x88	CHINESEBIG5_CHARSET
0xA1	GREEK_CHARSET
0xA2	TURKISH_CHARSET
0xA3	VIETNAMESE_CHARSET
0xB1	HEBREW_CHARSET
0xB2	ARABIC_CHARSET
0xBA	BALTIC_CHARSET
0xCC	RUSSIAN_CHARSET
0xDE	THAI_CHARSET
0xEE	EASTEUROPE_CHARSET
0xFF	OEM_CHARSET

unused4 (1 byte): This value undefined and MUST be ignored.

unused5 (4 bytes): This value is undefined and MUST be ignored.

reserved (4 bytes): This value MUST be 0 and MUST be ignored.

ifontScheme (4 bytes): An unsigned integer that specifies the **font scheme** to which this font belongs. When a font is part of a theme, as specified in [ISO/IEC29500-1:2016] section 14.2.7, the font is categorized as a **major scheme** or a **minor scheme**. When a new theme is chosen,

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every font that is part of the theme is updated to use the major scheme or the minor scheme. The value of this field MUST be a value from the following table.

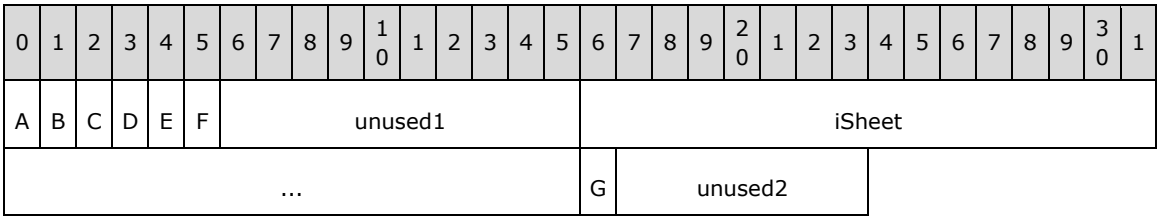
Value	Meaning
0x00	None
0x01	Major scheme
0x02	Minor scheme

xclrText (8 bytes): A **BrtColor** (section 2.4.332) structure that specifies the color of this font.

2.5.42 ExternalNameProperties

The **ExternalNameProperties** structure specifies properties of an external defined name (section 2.2.7.4.1.1).

The following packet diagram specifies this structure.



A - fBuiltIn (1 bit): A bit that specifies whether the application defines this external defined name. Otherwise, the user defines the external defined name.

B - reserved1 (1 bit): This value MUST be 0 and MUST be ignored.

C - reserved2 (1 bit): This value MUST be 0 and MUST be ignored.

D - reserved3 (1 bit): This value MUST be 0 and MUST be ignored.

E - reserved4 (1 bit): This value MUST be 0 and MUST be ignored.

F - reserved5 (1 bit): This value MUST be 0 and MUST be ignored.

unused1 (10 bits): This value is undefined and MUST be ignored.

iSheet (4 bytes): An unsigned integer that specifies the scope of this external defined name.

The value of this field MUST be a value from the following table.

Value	Meaning
0	The external defined name has a **workbook**-level scope.
>0	The external defined name has a **sheet**-level scope. This value MUST specify a one-based index of an element in the array of **XLWideString** (section 2.5.168) structures specified by the **sheetNames** field of the **BrtSupTabs** (section 2.4.799) record in this **External Link** (section 2.1.7.25) part **ABNF**. The referenced string specifies the name of the sheet that is in scope.

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G - reserved6 (1 bit): This value MUST be 0 and MUST be ignored.

unused2 (7 bits): This value is undefined and MUST be ignored.

2.5.43 ExternalReferenceType

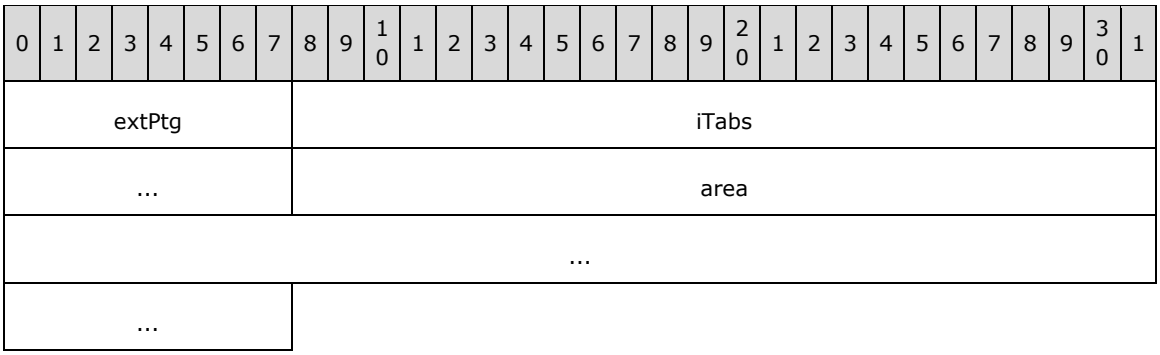
The **ExternalReferenceType** enumeration specifies a type of external link (section 2.2.7.4). The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
WORKBOOK	0x0000	The associated external link type is external workbook link (section 2.2.7.4.1).
DDE	0x0001	The associated external link type is **DDE data source** (section 2.2.7.4.2).
OLE	0x0002	The associated external link type is **OLE data source** (section 2.2.7.4.3).

2.5.44 ExtPtgArea3D

The **ExtPtgArea3D** structure is a variation of the **PtgArea3d** structure that formulas (section 2.2.2) use in external defined names (section 2.2.7.4.1.1). It specifies a rectangular **range** on one or more **sheets**.

The following packet diagram specifies this structure.



extPtg (1 byte): An unsigned integer that specifies the identity of this structure. This value MUST be 0x3B.

iTabs (4 bytes): An **ExtSheetPair** (section 2.5.49) structure that specifies the sheet or sheets that contain the range.

area (8 bytes): An **RgceAreaSmall** (section 2.5.119) structure that specifies the location of the range of **cells** within a sheet.

2.5.45 ExtPtgAreaErr3D

The **ExtPtgAreaErr3D** structure is a variation of the PtgAreaErr3d structure that formulas (section 2.2.2) use in external defined names (section 2.2.7.4.1.1). It specifies an invalid reference to a rectangular **range** of **cells** on one or more **sheets**.

The following packet diagram specifies this structure.

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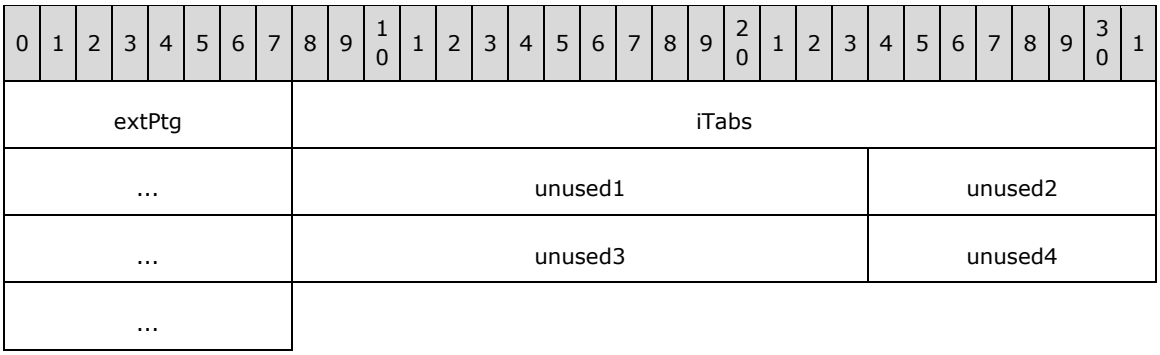


extPtg (1 byte): An unsigned integer that specifies the identity of this structure. This value MUST be 0x3D.

iTabs (4 bytes): An **ExtSheetPair** (section 2.5.49) structure that specifies the sheet or sheets that contain the target of this reference.

unused1 (2 bytes): Undefined and MUST be ignored.

unused2 (2 bytes): Undefined and MUST be ignored.

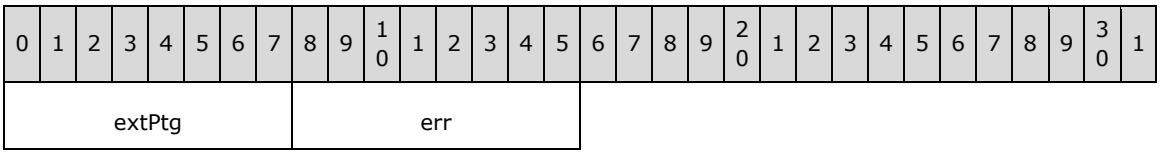
unused3 (2 bytes): Undefined and MUST be ignored.

unused4 (2 bytes): Undefined and MUST be ignored.

2.5.46 ExtPtgErr

The **ExtPtgErr** structure is a variation of the **PtgErr** (section 2.5.97.39) structure that formulas (section 2.2.2) use in external defined names (section 2.2.7.4.1.1). It specifies a **cell reference** that is not valid.

The following packet diagram specifies this structure.



extPtg (1 byte): An unsigned integer that specifies the identity of this structure. This value MUST be 0x1C.

err (1 byte): A **BErr** structure (section 2.5.97.2) that specifies the value of this error. This value MUST be 0x17.

2.5.47 ExtPtgRef3D

The **ExtPtgRef3D** structure is a variation of the PtgRef3d structure that formulas (section 2.2.2) use in external defined names (section 2.2.7.4.1.1). It specifies the location of a single **cell** on one or more **sheets**.

The following packet diagram specifies this structure.

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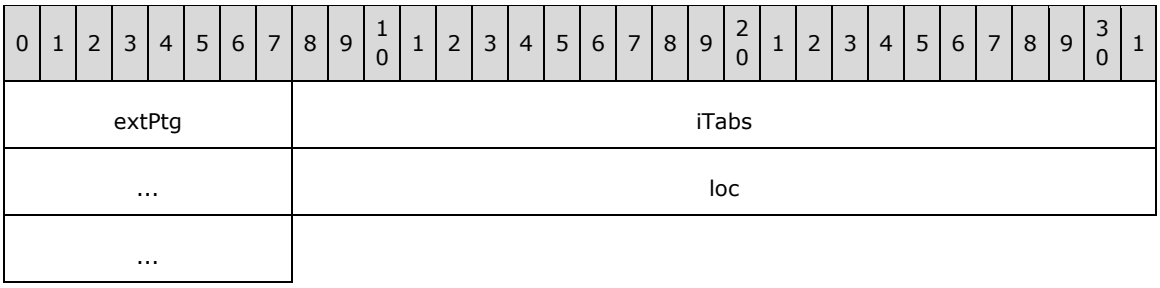


extPtg (1 byte): An unsigned integer that specifies the identity of this structure. This value MUST be 0x3A.

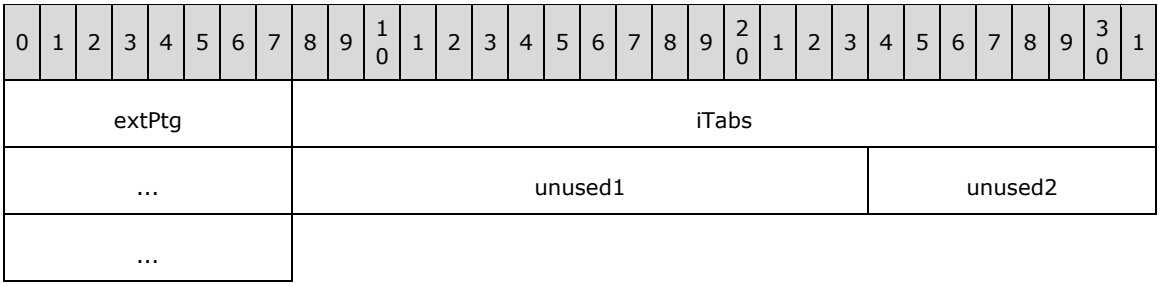
iTabs (4 bytes): An **ExtSheetPair** (section 2.5.49) structure that specifies the sheet or sheets that contain the cell.

loc (4 bytes): An **RgceLocSmall** (section 2.5.120) structure that specifies the location of a cell within a sheet.

2.5.48 ExtPtgRefErr3D

The **ExtPtgRefErr3D** structure is a variation of the PtgRefErr3d structure that formulas (section 2.2.2) use in external defined names (section 2.2.7.4.1.1). It specifies an invalid single **cell reference** on one or more **sheets**.

The following packet diagram specifies this structure.



extPtg (1 byte): An unsigned integer that specifies the identity of this structure. This value MUST be 0x3C.

iTabs (4 bytes): An **ExtSheetPair** (section 2.5.49) structure that specifies the sheet or sheets that contain the target of this reference.

unused1 (2 bytes): Undefined and MUST be ignored.

unused2 (2 bytes): Undefined and MUST be ignored.

2.5.49 ExtSheetPair

The **ExtSheetPair** structure specifies the **sheet** portion of a reference to a worksheet or macro sheet, or it specifies a range of worksheets or macro sheets in an external workbook (section 2.1.10). Formulas (section 2.2.2) use it in external defined names (section 2.2.7.4.1.1). The worksheets and macro sheets are in the collection of sheets in an external workbook, as specified by the **BrtSupTabs** (section 2.4.799) record.

The following packet diagram specifies this structure.

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0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iTabFirst																iTabLast															

iTabFirst (2 bytes): A signed integer that specifies the first sheet of a single or multisheet reference. The value of this field MUST be a value from the following table.

Value	Meaning
-1	Specifies that the first sheet of this reference cannot be found.
>= 0	Specifies the zero-based index of an **XLWideString** (section 2.5.168) type in the array specified by the **sheetNames** field in the **BrtSupTabs** record in this **External Link** (section 2.1.7.25) part **ABNF**. The referenced **XLWideString** (section 2.5.168) type MUST specify the name of a worksheet or macro sheet in the external workbook.

iTabLast (2 bytes): A signed integer that specifies the last sheet of a single or multisheet reference. The value of this field MUST be a value from the following table.

Value	Meaning
-1	Specifies that the last sheet of this reference cannot be found.
>= 0	Specifies the zero-based index of an **XLWideString** type in the array specified by the **sheetNames** field in the **BrtSupTabs** record in this **External Link** part. The referenced **XLWideString** type MUST specify the name of a worksheet or macro sheet in the external workbook. The value of this field MUST be greater than the value of **iTabFirst**.

2.5.50 FillPattern

The **FillPattern** enumeration specifies the **fill pattern**.<62>

The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
FLSNULL	0x00	No fill pattern
FLSSOLID	0x01	Solid
FLSMEDGRAY	0x02	50% gray
FLSDKGRAY	0x03	75% gray
FLSLTGRAY	0x04	25% gray
FLSDKHOR	0x05	Horizontal stripe

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Name	Value	Meaning
FLSDKVER	0x06	Vertical stripe
FLSDKDOWN	0x07	Reverse diagonal stripe
FLSDKUP	0x08	Diagonal stripe
FLSDKGRID	0x09	Diagonal crosshatch
FLSDKTRELLIS	0x0A	Thick diagonal crosshatch
FLSLTHOR	0x0B	Thin horizontal stripe
FLSLTVER	0x0C	Thin vertical stripe
FLSLTDOWN	0x0D	Thin reverse diagonal stripe
FLSLTUP	0x0E	Thin diagonal stripe
FLSLTGRID	0x0F	Thin horizontal crosshatch
FLSLTTRELLIS	0x10	Thin diagonal crosshatch
FLSGRAY125	0x11	12.5% gray
FLSGRAY0625	0x12	6.25% gray

2.5.51 FnGroupID

The **FnGroupID** structure is an unsigned integer used to classify **functions** into conceptual groups. For example, functions in the same group can be searched or **selected** from the application's user interface. Or, for example, it can be used to filter the list of all functions to enable the user to choose from functions used for financial data. The value of this structure MUST be a value from the following table.

Value of FnGroupID	Function group classification
0	(reserved)
1	Financial
2	Date and Time
3	Math and Trig
4	Statistical
5	Lookup & Reference
6	Database
7	Text
8	Logical
9	Information
10	Commands
11	Customizing

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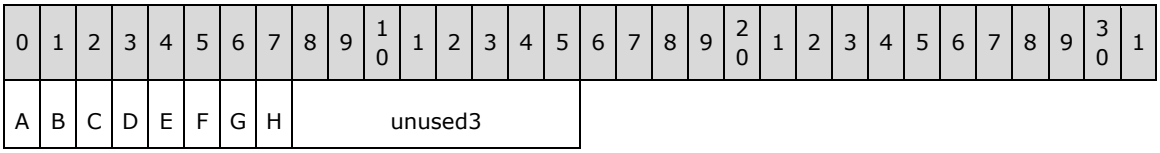
Value of FnGroupID	Function group classification
12	Macro Control
13	DDE/External
14	User Defined
15	Engineering
16	Cube
Any value that is greater than 16 and also less than the value of the **iMac** field of **BrtBeginFnGroup** (section 2.4.87).	(reserved)
Any value that is greater than the value of the **iMac** field of the **BrtBeginFnGroup** record and less than or equal to the value of the **iMac** field of **BrtBeginFnGroup** plus the count of the **BrtFnGroup** (section 2.4.676) records.	User-definable function groups, names of which are defined in **BrtFnGroup** records.

2.5.52 FontFlags

The **FontFlags** structure specifies the attributes of the **font**.

The following packet diagram specifies this structure.



A - unused1 (1 bit): Undefined and MUST be ignored.

B - fItalic (1 bit): A bit that specifies whether the text is italic.

C - unused2 (1 bit): Undefined and MUST be ignored.

D - fStrikeout (1 bit): A bit that specifies whether a strikethrough line is drawn through the horizontal middle of the text.

E - fOutline (1 bit): A bit that specifies whether only the inner and outer **borders** of the characters are displayed.

F - fShadow (1 bit): A bit that specifies a Macintosh compatibility setting. If this bit is set, the effect is to render a shadow behind, beneath, and to the right of the text on a Macintosh operating system.

G - fCondense (1 bit): A bit that specifies a Macintosh compatibility setting. If this bit is set, the effect is to condense the text (squeeze it together).

H - fExtend (1 bit): A bit that specifies a Macintosh compatibility setting. If this bit is set, the effect is to extend or stretch out the text.

unused3 (8 bits): Undefined and MUST be ignored.

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2.5.53 FontScheme

The **FontScheme** enumeration specifies the **font scheme** to which this **font** belongs. When a font is part of a theme, as specified in [ISO/IEC29500-1:2016] section 14.2.7, the font is categorized as a **major scheme** or a **minor scheme**.

The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
XFSNONE	0x00	No font scheme
XFSMAJOR	0x01	Major scheme
XFSMINOR	0x02	Minor scheme
XFSNIL	0xFF	**Ninched** state

2.5.54 FRTBlank

The **FRTBlank** structure is a future record (section 2.1.6) header that specifies that no future record attribute exists for the record that contains this structure. An application that does not support the containing record's content does not need to load or adjust any of its content during run-time operations. Such an application can write the containing record during save without modification.

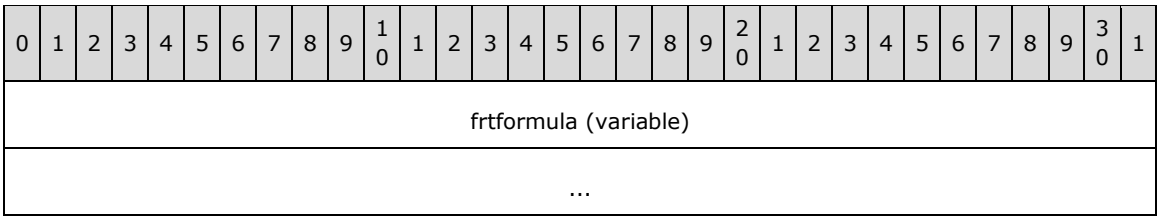
The following packet diagram specifies this structure.

reserved (4 bytes): This value MUST be 0 and MUST be ignored.

2.5.55 FRTCFParsedFormula14

The **FRTCFParsedFormula14** structure specifies a formula (section 2.2.2) used by a future record (section 2.1.6) that is used in a **conditional formatting** rule.

The following packet diagram specifies this structure.



frtformula (variable): An **FRTFormula** (section 2.5.58) structure that specifies the formula.

frtformula.rgce is an **Rgce** (section 2.5.97.88) structure that specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula. It MUST NOT contain the **PtgExp** (section 2.5.97.40), **PtgList** (section 2.5.97.52), **PtgSxName** (section 2.5.97.76), **PtgIsect** (section 2.5.97.50), **PtgUnion** (section 2.5.97.78), **PtgArray** (section 2.5.97.23), **PtgMemArea** (section 2.5.97.54), or **PtgMemNoMem** (section 2.5.97.57) structure. A **PtgArea** (section 2.5.97.18), **PtgAreaN** (section 2.5.97.22), or **PtgArea3d** (section 2.5.97.19) structure MUST NOT be the only **Ptg** structure in the sequence.

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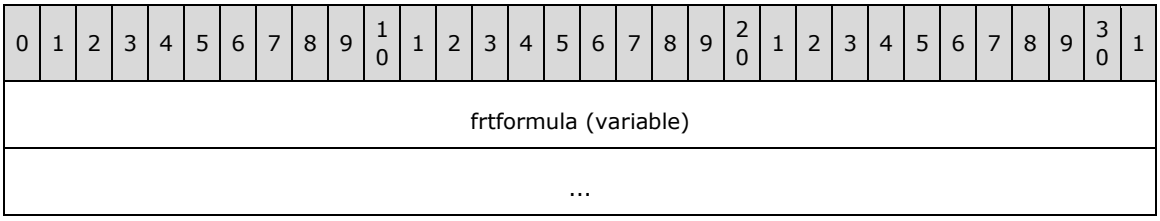
The root node of the parse tree of this field MUST be a VALUE_TYPE state, as described in section 2.5.97.88.

2.5.56 FRTCFVOParsedFormula14

The **FRTCFVOParsedFormula14** structure specifies a formula (section 2.2.2) without **relative references** used by a future record (section 2.1.6) that is used in a **conditional formatting** rule.

The following packet diagram specifies this structure.



frtformula (variable): An **FRTFormula** (section 2.5.58) structure that specifies the formula.

frtformula.rgce is an **Rgce** (section 2.5.97.88) structure that specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula. It MUST NOT contain a **PtgExp** (section 2.5.97.40), **PtgList** (section 2.5.97.52), **PtgSxName** (section 2.5.97.76), **PtgIsect** (section 2.5.97.50), **PtgUnion** (section 2.5.97.78), **PtgArray** (section 2.5.97.23), **PtgMemArea** (section 2.5.97.54), or **PtgMemNoMem** (section 2.5.97.57) structure. A **PtgArea** (section 2.5.97.18), **PtgAreaN** (section 2.5.97.22), or **PtgArea3d** (section 2.5.97.19) structure MUST NOT be the only **Ptg** structure the sequence.

If this field contains a **PtgRef** (section 2.5.97.68) structure, the **loc.column.fColRel** and **loc.column.fRwRel** fields in the **PtgRef** structure MUST be 0.

If this field contains a **PtgRefN** (section 2.5.97.72) structure, the **loc.column.fColRel** and **loc.column.fRwRel** fields in the **PtgRefN** structure MUST be 0.

If this field contains a **PtgRef3d** (section 2.5.97.69) structure, the **loc.column.fColRel** and **loc.column.fRwRel** fields in the **PtgRef3d** structure MUST be 0.

If this field contains a **PtgArea** structure, the **area.columnFirst.fColRel**, **area.columnFirst.fRwRel**, **area.columnLast.fColRel**, and **area.columnLast.fRwRel** fields in the **PtgArea** structure MUST be 0.

If this field contains a **PtgAreaN** structure, the **area.columnFirst.fColRel**, **area.columnFirst.fRwRel**, **area.columnLast.fColRel**, and **area.columnLast.fRwRel** fields in the **PtgAreaN** structure MUST be 0.

If this field contains a **PtgArea3d** structure, the **area.columnFirst.fColRel**, **area.columnFirst.fRwRel**, **area.columnLast.fColRel**, and **area.columnLast.fRwRel** fields in the **PtgArea3d** structure MUST be 0.

The root node of the parse tree of this field MUST be a VALUE_TYPE state, as described in section 2.5.97.88.

2.5.57 FRTDVParsedFormula14

The **FRTDVParsedFormula14** structure specifies a formula (section 2.2.2) used in a **data validation** rule.

The following packet diagram specifies this structure.

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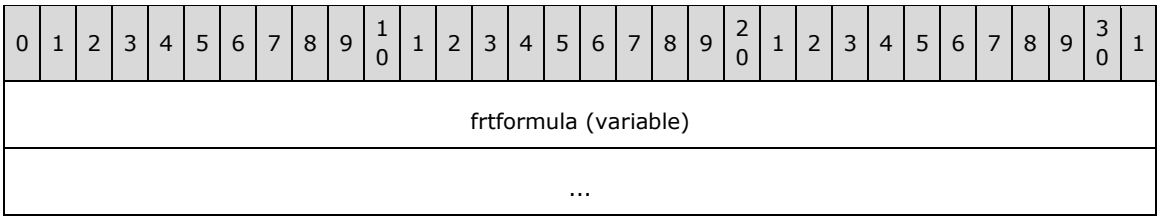

frtformula (variable): An **FRTFormula** (section 2.5.58) structure that specifies the formula.

frtformula.rgce is an **Rgce** (section 2.5.97.88) structure that specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula. It MUST NOT contain a **PtgExp** (section 2.5.97.40), **PtgList** (section 2.5.97.52), **PtgSxName** (section 2.5.97.76), **PtgIsect** (section 2.5.97.50), **PtgUnion** (section 2.5.97.78), **PtgArray** (section 2.5.97.23), **PtgMemArea** (section 2.5.97.54), or **PtgMemNoMem** (section 2.5.97.57) structure.

If the **BrtDVal14** (section 2.4.352) record that contains the **FRTHeader** (section 2.5.60) structure whose **FRTHeader.rgFormulas.array** contains this **FRTDVParsedFormula14** structure has a **BrtDVal14.valType** attribute not equal to 3, the **BrtDVal14**.**fDVMinFmla** attribute is 1 and this **FRTDVParsedFormula14** structure is the first formula contained in the **FRTHeader.rgFormulas** array, the following MUST be true:

- A **PtgArea** (section 2.5.97.18), **PtgAreaErr** (section 2.5.97.20), **PtgAreaN** (section 2.5.97.22), **PtgArea3d** (section 2.5.97.19), or **PtgAreaErr3d** (section 2.5.97.21) structure MUST NOT be the only **Ptg** structure in **rgce**.
- The root node of the parse tree of this field MUST be a VALUE_TYPE state, as described in section 2.5.97.88.

If the **BrtDVal14** record that contains the **FRTHeader** structure whose **FRTHeader.rgFormulas.array** contains this **FRTDVParsedFormula14** structure has a **BrtDVal14.valType** equal to 3, **BrtDVal14**.**fDVMinFmla** is 1 and this **FRTDVParsedFormula14** structure is the first formula contained in the **FRTHeader.rgFormulas** array, the following MUST be true:

- If **rgce** contains a **PtgArea3d**, **PtgAreaErr3d**, **PtgRef3d** (section 2.5.97.69), or **PtgRefErr3d** (section 2.5.97.71) structure, then **PtgArea3d**, **PtgAreaErr3d**, **PtgRef3d**, or **PtgRefErr3d** MUST be the only **Ptg** structure in **rgce**.
- The root node of the parse tree of this field MUST NOT be a VALUE_TYPE state, as described in section 2.5.97.88.

If the **BrtDVal14** record that contains the **FRTHeader** structure whose **FRTHeader.rgFormulas.array** contains this **FRTDVParsedFormula14** structure has a **BrtDVal14.valType** not equal to 3, **BrtDVal14**.**fDVMaxFmla** is 1 and this **FRTDVParsedFormula14** structure is the last formula contained in the **FRTHeader.rgFormulas** array, the following MUST be true:

- **PtgArea**, **PtgAreaErr**, **PtgAreaN**, **PtgArea3d**, or **PtgAreaErr3d** MUST NOT be the only **Ptg** structure in **rgce**.
- The root node of the parse tree of this field MUST be a VALUE_TYPE state, as described in section 2.5.97.88.

2.5.58 FRTFormula

The **FRTFormula** structure specifies a formula (section 2.2.2) that a future record (section 2.1.6) uses.

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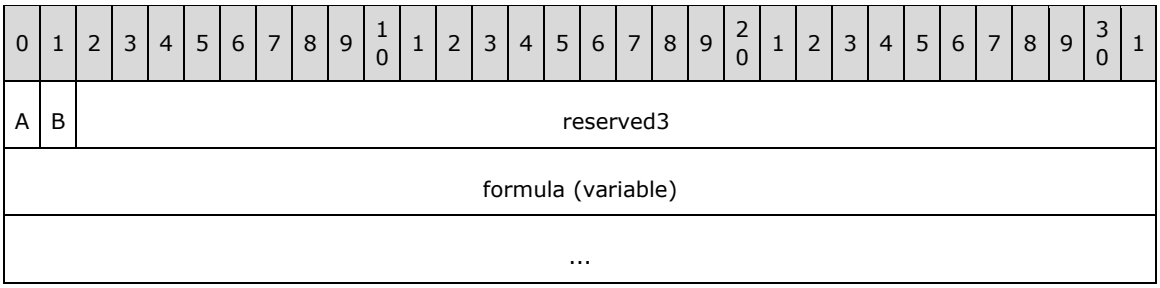
The following packet diagram specifies this structure.



A - reserved1 (1 bit): This value MUST be 0 and MUST be ignored.

B - reserved2 (1 bit): This value MUST be 1.

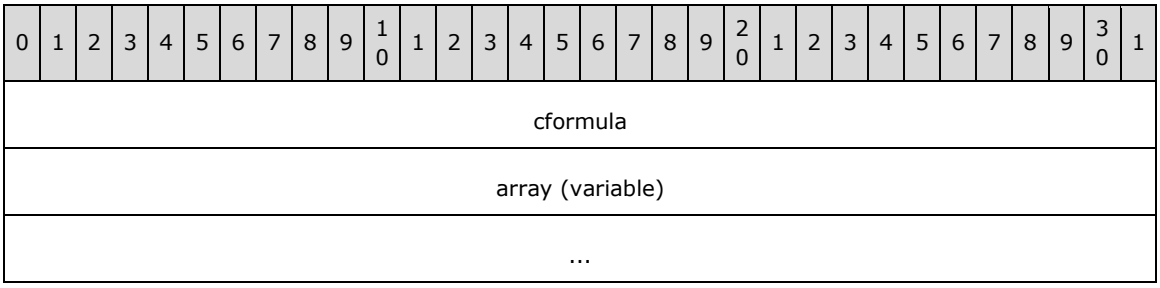
reserved3 (30 bits): This value MUST be 0 and MUST be ignored.

formula (variable): An **FRTParsedFormula** (section 2.5.97.9) structure that specifies the formula.

2.5.59 FRTFormulas

The **FRTFormulas** structure specifies an array of formulas (section 2.2.2) that a future record (section 2.1.6) uses.

The following packet diagram specifies this structure.



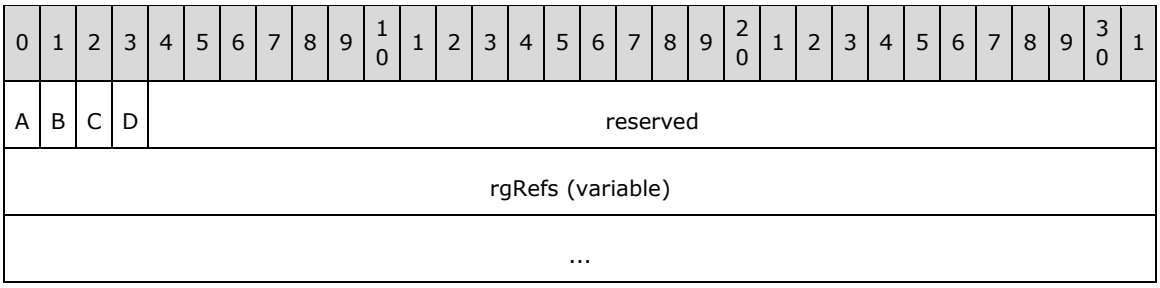
cformula (4 bytes): An unsigned integer that specifies the number of elements in the **array** field.

array (variable): An array of the **FRTFormula** (section 2.5.58) structure that specifies the array of formulas.

2.5.60 FRTHeader

The **FRTHeader** structure specifies attributes of a future record (section 2.1.6).

The following packet diagram specifies this structure.



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rgSqrefs (variable)
...
rgFormulas (variable)
...
relID (variable)
...

A - fRef (1 bit): A bit that specifies whether the **rgRefs** field exists. The value of this field MUST be 0 when the record is not in a **Worksheet** part (section 2.1.7.62) or a part (section 2.1.2) that is the **target** of an implicit or explicit relationship (section 2.1.3) from a Worksheet part.

B - fSqref (1 bit): A bit that specifies whether the **rgSqrefs** field exists. The value of this field MUST be 0 when the record is not in a Worksheet part or a part that is the target of an implicit or explicit relationship from a Worksheet part.

C - fFormula (1 bit): A bit that specifies whether the **rgFormulas** field exists. The value of this field MUST be 0 when the record is not in a Worksheet part or a part that is the target of an implicit or explicit relationship from a Worksheet part.

D - fRelID (1 bit): A bit that specifies whether the **relID** field exists.

reserved (28 bits): This value MUST be 0 and MUST be ignored.

rgRefs (variable): An **FRTRefs** (section 2.5.63) structure that specifies the array of rectangular **range** references that the future record uses. It MUST exist only if **fRef** equals 1. An application that does not support the containing record's content can load these references, adjust them during run-time operations, and write the updated references back into the containing record during save.

rgSqrefs (variable): An **FRTSqrefs** (section 2.5.65) structure that specifies the array of range references that the future record uses. It MUST exist only if **fSqref** equals 1. An application that does not support the containing record's content can load these references, adjust them during run-time operations, and write the updated references back into the containing record during save.

rgFormulas (variable): An **FRTFormulas** (section 2.5.59) structure that specifies the array of formulas (section 2.2.2) that the future record uses. MUST exist only if **fFormula** equals 1. An application that does not support the containing record's content can load these formulas, adjust them during run-time operations, and write the updated formulas back into the containing record during save.

relID (variable): An **FRTRelID** (section 2.5.64) structure that specifies a relationship that specifies a part that the future record uses. It MUST exist only if **fRelID** equals 1. An application that does not support the containing record's content can load this relationship and preserve it and the entire part during save.

2.5.61 FRTProductVersion

The **FRTProductVersion** structure specifies the application version that created the future record (section 2.1.6) or the sequence of future records.

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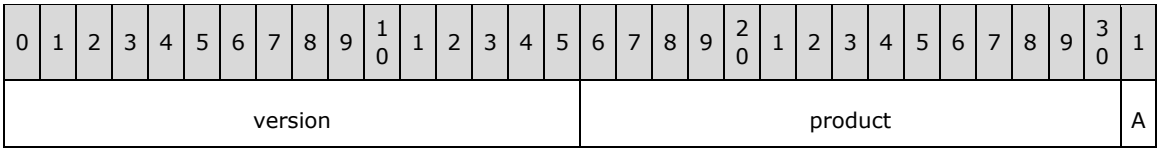
The following packet diagram specifies this structure.



version (2 bytes): An unsigned integer that specifies the version of the application.<63>

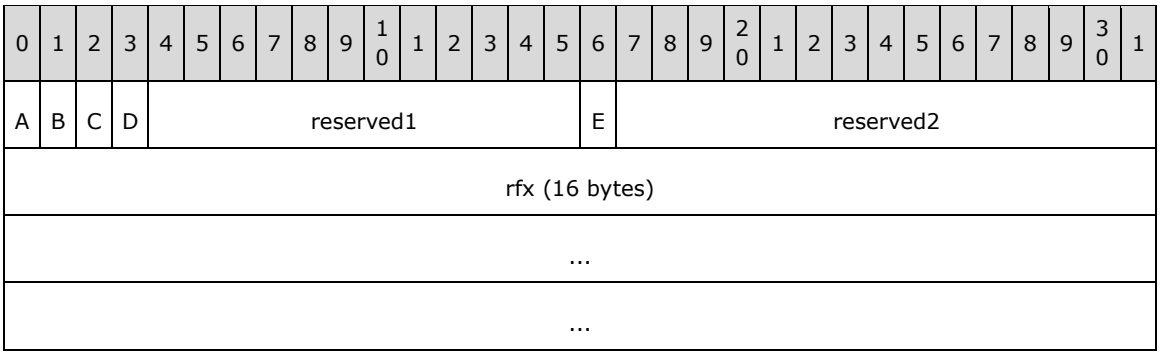
product (15 bits): An unsigned integer that specifies the application.<64>

A - reserved (1 bit): This value MUST be 0 and MUST be ignored.

2.5.62 FRTRef

The **FRTRef** structure specifies a rectangular **range** referenced by a future record (section 2.1.6).

The following packet diagram specifies this structure.



A - fAdjDelete (1 bit): Specifies that the range reference specified by the **rfx** field was deleted by an application that loaded this record as a future record that the application does not support.

B - fDoAdjust (1 bit): MUST be 1. Specifies that the range references specified by **rfx** are modified as cells, rows, and **columns (1)** and are inserted and deleted by an application that loaded this record as a future record that the application does not support.

C - fAdjChange (1 bit): Specifies that the range reference specified by **rfx** was modified because cells, **rows**, and columns (1) were inserted and deleted by an application that loaded this record as a future record that the application does not support.

D - fEdit (1 bit): Specifies that at least one cell in the range specified by **rfx** was edited by an application that loaded this record as a future record that the application does not support.

reserved1 (12 bits): This value MUST be 0 and MUST be ignored.

E - unused (1 bit): This value is undefined and MUST be ignored.

reserved2 (15 bits): This value MUST be 0 and MUST be ignored.

rfx (16 bytes): An **UncheckedRfX** (section 2.5.153) structure that specifies the rectangular range.

2.5.63 FRTRefs

The **FRTRefs** structure specifies an array of rectangular **ranges** that a future record refers to.

The following packet diagram specifies this structure.

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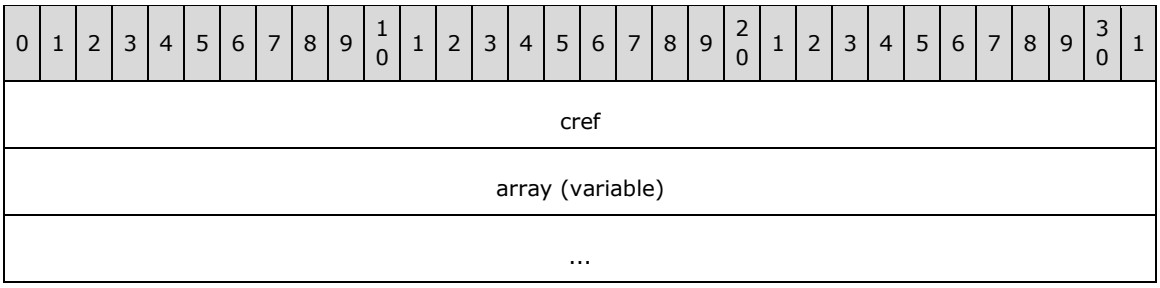


cref (4 bytes): An unsigned integer that specifies the number of elements in the **array** field.

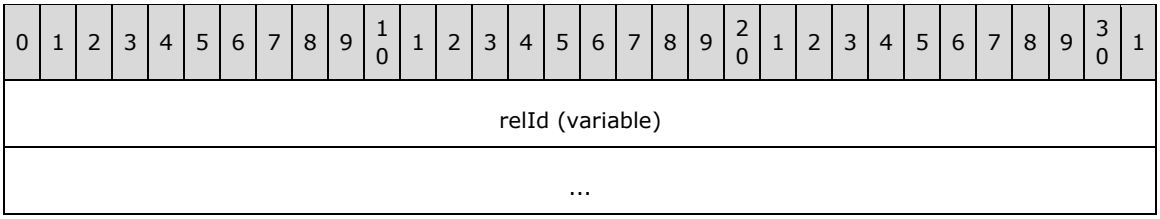
array (variable): An array of the **FRTRef** (section 2.5.62) structure that specifies the array of rectangular ranges.

2.5.64 FRTRelID

The **FRTRelID** structure specifies a string that specifies a relationship (section 2.1.3) identifier, as specified in [ISO/IEC29500-2:2012] section 9.3. The length of the string MUST be greater than 0 and MUST NOT exceed 255 characters. The string MUST NOT contain a zero character 0x0000.

If the application does not support the future record (section 2.1.6) that contains this structure, the application can cache the relationship from the current part and the part itself. On saving of the future record, the application can write out the relationship and the cached part.

The following packet diagram specifies this structure.

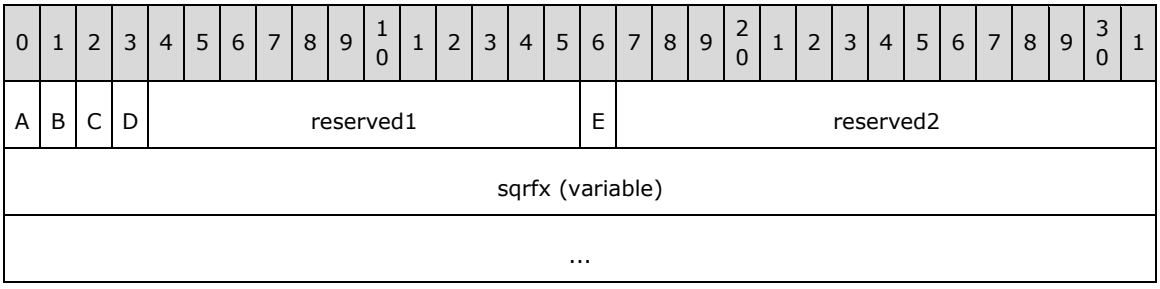


relId (variable): A **LPWideString** (section 2.5.91) value that specifies the string.

2.5.65 FRTSqref

The **FRTSqref** structure specifies a **range** that a future record (section 2.1.6) refers to.

The following packet diagram specifies this structure.



A - fAdjDelete (1 bit): Specifies that the ranges specified by the **sqrfx** field were deleted by an application that loaded this record as a future record that the application does not support.

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B - fDoAdjust (1 bit): MUST be 1. Specifies that the range references specified by **sqrfx** are modified as cells, **rows**, and **columns (1)** and are inserted or deleted by an application that loaded this record as a future record that the application does not support.

C - fAdjChange (1 bit): Specifies that the range references specified by **sqrfx** were modified because cells, rows, and columns (1) were inserted or deleted by an application that loaded this record as a future record that the application does not support.

D - fEdit (1 bit): Specifies that at least one cell in the ranges specified by **sqrfx** was edited by an application that loaded this record as a future record that the application does not support.

reserved1 (12 bits): This value MUST be 0 and MUST be ignored.

E - unused (1 bit): Undefined and MUST be ignored.

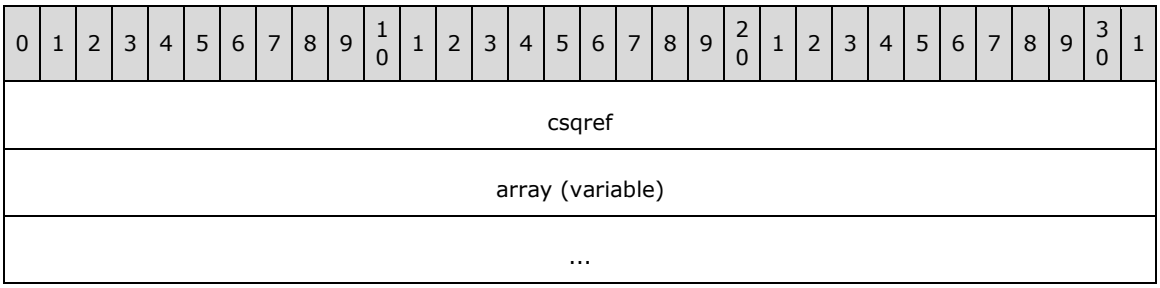
reserved2 (15 bits): This value MUST be 0 and MUST be ignored.

sqrfx (variable): An **UncheckedSqRfX** (section 2.5.155) structure that specifies the range.

2.5.66 FRTSqrefs

The **FRTSqrefs** structure specifies an array of **ranges** that a future record (section 2.1.6) refers to.

The following packet diagram specifies this structure.



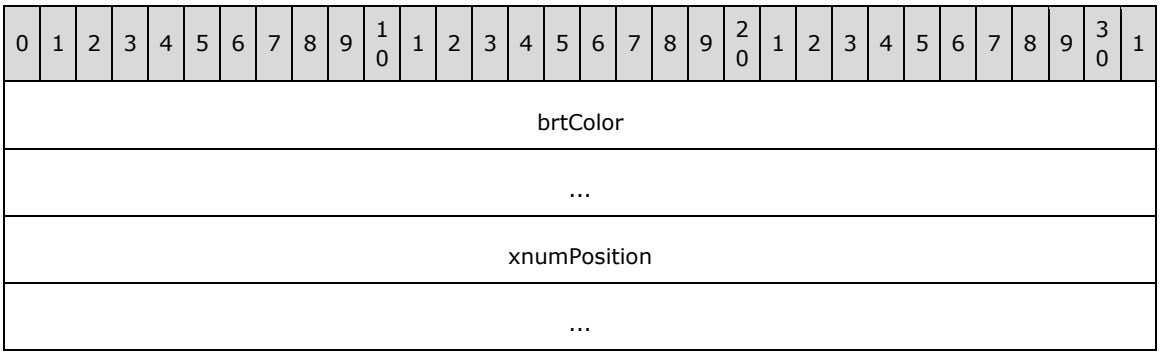
csqref (4 bytes): An unsigned integer that specifies the number of elements in the **array** field.

array (variable): An array of the **FRTSqref** (section 2.5.65) structure that specifies the array of ranges.

2.5.67 GradientStop

The **GradientStop** structure specifies a **gradient stop** for the **BrtFill** (section 2.4.668) record.

The following packet diagram specifies this structure.



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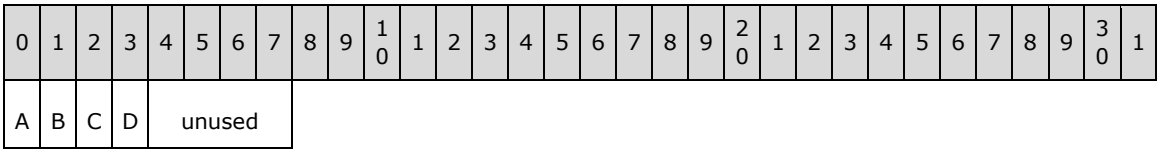
brtColor (8 bytes): A **BrtColor** (section 2.4.332) structure that specifies the color used for a gradient stop.

xnumPosition (8 bytes): An **Xnum** (section 2.5.171) value that specifies the gradient stop as a percentage in decimal notation. The position is specified in [ISO/IEC29500-1:2016] section 18.8.38 **stop** (Gradient stop). The value of this field MUST be greater than or equal to 0 and less than or equal to 1.

2.5.68 GrbitBeginSlicer

The **GrbitBeginSlicer** structure specifies properties of a slicer view (section 2.2.14.2).

The following packet diagram specifies this structure.



A - fCaptionVisible (1 bit): A bit that specifies whether the caption of the slicer view is displayed.

B - fHasCaption (1 bit): A bit that specifies whether the **stCaption** field of the slicer view is used. The value of this field MUST be 1 if **fCaptionVisible** is 1.

C - fHasStyle (1 bit): A bit that specifies whether the **stStyle** field of the slicer view is used.

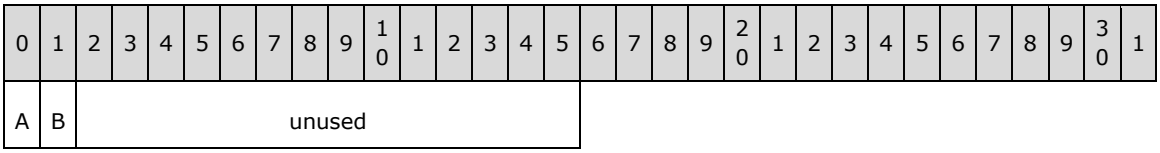
D - fLockedPosition (1 bit): A bit that specifies whether the slicer view is **locked**.

unused (4 bits): Undefined and MUST be ignored.

2.5.69 GrbitFmla

The **GrbitFmla** structure specifies additional formula (section 2.2.2) data.

The following packet diagram specifies this structure.



A - reserved (1 bit): This value MUST be 0 and MUST be ignored.

B - fAlwaysCalc (1 bit): A bit that specifies whether the formula is reevaluated when the document is loaded.

unused (14 bits): This value is undefined and MUST be ignored.

2.5.70 GrbitSXTupleSetHeaderItem

The **GrbitSXTupleSetHeaderItem** structure is a bit field used in the **BrtSXTupleSetHeaderItem** (section 2.4.806) record type.

The following packet diagram specifies this structure.

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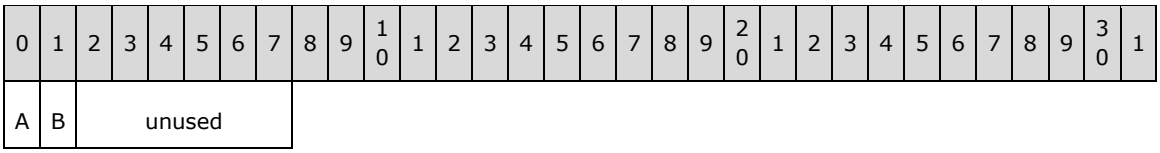


A - fUnique (1 bit): A bit that specifies whether the **irstUnique** field exists in the containing **BrtSXTupleSetHeaderItem** record.

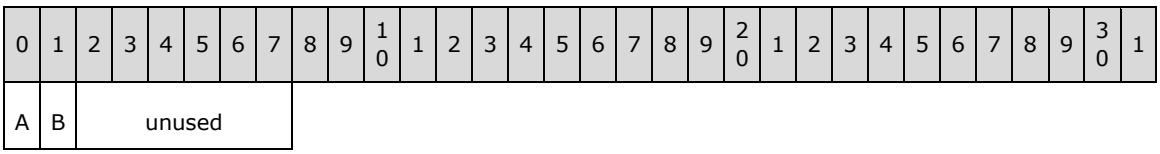
B - fHier (1 bit): A bit that specifies whether the **irstHier** field exists in the containing **BrtSXTupleSetHeaderItem** record.

unused (6 bits): Undefined and MUST be ignored.

2.5.71 GrbitSXTupleSetRowItem

The **GrbitSXTupleSetRowItem** structure is a bit field used in the **BrtSXTupleSetRowItem** (section 2.4.807) record type.

The following packet diagram specifies this structure.



A - fUnique (1 bit): A bit that specifies whether the **irstUnique** field exists in the containing **BrtSXTupleSetRowItem** record.

B - fDisplay (1 bit): A bit that specifies whether the **irstDisplay** field exists in the containing **BrtSXTupleSetRowItem** record.

unused (6 bits): This value is undefined and MUST be ignored.

2.5.72 HeaderFooterString

The **HeaderFooterString** structure is an **XLNullableWideString** (section 2.5.166) structure that specifies a header or footer string. The length of the string MUST be less than or equal to 255. Characters within the string MUST be interpreted through the following **ABNF** grammar for header and footer strings.

The following grammar specifies **Unicode** characters, starting with the space character (%x0020).

```
headerfooter = *(left / pagenum / pagetotal / fontsize / strikethrough / superscript / subscript
        / center / date / time / filepath / picture / underline / doubleunderline / right /
        bookpath / sheetname / fontname / fonttype / font / bold / italic / ampersand /
        emptytoken / UNICHAR)

UNICHAR = %x0020-FFFF
```

The following grammar specifies a digit between 0 and 9.

```
DIGIT = %x0030-0039
```

The following grammar specifies a character between A and F or between a and f.

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```
HEXALPHA = %x0041-0046 / %x0061-0066
```

The following grammar specifies a double quotation mark.

```
DQUOTE = %x0022
```

The following grammar specifies the beginning of the left section. There are three header and footer sections: left, center, and right. When two or more occurrences of this section marker exist, the contents from all markers are concatenated, in the order of appearance, and placed into the left section.

```
left = "&L"
```

The following grammar specifies the current page number.

```
pagenum = "&P"
```

The following grammar specifies the total number of pages.

```
pagetotal = "&N" 0*1(("-" / "+") *DIGIT)
```

The following grammar specifies the text **font** size, where font size is measured in points.

```
fontsize = "&" 1*3DIGIT
```

The following grammar specifies whether the strikethrough text style is on or off. The first occurrence of this grammar MUST turn the strikethrough text style on, and the second occurrence MUST turn it off.

```
strikethrough = "&S"
```

The following grammar specifies whether the superscript text style is on or off. The first occurrence of this grammar MUST turn the superscript text style on, and the second occurrence MUST turn it off. The superscript and subscript grammar MUST NOT be on at same time. If both occur in the string, the grammar that occurs first is applied and the second is ignored.

```
superscript = "&X"
```

The following grammar specifies whether the subscript text style is on or off. The first occurrence of this grammar MUST turn the subscript text style on, and the second occurrence MUST turn it off. The superscript and subscript grammar MUST NOT be on at same time. If both occur in the string, the grammar that occurs first is applied and the second is ignored.

```
subscript = "&Y"
```

The following grammar specifies the beginning of the center section. When two or more occurrences of this section marker exist, the contents from all markers are concatenated, in the order of appearance, and placed into the center section.

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```
center = "&C"
```

The following grammar specifies a date.

```
date = "&D"
```

The following grammar specifies a time.

```
time = "&T"
```

The following grammar specifies a picture.

```
picture = "&G"
```

The following grammar specifies whether the single underline text style is on or off. The first occurrence of this grammar MUST turn the underline text style on, and the second occurrence MUST turn it off.

```
underline = "&U"
```

The following grammar specifies whether the double underline text style is on or off. The first occurrence of this grammar MUST turn the double underline text style on, and the second occurrence MUST turn it off.

```
doubleunderline = "&E"
```

The following grammar specifies the beginning of the right section. When two or more occurrences of this section marker exist, the contents from all markers are concatenated, in the order of appearance, and placed into the right section.

```
right = "&R"
```

The following grammar specifies a workbook file path.

```
bookpath = "&Z"
```

The following grammar specifies a workbook file name.

```
bookname = "&F"
```

The following grammar specifies a **sheet** name.

```
sheetname = "&A"
```

The following grammar specifies the text font name. When the font name is a hyphen, no font is specified. This can be a localized string.

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```
fontname = (1*UNICHAR / "-")
```

The following grammar specifies the text font type. This can be a localized string.

```
fonttype = ("italic" / "bold" / "regular" / "italic bold" / "bold italic")
```

The following grammar specifies the text font.

```
font = "&" DQUOTE fontname , fonttype DQUOTE
```

The following grammar specifies whether the bold text style is on or off. The first occurrence of this code MUST turn the bold text style on, and the second occurrence MUST turn it off.

```
bold = "&B"
```

The following grammar specifies whether the italic text style is on or off. The first occurrence of this code MUST turn the italic text style on, and the second occurrence MUST turn it off.

```
italic = "&I"
```

The following grammar specifies an ampersand character.

```
ampersand = "&&"
```

The following grammar specifies an unidentified token. If only "&" appears, or if there is a UNICHAR character specified after "&" and it is not one of the UNICHAR characters listed in the preceding rules, the token is interpreted as empty and nothing is rendered in the header or footer text.

```
emptytoken = "&" *1UNICHAR
```

2.5.73 HorizAlign

The **HorizAlign** enumeration specifies the horizontal alignment.

The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
ALCNIL	0xFF	Alignment not specified
ALCGEN	0x00	**General alignment**
ALCLEFT	0x01	Left alignment
ALCCTR	0x02	Center alignment
ALCRIGHT	0x03	Right alignment
ALCFILL	0x04	**Fill alignment**
ALCJUST	0x05	Justify alignment

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Name	Value	Meaning
ALCCONTCTR	0x06	**Center-across-selection alignment**
ALCDIST	0x07	Distributed alignment

2.5.74 Icon

The **Icon** structure is a 32-bit signed integer that specifies the **icon** in an **icon set**. The value of this structure MUST be a value from the following table.

Value	Meaning
-1	No icon
0	First icon in the icon set
1	Second icon in the icon set
2	Third icon in the icon set
3	Fourth icon in the icon set
4	Fifth icon in the icon set

2.5.75 Icv

The **Icv** structure specifies a color. For values less than 64 and if a **BrtBeginIndexedColors** (section 2.4.92) record exists as defined by the **Styles** (section 2.1.7.50) part **ABNF**, this structure specifies a color from a custom color palette as a zero-based index of a **BrtIndexedColor** (section 2.4.684) record in the collection of all records directly following **BrtBeginIndexedColors**. The referenced **BrtIndexedColor** record specifies the color.

If a **BrtBeginIndexedColors** record does not exist or for values greater than or equal to 64, this structure specifies a color from the default color palette and MUST be a value from the following table, where the default value is in **red-green-blue-alpha (RGBA)**.

Value	Name	Default value
0x00	**icvBlack**	0x000000FF
0x01	**icvWhite**	0xFFFFFFFF
0x02	**icvRed**	0xFF0000FF
0x03	**icvGreen**	0x00FF00FF
0x04	**icvBlue**	0x0000FFFF
0x05	**icvYellow**	0xFFFF00FF
0x06	**icvMagenta**	0xFF00FFFF
0x07	**icvCyan**	0x00FFFFFF
0x08	**icvPlt1**	0x000000FF
0x09	**icvPlt2**	0xFFFFFFFF

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Value	Name	Default value
0x0A	**icvPlt3**	0xFF0000FF
0x0B	**icvPlt4**	0x00FF00FF
0x0C	**icvPlt5**	0x0000FFFF
0x0D	**icvPlt6**	0xFFFF00FF
0x0E	**icvPlt7**	0xFF00FFFF
0x0F	**icvPlt8**	0x00FFFFFF
0x10	**icvPlt9**	0x800000FF
0x11	**icvPlt10**	0x008000FF
0x12	**icvPlt11**	0x000080FF
0x13	**icvPlt12**	0x808000FF
0x14	**icvPlt13**	0x800080FF
0x15	**icvPlt14**	0x008080FF
0x16	**icvPlt15**	0xC0C0C0FF
0x17	**icvPlt16**	0x808080FF
0x18	**icvPlt17**	0x9999FFFF
0x19	**icvPlt18**	0x993366FF
0x1A	**icvPlt19**	0xFFFFCCFF
0x1B	**icvPlt20**	0xCCFFFFFF
0x1C	**icvPlt21**	0x660066FF
0x1D	**icvPlt22**	0xFF8080FF
0x1E	**icvPlt23**	0x0066CCFF
0x1F	**icvPlt24**	0xCCCCFFFF
0x20	**icvPlt25**	0x000080FF
0x21	**icvPlt26**	0xFF00FFFF
0x22	**icvPlt27**	0xFFFF00FF
0x23	**icvPlt28**	0x00FFFFFF
0x24	**icvPlt29**	0x800080FF
0x25	**icvPlt30**	0x800000FF
0x26	**icvPlt31**	0x008080FF
0x27	**icvPlt32**	0x0000FFFF
0x28	**icvPlt33**	0x00CCFFFF
0x29	**icvPlt34**	0xCCFFFFFF

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Value	Name	Default value
0x2A	**icvPlt35**	0xCCFFCCFF
0x2B	**icvPlt36**	0xFFFF99FF
0x2C	**icvPlt37**	0x99CCFFFF
0x2D	**icvPlt38**	0xFF99CCFF
0x2E	**icvPlt39**	0xCC99FFFF
0x2F	**icvPlt40**	0xFFCC99FF
0x30	**icvPlt41**	0x3366FFFF
0x31	**icvPlt42**	0x33CCCCFF
0x32	**icvPlt43**	0x99CC00FF
0x33	**icvPlt44**	0xFFCC00FF
0x34	**icvPlt45**	0xFF9900FF
0x35	**icvPlt46**	0xFF6600FF
0x36	**icvPlt47**	0x666699FF
0x37	**icvPlt48**	0x969696FF
0x38	**icvPlt49**	0x003366FF
0x39	**icvPlt50**	0x339966FF
0x3A	**icvPlt51**	0x003300FF
0x3B	**icvPlt52**	0x333300FF
0x3C	**icvPlt53**	0x993300FF
0x3D	**icvPlt54**	0x993366FF
0x3E	**icvPlt55**	0x333399FF
0x3F	**icvPlt56**	0x333333FF
0x40	**icvForeground**	System color for text in windows.
0x41	**icvBackground**	System color for window background.
0x42	**icvFrame**	System color for window frame.
0x43	**icv3D**	System-defined face color for three-dimensional display elements and for dialog box backgrounds.
0x44	**icv3DText**	System color for text on push buttons.
0x45	**icv3DHilite**	System highlight color for three-dimensional display elements (for edges facing the light source).
0x46	**icv3DShadow**	System shadow color for three-dimensional display elements (for edges facing away from the light source).
0x47	**icvHilite**	System color for items selected in a control.

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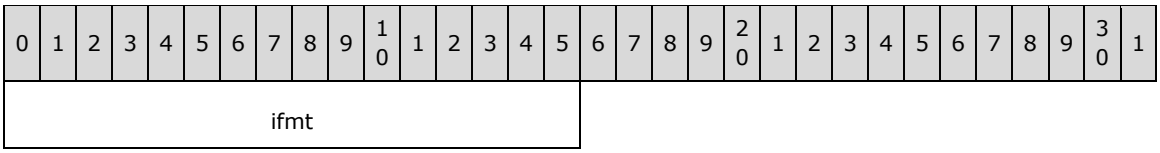
Value	Name	Default value
0x48	**icvCtlText**	System color for text in windows.
0x49	**icvCtlScrl**	System color for scroll bar gray area.
0x4A	**icvCtlInv**	Bitwise inverse of the RGB value of **icvCtlScrl.**
0x4B	**icvCtlBody**	System color for window background.
0x4C	**icvCtlFrame**	System color for window frame.
0x4D	**icvCrtFore**	System color for text in windows.
0x4E	**icvCrtBack**	System color for window background.
0x4F	**icvCrtNeutral**	0x000000FF
0x50	**icvInfoBk**	System **background color** for tooltip controls.
0x51	**icvInfoText**	System text color for tooltip controls.

2.5.76 Ifmt

The **Ifmt** structure specifies the identifier of a **number format**.

The following packet diagram specifies this structure.



ifmt (2 bytes): An unsigned integer that specifies the identifier of a number format. The identifier specified through this field MUST be a valid built-in number format identifier or the identifier of a custom number format defined through a **BrtFmt** (section 2.4.675) record in the **Styles** (section 2.1.7.50) part **ABNF**. The built-in number formats are listed in [ISO/IEC29500-1:2016] section 18.8.30.

2.5.77 IHDB

The **IHDB** structure is a 4-byte signed integer that specifies a reference to a cache hierarchy. The value of this structure MUST be a value from the following table.

Value	Meaning
-2	Specifies that the measure (section 2.2.5.2.7.1) cache hierarchy is used.
-1	Specifies that no cache hierarchy is used.
greater than or equal to 0	Specifies a cache hierarchy index, as specified in section 2.2.5.2.7. The referenced **BrtBeginPCDHierarchy** (section 2.4.145) record specifies the cache hierarchy that is used. This value MUST be less than the number of **BrtBeginPCDHierarchy** records in the **BrtBeginPCDHierarchies** collection (section 2.4.144).

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2.5.78 IIFtab

The **IIFtab** enumeration specifies the valid mathematical aggregator functions that **data consolidation** uses.

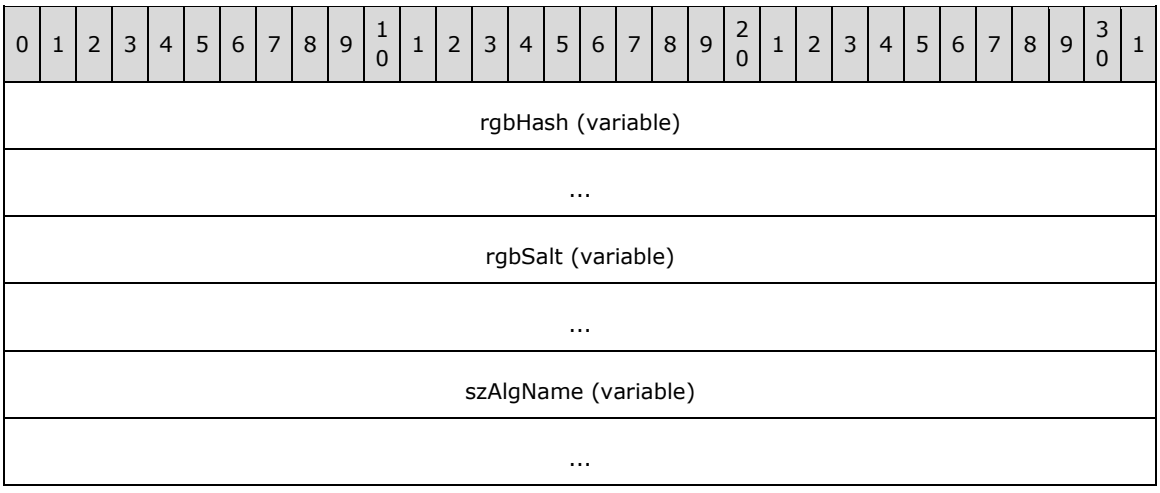
The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
IIFTABAVERAGE	0x00	Consolidate by using the **AVERAGE** function.
IIFTABCOUNT	0x01	Consolidate by using the **COUNT** function.
IIFTABCOUNTA	0x02	Consolidate by using the **COUNTA** function.
IIFTABMAX	0x03	Consolidate by using the **MAX** function.
IIFTABMIN	0x04	Consolidate by using the **MIN** function.
IIFTABPRODUCT	0x05	Consolidate by using the **PRODUCT** function.
IIFTABSTDEV	0x06	Consolidate by using the **STDEV** function.
IIFTABSTDEVP	0x07	Consolidate by using the **STDEVP** function.
IIFTABSUM	0x08	Consolidate by using the **SUM** function.
IIFTABVAR	0x09	Consolidate by using the **VAR** function.
IIFTABVARP	0x0A	Consolidate by using the **VARP** function.

2.5.79 IsoPasswordData

The **IsoPasswordData** structure specifies the variable-sized fields necessary to verify a password hash created through the Strong Password Verifier Algorithm (section 2.2.10).

The following packet diagram specifies this structure.



rgbHash (variable): An **LPByteBuf** (section 2.5.90) that specifies a password hash, calculated as specified by the Strong Password Verifier Algorithm. If the size of this field is nonzero, the **szAlgName** field MUST contain at least one character.

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rgbSalt (variable): An **LPByteBuf** that specifies the **salt** used to calculate **rgbHash**, as specified by the Strong Password Verifier Algorithm. If the size of this field is zero, no salt was used when **rgbHash** was calculated. If the size of this field is nonzero, **rgbHash** and **szAlgName** MUST also be non-empty.

szAlgName (variable): An **XLNullableWideString** (section 2.5.166) that specifies the name of the hash algorithm used to calculate **rgbHash**, as specified by the Strong Password Verifier Algorithm. If the size of this field is nonzero, **rgbHash** MUST also be non-empty.

2.5.80 Istr

The **Istr** structure is a 4-byte signed integer that specifies a zero-based index of a **BrtStr** (section 2.4.782) record in the collection of all records directly following **BrtBeginEsstr** (section 2.4.76).

2.5.81 ISXDI

The **ISXDI** structure is a 4-byte signed integer that specifies a reference to a data item (section 2.2.5.3.7.5.1). The value of this structure MUST be a value from the following table.

Value	Meaning
-1	Specifies that no data item is used.
greater than or equal to 0	Specifies that a data item index, as specified in section 2.2.5.3.7.5.1, is used. The referenced **BrtBeginSXDI** (section 2.4.241) record specifies the data item that is used.

2.5.82 ISXTH

The **ISXTH** structure is a 4-byte signed integer that specifies a reference to a pivot hierarchy (section 2.2.5.3.4). The value of this structure MUST be a value from the following table.

Value	Meaning
-2	Specifies that the data field (section 2.2.5.3.7.5.2) is used.
-1	Specifies that no pivot hierarchy is used.
greater than or equal to 0	Specifies a pivot hierarchy index, as specified in section 2.2.5.3.4). The referenced **BrtBeginSXTH** (section 2.4.261) record specifies the pivot hierarchy that is used.

2.5.83 ISXVD

The **ISXVD** structure is a 4-byte signed integer that specifies a reference to a pivot field (section 2.2.5.3.2) or the data field (section 2.2.5.3.7.5.2). The value of this structure MUST be a value from the following table.

Value	Meaning
-2	**ISXVD** specifies a reference to the data field in a PivotTable view (section 2.2.5.3).
-1	**ISXVD** does not specify a reference to any pivot field or the data field.

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Value	Meaning
greater than or equal to 0	**ISXVD** specifies a pivot field index, as specified by Pivot Fields.

2.5.84 KPIProp

The **KPIProp** enumeration specifies the valid Key Performance Indicator (KPI) properties of MDX KPI metadata (section 2.2.4.8.4).

The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
KPIPROPVALUE	0x00000001	The actual value.
KPIPROPGOAL	0x00000002	A target value.
KPIPROPSTATUS	0x00000003	The state of the KPI at a specific moment.
KPIPROPTREND	0x00000004	A measure of the value over time.
KPIPROPWEIGHT	0x00000005	A relative importance assigned to the **KPI**.
KPIPROPCURRENTTIMEMEMBER	0x00000006	A temporal context for the KPI.

2.5.85 KPISets

The **KPISets** enumeration specifies an **icon set**. The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
KPINIL	0xFFFFFFFF	No icon set
KPI3ARROWS	0x00000000	
KPI3ARROWSGRAY	0x00000001	
KPI3FLAGS	0x00000002	
KPI3TRAFFICLIGHTS1	0x00000003	
KPI3TRAFFICLIGHTS2	0x00000004	
KPI3SIGNS	0x00000005	
KPI3SYMBOLS	0x00000006	
KPI3SYMBOLS2	0x00000007	
KPI4ARROWS	0x00000008	

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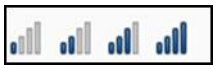
Name	Value	Meaning
KPI4ARROWSGRAY	0x00000009	
KPI4REDTOBLACK	0x0000000A	
KPI4RATING	0x0000000B	
KPI4TRAFFICLIGHTS	0x0000000C	
KPI5ARROWS	0x0000000D	
KPI5ARROWSGRAY	0x0000000E	
KPI5RATING	0x0000000F	
KPI5QUARTERS	0x00000010	

2.5.86 KPISets14

The **KPISets14** enumeration specifies an **icon set**. The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
KPINIL_14	0xFFFFFFFF	No icon set
KPI3ARROWS_14	0x00000000	
KPI3ARROWSGRAY_14	0x00000001	
KPI3FLAGS_14	0x00000002	
KPI3TRAFFICLIGHTS1_14	0x00000003	
KPI3TRAFFICLIGHTS2_14	0x00000004	
KPI3SIGNS_14	0x00000005	
KPI3SYMBOLS_14	0x00000006	
KPI3SYMBOLS2_14	0x00000007	
KPI4ARROWS_14	0x00000008	
KPI4ARROWSGRAY_14	0x00000009	

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Name	Value	Meaning
KPI4REDTOBLACK_14	0x0000000A	
KPI4RATING_14	0x0000000B	
KPI4TRAFFICLIGHTS_14	0x0000000C	
KPI5ARROWS_14	0x0000000D	
KPI5ARROWSGRAY_14	0x0000000E	
KPI5RATING_14	0x0000000F	
KPI5QUARTERS_14	0x00000010	
KPI3STARS_14	0x00000011	
KPI3TRIANGLES_14	0x00000012	
KPI5BOXES_14	0x00000013	

2.5.87 ListTotalRowFunction

The **ListTotalRowFunction** enumeration specifies the index of a list total aggregate (ILTA) operation to perform on the **data region** of a **column (1)** in a **table**.

The values ILTA_AVERAGE, ILTA_COUNT, ILTA_COUNTNUMS, ILTA_MAX, ILTA_MIN, ILTA_STDDEV, ILTA_SUM, and ILTA_VAR specify the function number and reference parameters of the subtotal formula (section 2.2.2). The function number is a 2-byte unsigned integer that specifies the aggregation operation to perform. The reference is a **PtgList** (section 2.5.97.52) or **PtgArea** (section 2.5.97.18) structure that designates the data region of the column (1) in a table.

The Parsed Expression (section 2.5.97) **ABNF** for the subtotal formula is as follows.

```
subtotal-formula = PtgInt function-number reference PtgFuncVar

reference = PtgList / PtgArea
```

The following non-reserved fields of **PtgList** MUST be equal to 0 with the following exceptions:

- The **ixti** field MUST specify the **Xti** (section 2.5.172) structure that identifies the **sheet** that contains the table.
- The **columns** field MUST equal 0x01.
- The **listIndex** field MUST equal the associated **idList** field of the **BrtBeginList** (section 2.4.99) record.

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- The **colFirst** field MUST equal the zero-based index of the table column (1) within the **BrtBeginList** record.
- The **colLast** field MUST be equal to the **colFirst** field.

The following non-reserved fields of **PtgArea** MUST have the following values:

- The **rowFirst** field MUST equal the first sheet **row** of the data region of the table column (1).
- The **rowLast** field MUST equal the last sheet row of the data region of the table column (1).
- The **columnFirst** field MUST equal the sheet column (1) of the data region of the table column (1).
- The **columnLast** field MUST equal **columnFirst**.
- The **type**, **columnFirst**, **rowFirst**, **columnLast**, and **rowLast** fields MUST equal 0x01.

The following non-reserved fields of the **PtgFuncVar** (section 2.5.97.46) structure MUST equal 0, with the following exceptions:

- The **type** field MUST equal 0x02.
- The **cparams** field MUST equal 0x02.
- The **tab** field MUST equal 0x0158.
- The **fCeFunc** field MUST equal 0x00.

The following table specifies the values of this enumeration and the value and meaning of the function number.

Name	Value	Meaning
ILTA_NONE	0x00000000	Specifies that no operation is performed.
ILTA_AVERAGE	0x00000001	Specifies to calculate the arithmetic mean. The function number of the subtotal formula is 101.
ILTA_COUNT	0x00000002	Specifies to count the non-empty **cells**. The function number of the subtotal formula is 103.
ILTA_COUNTNUMS	0x00000003	Specifies to count the cells that contain numbers. The function number of the subtotal formula is 102.
ILTA_MAX	0x00000004	Specifies to calculate the largest value. The function number of the subtotal formula is 104.
ILTA_MIN	0x00000005	Specifies to calculate the smallest value. The function number of the subtotal formula is 105.
ILTA_SUM	0x00000006	Specifies to calculate the arithmetic sum. The function number of the subtotal formula is 109.
ILTA_STDDEV	0x00000007	Specifies to calculate the estimated standard deviation. The function number of the subtotal formula is 107.
ILTA_VAR	0x00000008	Specifies to calculate the estimated variance. The function number of the subtotal formula is 110.
ILTA_CUSTOM	0x00000009	Specifies to use the formula specified by the **BrtListTrFmla** (section 2.4.695) child record of the **BrtBeginListCol** (section 2.4.100) record.

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2.5.88 ListType

The **ListType** enumeration specifies the type of a **table**.

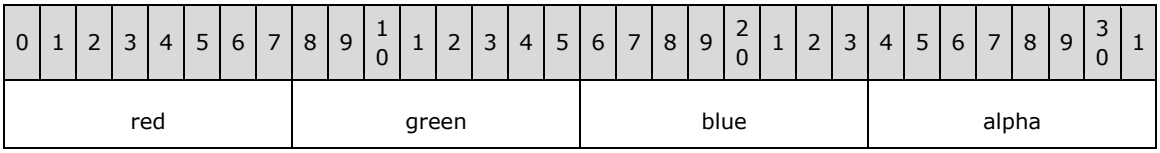
The value of this enumeration MUST be a value from the following table.

Name	Value	Meaning
LTRANGE	0x00000000	Specifies a standard table.
LTXML	0x00000002	Specifies an **XML** table.
LTEXTDATA	0x00000003	Specifies a **query table**.

2.5.89 LongRGBA

The **LongRGBA** structure specifies a color as a combination of red, green, blue, and alpha values.

The following packet diagram specifies this structure.



red (1 byte): An unsigned integer that specifies the relative intensity of red.

green (1 byte): An unsigned integer that specifies the relative intensity of green.

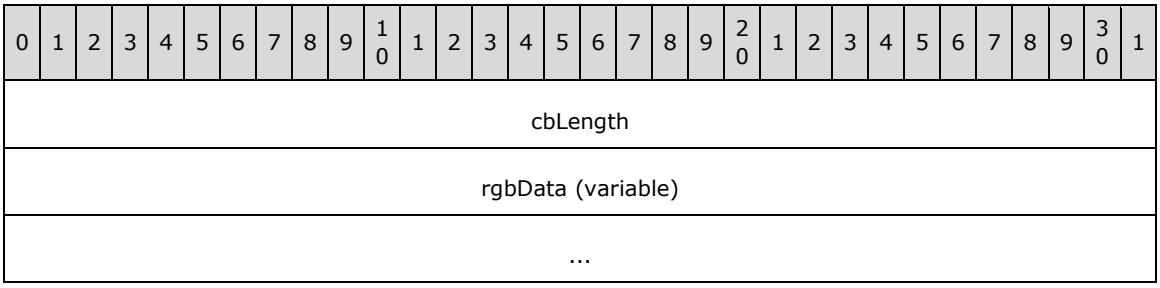
blue (1 byte): An unsigned integer that specifies the relative intensity of blue.

alpha (1 byte): An unsigned integer that specifies the alpha value.

2.5.90 LPByteBuf

The **LPByteBuf** type specifies an array of bytes that is prefixed by a length.

The following packet diagram specifies this type.



cbLength (4 bytes): An unsigned integer that specifies the number of bytes.

rgbData (variable): Binary data that specifies the contents of the array. There MUST be **cbLength** bytes of data.

2.5.91 LPWideString

The **LPWideString** type specifies a **Unicode** string that is prefixed by a length.

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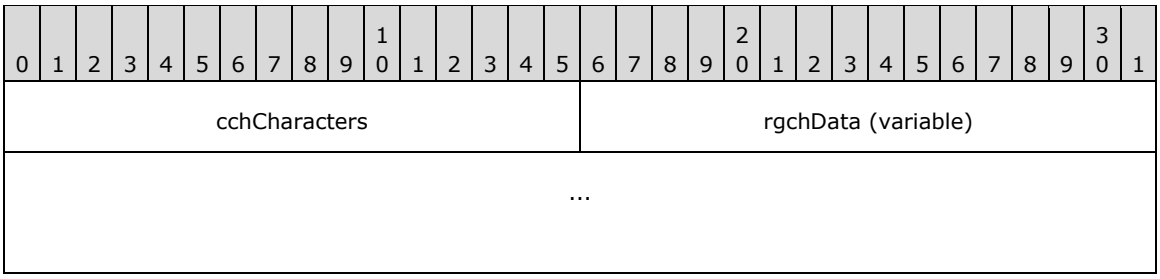
The following packet diagram specifies this type.



cchCharacters (2 bytes): An unsigned integer that specifies the number of characters.

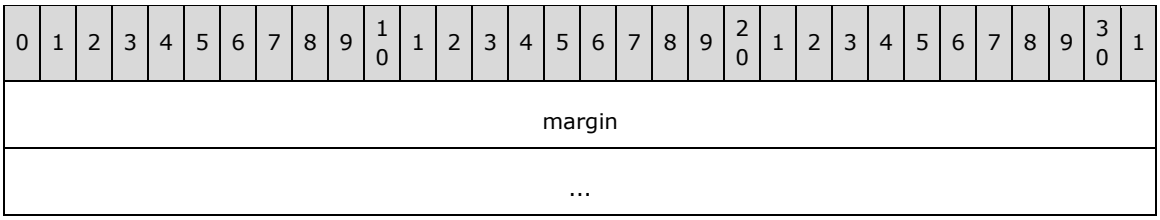
rgchData (variable): An array of Unicode characters that specifies the characters of the string. The size of this array in bytes MUST equal the following formula (section 2.2.2):

cchCharacters * 2

2.5.92 Margin

The **Margin** structure specifies a single page margin.

The following packet diagram specifies this structure.

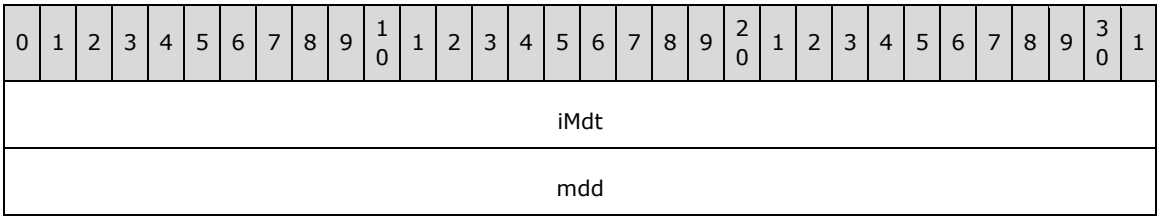


margin (8 bytes): An **Xnum** (section 2.5.171) value that specifies a page margin size in inches. The value of this field MUST be greater than or equal to 0 and less than 49.

2.5.93 Mdir

The **Mdir** structure specifies a reference to a metadata type (section 2.2.4.1) and a corresponding metadata record.

The following packet diagram specifies this structure.



iMdt (4 bytes): A signed integer that specifies a one-based index to a **BrtMdtinfo** (section 2.4.698) record in the collection of all records directly following a **BrtBeginEsmdtinfo** (section 2.4.74) record.

mdd (4 bytes): If the value of the **stName** field of the **BrtMdtinfo** record indexed by **iMdt** is "XLMDX", then **mdd** specifies a zero-based index to a **BrtBeginMdx** (section 2.4.105) record in the collection of **BrtBeginMdx** records directly following the **BrtBeginEsmdx** (section 2.4.75)

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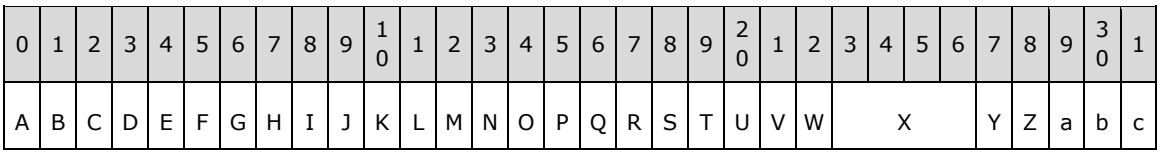
record. The referenced **BrtBeginMdx** record specifies the beginning of an MDX Metadata (section 2.2.4.8) record. Otherwise, **mdd** specifies a zero-based index to a **BrtBeginFmd** (section 2.4.85) record in the collection of **BrtBeginFmd** records directly following the **BrtBeginEsfmd** (section 2.4.72) record whose **stName** field matches the **stName** field of the **BrtMdtinfo** record indexed by **iMdt**. The referenced **BrtBeginFmd** record specifies the beginning of a future metadata (section 2.2.4.9) record.

2.5.94 MdtFlags

The **MdtFlags** structure specifies properties and behaviors of a cell metadata (section 2.2.4.2) or value metadata (section 2.2.4.3) type. In general, the behaviors specify that when operations are performed on a **cell**, the metadata remains associated with the cell or with the value stored in this cell.<65>

The following packet diagram specifies this structure.



A - fGhostRw (1 bit): A bit that specifies whether the metadata is applied to all cells in newly inserted rows.

B - fGhostCol (1 bit): A bit that specifies whether the metadata is applied to all cells in newly inserted **columns (1)**.

C - fEdit (1 bit): A bit that specifies whether the metadata is preserved when the cell is edited.

D - fDelete (1 bit): A bit that specifies whether the metadata is preserved when the **cell value** is deleted. The value of this field MUST be equal to **fClearContents**.

E - fCopy (1 bit): A bit that specifies whether the metadata is copied when the cell is copied. The value of this field MUST be 1 if the value of one of the following is 1: **fPasteAll**, **fPasteFmlas**, **fPasteValues**, **fPasteFmts**, **fPasteComments**, **fPasteDv**, **fPasteBorders**, **fPasteColWidths**, or **fPasteNumFmts**.

F - fPasteAll (1 bit): A bit that specifies whether the metadata is pasted when formulas (section 2.2.2), values, formatting, comments, and **data validation** rules are pasted all at once from the previously copied cell.

G - fPasteFmlas (1 bit): A bit that specifies whether the metadata is pasted when only formulas are pasted from the previously copied cell.

H - fPasteValues (1 bit): A bit that specifies whether the metadata is pasted when only values are pasted from the previously copied cell.

I - fPasteFmts (1 bit): A bit that specifies whether the metadata is pasted when only formatting is pasted from the previously copied cell.

J - fPasteComments (1 bit): A bit that specifies whether the metadata is pasted when only comments are pasted from the previously copied cell.

K - fPasteDv (1 bit): A bit that specifies whether the metadata is pasted when only data validation rules are pasted from the previously copied cell.

L - fPasteBorders (1 bit): A bit that specifies whether the metadata is pasted when only **borders** are pasted from the previously copied cell.

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M - fPasteColWidths (1 bit): A bit that specifies whether the metadata is pasted when only column (1) widths are pasted from the previously copied cell.

N - fPasteNumFmts (1 bit): A bit that specifies whether the metadata is pasted when only number formatting is pasted from the previously copied cell.

O - fMerge (1 bit): A bit that specifies whether the metadata is preserved when cells are merged. If the value of this bit is 1, the metadata is preserved for the cell with the smallest row number and the smallest column (1) number among the cells being merged.

P - fSplitFirst (1 bit): A bit that specifies whether, when a cell is split, the metadata is copied to the cell with the smallest row number and the smallest column (1) number. If **fSplitAll** is set to 1, this field MUST be ignored.

Q - fSplitAll (1 bit): A bit that specifies whether, when a cell is split, the metadata is copied to all the resulting cells.

R - fRwColShift (1 bit): A bit that specifies whether the metadata is preserved when the cell is shifted because of row or column (1) deletion or insertion.

S - fClearAll (1 bit): A bit that specifies whether the metadata is preserved when the contents, formatting, and comments of the cell are cleared.

T - fClearFmts (1 bit): A bit that specifies whether the metadata is preserved when the formatting of the cell is cleared.

U - fClearContents (1 bit): A bit that specifies whether the metadata is preserved when the contents of the cell are cleared. The value of this field MUST be equal to **fDelete**.

V - fClearComments (1 bit): A bit that specifies whether the metadata is preserved when the comments of the cell are cleared.

W - fAssign (1 bit): A bit that specifies whether the metadata is preserved when the cell value is propagated through an assignment operation or by a **function** that returns one of the referenced values.<66>

X - reserved1 (4 bits): This value MUST be 0 and MUST be ignored.

Y - reserved2 (1 bit): This value MUST be 0 and MUST be ignored.<67>

Z - fCanCoerce (1 bit): A bit that specifies whether the metadata is preserved when the cell value is cast to a different type. If the value of this bit is 0, the metadata is not preserved, and the destination cell value is set to the **BErr** (section 2.5.97.2) #VALUE! (0x0F) error.

a - fAdjust (1 bit): A bit that specifies whether the metadata is updated when the cell location is changed.

b - fCellMeta (1 bit): A bit that specifies whether this metadata type (section 2.2.4.1) is cell metadata or value metadata (section 2.2.4.3).

The following table specifies values for this bit.

Value	Meaning
0	Metadata is value metadata.
1	Metadata is cell metadata.

c - reserved3 (1 bit): MUST be 1 and MUST be ignored.

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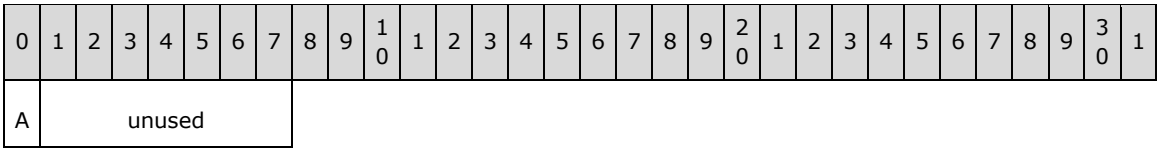
2.5.95 MdxMbrIstrFlags

The **MdxMbrIstrFlags** structure specifies properties of a **BrtMdxMbrIstr** (section 2.4.699) record.

The following packet diagram specifies this structure.



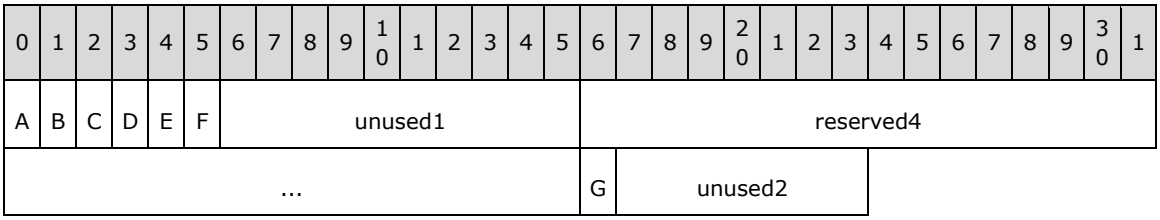
A - fCubeSet (1 bit): A bit that specifies whether the **istr** field of the associated **BrtMdxMbrIstr** record represents a set of **OLAP members**.

unused (7 bits): Undefined and MUST be ignored.

2.5.96 OLEItemProperties

The **OLEItemProperties** structure specifies properties of an OLE Data Item (section 2.2.7.4.3.1).

The following packet diagram specifies this structure.



A - reserved1 (1 bit): This value MUST be 0 and MUST be ignored.

B - fWantAdvise (1 bit): A bit that specifies whether the application requests that the **data source** provides a notification when the data changes.

C - fWantPict (1 bit): A bit that specifies whether this OLE data item uses a picture-based data format.

D - reserved2 (1 bit): This value MUST be 0 and MUST be ignored.

E - reserved3 (1 bit): MUST be 1 and MUST be ignored.

F - fIcon (1 bit): A bit that specifies that this OLE data item is displayed as an **icon**.

unused1 (10 bits): Undefined and MUST be ignored.

reserved4 (4 bytes): This value MUST be 0 and MUST be ignored.

G - reserved5 (1 bit): This value MUST be 1 and MUST be ignored.

unused2 (7 bits): Undefined and MUST be ignored.

2.5.97 Parsed Expressions

2.5.97.1 ArrayParsedFormula

This structure specifies an array formula (section 2.2.2).

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0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cce																															
rgce (variable)																															
...																															
cb																															
rgcb (variable)																															
...																															

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. MUST be greater than 0 and less than 16385.

rgce (variable): An **Rgce** (section 2.5.97.88) structure that specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula. MUST NOT contain **PtgExp** (section 2.5.97.40), **PtgRefN** (section 2.5.97.72), **PtgAreaN** (section 2.5.97.22), or **PtgSxName** (section 2.5.97.76).

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An **RgbExtra** (section 2.5.97.87) structure that specifies ancillary data for the formula.

2.5.97.2 BErr

BErr is a 1-byte unsigned integer that specifies an error. It MUST be a value from the following table.

Value	Meaning
0x00	#NULL!
0x07	#DIV/0!
0x0F	#VALUE!
0x17	#REF!
0x1D	#NAME?
0x24	#NUM!
0x2A	#N/A
0x2B	#GETTING_DATA

2.5.97.3 Boolean

A **Boolean** (section 2.5.97.3) is an unsigned integer, of size greater than 1 bit, that specifies a Boolean value. It MUST be a value from the following table. All other bits in the field MUST be 0.

Value	Meaning
0x0	Boolean value FALSE
0x1	Boolean value TRUE

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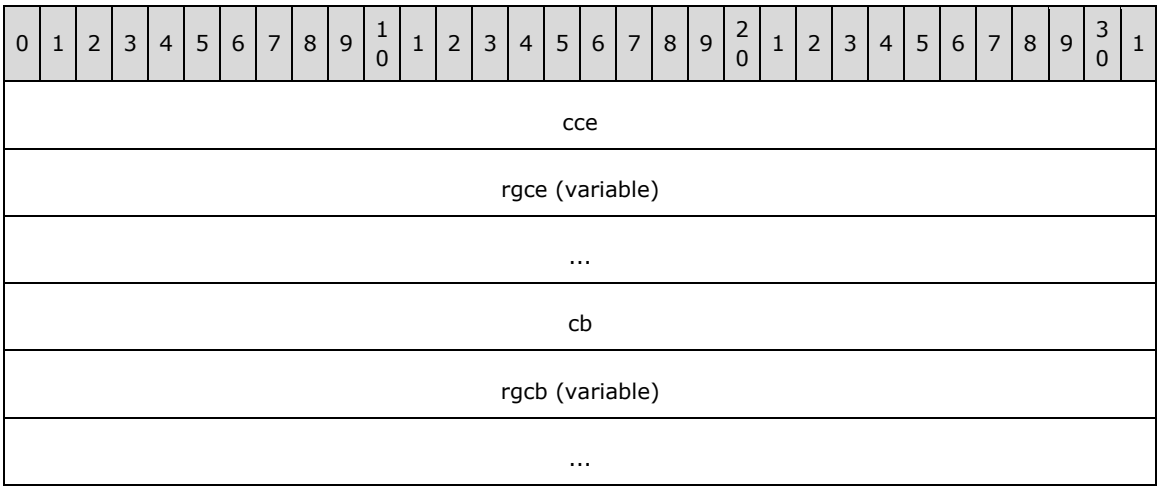
2.5.97.4 CellParsedFormula

CellParsedFormula is a structure that specifies a formula (section 2.2.2) stored in a **cell**.



cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. This value MUST be greater than 0 and less than 16385.

rgce (variable): An **Rgce** (section 2.5.97.88) structure that specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula. MUST NOT contain **PtgRefN** (section 2.5.97.72), **PtgAreaN** (section 2.5.97.22), or **PtgSxName** (section 2.5.97.76).

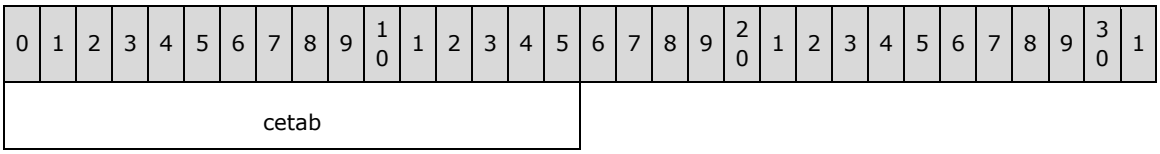
The root node of the parse tree of this field MUST be a VALUE_TYPE, as described in section 2.5.97.88.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An **RgbExtra** (section 2.5.97.87) structure that specifies ancillary data for the formula.

2.5.97.5 Cetab

The **Cetab** structure specifies a function that can be called from a formula (section 2.2.2). The definition of each function specifies the function name and the valid sequence of arguments.



cetab (2 bytes): An unsigned integer that specifies the function to be called. It MUST be a value from the following table.

The elements **ref** and **val** are specified in **Rgce** (section 2.5.97.88).

Value	Meaning	Parameters
0x000	BEEP	beep-params = [val]

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Value	Meaning	Parameters
0		
0x0001	OPEN	open-params = *17(val)
0x0002	OPEN.LINKS	open-links-params = *15(val)
0x0003	CLOSE.ALL	This function takes no parameters.
0x0004	SAVE	This function takes no parameters.
0x0005	SAVE.AS	save-as-params = *7(val)
0x0006	FILE.DELETE	file-delete-params = [val]
0x0007	PAGE.SETUP	page-setup-params = *30(val)
0x0008	PRINT	print-params = *17(val)
0x0009	PRINTER.SETUP	printer-setup-params = [val]
0x000A	QUIT	This function takes no parameters.
0x000B	NEW.WINDOW	This function takes no parameters.
0x000C	ARRANGE.ALL	arrange-All-params = *4(val)
0x000D	WINDOW.SIZE	window-size-params = *3(val)
0x000E	WINDOW.MOVE	window-move-params = *3(val)
0x000F	FULL	full-params = [val]
0x0010	CLOSE	close-params = *2(val)
0x0011	RUN	run-params = [(ref / val), [val]]
0x0016	SET.PRINT.AREA	set-print-area-params = [ref / val]
0x0017	SET.PRINT.TITLES	set-print-titles-params = *2(ref / val)
0x0018	SET.PAGE.BREAK	This function takes no parameters.
0x001	REMOVE.PAGE.BREAK	remove-page-break-params = *2(val)

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Value	Meaning	Parameters
9		
0x001A	FONT	font-params = *2(val)
0x001B	DISPLAY	display-params = *9(val)
0x001C	PROTECT.DOCUMENT	protect-document-params = *7(val)
0x001D	PRECISION	precision-params = [val]
0x001E	A1.R1C1	a1-r1c1-params = [val]
0x001F	CALCULATE.NOW	This function takes no parameters.
0x0020	CALCULATION	calculation-params = *11(val)
0x0022	DATA.FIND	data-find-params = [val]
0x0023	EXTRACT	extract-params = [val]
0x0024	DATA.DELETE	This function takes no parameters.
0x0025	SET.DATABASE	This function takes no parameters.
0x0026	SET.CRITERIA	This function takes no parameters.
0x0027	SORT	sort-params = [val, [(ref / val), [(ref / val), [(ref / val), [(ref / val), [(ref / val), [(ref / val), *10(val)]]]]]]]
0x0028	DATA.SERIES	data-series-params = *6(val)
0x0029	TABLE	table-params = *2(ref / val)
0x002A	FORMAT.NUMBER	format-number-params = [val]
0x002B	ALIGNMENT	alignment-params = *10(val)
0x002C	STYLE	style-params = *2(val)
0x002D	BORDER	border-params = *27(val)
0x002E	CELL.PROTECTION	cell-protection-params = *2(val)
0x002	COLUMN.WIDTH	column-width-params = [val, *4(ref / val)]

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Value	Meaning	Parameters
F		
0x0030	UNDO	This function takes no parameters.
0x0031	CUT	cut-params = *2(ref / val)
0x0032	COPY	copy-params = *2(ref / val)
0x0033	PASTE	paste-params = [ref / val]
0x0034	CLEAR	clear-params = [val]
0x0035	PASTE.SPECIAL	paste-special-params = *7(val)
0x0036	EDIT.DELETE	edit-delete-params = [val]
0x0037	INSERT	insert-params = *2(val)
0x0038	FILL.RIGHT	This function takes no parameters.
0x0039	FILL.DOWN	This function takes no parameters.
0x003D	DEFINE.NAME	define-name-params = [val, [(ref / val), [(ref / val), [(ref / val), [(ref / val), [(ref / val), [val]]]]]]]
0x003E	CREATE.NAMES	create-names-params = *4(val)
0x003F	FORMULA.GOTO	formula-goto-params = [(ref / val), [val]]
0x0040	FORMULA.FIND	formula-find-params = *12(val)
0x0041	SELECT.LAST.CELL	This function takes no parameters.
0x0042	SHOW.ACTIVE.CELL	This function takes no parameters.
0x0043	GALLERY.AREA	gAllery-area-params = *2(val)
0x0044	GALLERY.BAR	gAllery-bar-params = *2(val)
0x0045	GALLERY.COLUMN	gAllery-column-params = *2(val)
0x0046	GALLERY.LINE	gAllery-line-params = *2(val)
0x004	GALLERY.PIE	gAllery-pie-params = *2(val)

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Value	Meaning	Parameters
7		
0x0048	GALLERY.SCATTER	gAllery-scatter-params = *2(val)
0x0049	COMBINATION	combination-params = [val]
0x004A	PREFERRED	This function takes no parameters.
0x004B	ADD.OVERLAY	This function takes no parameters.
0x004C	GRIDLINES	gridlines-params = *7(val)
0x004D	SET.PREFERRED	set-preferred-params = [val]
0x004E	AXES	axes-params = *6(val)
0x004F	LEGEND	legend-params = [val]
0x0050	ATTACH.TEXT	attach-text-params = *3(val)
0x0051	ADD.ARROW	This function takes no parameters.
0x0052	SELECT.CHART	This function takes no parameters.
0x0053	SELECT.PLOT.AREA	This function takes no parameters.
0x0054	PATTERNS	patterns-params = *13(val)
0x0055	MAIN.CHART	main-chart-params = *10(val)
0x0056	OVERLAY	overlay-params = *12(val)
0x0057	SCALE	scale-params = *10(val)
0x0058	FORMAT.LEGEND	format-legend-params = [val]
0x0059	FORMAT.TEXT	format-text-params = *11(val)
0x005A	EDIT.REPEAT	This function takes no parameters.
0x005B	PARSE	parse-params = [val, [ref / val]]
0x005C	JUSTIFY	This function takes no parameters.

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Value	Meaning	Parameters
0x005D	HIDE	This function takes no parameters.
0x005E	UNHIDE	unhide-params = [val]
0x005F	WORKSPACE	workspace-params = *16(val)
0x0060	FORMULA	formula-params = [val, [ref / val]]
0x0061	FORMULA.FILL	formula-fill-params = [val, [ref / val]]
0x0062	FORMULA.ARRAY	formula-array-params = [val, [ref / val]]
0x0063	DATA.FIND.NEXT	This function takes no parameters.
0x0064	DATA.FIND.PREV	This function takes no parameters.
0x0065	FORMULA.FIND.NEXT	This function takes no parameters.
0x0066	FORMULA.FIND.PREV	This function takes no parameters.
0x0067	ACTIVATE	activate-params = *2(val)
0x0068	ACTIVATE.NEXT	activate-next-params = [val]
0x0069	ACTIVATE.PREV	activate-prev-params = [val]
0x006A	UNLOCKED.NEXT	This function takes no parameters.
0x006B	UNLOCKED.PREV	This function takes no parameters.
0x006C	COPY.PICTURE	copy-picture-params = *3(val)
0x006D	SELECT	select-params = *2(ref / val)
0x006E	DELETE.NAME	delete-name-params = [val]
0x006F	DELETE.FORMAT	delete-format-params = [val]
0x0070	VLINE	vline-params = [val]
0x0071	HLINE	hline-params = [val]

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Value	Meaning	Parameters
0x0072	VPAGE	vpage-params = [val]
0x0073	HPAGE	hpage-params = [val]
0x0074	VSCROLL	vscroll-params = *2(val)
0x0075	HSCROLL	hscroll-params = *2(val)
0x0076	ALERT	alert-params = *3(val)
0x0077	NEW	new-params = *3(val)
0x0078	CANCEL.COPY	cancel-copy-params = [val]
0x0079	SHOW.CLIPBOARD	This function takes no parameters.
0x007A	MESSAGE	message-params = *2(val)
0x007C	PASTE.LINK	This function takes no parameters.
0x007D	APP.ACTIVATE	app-activate-params = *2(val)
0x007E	DELETE.ARROW	This function takes no parameters.
0x007F	ROW.HEIGHT	row-height-params = [val, *3(ref / val)]
0x0080	FORMAT.MOVE	format-move-params = [val, *2(ref / val)]
0x0081	FORMAT.SIZE	format-size-params = [val, *2(ref / val)]
0x0082	FORMULA.REPLACE	formula-replace-params = *11(val)
0x0083	SEND.KEYS	send-keys-params = *2(val)
0x0084	SELECT.SPECIAL	select-special-params = *3(val)
0x0085	APPLY.NAMES	apply-names-params = *7(val)
0x0086	REPLACE.FONT	replace-font-params = *10(val)
0x0087	FREEZE.PANES	freeze-panes-params = *3(val)

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Value	Meaning	Parameters
0x0088	SHOW.INFO	show-info-params = [val]
0x0089	SPLIT	split-params = *2(val)
0x008A	ON.WINDOW	on-window-params = *2(val)
0x008B	ON.DATA	on-data-params = *2(val)
0x008C	DISABLE.INPUT	disable-input-params = [val]
0x008E	OUTLINE	outline-params = *4(val)
0x008F	LIST.NAMES	This function takes no parameters.
0x0090	FILE.CLOSE	file-close-params = *2(val)
0x0091	SAVE.WORKBOOK	save-workbook-params = *6(val)
0x0092	DATA.FORM	This function takes no parameters.
0x0093	COPY.CHART	copy-chart-params = [val]
0x0094	ON.TIME	on-time-params = *4(val)
0x0095	WAIT	wait-params = [val]
0x0096	FORMAT.FONT	format-font-params = *15(val)
0x0097	FILL.UP	This function takes no parameters.
0x0098	FILL.LEFT	This function takes no parameters.
0x0099	DELETE.OVERLAY	This function takes no parameters.
0x009B	SHORT.MENUS	short-menus-params = [val]
0x009F	SET.UPDATE.STATUS	set-update-status-params = *3(val)
0x00A1	COLOR.PALETTE	color-palette-params = [val]
0x00A2	DELETE.STYLE	delete-style-params = [val]

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Value	Meaning	Parameters
0x00A3	WINDOW.RESTORE	window-restore-params = [val]
0x00A4	WINDOW.MAXIMIZE	window-maximize-params = [val]
0x00A6	CHANGE.LINK	change-link-params = *3(val)
0x00A7	CALCULATE.DOCUMENT	This function takes no parameters.
0x00A8	ON.KEY	on-key-params = *2(val)
0x00A9	APP.RESTORE	This function takes no parameters.
0x00AA	APP.MOVE	app-move-params = *2(val)
0x00AB	APP.SIZE	app-size-params = *2(val)
0x00AC	APP.MINIMIZE	This function takes no parameters.
0x00AD	APP.MAXIMIZE	This function takes no parameters.
0x00AE	BRING.TO.FRONT	This function takes no parameters.
0x00AF	SEND.TO.BACK	This function takes no parameters.
0x00B9	MAIN.CHART.TYPE	main-chart-type-params = [val]
0x00BA	OVERLAY.CHART.TYPE	overlay-chart-type-params = [val]
0x00BB	SELECT.END	select-end-params = [val]
0x00BC	OPEN.MAIL	open-mail-params = *2(val)
0x00BD	SEND.MAIL	send-mail-params = [(ref / val), *2(val)]
0x00BE	STANDARD.FONT	standard-font-params = *9(val)
0x00BF	CONSOLIDATE	consolidate-params = *5(val)
0x00C0	SORT.SPECIAL	sort-special-params = [val, [val, [(ref / val), [(ref / val), [(ref / val), [(ref / val), [(ref / val), *6(val)]]]]]]]
0x00C1	GALLERY.3D.AREA	gAllery-3d-area-params = [val]

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Value	Meaning	Parameters
0x00C2	GALLERY.3D.COLUMN	gAllery-3d-column-params = [val]
0x00C3	GALLERY.3D.LINE	gAllery-3d-line-params = [val]
0x00C4	GALLERY.3D.PIE	gAllery-3d-pie-params = [val]
0x00C5	VIEW.3D	view-3d-params = *6(val)
0x00C6	GOAL.SEEK	goal-seek-params = *3(ref / val)
0x00C7	WORKGROUP	workgroup-params = [val]
0x00C8	FILL.GROUP	fill-group-params = [val]
0x00C9	UPDATE.LINK	update-link-params = *2(val)
0x00CA	PROMOTE	promote-params = [val]
0x00CB	DEMOTE	demote-params = [val]
0x00CC	SHOW.DETAIL	show-detail-params = *4(val)
0x00CE	UNGROUP	This function takes no parameters.
0x00CF	OBJECT.PROPERTIES	object-properties-params = *2(val)
0x00D0	SAVE.NEW.OBJECT	save-new-object-params = [val]
0x00D1	SHARE	This function takes no parameters.
0x00D2	SHARE.NAME	share-name-params = [val]
0x00D3	DUPLICATE	This function takes no parameters.
0x00D4	APPLY.STYLE	apply-style-params = [val]
0x00D5	ASSIGN.TO.OBJECT	assign-to-object-params = [ref / val]
0x00D6	OBJECT.PROTECTION	object-protection-params = *2(val)
0x00D7	HIDE.OBJECT	hide-object-params = *2(val)

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Value	Meaning	Parameters
0x00D8	SET.EXTRACT	This function takes no parameters.
0x00D9	CREATE.PUBLISHER	create-publisher-params = *4(val)
0x00DA	SUBSCRIBE.TO	subscribe-to-params = *2(val)
0x00DB	ATTRIBUTES	attributes-params = *2(val)
0x00DC	SHOW.TOOLBAR	show-toolbar-params = *10(val)
0x00DE	PRINT.PREVIEW	print-preview-params = [val]
0x00DF	EDIT.COLOR	edit-color-params = *4(val)
0x00E0	SHOW.LEVELS	show-levels-params = *2(val)
0x00E1	FORMAT.MAIN	format-main-params = *14(val)
0x00E2	FORMAT.OVERLAY	format-overlay-params = *14(val)
0x00E3	ON.RECALC	on-recalc-params = *2(val)
0x00E4	EDIT.SERIES	edit-series-params = [val, *6(ref / val)]
0x00E5	DEFINE.STYLE	define-style-params = *14(val)
0x00F0	LINE.PRINT	line-print-params = *11(val)
0x00F3	ENTER.DATA	enter-data-params = [ref / val]
0x00F9	GALLERY.RADAR	gAllery-radar-params = *2(val)
0x00FA	MERGE.STYLES	merge-styles-params = [val]
0x00FB	EDITION.OPTIONS	edition-options-params = [val, *6(ref / val)]
0x00FC	PASTE.PICTURE	This function takes no parameters.
0x00FD	PASTE.PICTURE.LINK	This function takes no parameters.
0x00FE	SPELLING	spelling-params = *6(val)

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Value	Meaning	Parameters
0x0100	ZOOM	zoom-params = [val]
0x0103	INSERT.OBJECT	insert-object-params = [val, [val, [val, [val, [val, [val, [val, [(ref / val), [val, [val, [(ref / val), *2(val)]]]]]]]]]]
0x0104	WINDOW.MINIMIZE	window-minimize-params = [val]
0x0109	SOUND.NOTE	sound-note-params = [(ref / val), *2(val)]
0x010A	SOUND.PLAY	sound-play-params = [(ref / val), *2(val)]
0x010B	FORMAT.SHAPE	format-shape-params = [val, [val, [(ref / val), *2(val)]]]
0x010C	EXTEND.POLYGON	extend-polygon-params = [val]
0x010D	FORMAT.AUTO	format-auto-params = *7(val)
0x0110	GALLERY.3D.BAR	gAllery-3d-bar-params = [val]
0x0111	GALLERY.3D.SURFACE	gAllery-3d-surface-params = [val]
0x0112	FILL.AUTO	fill-auto-params = [(ref / val), [val]]
0x0114	CUSTOMIZE.TOOLBAR	customize-toolbar-params = [val]
0x0115	ADD.TOOL	add-tool-params = *3(val)
0x0116	EDIT.OBJECT	edit-object-params = [val]
0x0117	ON.DOUBLECLICK	on-doubleclick-params = *2(val)
0x0118	ON.ENTRY	on-entry-params = *2(val)
0x0119	WORKBOOK.ADD	workbook-add-params = *3(val)
0x011A	WORKBOOK.MOVE	workbook-move-params = *3(val)
0x011B	WORKBOOK.COPY	workbook-copy-params = *3(val)
0x011C	WORKBOOK.OPTIONS	workbook-options-params = *3(val)
0x011D	SAVE.WORKSPACE	save-workspace-params = [val]

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Value	Meaning	Parameters
0x0120	CHART.WIZARD	chart-wizard-params = [val, [(ref / val), *12(val)]]
0x0121	DELETE.TOOL	delete-tool-params = *2(val)
0x0122	MOVE.TOOL	move-tool-params = *6(val)
0x0123	WORKBOOK.SELECT	workbook-select-params = *3(val)
0x0124	WORKBOOK.ACTIVATE	workbook-activate-params = *2(val)
0x0125	ASSIGN.TO.TOOL	assign-to-tool-params = [val, [val, [ref / val]]]
0x0127	COPY.TOOL	copy-tool-params = *2(val)
0x0128	RESET.TOOL	reset-tool-params = *2(val)
0x0129	CONSTRAIN.NUMERIC	constrain-numeric-params = [val]
0x012A	PASTE.TOOL	paste-tool-params = *2(val)
0x012E	WORKBOOK.NEW	workbook-new-params = *3(val)
0x0131	SCENARIO.CELLS	scenario-cells-params = [ref / val]
0x0132	SCENARIO.DELETE	scenario-delete-params = [val]
0x0133	SCENARIO.ADD	scenario-add-params = [val, [val, [(ref / val), *3(val)]]]
0x0134	SCENARIO.EDIT	scenario-edit-params = [val, [val, [val, [(ref / val), *3(val)]]]]
0x0135	SCENARIO.SHOW	scenario-show-params = [val]
0x0136	SCENARIO.SHOW.NEXT	This function takes no parameters.
0x0137	SCENARIO.SUMMARY	scenario-summary-params = [(ref / val), [val]]
0x0138	PIVOT.TABLE.WIZARD	pivot-table-wizard-params = [val, [(ref / val), [(ref / val), *13(val)]]]
0x0139	PIVOT.FIELD.PROPERTIES	pivot-field-properties-params = *7(val)
0x013A	PIVOT.FIELD	pivot-field-params = *4(val)

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Value	Meaning	Parameters
0x013B	PIVOT.ITEM	pivot-item-params = *4(val)
0x013C	PIVOT.ADD.FIELDS	pivot-add-fields-params = *5(val)
0x013E	OPTIONS.CALCULATION	options-calculation-params = *10(val)
0x013F	OPTIONS.EDIT	options-edit-params = *11(val)
0x0140	OPTIONS.VIEW	options-view-params = *18(val)
0x0141	ADDIN.MANAGER	addin-manager-params = *3(val)
0x0142	MENU.EDITOR	This function takes no parameters.
0x0143	ATTACH.TOOLBARS	This function takes no parameters.
0x0144	VBAActivate	vbaactivate-params = *2(val)
0x0145	OPTIONS.CHART	options-chart-params = *3(val)
0x0148	VBA.INSERT.FILE	vba-insert-file-params = [val]
0x014A	VBA.PROCEDURE.DEFINITION	This function takes no parameters.
0x0150	ROUTING.SLIP	routing-slip-params = [(ref / val), *5(val)]
0x0152	ROUTE.DOCUMENT	This function takes no parameters.
0x0153	MAIL.LOGON	mail-logon-params = [(ref / val), [(ref /
0x0156	INSERT.PICTURE	insert-picture-params = *2(val)
0x0157	EDIT.TOOL	edit-tool-params = *2(val)
0x0158	GALLERY.DOUGHNUT	gAllery-doughnut-params = *2(val)
0x015E	CHART.TREND	chart-trend-params = *8(val)
0x0160	PIVOT.ITEM.PROPERTIES	pivot-item-properties-params = *7(val)
0x0162	WORKBOOK.INSERT	workbook-insert-params = [val]

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Value	Meaning	Parameters
0x0163	OPTIONS.TRANSITION	options-transition-params = *5(val)
0x0164	OPTIONS.GENERAL	options-general-params = *14(val)
0x0172	FILTER.ADVANCED	filter-advanced-params = [val, [(ref / val), [(ref / val), [(ref / val), [val]]]]]
0x0175	MAIL.ADD.MAILER	This function takes no parameters.
0x0176	MAIL.DELETE.MAILER	This function takes no parameters.
0x0177	MAIL.REPLY	This function takes no parameters.
0x0178	MAIL.REPLY.ALL	This function takes no parameters.
0x0179	MAIL.FORWARD	This function takes no parameters.
0x017A	MAIL.NEXT.LETTER	This function takes no parameters.
0x017B	DATA.LABEL	data-label-params = *10(val)
0x017C	INSERT.TITLE	insert-title-params = *5(val)
0x017D	FONT.PROPERTIES	font-properties-params = *14(val)
0x017E	MACRO.OPTIONS	macro-options-params = *10(val)
0x017F	WORKBOOK.HIDE	workbook-hide-params = *2(val)
0x0180	WORKBOOK.UNHIDE	workbook-unhide-params = [val]
0x0181	WORKBOOK.DELETE	workbook-delete-params = [val]
0x0182	WORKBOOK.NAME	workbook-name-params = *2(val)
0x0184	GALLERY.CUSTOM	gAllery-custom-params = [val]
0x0186	ADD.CHART.AUTOFORMAT	add-chart-autoformat-params = *2(val)
0x0187	DELETE.CHART.AUTOFORMAT	delete-chart-autoformat-params = [val]
0x0188	CHART.ADD.DATA	chart-add-data-params = [val, [(ref / val), *4(val)]]

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Value	Meaning	Parameters
0x0189	AUTO.OUTLINE	This function takes no parameters.
0x018A	TAB.ORDER	This function takes no parameters.
0x018B	SHOW.DIALOG	show-dialog-params = [val]
0x018C	SELECT.ALL	This function takes no parameters.
0x018D	UNGROUP.SHEETS	This function takes no parameters.
0x018E	SUBTOTAL.CREATE	subtotal-create-params = *6(val)
0x018F	SUBTOTAL.REMOVE	This function takes no parameters.
0x0190	RENAME.OBJECT	rename-object-params = [val]
0x019C	WORKBOOK.SCROLL	workbook-scroll-params = *2(val)
0x019D	WORKBOOK.NEXT	This function takes no parameters.
0x019E	WORKBOOK.PREV	This function takes no parameters.
0x019F	WORKBOOK.TAB.SPLIT	workbook-tab-split-params = [val]
0x01A0	FULL.SCREEN	full-screen-params = [val]
0x01A1	WORKBOOK.PROTECT	workbook-protect-params = *3(val)
0x01A4	SCROLLBAR.PROPERTIES	scrollbar-properties-params = *7(val)
0x01A5	PIVOT.SHOW.PAGES	pivot-show-pages-params = *2(val)
0x01A6	TEXT.TO.COLUMNS	text-to-columns-params = [val, [(ref / val), *12(val)]]
0x01A7	FORMAT.CHARTTYPE	format-charttype-params = *4(val)
0x01A8	LINK.FORMAT	This function takes no parameters.
0x01A9	TRACER.DISPLAY	tracer-display-params = *2(val)
0x01AE	TRACER.NAVIGATE	tracer-navigate-params = *3(val)

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Value	Meaning	Parameters
0x01AF	TRACER.CLEAR	This function takes no parameters.
0x01B0	TRACER.ERROR	This function takes no parameters.
0x01B1	PIVOT.FIELD.GROUP	pivot-field-group-params = *4(val)
0x01B2	PIVOT.FIELD.UNGROUP	This function takes no parameters.
0x01B3	CHECKBOX.PROPERTIES	checkbox-properties-params = *5(val)
0x01B4	LABEL.PROPERTIES	label-properties-params = *3(val)
0x01B5	LISTBOX.PROPERTIES	listbox-properties-params = *5(val)
0x01B6	EDITBOX.PROPERTIES	editbox-properties-params = *4(val)
0x01B7	PIVOT.REFRESH	pivot-refresh-params = [val]
0x01B8	LINK.COMBO	link-combo-params = [val]
0x01B9	OPEN.TEXT	open-text-params = *17(val)
0x01BA	HIDE.DIALOG	hide-dialog-params = [val]
0x01BB	SET.DIALOG.FOCUS	set-dialog-focus-params = [val]
0x01BC	ENABLE.OBJECT	enable-object-params = *2(val)
0x01BD	PUSHBUTTON.PROPERTIES	pushbutton-properties-params = *6(val)
0x01BE	SET.DIALOG.DEFAULT	set-dialog-default-params = [val]
0x01BF	FILTER	filter-params = *6(val)
0x01C0	FILTER.SHOW.ALL	This function takes no parameters.
0x01C1	CLEAR.OUTLINE	This function takes no parameters.
0x01C2	FUNCTION.WIZARD	function-wizard-params = [val]
0x01C3	ADD.LIST.ITEM	add-list-item-params = *2(val)

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Value	Meaning	Parameters
0x01C4	SET.LIST.ITEM	set-list-item-params = *2(val)
0x01C5	REMOVE.LIST.ITEM	remove-list-item-params = *2(val)
0x01C6	SELECT.LIST.ITEM	select-list-item-params = *2(val)
0x01C7	SET.CONTROL.VALUE	set-control-value-params = [val]
0x01C8	SAVE.COPY.AS	save-copy-as-params = [val]
0x01CA	OPTIONS.LISTS.ADD	options-lists-add-params = [val, [ref / val]]
0x01CB	OPTIONS.LISTS.DELETE	options-lists-delete-params = [val]
0x01CC	SERIES.AXES	series-axes-params = [val]
0x01CD	SERIES.X	series-x-params = [ref / val]
0x01CE	SERIES.Y	series-y-params = *2(ref / val)
0x01CF	ERRORBAR.X	errorbar-x-params = [val, [val, [val, [ref / val]]]]
0x01D0	ERRORBAR.Y	errorbar-y-params = [val, [val, [val, [ref / val]]]]
0x01D1	FORMAT.CHART	format-chart-params = [(ref / val), *17(val)]
0x01D2	SERIES.ORDER	series-order-params = *3(val)
0x01D3	MAIL.LOGOFF	This function takes no parameters.
0x01D4	CLEAR.ROUTING.SLIP	clear-routing-slip-params = [val]
0x01D5	APP.ACTIVATE.MICROSOFT	app-activate-microsoft-params = [val]
0x01D6	MAIL.EDIT.MAILER	mail-edit-mailer-params = [val, [(ref / val), [(ref / val), [(ref / val), [val, [ref / val]]]]]]
0x01D7	ON.SHEET	on-sheet-params = *3(val)
0x01D8	STANDARD.WIDTH	standard-width-params = [val]
0x01D9	SCENARIO.MERGE	scenario-merge-params = [val]

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Value	Meaning	Parameters
0x01DA	SUMMARY.INFO	summary-info-params = *5(val)
0x01DB	FIND.FILE	This function takes no parameters.
0x01DC	ACTIVE.CELL.FONT	active-cell-font-params = *14(val)
0x01DD	ENABLE.TIPWIZARD	enable-tipwizard-params = [val]
0x01DE	VBA.MAKE.ADDIN	vba-make-addin-params = [val]
0x01E0	INSERTDATATABLE	insertdatatable-params = [val]
0x01E1	WORKGROUP.OPTIONS	This function takes no parameters.
0x01E2	MAIL.SEND.MAILER	mail-send-mailer-params = *2(val)
0x01E5	AUTOCORRECT	autocorrect-params = *2(val)
0x01E9	POST.DOCUMENT	post-document-params = [val]
0x01EB	PICKLIST	This function takes no parameters.
0x01ED	VIEW.SHOW	view-show-params = [val]
0x01EE	VIEW.DEFINE	view-define-params = *3(val)
0x01EF	VIEW.DELETE	view-delete-params = [val]
0x01FD	SHEET.BACKGROUND	sheet-background-params = *2(val)
0x01FE	INSERT.MAP.OBJECT	This function takes no parameters.
0x01FF	OPTIONS.MENONO	options-menono-params = *5(val)
0x0205	MSOCHECKS	This function takes no parameters.
0x0206	NORMAL	This function takes no parameters.
0x0207	LAYOUT	This function takes no parameters.
0x0208	RM.PRINT.AREA	rm-print-area-params = [ref / val]

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Value	Meaning	Parameters
0x0209	CLEAR.PRINT.AREA	This function takes no parameters.
0x020A	ADD.PRINT.AREA	This function takes no parameters.
0x020B	MOVE.BRK	move-brk-params = *4(val)
0x0221	HIDECURR.NOTE	hidecurr-note-params = [(ref / val), [val]]
0x0222	HIDEALL.NOTES	hideall-notes-params = [val]
0x0223	DELETE.NOTE	delete-note-params = [ref / val]
0x0224	TRAVERSE.NOTES	traverse-notes-params = [(ref / val), [val]]
0x0225	ACTIVATE.NOTES	activate-notes-params = [(ref / val), [val]]
0x026C	PROTECT.REVISIONS	This function takes no parameters.
0x026D	UNPROTECT.REVISIONS	This function takes no parameters.
0x0287	OPTIONS.ME	options-me-params = [(ref / val), *8(val)]
0x028D	WEB.PUBLISH	web-publish-params = *9(val)
0x029B	NEWWEBQUERY	newwebquery-params = [val]
0x02A1	PIVOT.TABLE.CHART	pivot-table-chart-params = [val, [(ref / val), [(ref / val), *13(val)]]]
0x02F1	OPTIONS.SAVE	options-save-params = *4(val)
0x02F3	OPTIONS.SPELL	options-spell-params = *12(val)
0x0328	HIDEALL.INKANNOTS	hideall-inkannots-params = [val]

The following grammar is used in the **Rgce** structure definition:

```
params-cetab = beep-params / open-params / open-links-params / save-as-params /
    file-delete-params / page-setup-params / print-params /
    printer-setup-params /
    arrange-all-params / window-size-params / window-move-params /
    full-params / close-params / run-params /
```


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```
    set-print-area-params / set-print-titles-params /

    remove-page-break-params / font-params / display-params /

    protect-document-params / precision-params / a1-r1c1-params / calculation-
params / data-find-params /

    extract-params / sort-params / data-series-params /

    table-params / format-number-params / alignment-params /

    style-params / border-params / cell-protection-params /

    column-width-params / cut-params /

    copy-params / paste-params / clear-params /

    paste-special-params / edit-delete-params / insert-params / define-name-params
/

    create-names-params / formula-goto-params / formula-find-params / gallery-area-
params /

    gallery-bar-params / gallery-column-params / gallery-line-params /

    gallery-pie-params / gallery-scatter-params / combination-params / gridlines-
params /

    set-preferred-params / axes-params / legend-params /

    attach-text-params / patterns-params / main-chart-params /

    overlay-params / scale-params / format-legend-params /

    format-text-params / parse-params / unhide-params /

    workspace-params / formula-params / formula-fill-params /

    formula-array-params / activate-params /

    activate-next-params / activate-prev-params / copy-picture-params / select-
params /

    delete-name-params / delete-format-params / vline-params /

    hline-params / vpage-params / hpage-params /

    vscroll-params / hscroll-params / alert-params /

    new-params / cancel-copy-params /

    message-params / app-activate-params / row-height-params / format-move-params /

    format-size-params / formula-replace-params / send-keys-params /

    select-special-params / apply-names-params / replace-font-params /

    freeze-panes-params / show-info-params / split-params /

    on-window-params / on-data-params / disable-input-params /

    outline-params / file-close-params /

    save-workbook-params / copy-chart-params /

    on-time-params / wait-params / format-font-params /
```


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short-menus-params / set-update-status-params / color-palette-params /

delete-style-params / window-restore-params / window-maximize-params /

change-link-params / on-key-params / app-move-params / app-size-params / main-chart-type-params / overlay-chart-type-params /

select-end-params / open-mail-params / send-mail-params /

standard-font-params / consolidate-params / sort-special-params /

gallery-3d-area-params / gallery-3d-column-params / gallery-3d-line-params /

gallery-3d-pie-params / view-3d-params / goal-seek-params /

workgroup-params / fill-group-params / update-link-params /

promote-params / demote-params / show-detail-params / object-properties-params / save-new-object-params / share-name-params /

apply-style-params / assign-to-object-params / object-protection-params /

hide-object-params / create-publisher-params /

subscribe-to-params / attributes-params / show-toolbar-params /

print-preview-params / edit-color-params / show-levels-params /

format-main-params / format-overlay-params / on-recalc-params /

edit-series-params / define-style-params / line-print-params /

enter-data-params / gallery-radar-params / merge-styles-params /

edition-options-params /

spelling-params / zoom-params / insert-object-params /

window-minimize-params / sound-note-params / sound-play-params /

format-shape-params / extend-polygon-params / format-auto-params /

gallery-3d-bar-params / gallery-3d-surface-params / fill-auto-params /

customize-toolbar-params / add-tool-params / edit-object-params /

on-doubleclick-params / on-entry-params / workbook-add-params /

workbook-move-params / workbook-copy-params / workbook-options-params /

save-workspace-params / chart-wizard-params / delete-tool-params /

move-tool-params / workbook-select-params / workbook-activate-params /

assign-to-tool-params / copy-tool-params / reset-tool-params /

constrain-numeric-params / paste-tool-params / workbook-new-params /

scenario-cells-params / scenario-delete-params / scenario-add-params /

scenario-edit-params / scenario-show-params /

scenario-summary-params / pivot-table-wizard-params / pivot-field-properties-params /

pivot-field-params / pivot-item-params / pivot-add-fields-params /

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```
    options-calculation-params / options-edit-params / options-view-params /

    addin-manager-params /

    vbaactivate-params / options-chart-params / vba-insert-file-params / routing-
slip-params /

    mail-logon-params / insert-picture-params / edit-tool-params /

    gallery-doughnut-params / chart-trend-params / pivot-item-properties-params /

    workbook-insert-params / options-transition-params / options-general-params /

    filter-advanced-params / data-label-params / insert-title-params /

    font-properties-params / macro-options-params / workbook-hide-params /

    workbook-unhide-params / workbook-delete-params / workbook-name-params /

    gallery-custom-params / add-chart-autoformat-params / delete-chart-autoformat-
params /

    chart-add-data-params /

    show-dialog-params /

    subtotal-create-params / rename-object-params /

    workbook-scroll-params /

    workbook-tab-split-params / full-screen-params / workbook-protect-params /

    scrollbar-properties-params / pivot-show-pages-params / text-to-columns-params
/

    format-charttype-params / tracer-display-params /

    tracer-navigate-params /

    pivot-field-group-params / checkbox-properties-params /

    label-properties-params / listbox-properties-params / editbox-properties-params
/

    pivot-refresh-params / link-combo-params / open-text-params /

    hide-dialog-params / set-dialog-focus-params / enable-object-params /

    pushbutton-properties-params / set-dialog-default-params / filter-params /
function-wizard-params /

    add-list-item-params / set-list-item-params / remove-list-item-params /

    select-list-item-params / set-control-value-params / save-copy-as-params /

    options-lists-add-params / options-lists-delete-params / series-axes-params /

    series-x-params / series-y-params / errorbar-x-params /

    errorbar-y-params / format-chart-params / series-order-params / clear-routing-
slip-params / app-activate-microsoft-params /

    mail-edit-mailer-params / on-sheet-params / standard-width-params /

    scenario-merge-params / summary-info-params /
```


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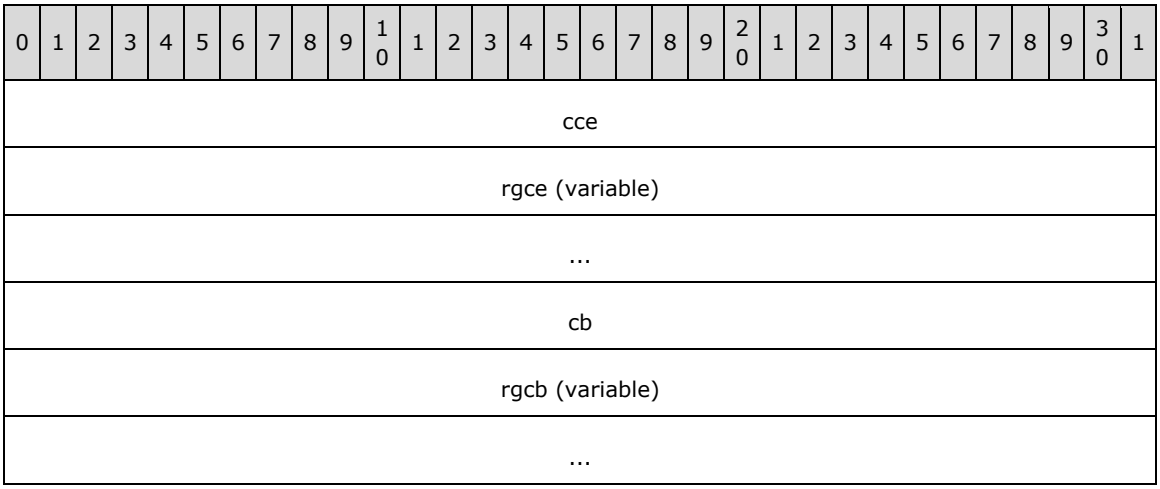
```
    active-cell-font-params / enable-tipwizard-params / vba-make-addin-params /

    insertdatatable-params / mail-send-mailer-params /

    autocorrect-params / post-document-params /

    view-show-params / view-define-params / view-delete-params /

    sheet-background-params / options-menono-params /

    rm-print-area-params /

    move-brk-params / hidecurr-note-params / hideall-notes-params /

    delete-note-params / traverse-notes-params / activate-notes-params / options-
me-params /

    web-publish-params / newwebquery-params / pivot-table-chart-params /

    options-save-params / options-spell-params / hideall-inkannots-params
```

2.5.97.6 CFParsedFormula

The **CFParsedFormula** structure specifies a formula (section 2.2.2) used in a **conditional formatting** rule.



cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. This value MUST be greater than 0 and less than 16385.

rgce (variable): An **Rgce** (section 2.5.97.88) structure that specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula. MUST NOT contain **PtgExp** (section 2.5.97.40), **PtgList** (section 2.5.97.52), **PtgSxName** (section 2.5.97.76), **PtgIsect** (section 2.5.97.50), **PtgUnion** (section 2.5.97.78), **PtgArray** (section 2.5.97.23), **PtgRef3d** (section 2.5.97.69), **PtgArea3d** (section 2.5.97.19), **PtgRefErr3d** (section 2.5.97.71), **PtgAreaErr3d** (section 2.5.97.21), **PtgNameX** (section 2.5.97.61), **PtgMemArea** (section 2.5.97.54), or **PtgMemNoMem** (section 2.5.97.57). A **PtgArea** (section 2.5.97.18) or a **PtgAreaN** (section 2.5.97.22) MUST NOT be the only **Ptg** structure in the sequence.

The root node of the parse tree of this field MUST be a VALUE_TYPE, as described in section 2.5.97.88.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

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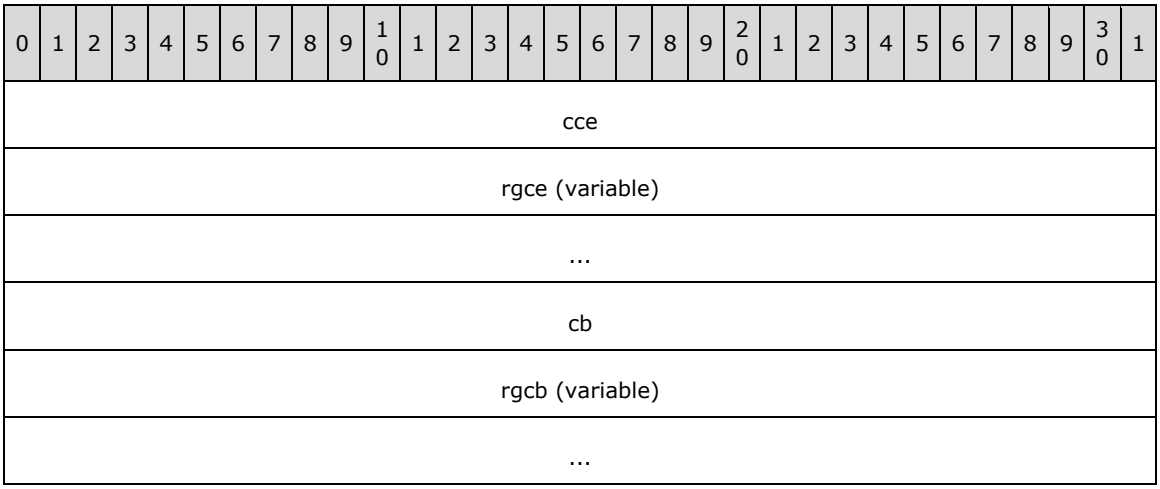
rgcb (variable): An **RgbExtra** (section 2.5.97.87) structure that specifies ancillary data for the formula.

2.5.97.7 CFVOParsedFormula

This structure specifies a formula (section 2.2.2) without **relative references** that is used in a **conditional formatting** rule.



cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. MUST be greater than 0 and less than 16385.

rgce (variable): An **Rgce** (section 2.5.97.88) structure that specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula. MUST NOT contain **PtgExp** (section 2.5.97.40), **PtgList** (section 2.5.97.52), **PtgSxName** (section 2.5.97.76), **PtgIsect** (section 2.5.97.50), **PtgUnion** (section 2.5.97.78), **PtgArray** (section 2.5.97.23), **PtgRef3d** (section 2.5.97.69), **PtgArea3d** (section 2.5.97.19), **PtgNameX** (section 2.5.97.61), **PtgMemArea** (section 2.5.97.54), **PtgMemNoMem** (section 2.5.97.57), **PtgRefErr3d** (section 2.5.97.71) or **PtgAreaErr3d** (section 2.5.97.21). A **PtgArea** (section 2.5.97.18) or a **PtgAreaN** (section 2.5.97.22) MUST NOT be the only **Ptg** in the sequence.

If this field contains a **PtgRef** (section 2.5.97.68), the **loc.column.fColRel** and **loc.column.fRwRel** fields in the **PtgRef** MUST be 0.

If this field contains a **PtgRefN** (section 2.5.97.72), the **loc.column.fColRel** and **loc.column.fRwRel** fields in the **PtgRefN** MUST be 0.

If this field contains a **PtgArea** (section 2.5.97.18), the **area.columnFirst.fColRel**, **area.columnFirst.fRwRel**, **area.columnLast.fColRel**, and **area.columnLast.fRwRel** fields in the **PtgArea** MUST be 0**.**

If this field contains a **PtgAreaN** (section 2.5.97.22), the **area.columnFirst.fColRel**, **area.columnFirst.fRwRel**, **area.columnLast.fColRel**, and **area.columnLast.fRwRel** fields in the **PtgAreaN** MUST be 0.

The root node of the parse tree of this field MUST be a VALUE_TYPE, as described in **Rgce** (section 2.5.97.88).

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

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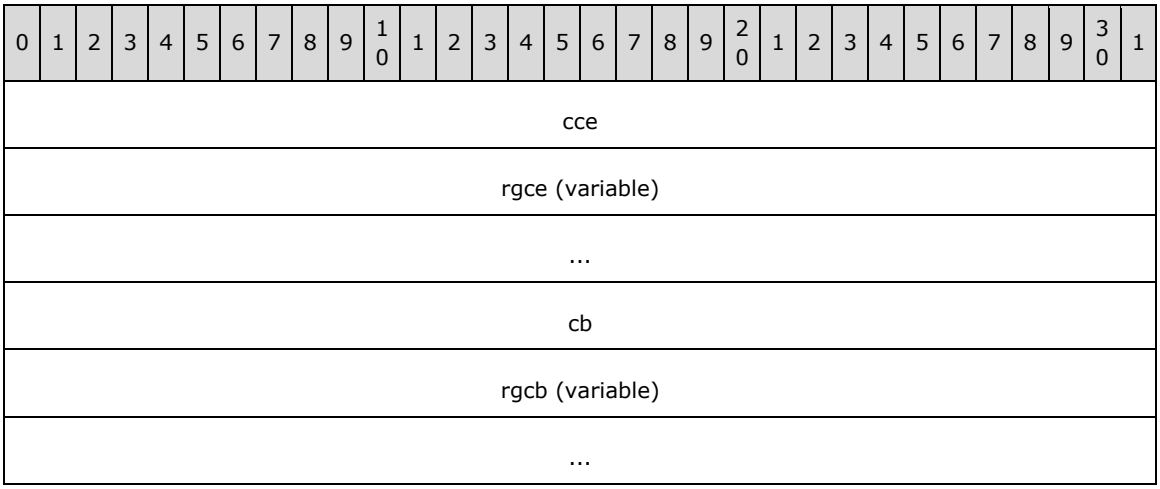
rgcb (variable): An **RgbExtra** (section 2.5.97.87) structure that specifies ancillary data for the formula.

2.5.97.8 DVParsedFormula

This structure specifies a formula (section 2.2.2) used in a **data validation** rule.



cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. MUST be less than 16385.

rgce (variable): An **Rgce** (section 2.5.97.88) structure that specifies the sequence of **Ptg** (section 2.5.97.16) for the formula. MUST NOT contain **PtgExp** (section 2.5.97.40), **PtgList** (section 2.5.97.52), **PtgSxName** (section 2.5.97.76), **PtgIsect** (section 2.5.97.50), **PtgUnion** (section 2.5.97.78), **PtgArray** (section 2.5.97.23) , **PtgRef3d** (section 2.5.97.69), **PtgRefErr3d** (section 2.5.97.71), **PtgNameX** (section 2.5.97.61), **PtgMemArea** (section 2.5.97.54), or **PtgMemNoMem** (section 2.5.97.57).

If the **BrtDVal** (section 2.4.351) record that contains this **DVParsedFormula** in its **BrtDVal.formula1** field has a **BrtDVal.valType** not equal to 3, then the following MUST be true:

- **rgce** MUST NOT contain a **PtgArea3d** (section 2.5.97.19) or a **PtgAreaErr3d** (section 2.5.97.21).
- A **PtgArea** (section 2.5.97.18), a **PtgAreaErr** (section 2.5.97.20), or a **PtgAreaN** (section 2.5.97.22), MUST NOT be the only **Ptg** in **rgce**.
- The root node of the parse tree of this field MUST be a VALUE_TYPE, as described in **Rgce** (section 2.5.97.88).

If the **BrtDVal** (section 2.4.351) record that contains this **DVParsedFormula** in its **BrtDVal.formula1** field has a **BrtDVal.valType** equal to 3, then the following MUST be true:

- If **rgce** contains a **PtgArea3d** or a **PtgAreaErr3d** (section 2.5.97.21), then the **PtgArea3d** or **PtgAreaErr3d** MUST be the only **Ptg** in **rgce**.
- The root node of the parse tree of this field MUST NOT be a VALUE_TYPE, as described in **Rgce** (section 2.5.97.88).

If this **DVParsedFormula** is a **BrtDVal.formula2** field**,** the following MUST be true:

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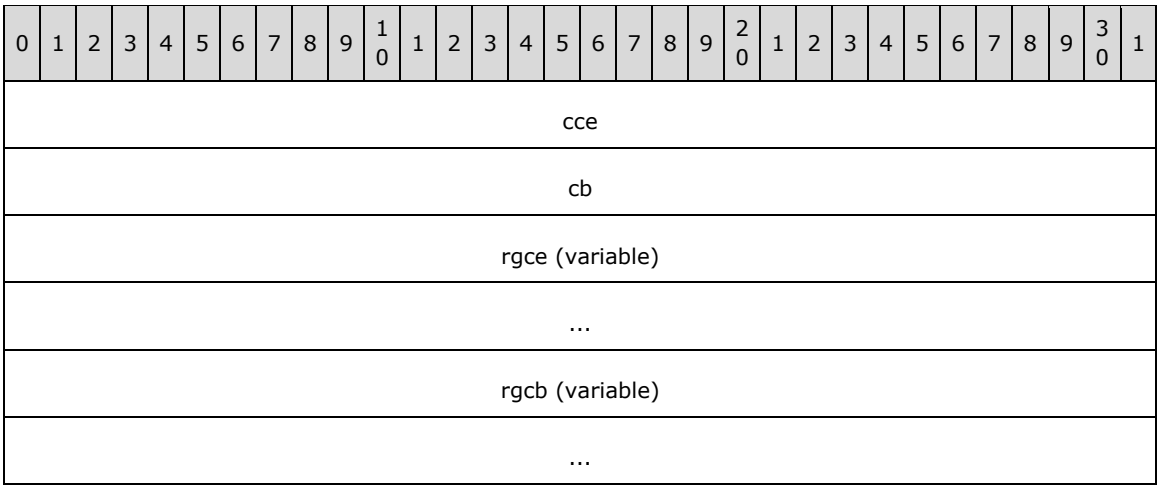
- **rgce** MUST NOT contain a **PtgArea3d** or a **PtgAreaErr3d** (section 2.5.97.21).
- A **PtgArea** (section 2.5.97.18), a **PtgAreaErr** (section 2.5.97.20), or a **PtgAreaN** (section 2.5.97.22) MUST NOT be the only **Ptg** in **rgce**.
- The root node of the parse tree of this field MUST be a VALUE_TYPE, as described in **Rgce** (section 2.5.97.88).

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An **RgbExtra** (section 2.5.97.87) structure that specifies ancillary data for the formula.

2.5.97.9 FRTParsedFormula

The **FRTParsedFormula** structure specifies a formula (section 2.2.2) used by a future record (section 2.1.6).



cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. This value MUST be less than 16385.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgce (variable): An **Rgce** (section 2.5.97.88) structure that specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula.

rgcb (variable): An **RgbExtra** (section 2.5.97.87) structure that specifies ancillary data for the formula.

2.5.97.10 Ftab

The **Ftab** structure specifies a **function** that can be called from a formula (section 2.2.2). The definition of each function specifies the function name and the valid sequence of parameters.

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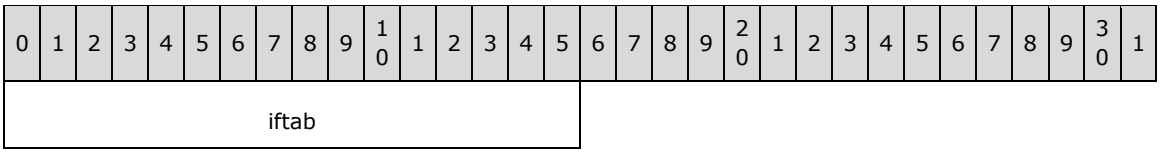

iftab (2 bytes): An unsigned integer that specifies the function to be called. It MUST be a value from the following table.

The elements **ref** and **val** (section 2.5.97.88) are specified in section 2.5.97.88.

Value	Meaning	Parameters
0x0000	COUNT	count-params = (ref / val) *254(ref / val)
0x0001	IF	if-params = val *2(ref / val)
0x0002	ISNA	isna-params = val
0x0003	ISERROR	iserror-params = val
0x0004	SUM	sum-params = (ref / val) *254(ref / val)
0x0005	AVERAGE	average-params = (ref / val) *254(ref / val)
0x0006	MIN	min-params = (ref / val) *254(ref / val)
0x0007	MAX	max-params = (ref / val) *254(ref / val)
0x0008	ROW	row-params = [ref]
0x0009	COLUMN	column-params = [ref]
0x000A	NA	This function takes no parameters.
0x000B	NPV	npv-params = val (ref / val) *253(ref / val)
0x000C	STDEV	stdev-params = (ref / val) *254(ref / val)
0x000D	DOLLAR	dollar-params = val [val]
0x000E	FIXED	fixed-params = val [val [val]]
0x000F	SIN	sin-params = val
0x0010	COS	cos-params = val
0x0011	TAN	tan-params = val
0x0012	ATAN	atan-params = val
0x0013	PI	This function takes no parameters.
0x0014	SQRT	sqrt-params = val
0x0015	EXP	exp-params = val
0x0016	LN	ln-params = val
0x0017	LOG10	log10-params = val
0x0018	ABS	abs-params = val
0x0019	INT	int-params = val
0x001A	SIGN	sign-params = val
0x001B	ROUND	round-params = val val
0x001C	LOOKUP	lookup-params = val (ref / val) [ref / val]
0x001D	INDEX	index-params = (ref / val) val *2(val)
0x001E	REPT	rept-params = val val
0x001F	MID	mid-params = val val val

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Value	Meaning	Parameters
0x0020	LEN	len-params = val
0x0021	VALUE	value-params = val
0x0022	TRUE	This function takes no parameters.
0x0023	FALSE	This function takes no parameters.
0x0024	AND	and-params = (ref / val) *254(ref / val)
0x0025	OR	or-params = (ref / val) *254(ref / val)
0x0026	NOT	not-params = val
0x0027	MOD	mod-params = val val
0x0028	DCOUNT	dcount-params = ref (ref / val) (ref / val)
0x0029	DSUM	dsum-params = ref (ref / val) (ref / val)
0x002A	DAVERAGE	daverage-params = ref (ref / val) (ref / val)
0x002B	DMIN	dmin-params = ref (ref / val) (ref / val)
0x002C	DMAX	dmax-params = ref (ref / val) (ref / val)
0x002D	DSTDEV	dstdev-params = ref (ref / val) (ref / val)
0x002E	VAR	var-params = (ref / val) *254(ref / val)
0x002F	DVAR	dvar-params = ref (ref / val) (ref / val)
0x0030	TEXT	text-params = val val
0x0031	LINEST	linest-params = (ref / val) [(ref / val) *2(ref / val)]
0x0032	TREND	trend-params = (ref / val) [(ref / val) [(ref / val) [ref / val]]]
0x0033	LOGEST	logest-params = (ref / val) [(ref / val) *2(ref / val)]
0x0034	GROWTH	growth-params = (ref / val) [(ref / val) [(ref / val) [ref / val]]]
0x0035	GOTO	goto-params = ref
0x0036	HALT	halt-params = [val]
0x0037	RETURN	return-params = [ref / val]
0x0038	PV	pv-params = val val val *2(val)
0x0039	FV	fv-params = val val val *2(val)
0x003A	NPER	nper-params = val val val *2(val)
0x003B	PMT	pmt-params = val val val *2(val)
0x003C	RATE	rate-params = val val val *3(val)
0x003D	MIRR	mirr-params = (ref / val) val val
0x003E	IRR	irr-params = (ref / val) [val]
0x003F	RAND	This function takes no parameters.
0x0040	MATCH	match-params = val (ref / val) [ref / val]
0x0041	DATE	date-params = val val val
0x0042	TIME	time-params = val val val
0x0043	DAY	day-params = val

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Value	Meaning	Parameters
0x0044	MONTH	month-params = val
0x0045	YEAR	year-params = val
0x0046	WEEKDAY	weekday-params = val [val]
0x0047	HOUR	hour-params = val
0x0048	MINUTE	minute-params = val
0x0049	SECOND	second-params = val
0x004A	NOW	This function takes no parameters.
0x004B	AREAS	areas-params = ref
0x004C	ROWS	rows-params = (ref / val)
0x004D	COLUMNS	columns-params = (ref / val)
0x004E	OFFSET	offset-params = ref val val *2(val)
0x004F	ABSREF	absref-params = val ref
0x0050	RELREF	relref-params = ref ref
0x0051	ARGUMENT	argument-params = [val [(ref / val) [ref]]]
0x0052	SEARCH	search-params = val val [val]
0x0053	TRANSPOSE	transpose-params = val
0x0054	ERROR	error-params = [val [ref / val]]
0x0055	STEP	This function takes no parameters.
0x0056	TYPE	type-params = val
0x0057	ECHO	echo-params = [val]
0x0058	SET.NAME	set-name-params = val [ref / val]
0x0059	CALLER	This function takes no parameters.
0x005A	DEREF	deref-params = ref
0x005B	WINDOWS	windows-params = [val [val]]
0x005D	DOCUMENTS	documents-params = [val [val]]
0x005E	ACTIVE.CELL	This function takes no parameters.
0x005F	SELECTION	This function takes no parameters.
0x0060	RESULT	result-params = [val]
0x0061	ATAN2	atan2-params = val val
0x0062	ASIN	asin-params = val
0x0063	ACOS	acos-params = val
0x0064	CHOOSE	choose-params = val (ref / val) *253(ref / val)
0x0065	HLOOKUP	hlookup-params = val (ref / val) (ref / val) [val]
0x0066	VLOOKUP	vlookup-params = val (ref / val) (ref / val) [val]
0x0067	LINKS	links-params = [val [val]]
0x0068	INPUT	input-params = val [val [val [val [val [val [val]]]]]]
0x0069	ISREF	isref-params = (ref / val)
0x006A	GET.FORMULA	get-formula-params = (ref / val)
0x006B	GET.NAME	get-name-params = val [val]
0x006C	SET.VALUE	set-value-params = ref val
0x006D	LOG	log-params = val [val]
0x006E	EXEC	exec-params = val [val *2(val)]
0x006F	CHAR	char-params = val

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Value	Meaning	Parameters
0x0070	LOWER	lower-params = val
0x0071	UPPER	upper-params = val
0x0072	PROPER	proper-params = val
0x0073	LEFT	left-params = val [val]
0x0074	RIGHT	right-params = val [val]
0x0075	EXACT	right-params = val [val]
0x0076	TRIM	trim-params = val
0x0077	REPLACE	replace-params = val val val val
0x0078	SUBSTITUTE	substitute-params = val val val [val]
0x0079	CODE	code-params = val
0x007A	NAMES	names-params = [val [val [val]]]
0x007B	DIRECTORY	directory-params = [val]
0x007C	FIND	find-params = val val [val]
0x007D	CELL	cell-params = val [ref]
0x007E	ISERR	iserr-params = val
0x007F	ISTEXT	istext-params = val
0x0080	ISNUMBER	isnumber-params = val
0x0081	ISBLANK	isblank-params = val
0x0082	T	t-params = (ref / val)
0x0083	N	n-params = (ref / val)
0x0084	FOPEN	fopen-params = val [val]
0x0085	FCLOSE	fclose-params = val
0x0086	FSIZE	fsize-params = val
0x0087	FREADLN	freadln-params = val
0x0088	FREAD	fread-params = val val
0x0089	FWRITELN	fwriteln-params = val val
0x008A	FWRITE	fwrite-params = val val
0x008B	FPOS	fpos-params = val [val]
0x008C	DATEVALUE	datevalue-params = val
0x008D	TIMEVALUE	timevalue-params = val
0x008E	SLN	sln-params = val val val
0x008F	SYD	syd-params = val val val val
0x0090	DDB	ddb-params = val val val val [val]
0x0091	GET.DEF	get-def-params = val [val [val]]
0x0092	REFTEXT	reftext-params = ref [val]
0x0093	TEXTREF	textref-params = val [val]
0x0094	INDIRECT	indirect-params = val [val]
0x0095	REGISTER	register-params = val [val [val [val [val [val [val [val [val [val *245(val)]]]]]]]]]
0x0096	CALL	call-params = val [(ref / val) *253(ref / val)]
0x0097	ADD.BAR	add-bar-params = [val]
0x0098	ADD.MENU	add-menu-params = val (ref / val) [(ref / val) [val]]
0x0099	ADD.COMMAND	add-command-params = val (ref / val) (ref / val) [(ref / val) [val]]
0x009A	ENABLE.COMMAND	enable-command-params = val val

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Value	Meaning	Parameters
		val val [val]
0x009B	CHECK.COMMAND	check-command-params = val val val val [val]
0x009C	RENAME.COMMAND	rename-command-params = val val val val [val]
0x009D	SHOW.BAR	show-bar-params = [val]
0x009E	DELETE.MENU	delete-menu-params = val val [val]
0x009F	DELETE.COMMAND	delete-command-params = val val val [val]
0x00A0	GET.CHART.ITEM	get-chart-item-params = val [val [val]]
0x00A1	DIALOG.BOX	dialog-box-params = (ref / val)
0x00A2	CLEAN	clean-params = val
0x00A3	MDETERM	mdeterm-params = val
0x00A4	MINVERSE	minverse-params = val
0x00A5	MMULT	mmult-params = val val
0x00A6	FILES	files-params = *2(val)
0x00A7	IPMT	ipmt-params = val val val val *2(val)
0x00A8	PPMT	ppmt-params = val val val val *2(val)
0x00A9	COUNTA	counta-params = (ref / val) *254(ref / val)
0x00AA	CANCEL.KEY	cancel-key-params = [val [ref]]
0x00AB	FOR	for-params = val val val [val]
0x00AC	WHILE	while-params = val
0x00AD	BREAK	This function takes no parameters.
0x00AE	NEXT	This function takes no parameters.
0x00AF	INITIATE	initiate-params = val val
0x00B0	REQUEST	request-params = val val
0x00B1	POKE	poke-params = val (ref / val) (ref / val)
0x00B2	EXECUTE	execute-params = val val
0x00B3	TERMINATE	terminate-params = val
0x00B4	RESTART	restart-params = [val]
0x00B5	HELP	help-params = [val]
0x00B6	GET.BAR	get-bar-params = *4(val)
0x00B7	PRODUCT	product-params = (ref / val) *254(ref / val)
0x00B8	FACT	fact-params = val
0x00B9	GET.CELL	get-cell-params = val [ref]
0x00BA	GET.WORKSPACE	get-workspace-params = val
0x00BB	GET.WINDOW	get-window-params = val [val]
0x00BC	GET.DOCUMENT	get-document-params = val [val]
0x00BD	DPRODUCT	dproduct-params = ref (ref / val) (ref / val)
0x00BE	ISNONTEXT	isnontext-params = val
0x00BF	GET.NOTE	get-note-params = [(ref / val) *2(val)]
0x00C0	NOTE	note-params = [val [(ref / val)

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Value	Meaning	Parameters
		*2(ref / val)]]
0x00C1	STDEVP	stdevp-params = (ref / val) *254(ref / val)
0x00C2	VARP	varp-params = (ref / val) *254(ref / val)
0x00C3	DSTDEVP	dstdevp-params = ref (ref / val) (ref / val)
0x00C4	DVARP	dvarp-params = ref (ref / val) (ref / val)
0x00C5	TRUNC	trunc-params = val [val]
0x00C6	ISLOGICAL	islogical-params = val
0x00C7	DCOUNTA	dcounta-params = ref (ref / val) (ref / val)
0x00C8	DELETE.BAR	delete-bar-params = val
0x00C9	UNREGISTER	unregister-params = val
0x00CC	USDOLLAR	usdollar-params = val [val]
0x00CD	FINDB	findb-params = val val [val]
0x00CE	SEARCHB	searchb-params = val val [val]
0x00CF	REPLACEB	replaceb-params = val val val val
0x00D0	LEFTB	leftb-params = val [val]
0x00D1	RIGHTB	rightb-params = val [val]
0x00D2	MIDB	midb-params = val val val
0x00D3	LENB	midb-params = val val val
0x00D4	ROUNDUP	roundup-params = val val
0x00D5	ROUNDDOWN	rounddown-params = val val
0x00D6	ASC	asc-params = val
0x00D7	DBCS	dbcs-params = val
0x00D8	RANK	rank-params = val ref [val]
0x00DB	ADDRESS	address-params = val val [val [val [val]]]
0x00DC	DAYS360	days360-params = val val [val]
0x00DD	TODAY	This function takes no parameters.
0x00DE	VDB	vdb-params = val val val val val [val [val]]
0x00DF	ELSE	This function takes no parameters.
0x00E0	ELSE.IF	else-if-params = val
0x00E1	END.IF	This function takes no parameters.
0x00E2	FOR.CELL	for-cell-params = val [(ref / val) [ref / val]]
0x00E3	MEDIAN	median-params = (ref / val) *254(ref / val)
0x00E4	SUMPRODUCT	sumproduct-params = val *254(val)
0x00E5	SINH	sinh-params = val
0x00E6	COSH	cosh-params = val
0x00E7	TANH	tanh-params = val
0x00E8	ASINH	asinh-params = val
0x00E9	ACOSH	acosh-params = val
0x00EA	ATANH	atanh-params = val
0x00EB	DGET	dget-params = ref (ref / val) (ref / val)

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Value	Meaning	Parameters
0x00EC	CREATE.OBJECT	create-object-params = val (ref / val) [(ref / val) [(ref / val) [(ref / val) [(ref / val) [(ref / val) [(ref / val) [ref / val]]]]]]]
0x00ED	VOLATILE	volatile-params = [val]
0x00EE	LAST.ERROR	This function takes no parameters.
0x00EF	CUSTOM.UNDO	custom-undo-params = *2(val)
0x00F0	CUSTOM.REPEAT	custom-repeat-params = *3(val)
0x00F1	FORMULA.CONVERT	formula-convert-params = val (ref / val) *3(ref / val)
0x00F2	GET.LINK.INFO	get-link-info-params = val val [val [val]]
0x00F3	TEXT.BOX	text-box-params = val [val *2(val)]
0x00F4	INFO	info-params = val
0x00F5	GROUP	This function takes no parameters.
0x00F6	GET.OBJECT	get-object-params = val [val *3(val)]
0x00F7	DB	db-params = val val val val [val]
0x00F8	PAUSE	pause-params = [val]
0x00FB	RESUME	resume-params = [val]
0x00FC	FREQUENCY	frequency-params = (ref / val) (ref / val)
0x00FD	ADD.TOOLBAR	add-toolbar-params = [val [val]]
0x00FE	DELETE.TOOLBAR	delete-toolbar-params = val

0x00FF	**user-defined function (UDF)** or **future function**	`user-defined-or-future-function = cell-params / user-defined-params / user-defined-x-params / future-function`
		
		`cell-params = (`**`PtgRef`**` / `**`PtgRefN`**` / `**`PtgRef3d`**` / `**`PtgRefErr`**` / `**`PtgRefErr3d`**`) *254(ref / val)`
		
		`user-defined-params =` **`PtgName`** `*254(ref / val)`
		
		The **PtgName** (section 2.5.97.60) of the user-defined-params rule MUST NOT be a VALUE_TYPE, as described in section 2.5.97.88.
		
		If the formula (section 2.2.2) containing this structure is part of a **revision** as specified in the Formulas overview (section 2.2.2), then this structure MUST be contained by a **CellParsedFormula** (section 2.5.97.4) or

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Value	Meaning	Parameters
		NameParsedFormula (section 2.5.97.12) structure. The **rgcb** field of the **CellParsedFormula** or **NameParsedFormula** MUST have a **RevNameTabid** (section 2.5.97.85) that corresponds to the **PtgName** in the user-defined-params rule. The correspondence between **RevNameTabid** and **PtgName** is specified by **RgbExtra** (section 2.5.97.87). The **RevNameTabid** MUST NOT have a **name.st** equal to one of the values in the following table. If the formula containing this structure is not part of a revision as specified in the Formulas overview (section 2.2.2), the **fFutureFunction** field of the **BrtName** (section 2.4.705) record MUST be 0. The **BrtName** record is specified by the **nameindex** field of the **PtgName** of the user-defined-params rule. `user-defined-x-params = PtgNameX *254(ref / val)` The **PtgNameX** (section 2.5.97.61) of the user-defined-x-params rule MUST NOT be a VALUE_TYPE, as described in section 2.5.97.88. Some of the formulas containing this structure are part of a revision as specified in the Formulas overview (section 2.2.2). If so, the **RevName** (section 2.5.97.83) corresponding to the **PtgNameX** (as specified by **RgbExtra)** in the **rgcb** field of the **CellParsedFormula** or **NameParsedFormula** containing this structure MUST NOT have a **name.name.st** or **externName.name.st** equal to one of the values

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Value	Meaning	Parameters
		in the following table. If the formula containing this structure is not part of a revision as specified in the Formulas overview (section 2.2.2), the **fFutureFunction** field of the **BrtName** record MUST be 0. The **BrtName** record is specified by the **nameindex** field of the **PtgNameX** of the user-defined-x-params rule. `future-function = PtgName future-function-params` The PtgName of the future-function rule MUST NOT be a VALUE_TYPE, as described in section 2.5.97.88. If the formula containing this structure is part of a revision as specified in the Formulas overview (section 2.2.2), then this structure MUST be contained by a **CellParsedFormula** or **NameParsedFormula** structure. The **rgcb** field of the **CellParsedFormula** or **NameParsedFormula** MUST have a **RevNameTabid** that corresponds to the **PtgName** in the future-function rule. The correspondence between **RevNameTabid** and **PtgName** is specified by **RgbExtra**. The **RevNameTabid** MUST have a **tabid** of 0xFFFF, a **name.iBuiltin** of 0, and a **name.st** equal to one of the values in the following table. If the formula containing this structure is not part of a revision as specified in the Formulas overview (section 2.2.2), the **fFutureFunction** field of the **BrtName** record MUST be 1. The **BrtName** record is specified by the **nameindex** field of the

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Value	Meaning	Parameters
		PtgName of the future-function rule. future-function-params = acot-params / acoth-params / aggregate-params / arabic-params / base-params / betadist-params / beta-inv-params / binom-dist-params / binom-dist-range-params / binom-inv-params / bitand-params / bitlshift-params / bitor-params / bitrshift-params / bitxor-params / ceiling-math-params / ceiling-precise-params / chisq-dist-params / chisq-dist-rt-params / chisq-inv-params / chisq-inv-rt-params / chisq-test-params / combina-params / concat-params / confidence-norm-params / confidence-t-params / cot-params / coth-params / covariance-p-params / covariance-s-params / csc-params / csch-params / days-params / decimal-params / ecma-ceiling-params / erf-precise-params / erfc-precise-params / expon-dist-params / f-dist-params / f-dist-rt-params / f-inv-params / f-inv-rt-params / fieldvalue-params / filterxml-params / floor-math-params / floor-precise-params / forecast-ets-params / forecast-ets-confint-params / forecast-ets-seasonality-params / forecast-ets-stat-params / forecast-linear-params / formulatext-params / gamma-params / gamma-dist-params / gamma-inv-params / gammaln-precise-params / gauss-params / hypgeom-dist-params / ifna-params / ifs-params / imcosh-params / imcot-params / imcsc-params / imcsch-params / imsec-params / imsech-params / imsinh-params / imtan-params / isformula-

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Value	Meaning	Parameters
		params / iso-ceiling-params / isoweeknum-params / let-params / lognorm-dist-params / lognorm-inv-params / maxifs-params / minifs-params / mode-mult-params / mode-sngl-params / munit-params / negbinom-dist-params / networkdays-intl-params / norm-dist-params / norm-inv-params / norm-s-dist-params / norm-s-inv-params / numbervalue-params / pduration-params / percentile-exc-params / percentile-inc-params / percentrank-exc-params / percentrank-inc-params / permutationa-params / phi-params / poisson-dist-params / quartile-exc-params / quartile-inc-params / querystring-params / randarray-params / rank-avg-params / rank-eq-params / rri-params / sec-params / sech-params / sequence-params / sheet-params / sheets-params / skew-p-params / sortby-params / stdev-p-params / stdev-s-params / switch-params / t-dist-params / t-dist-twotails-params / t-dist-rt-params / t-inv-params / t-inv-twotails-params / t-test-params / textjoin-params / unichar-params / unicode-params / unique-params / var-s-params / var-p-params / webservice-params / weibull-dist-params / workday-intl-params / xlookup-params / xor-params / z-test-params
0x0100	RESET.TOOLBAR	reset-toolbar-params = val
0x0101	EVALUATE	evaluate-params = val

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Value	Meaning	Parameters
0x0102	GET.TOOLBAR	get-toolbar-params = val [val]
0x0103	GET.TOOL	get-tool-params = val [val [val]]
0x0104	SPELLING.CHECK	spelling-check-params = val [val [val]]
0x0105	ERROR.TYPE	error-type-params = val
0x0106	APP.TITLE	app-title-params = [val]
0x0107	WINDOW.TITLE	window-title-params = [val]
0x0108	SAVE.TOOLBAR	save-toolbar-params = [val [val]]
0x0109	ENABLE.TOOL	enable-tool-params = val val val
0x010A	PRESS.TOOL	press-tool-params = val val val
0x010B	REGISTER.ID	register-id-params = val val [val]
0x010C	GET.WORKBOOK	get-workbook-params = val [val]
0x010D	AVEDEV	avedev-params = (ref / val) *254(ref / val)
0x010E	BETADIST	betadist-params = val val val *2(val)
0x010F	GAMMALN	gammaln-params = val
0x0110	BETAINV	betainv-params = val val val *2(val)
0x0111	BINOMDIST	binomdist-params = val val val val
0x0112	CHIDIST	chidist-params = val val
0x0113	CHIINV	chiinv-params = val val
0x0114	COMBIN	combin-params = val val
0x0115	CONFIDENCE	confidence-params = val val val
0x0116	CRITBINOM	critbinom-params = val val val
0x0117	EVEN	even-params = val
0x0118	EXPONDIST	expondist-params = val val val
0x0119	FDIST	fdist-params = val val val
0x011A	FINV	finv-params = val val val
0x011B	FISHER	fisher-params = val
0x011C	FISHERINV	fisherinv-params = val
0x011D	FLOOR	floor-params = val val
0x011E	GAMMADIST	gammadist-params = val val val val
0x011F	GAMMAINV	gammainv-params = val val val
0x0120	CEILING	ceiling-params = val val
0x0121	HYPGEOMDIST	hypgeomdist-params = val val val val
0x0122	LOGNORMDIST	lognormdist-params = val val val
0x0123	LOGINV	loginv-params = val val val
0x0124	NEGBINOMDIST	negbinomdist-params = val val val
0x0125	NORMDIST	normdist-params = val val val val
0x0126	NORMSDIST	normsdist-params = val
0x0127	NORMINV	norminv-params = val val val
0x0128	NORMSINV	normsinv-params = val
0x0129	STANDARDIZE	standardize-params = val val val
0x012A	ODD	odd-params = val
0x012B	PERMUT	permut-params = val val
0x012C	POISSON	poisson-params = val val val

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Value	Meaning	Parameters
0x012D	TDIST	tdist-params = val val val
0x012E	WEIBULL	weibull-params = val val val val
0x012F	SUMXMY2	sumxmy2-params = val val
0x0130	SUMX2MY2	sumx2my2-params = val val
0x0131	SUMX2PY2	sumx2py2-params = val val
0x0132	CHITEST	chitest-params = val val
0x0133	CORREL	correl-params = val val
0x0134	COVAR	covar-params = val val
0x0135	FORECAST	forecast-params = val val val
0x0136	FTEST	ftest-params = val val
0x0137	INTERCEPT	intercept-params = val val
0x0138	PEARSON	pearson-params = val val
0x0139	RSQ	rsq-params = val val
0x013A	STEYX	steyx-params = val val
0x013B	SLOPE	slope-params = val val
0x013C	TTEST	ttest-params = val val val val
0x013D	PROB	prob-params = val val val [val]
0x013E	DEVSQ	devsq-params = (ref / val) *254(ref / val)
0x013F	GEOMEAN	geomean-params = (ref / val) *254(ref / val)
0x0140	HARMEAN	harmean-params = (ref / val) *254(ref / val)
0x0141	SUMSQ	sumsq-params = (ref / val) *254(ref / val)
0x0142	KURT	kurt-params = (ref / val) *254(ref / val)
0x0143	SKEW	skew-params = (ref / val) *254(ref / val)
0x0144	ZTEST	ztest-params = (ref / val) val [val]
0x0145	LARGE	large-params = (ref / val) val
0x0146	SMALL	small-params = (ref / val) val
0x0147	QUARTILE	quartile-params = (ref / val) val
0x0148	PERCENTILE	quartile-params = (ref / val) val
0x0149	PERCENTRANK	percentrank-params = (ref / val) val [val]
0x014A	MODE	mode-params = val *254(val)
0x014B	TRIMMEAN	trimmean-params = (ref / val) val
0x014C	TINV	tinv-params = val val
0x014E	MOVIE.COMMAND	movie-command-params = val val val [val]
0x014F	GET.MOVIE	get-movie-params = val val [val]
0x0150	CONCATENATE	concatenate-params = val *254(val)
0x0151	POWER	power-params = val val
0x0152	PIVOT.ADD.DATA	pivot-add-data-params = val val [val [val [val [val *3(val)]]]]
0x0153	GET.PIVOT.TABLE	get-pivot-table-params = val [val]
0x0154	GET.PIVOT.FIELD	get-pivot-field-params = val [val [val]]

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Value	Meaning	Parameters
0x0155	GET.PIVOT.ITEM	get-pivot-item-params = val [val [val [val]]]
0x0156	RADIANS	radians-params = val
0x0157	DEGREES	degrees-params = val
0x0158	SUBTOTAL	subtotal-params = val ref *253(ref)
0x0159	SUMIF	sumif-params = ref val [ref]
0x015A	COUNTIF	countif-params = ref val
0x015B	COUNTBLANK	countblank-params = ref
0x015C	SCENARIO.GET	scenario-get-params = val [val]
0x015D	OPTIONS.LISTS.GET	options-lists-get-params = val
0x015E	ISPMT	ispmt-params = val val val val
0x015F	DATEDIF	datedif-params = val val val
0x0160	DATESTRING	datestring-params = val
0x0161	NUMBERSTRING	numberstring-params = val val
0x0162	ROMAN	roman-params = val [val]
0x0163	OPEN.DIALOG	open-dialog-params = [val [val [val [val]]]]
0x0164	SAVE.DIALOG	save-dialog-params = [val [val [val [val [val]]]]]
0x0165	VIEW.GET	view-get-params = val [val]
0x0166	GETPIVOTDATA	getpivotdata-params = (ref / val) (ref / val) [val [val *125(val val)]]
0x0167	HYPERLINK	hyperlink-params = val [val]
0x0168	PHONETIC	phonetic-params = ref
0x0169	AVERAGEA	averagea-params = (ref / val) *254(ref / val)
0x016A	MAXA	maxa-params = (ref / val) *254(ref / val)
0x016B	MINA	mina-params = (ref / val) *254(ref / val)
0x016C	STDEVPA	stdevpa-params = (ref / val) *254(ref / val)
0x016D	VARPA	varpa-params = (ref / val) *254(ref / val)
0x016E	STDEVA	stdeva-params = (ref / val) *254(ref / val)
0x016F	VARA	vara-params = (ref / val) *254(ref / val)
0x0170	BAHTTEXT	bahttext-params = val
0x0171	THAIDAYOFWEEK	thaidayofweek-params = val
0x0172	THAIDIGIT	thaidigit-params = val
0x0173	THAIMONTHOFYEAR	thaimonthofyear-params = val
0x0174	THAINUMSOUND	thainumsound-params = val
0x0175	THAINUMSTRING	thainumstring-params = val
0x0176	THAISTRINGLENGTH	thaistringlength-params = val
0x0177	ISTHAIDIGIT	isthaidigit-params = val
0x0178	ROUNDBAHTDOWN	roundbahtdown-params = val
0x0179	ROUNDBAHTUP	roundbahtup-params = val
0x017A	THAIYEAR	thaiyear-params = val
0x017B	RTD	rtd-params = val val val *252(val)

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Value	Meaning	Parameters
0x017C	CUBEVALUE	cubevalue-params = val [(ref / val) *253(ref / val)]
0x017D	CUBEMEMBER	cubemember-params = val (ref / val) [val]
0x017E	CUBEMEMBERPROPERTY	cubememberproperty-params = val val val
0x017F	CUBERANKEDMEMBER	cuberankedmember-params = val val val [val]
0x0180	HEX2BIN	hex2bin-params = (ref / val) [ref / val]
0x0181	HEX2DEC	hex2dec-params = (ref / val)
0x0182	HEX2OCT	hex2oct-params = (ref / val) [ref / val]
0x0183	DEC2BIN	dec2bin-params = (ref / val) [ref / val]
0x0184	DEC2HEX	dec2hex-params = (ref / val) [ref / val]
0x0185	DEC2OCT	dec2oct-params = (ref / val) [ref / val]
0x0186	OCT2BIN	oct2bin-params = (ref / val) [ref / val]
0x0187	OCT2HEX	oct2hex-params = (ref / val) [ref / val]
0x0188	OCT2DEC	oct2dec-params = (ref / val)
0x0189	BIN2DEC	bin2dec-params = (ref / val)
0x018A	BIN2OCT	bin2oct-params = (ref / val) [ref / val]
0x018B	BIN2HEX	bin2hex-params = (ref / val) [ref / val]
0x018C	IMSUB	imsub-params = (ref / val) (ref / val)
0x018D	IMDIV	imdiv-params = (ref / val) (ref / val)
0x018E	IMPOWER	impower-params = (ref / val) (ref / val)
0x018F	IMABS	imabs-params = (ref / val)
0x0190	IMSQRT	imsqrt-params = (ref / val)
0x0191	IMLN	imln-params = (ref / val)
0x0192	IMLOG2	imlog2-params = (ref / val)
0x0193	IMLOG10	imlog10-params = (ref / val)
0x0194	IMSIN	imsin-params = (ref / val)
0x0195	IMCOS	imcos-params = (ref / val)
0x0196	IMEXP	imexp-params = (ref / val)
0x0197	IMARGUMENT	imargument-params = (ref / val)
0x0198	IMCONJUGATE	imconjugate-params = (ref / val)
0x0199	IMAGINARY	imaginary-params = (ref / val)
0x019A	IMREAL	imreal-params = (ref / val)
0x019B	COMPLEX	complex-params = (ref / val) (ref / val) [ref / val]
0x019C	IMSUM	imsum-params = (ref / val) *254(ref / val)
0x019D	IMPRODUCT	improduct-params = (ref / val)

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Value	Meaning	Parameters
		*254(ref / val)
0x019E	SERIESSUM	seriessum-params = (ref / val) (ref / val) (ref / val) (ref / val)
0x019F	FACTDOUBLE	factdouble-params = (ref / val)
0x01A0	SQRTPI	sqrtpi-params = (ref / val)
0x01A1	QUOTIENT	quotient-params = (ref / val) (ref / val)
0x01A2	DELTA	delta-params = (ref / val) [ref / val]
0x01A3	GESTEP	gestep-params = (ref / val) [ref / val]
0x01A4	ISEVEN	iseven-params = (ref / val)
0x01A5	ISODD	isodd-params = (ref / val)
0x01A6	MROUND	mround-params = (ref / val) (ref / val)
0x01A7	ERF	erf-params = (ref / val) [ref / val]
0x01A8	ERFC	erfc-params = (ref / val)
0x01A9	BESSELJ	besselj-params = (ref / val) (ref / val)
0x01AA	BESSELK	besselk-params = (ref / val) (ref / val)
0x01AB	BESSELY	bessely-params = (ref / val) (ref / val)
0x01AC	BESSELI	besseli-params = (ref / val) (ref / val)
0x01AD	XIRR	xirr-params = (ref / val) (ref / val) [ref / val]
0x01AE	XNPV	xnpv-params = (ref / val) (ref / val) (ref / val)
0x01AF	PRICEMAT	pricemat-params = (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01B0	YIELDMAT	yieldmat-params = (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01B1	INTRATE	intrate-params = (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01B2	RECEIVED	received-params = (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01B3	DISC	disc-params = (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01B4	PRICEDISC	pricedisc-params = (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01B5	YIELDDISC	yielddisc-params = (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01B6	TBILLEQ	tbilleq-params = (ref / val) (ref / val) (ref / val)
0x01B7	TBILLPRICE	tbillprice-params = (ref / val) (ref / val) (ref / val)
0x01B8	TBILLYIELD	tbillyield-params = (ref / val) (ref / val) (ref / val)
0x01B9	PRICE	price-params = (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]

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Value	Meaning	Parameters
0x01BA	YIELD	yield-params = (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01BB	DOLLARDE	dollarde-params = (ref / val) (ref / val)
0x01BC	DOLLARFR	dollarfr-params = (ref / val) (ref / val)
0x01BD	NOMINAL	nominal-params = (ref / val) (ref / val)
0x01BE	EFFECT	effect-params = (ref / val) (ref / val)
0x01BF	CUMPRINC	cumprinc-params = (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val)
0x01C0	CUMIPMT	cumipmt-params = (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val)
0x01C1	EDATE	edate-params = (ref / val) (ref / val)
0x01C2	EOMONTH	eomonth-params = (ref / val) (ref / val)
0x01C3	YEARFRAC	yearfrac-params = (ref / val) (ref / val) [ref / val]
0x01C4	COUPDAYBS	coupdaybs-params = (ref / val) (ref / val) (ref / val) [ref / val]
0x01C5	COUPDAYS	coupdays-params = (ref / val) (ref / val) (ref / val) [ref / val]
0x01C6	COUPDAYSNC	coupdaysnc-params = (ref / val) (ref / val) (ref / val) [ref / val]
0x01C7	COUPNCD	coupncd-params = (ref / val) (ref / val) (ref / val) [ref / val]
0x01C8	COUPNUM	coupnum-params = (ref / val) (ref / val) (ref / val) [ref / val]
0x01C9	COUPPCD	couppcd-params = (ref / val) (ref / val) (ref / val) [ref / val]
0x01CA	DURATION	duration-params = (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01CB	MDURATION	mduration-params = (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01CC	ODDLPRICE	oddlprice-params = (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01CD	ODDLYIELD	oddlyield-params = (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01CE	ODDFPRICE	oddfprice-params = (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01CF	ODDFYIELD	oddfyield-params = (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01D0	RANDBETWEEN	randbetween-params = (ref / val)

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Value	Meaning	Parameters
		(ref / val)
0x01D1	WEEKNUM	weeknum-params = (ref / val) [ref / val]
0x01D2	AMORDEGRC	amordegrc-params = (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01D3	AMORLINC	amorlinc-params = (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01D5	ACCRINT	accrint-params = (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) (ref / val) *2(ref / val)
0x01D6	ACCRINTM	accrintm-params = (ref / val) (ref / val) (ref / val) (ref / val) [ref / val]
0x01D7	WORKDAY	workday-params = (ref / val) (ref / val) [ref / val]
0x01D8	NETWORKDAYS	networkdays-params = (ref / val) (ref / val) [ref / val]
0x01D9	GCD	gcd-params = (ref / val) *254(ref / val)
0x01DA	MULTINOMIAL	multinomial-params = (ref / val) *254(ref / val)
0x01DB	LCM	lcm-params = (ref / val) *254(ref / val)
0x01DC	FVSCHEDULE	fvschedule-params = (ref / val) (ref / val)
0x01DD	CUBEKPIMEMBER	cubekpimember-params = val val val [val]
0x01DE	CUBESET	cubeset-params = val (ref / val) [val [val [val]]]
0x01DF	CUBESETCOUNT	cubesetcount-params = val
0x01E0	IFERROR	iferror-params = val (ref / val)
0x01E1	COUNTIFS	countifs-params = ref val *126(ref val)
0x01E2	SUMIFS	sumifs-params = ref ref val *126(ref val)
0x01E3	AVERAGEIF	averageif-params = ref val [ref]
0x01E4	AVERAGEIFS	averageifs-params = ref ref val *126(ref val)

The following table specifies the names of future functions.

Future Function Value	Meaning	Parameters
_xlfn.ACOT	ACOT	acot-params = val
_xlfn.ACOTH	ACOTH	acoth-params = val
_xlfn.AGGREGATE	AGGREGATE	aggregate-params = 2(val) 1*2(ref / val) *250(ref)
_xlfn.ARABIC	ARABIC	arabic-params = val
_xlfn.BASE	BASE	base-params = val val [val]

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Future Function Value	Meaning	Parameters
_xlfn.BETA.DIST	BETA.DIST	betadist-params = val val val val *2(val)
_xlfn.BETA.INV	BETA.INV	beta-inv-params = val val val *2(val)
_xlfn.BINOM.DIST	BINOM.DIST	binom-dist-params = val val val val
_xlfn.BINOM.DIST.RANGE	BINOM.DIST.RANGE	binom-dist-range-params = val val val [val
_xlfn.BINOM.INV	BINOM.INV	binom-inv-params = val val val
_xlfn.BITAND	BITAND	bitand-params = val val
_xlfn.BITLSHIFT	BITLSHIFT	bitlshift-params = val val
_xlfn.BITOR	BITOR	bitor-params = val val
_xlfn.BITRSHIFT	BITRSHIFT	bitrshift-params = val val
_xlfn.BITXOR	BITXOR	bitxor-params = val val
_xlfn.CEILING.MATH	CEILING.MATH	ceiling-math-params = val [val [val]]
_xlfn.CEILING.PRECISE	CEILING.PRECISE	ceiling-precise-params = val val
_xlfn.CHISQ.DIST	CHISQ.DIST	chisq-dist-params = val val val
_xlfn.CHISQ.DIST.RT	CHISQ.DIST.RT	chisq-dist-rt-params = val val
_xlfn.CHISQ.INV	CHISQ.INV	chisq-inv-params = val val
_xlfn.CHISQ.INV.RT	CHISQ.INV.RT	chisq-inv-rt-params = val val
_xlfn.CHISQ.TEST	CHISQ.TEST	chisq-test-params = val val
_xlfn.COMBINA	COMBINA	combina-params = val val
_xlfn.CONCAT	CONCAT	concat-params = (ref / val) *253(ref / val)
_xlfn.CONFIDENCE.NORM	CONFIDENCE.NORM	confidence-norm-params = val val val
_xlfn.CONFIDENCE.T	CONFIDENCE.T	confidence-t-params = val val val
_xlfn.COT	COT	cot-params = val
_xlfn.COTH	COTH	coth-params = val
_xlfn.COVARIANCE.P	COVARIANCE.P	covariance-p-params = val val

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Future Function Value	Meaning	Parameters
_xlfn.COVARIANCE.S	COVARIANCE.S	covariance-s-params = val val
_xlfn.CSC	CSC	csc-params = val
_xlfn.CSCH	CSCH	csch-params = val
_xlfn.DAYS	DAYS	days-params = val val
_xlfn.DECIMAL	DECIMAL	decimal-params = val val
_xlfn.ECMA.CEILING	ECMA.CEILING	ecma-ceiling-params = val val
_xlfn.ERF.PRECISE	ERF.PRECISE	erf-precise-params = (ref / val)
_xlfn.ERFC.PRECISE	ERFC.PRECISE	erfc-precise-params = (ref / val)
_xlfn.EXPON.DIST	EXPON.DIST	expon-dist-params = val val val
_xlfn.F.DIST	F.DIST	f-dist-params = val val val val
_xlfn.F.DIST.RT	F.DIST.RT	f-dist-rt-params = val val val
_xlfn.F.INV	F.INV	f-inv-params = val val val
_xlfn.F.INV.RT	F.INV.RT	f-inv-rt-params = val val val
_xlfn.FIELDVALUE	FIELDVALUE	fieldvalue-params = val val
_xlfn.FILTERXML	FILTERXML	filterxml-params = val val
_xlfn.FLOOR.MATH	FLOOR.MATH	floor-math-params = val [val [val]]
_xlfn.FLOOR.PRECISE	FLOOR.PRECISE	floor-precise-params = val val
_xlfn.FORMULATEXT	FORMULATEXT	formulatext-params = ref
_xlfn.GAMMA	GAMMA	gamma-params = val
_xlfn.GAMMA.DIST	GAMMA.DIST	gamma-dist-params = val val val val
_xlfn.GAMMA.INV	GAMMA.INV	gamma-inv-params = val val val
_xlfn.GAMMALN.PRECISE	GAMMALN.PRECISE	gammaln-precise-params = val
_xlfn.GAUSS	GAUSS	gauss-params = val
_xlfn.HYPGEOM.DIST	HYPGEOM.DIST	hypgeom-dist-params = val val val val val

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Future Function Value	Meaning	Parameters
_xlfn.IFNA	IFNA	ifna-params = val (ref / val)
_xlfn.IFS	IFS	ifs-params = val (ref / val) *126(val (ref / val))
_xlfn.IMCOSH	IMCOSH	imcosh-params = val
_xlfn.IMCOT	IMCOT	imcot-params = val
_xlfn.IMCSC	IMCSC	imcsc-params = val
_xlfn.IMCSCH	IMCSCH	imcsch-params = val
_xlfn.IMSEC	IMSEC	imsec-params = val
_xlfn.IMSECH	IMSECH	imsech-params = val
_xlfn.IMSINH	IMSINH	imsinh-params = val
_xlfn.IMTAN	IMTAN	imtan-params = val
_xlfn.ISFORMULA	ISFORMULA	isformula-params = ref
_xlfn.ISO.CEILING	ISO.CEILING	iso-ceiling-params = val val
_xlfn.ISOWEEKNUM	ISOWEEKNUM	isoweeknum-params = val
_xlfn.LOGNORM.DIST	LOGNORM.DIST	lognorm-dist-params = val val val val
_xlfn.LOGNORM.INV	LOGNORM.INV	lognorm-inv-params = val val val
_xlfn.MAXIFS	MAXIFS	maxifs-params = ref ref val *125(ref val)
_xlfn.MINIFS	MINIFS	minifs-params = ref ref val *125(ref val)
_xlfn.MODE.MULT	MODE.MULT	mode-mult-params = 1*254(val)
_xlfn.MODE.SNGL	MODE.SNGL	mode-sngl-params = 1*254(val)
_xlfn.MUNIT	MUNIT	munit-params = val
_xlfn.NEGBINOM.DIST	NEGBINOM.DIST	negbinom-dist-params = val val val val
_xlfn.NETWORKDAYS.INTL	NETWORKDAYS.INTL	networkdays-intl-params = 2(ref / val) [val [ref / val]]
_xlfn.NORM.DIST	NORM.DIST	norm-dist-params = val val val val
_xlfn.NORM.INV	NORM.INV	norm-inv-params = val val val
_xlfn.NORM.S.DIST	NORM.S.DIST	norm-s-dist-params = val

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Future Function Value	Meaning	Parameters
		val
_xlfn.NORM.S.INV	NORM.S.INV	norm-s-inv-params = val
_xlfn.NUMBERVALUE	NUMBERVALUE	numbervalue-params = val [val [val]]
_xlfn.PDURATION	PDURATION	pduration-params = val val val
_xlfn.PERCENTILE.EXC	PERCENTILE.EXC	percentile-exc-params = (ref / val) val
_xlfn.PERCENTILE.INC	PERCENTILE.INC	percentile-inc-params = (ref / val) val
_xlfn.PERCENTRANK.EXC	PERCENTRANK.EXC	percentrank-exc-params = (ref / val) val [val]
_xlfn.PERCENTRANK.INC	PERCENTRANK.INC	percentrank-inc-params = (ref / val) val [val]
_xlfn.PERMUTATIONA	PERMUTATIONA	permutationa-params = val val
_xlfn.PHI	PHI	phi-params = val
_xlfn.POISSON.DIST	POISSON.DIST	poisson-dist-params = val val val
_xlfn.QUARTILE.EXC	QUARTILE.EXC	quartile-exc-params = (ref / val) val
_xlfn.QUARTILE.INC	QUARTILE.INC	quartile-inc-params = (ref / val) val
_xlfn.QUERYSTRING	QUERYSTRING	querystring-params = val val *126(val val)
_xlfn.RANDARRAY	RANDARRAY	randarray-params = *5(val)
_xlfn.RANK.AVG	RANK.AVG	rank-avg-params = val ref [val]
_xlfn.RANK.EQ	RANK.EQ	rank-eq-params = val ref [val]
_xlfn.RRI	RRI	rri-params = val val val
_xlfn.SEC	SEC	sec-params = val
_xlfn.SECH	SECH	sech-params = val
_xlfn.SEQUENCE	SEQUENCE	sequence-params = 1*4(val)
_xlfn.SHEET	SHEET	sheet-params = [(ref / val)]
_xlfn.SHEETS	SHEETS	sheets-params = [(ref / val)]

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Future Function Value	Meaning	Parameters
_xlfn.SKEW.P	SKEW.P	skew-p-params = (ref / val) *253(ref / val)
_xlfn.SORTBY	SORTBY	sortby-params = val val [val *125(val val)]
_xlfn.STDEV.P	STDEV.P	stdev-p-params = 1*254(ref / val)
_xlfn.STDEV.S	STDEV.S	stdev-s-params = 1*254(ref / val)
_xlfn.SWITCH	SWITCH	switch-params = val (ref / val) (ref / val) *251(ref / val)
_xlfn.T.DIST	T.DIST	t-dist-params = val val val
_xlfn.T.DIST.2T	T.DIST.2T	t-dist-twotails-params = val val
_xlfn.T.DIST.RT	T.DIST.RT	t-dist-rt-params = val val
_xlfn.T.INV	T.INV	t-inv-params = val val
_xlfn.T.INV.2T	T.INV.2T	t-inv-twotails-params = val val
_xlfn.T.TEST	T.TEST	t-test-params = val val val val
_xlfn.TEXTJOIN	TEXTJOIN	textjoin-params = (ref / val) val (ref / val) *251(ref / val)
_xlfn.UNICHAR	UNICHAR	unichar-params = val
_xlfn.UNICODE	UNICODE	unicode-params = val
_xlfn.UNIQUE	UNIQUE	unique-params = 1*3(val)
_xlfn.VAR.P	VAR.P	var-p-params = 1*254(ref / val)
_xlfn.VAR.S	VAR.S	var-s-params = 1*254(ref / val)
_xlfn.WEBSERVICE	WEBSERVICE	webservice-params = val [val]
_xlfn.WEIBULL.DIST	WEIBULL.DIST	weibull-dist-params = val val val val
_xlfn.WORKDAY.INTL	WORKDAY.INTL	workday-intl-params = 2(ref / val) [val [ref / val]]
_xlfn.XLOOKUP	XLOOKUP	xlookup-params = val (ref/val) (ref/val) [(ref/val) *2(val)]
_xlfn.XOR	XOR	xor-params = (ref / val) *253(ref / val)

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Future Function Value	Meaning	Parameters
_xlfn.Z.TEST	Z.TEST	z-test-params = (ref / val) val [val]
_xlfn.FORECAST.ETS	FORECAST.ETS	forecast-ets-params = val (ref / val) (ref / val) [val] [val] [val]
_xlfn.FORECAST.ETS.CONFINT	FORECAST.ETS.CONFINT	forecast-ets-confint-params = val (ref / val) (ref / val) [val] [val] [val] [val]
_xlfn.FORECAST.ETS.SEASONALITY	FORECAST.ETS.SEASONALITY	forecast-ets-seasonality-params = (ref / val) (ref / val) [val] [val]
_xlfn.FORECAST.ETS.STAT	FORECAST.ETS.STAT	forecast-ets-stat-params = val (ref / val) (ref / val) [val] [val] [val]
_xlfn.FORECAST.LINEAR	FORECAST.LINEAR	forecast-linear-params = val val val
_xlfn.LET	LET	let-params = 1*253(PtgName (ref / val)) (ref / val) The PtgName (section 2.5.97.60) of the let-params rule MUST NOT be a VALUE_TYPE, as described in section 2.5.97.88. The string field of the XLNameWideString (section 2.5.165) of the name field of the BrtName (section 2.4.705) specified by the nameindex field of the PtgName (section 2.5.97.60) of the let-params rule MUST adhere to the following grammar (where name_character is specified in section 2.5.165): string = "_xlpm." parameter_name parameter_name = *name_character parameter_name MUST NOT equal "TRUE" or "FALSE" (case-insensitive). parameter_name MUST NOT be an A1 cell reference as specified in section 2.5.165.

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The following grammar is used in the **Rgce** (section 2.5.97.88) structure definition.

```
params-fixed = isna-params / iserror-params /
    sin-params / cos-params / tan-params /
    atan-params / sqrt-params /
    exp-params / ln-params / log10-params /
    abs-params / int-params / sign-params /
    round-params / rept-params / mid-params /
    len-params / value-params / not-params / mod-params /
    dcount-params / dsum-params / daverage-params /
    dmin-params / dmax-params / dstdev-params /
    dvar-params / text-params / goto-params /
    mirr-params / date-params /
    time-params / day-params / month-params /
    year-params / hour-params / minute-params /
    second-params / areas-params /
    rows-params / columns-params / absref-params /
    relref-params / transpose-params /
    type-params / deref-params / atan2-params /
    asin-params / acos-params / isref-params /
    get-formula-params / set-value-params / char-params /
    lower-params / upper-params / proper-params /
    exact-params / trim-params / replace-params /
    code-params / iserr-params / istext-params /
    isnumber-params / isblank-params / t-params /
    n-params / fclose-params / fsize-params /
    freadln-params / fread-params / fwriteln-params /
    fwrite-params / datevalue-params / timevalue-params /
    sln-params / syd-params / dialog-box-params /
    clean-params / mdeterm-params / minverse-params /
    mmult-params / while-params / initiate-params / request-params /
    poke-params / execute-params / terminate-params /
    fact-params / get-workspace-params / dproduct-params /
    isnontext-params / dstdevp-params / dvarp-params /
```


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islogical-params / dcounta-params / delete-bar-params /

unregister-params / replaceb-params / midb-params /

lenb-params / roundup-params / rounddown-params /

asc-params / dbcs-params / else-if-params /

sinh-params / cosh-params / tanh-params /

asinh-params / acosh-params / atanh-params /

dget-params / info-params / frequency-params / delete-toolbar-params /

reset-toolbar-params / evaluate-params / error-type-params /

enable-tool-params / press-tool-params / gammaln-params /

binomdist-params / chidist-params / chiinv-params /

combin-params / confidence-params / critbinom-params /

even-params / expondist-params / fdist-params /

finv-params / fisher-params / fisherinv-params /

floor-params / gammadist-params / gammainv-params /

ceiling-params / hypgeomdist-params / lognormdist-params /

loginv-params / negbinomdist-params / normdist-params /

normsdist-params / norminv-params / normsinv-params /

standardize-params / odd-params / permut-params /

poisson-params / tdist-params / weibull-params /

sumxmy2-params / sumx2my2-params / sumx2py2-params /

chitest-params / correl-params / covar-params /

forecast-params / ftest-params / intercept-params /

pearson-params / rsq-params / steyx-params /

slope-params / ttest-params / large-params /

small-params / quartile-params / percentile-params /

trimmean-params / tinv-params / power-params /

radians-params / degrees-params / countif-params /

countblank-params / options-lists-get-params / ispmt-params /

datedif-params / datestring-params / numberstring-params /

phonetic-params / bahttext-params / thaidayofweek-params /

thaidigit-params / thaimonthofyear-params / thainumsound-params /

thainumstring-params / thaistringlength-params / isthaidigit-params /

roundbahtdown-params / roundbahtup-params / thaiyear-params /

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```
    cubememberproperty-params / hex2dec-params / oct2dec-params /
    bin2dec-params / imsub-params / imdiv-params /
    impower-params / imabs-params / imsqrt-params /
    imln-params / imlog2-params / imlog10-params /
    imsin-params / imcos-params / imexp-params /
    imargument-params / imconjugate-params / imaginary-params /
    imreal-params / seriessum-params / factdouble-params /
    sqrtpi-params / quotient-params / iseven-params /
    isodd-params / mround-params / erfc-params /
    besselj-params / besselk-params / bessely-params /
    besseli-params / xnpv-params / tbilleq-params /
    tbillprice-params / tbillyield-params / dollarde-params /
    dollarfr-params / nominal-params / effect-params /
    cumprinc-params / cumipmt-params / edate-params /
    eomonth-params / randbetween-params / convert-params /
    fvschedule-params / cubesetcount-params / iferror-params
params-variable = count-params / if-params / sum-params /
    average-params / min-params / max-params /
    row-params / column-params / npv-params /
    stdev-params / dollar-params / fixed-params /
    lookup-params / index-params / and-params /
    or-params / var-params / linest-params /
    trend-params / logest-params / growth-params /
    halt-params / return-params / pv-params /
    fv-params / nper-params / pmt-params /
    rate-params / irr-params / match-params /
    weekday-params / offset-params / argument-params /
    search-params / error-params / echo-params /
    set-name-params / windows-params /
    documents-params / result-params / choose-params /
    hlookup-params / vlookup-params / links-params /
    input-params / get-name-params / log-params /
    exec-params / left-params / right-params /
```


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```
substitute-params / names-params / directory-params /
find-params / cell-params / fopen-params /
fpos-params / ddb-params / get-def-params /
reftext-params / textref-params / indirect-params /
register-params / call-params / add-bar-params /
add-menu-params / add-command-params / enable-command-params /
check-command-params / rename-command-params / show-bar-params /
delete-menu-params / delete-command-params / get-chart-item-params /
files-params / ipmt-params / ppmt-params /
counta-params / cancel-key-params / for-params /
restart-params / help-params / get-bar-params /
product-params / get-cell-params / get-window-params /
get-document-params / get-note-params / note-params /
stdevp-params / varp-params / trunc-params /
usdollar-params / findb-params / searchb-params /
leftb-params / rightb-params / rank-params /
address-params / days360-params / vdb-params /
for-cell-params / median-params / sumproduct-params /
create-object-params / volatile-params / custom-undo-params /
custom-repeat-params / formula-convert-params / get-link-info-params /
text-box-params / get-object-params / db-params /
pause-params / resume-params / add-toolbar-params /
user-defined-or-future-function / get-toolbar-params / get-tool-params /
spelling-check-params / app-title-params / window-title-params /
save-toolbar-params / register-id-params / get-workbook-params /
avedev-params / betadist-params / betainv-params /
prob-params / devsq-params / geomean-params /
harmean-params / sumsq-params / kurt-params /
skew-params / ztest-params / percentrank-params /
mode-params / movie-command-params / get-movie-params /
concatenate-params / pivot-add-data-params / get-pivot-table-params /
get-pivot-field-params / get-pivot-item-params / subtotal-params /
sumif-params / scenario-get-params / roman-params /
```


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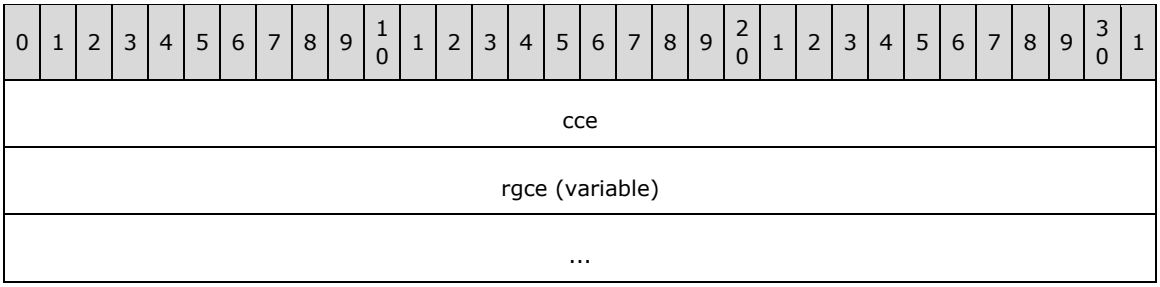
```
open-dialog-params / save-dialog-params / view-get-params /
getpivotdata-params / hyperlink-params / averagea-params /
maxa-params / mina-params / stdevpa-params /
varpa-params / stdeva-params / vara-params /
rtd-params / cubevalue-params / cubemember-params /
cuberankedmember-params / hex2bin-params / hex2oct-params /
dec2bin-params / dec2hex-params / dec2oct-params /
oct2bin-params / oct2hex-params / bin2oct-params /
bin2hex-params / complex-params / imsum-params /
improduct-params / delta-params / gestep-params /
erf-params / xirr-params / pricemat-params /
yieldmat-params / intrate-params / received-params /
disc-params / pricedisc-params / yielddisc-params /
price-params / yield-params / yearfrac-params /
coupdaybs-params / coupdays-params / coupdaysnc-params /
coupncd-params / coupnum-params / couppcd-params /
duration-params / mduration-params / oddlprice-params /
oddlyield-params / oddfprice-params / oddfyield-params /
weeknum-params / amordegrc-params / amorlinc-params /
accrint-params / accrintm-params / workday-params /
networkdays-params / gcd-params / multinomial-params /
lcm-params / cubekpimember-params / cubeset-params /
countifs-params / sumifs-params / averageif-params /
averageifs-params
```

2.5.97.11 ListParsedFormula

The **ListParsedFormula** structure specifies a formula (section 2.2.2) used in a **table**.



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cb
rgcb (variable)
...

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. Its value MUST be greater than 0 and less than 16385.

rgce (variable): An **Rgce** (section 2.5.97.88) structure that specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula. It MUST NOT contain **PtgExp** (section 2.5.97.40) or **PtgSxName** (section 2.5.97.76).

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An **RgbExtra** (section 2.5.97.87) structure that specifies ancillary data for the formula.

2.5.97.12 NameParsedFormula

The **NameParsedFormula** structure specifies a formula (section 2.2.2) used in a **defined name**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cce																															
rgce (variable)																															
...																															
cb																															
rgcb (variable)																															
...																															

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. Its value MUST be greater than 0 and less than 16385.

rgce (variable): An **Rgce** (section 2.5.97.88) structure that specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula. It MUST NOT contain **PtgExp** (section 2.5.97.40), **PtgSxName** (section 2.5.97.76), **PtgRef** (section 2.5.97.68), **PtgRefN** (section 2.5.97.72), **PtgRefErr** (section 2.5.97.70), **PtgArea** (section 2.5.97.18), **PtgAreaN** (section 2.5.97.22), or **PtgAreaErr** (section 2.5.97.20).

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An **RgbExtra** (section 2.5.97.87) structure that specifies ancillary data for the formula.

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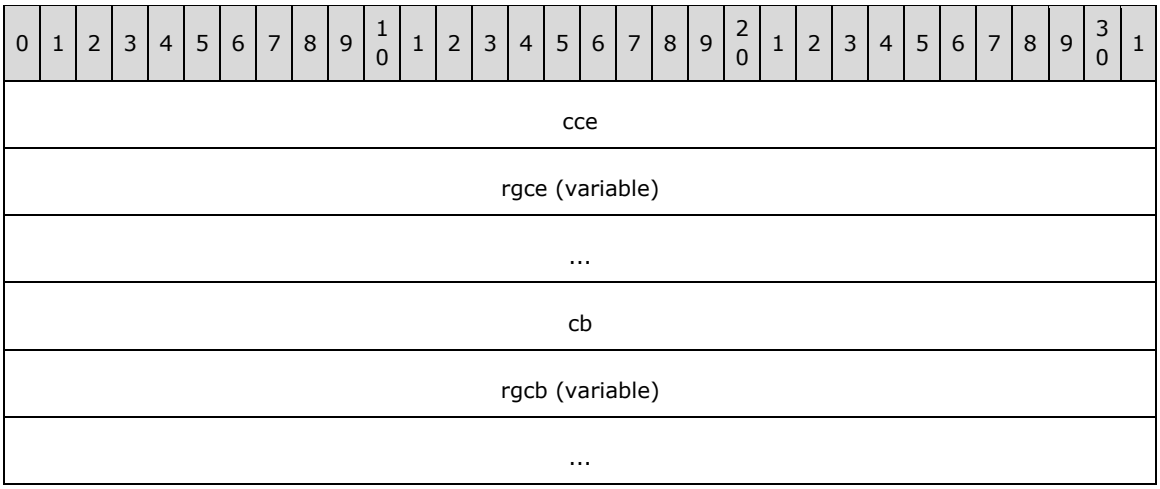
2.5.97.13 ObjectParsedFormula

The **ObjectParsedFormula** structure specifies a formula (section 2.2.2) used by an **embedded object**.



cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. Its value MUST be equal to 7.

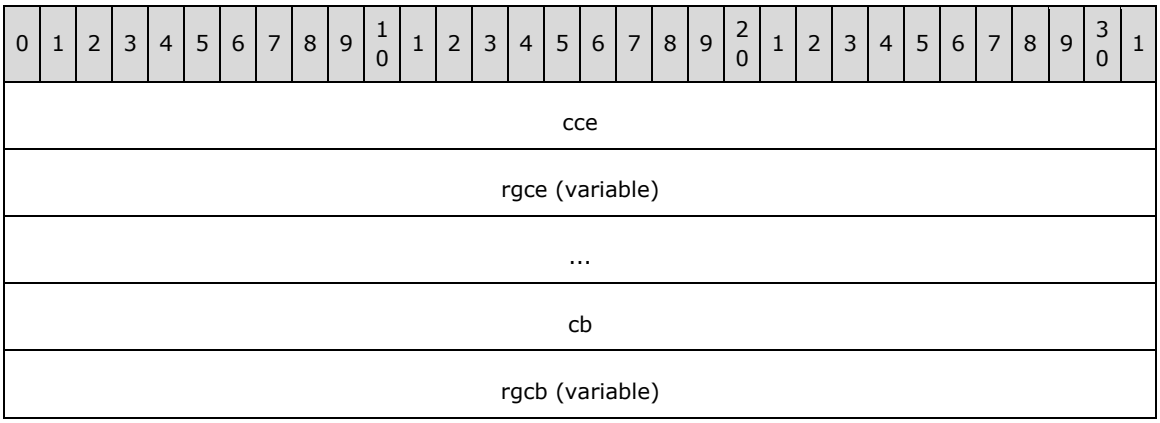
rgce (variable): An **Rgce** (section 2.5.97.88) structure that specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula. It MUST contain only one **Ptg**, and this **Ptg** MUST be **PtgNameX** (section 2.5.97.61).

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An **RgbExtra** (section 2.5.97.87) structure that specifies ancillary data for the formula.

2.5.97.14 ParameterParsedFormula

The **ParameterParsedFormula** structure specifies the formula (section 2.2.2) for a **query** parameter.



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...

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. Its value MUST be greater than 0 and less than 16385.

rgce (variable): An **Rgce** (section 2.5.97.88) structure that specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula. It MUST NOT contain **PtgExp** (section 2.5.97.40), **PtgArray** (section 2.5.97.23)<68>, **PtgMemArea** (section 2.5.97.54), or **PtgSxName** (section 2.5.97.76).

The root node of the parse tree of this field MUST NOT be a VALUE_TYPE, as described in section 2.5.97.88.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An **RgbExtra** (section 2.5.97.87) structure that specifies ancillary data for the formula.

2.5.97.15 PivotParsedFormula

The **PivotParsedFormula** structure specifies a formula (section 2.2.2) used in a **PivotTable** (section 2.1.7.40).

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cce																															
rgce (variable)																															
...																															
cb																															
rgcb (variable)																															
...																															

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. Its value MUST be less than 16385.

rgce (variable): An **Rgce** (section 2.5.97.88) structure that specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula. MUST NOT contain **PtgExp** (section 2.5.97.40), **PtgUnion** (section 2.5.97.78), **PtgIsect** (section 2.5.97.50), **PtgRange** (section 2.5.97.67), **PtgList** (section 2.5.97.52), **PtgArray** (section 2.5.97.23), **PtgAttrSpaceSemi** (section 2.5.97.31), **PtgAttrSemi** (section 2.5.97.29), **PtgRef** (section 2.5.97.68), **PtgRefErr** (section 2.5.97.70), **PtgRefN** (section 2.5.97.72), **PtgArea** (section 2.5.97.18), **PtgAreaErr** (section 2.5.97.20), **PtgAreaN** (section 2.5.97.22), **PtgRef3d** (section 2.5.97.69), **PtgArea3d** (section 2.5.97.19), **PtgRefErr3d** (section 2.5.97.71), **PtgAreaErr3d** (section 2.5.97.21), **PtgName** (section 2.5.97.60), **PtgNameX** (section 2.5.97.61), **PtgMemArea** (section 2.5.97.54), **PtgMemErr** (section 2.5.97.55), **PtgMemNoMem** (section 2.5.97.57), **or PtgMemFunc** (section 2.5.97.56).

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If this field contains a **PtgFunc** (section 2.5.97.45), then the **iftab** field of **PtgFunc** MUST be less than 0x0028 or greater than 0x002D and MUST NOT be equal to 0x002F, 0x00BD, 0x00C3, 0x00C4, or 0x00C7.

If this field contains a **PtgFuncVar** (section 2.5.97.46), then the value of the **fCeFunc** field of **PtgFuncVar** MUST be 0 and the **tab** field of **PtgFuncVar** MUST NOT be equal to 0x00FF or 0x0166.

The root node of the parse tree of this field MUST be a VALUE_TYPE, as described in section 2.5.97.88.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An **RgbExtra** (section 2.5.97.87) structure that specifies ancillary data for the formula.

2.5.97.16 Ptg

The **Ptg** structure specifies a single element of a formula (section 2.2.2). The value of the first byte determines which structure it represents and MUST be one of the values specified in the first column of the following table. If the value of the first byte is 0x18 or 0x19, then the second byte determines which structure it represents and MUST be one of the values specified in the second column of the following table.

First byte	Second byte	Ptg
0x01		**PtgExp**
0x03		**PtgAdd**
0x04		**PtgSub**
0x05		**PtgMul**
0x06		**PtgDiv**
0x07		**PtgPower**
0x08		**PtgConcat**
0x09		**PtgLt**
0x0A		**PtgLe**
0x0B		**PtgEq**
0x0C		**PtgGe**
0x0D		**PtgGt**
0x0E		**PtgNe**
0x0F		**PtgIsect**
0x10		**PtgUnion**
0x11		**PtgRange**
0x12		**PtgUPlus**
0x13		**PtgUMinus**
0x14		**PtgPercent**
0x15		**PtgParen**
0x16		**PtgMissArg**
0x17		**PtgStr**
0x18	0x19	**PtgList**
0x18	0x1D	**PtgSxName**
0x19	0x01	**PtgAttrSemi**
0x19	0x02	**PtgAttrIf**
0x19	0x04	**PtgAttrChoose**
0x19	0x08	**PtgAttrGoTo**

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First byte	Second byte	Ptg
0x19	0x10	**PtgAttrSum**
0x19	0x20	**PtgAttrBaxcel**
0x19	0x21	**PtgAttrBaxcel**
0x19	0x40	**PtgAttrSpace**
0x19	0x41	**PtgAttrSpaceSemi**
0x19	0x80	**PtgAttrIfError**
0x1C		**PtgErr**
0x1D		**PtgBool**
0x1E		**PtgInt**
0x1F		**PtgNum**
0x20		**PtgArray**
0x21		**PtgFunc**
0x22		**PtgFuncVar**
0x23		**PtgName**
0x24		**PtgRef**
0x25		**PtgArea**
0x26		**PtgMemArea**
0x27		**PtgMemErr**
0x28		**PtgMemNoMem**
0x29		**PtgMemFunc**
0x2A		**PtgRefErr**
0x2B		**PtgAreaErr**
0x2C		**PtgRefN**
0x2D		**PtgAreaN**
0x39		**PtgNameX**
0x3A		**PtgRef3d**
0x3B		**PtgArea3d**
0x3C		**PtgRefErr3d**
0x3D		**PtgAreaErr3d**
0x40		**PtgArray**
0x41		**PtgFunc**
0x42		**PtgFuncVar**
0x43		**PtgName**
0x44		**PtgRef**
0x45		**PtgArea**
0x46		**PtgMemArea**
0x47		**PtgMemErr**
0x48		**PtgMemNoMem**
0x49		**PtgMemFunc**
0x4A		**PtgRefErr**
0x4B		**PtgAreaErr**
0x4C		**PtgRefN**
0x4D		**PtgAreaN**
0x59		**PtgNameX**
0x5A		**PtgRef3d**
0x5B		**PtgArea3d**
0x5C		**PtgRefErr3d**

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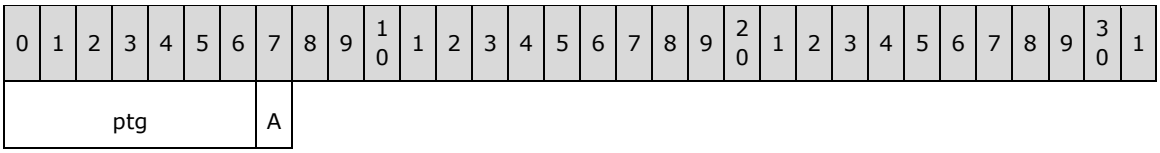
First byte	Second byte	Ptg
0x5D		**PtgAreaErr3d**
0x60		**PtgArray**
0x61		**PtgFunc**
0x62		**PtgFuncVar**
0x63		**PtgName**
0x64		**PtgRef**
0x65		**PtgArea**
0x66		**PtgMemArea**
0x67		**PtgMemErr**
0x68		**PtgMemNoMem**
0x69		**PtgMemFunc**
0x6A		**PtgRefErr**
0x6B		**PtgAreaErr**
0x6C		**PtgRefN**
0x6D		**PtgAreaN**
0x79		**PtgNameX**
0x7A		**PtgRef3d**
0x7B		**PtgArea3d**
0x7C		**PtgRefErr3d**
0x7D		**PtgAreaErr3d**

2.5.97.17 PtgAdd

The **PtgAdd** structure specifies a binary-value-operator (section 2.5.97.88) that adds the second **expression** in a binary-value-expression (section 2.5.97.88) to the first.



ptg (7 bits): Reserved. This value MUST be 0x03.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.18 PtgArea

The **PtgArea** operand (section 2.5.97.88) specifies a reference to a rectangular **range** of **cells**.

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ptg (5 bits): Reserved. This value MUST be 0x05.

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

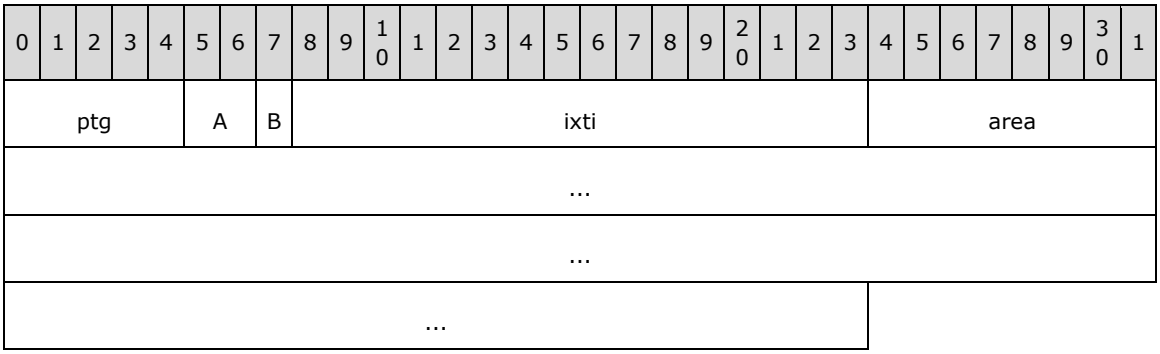
B - reserved (1 bit): This value MUST be 0 and MUST be ignored.

area (12 bytes): A **RgceArea** (section 2.5.97.89) structure that specifies the referenced range of cells.

2.5.97.19 PtgArea3d

The **PtgArea3d** operand (section 2.5.97.88) specifies a reference to the same rectangular **range** of **cells** on one or more **sheets**.

If the formula containing this structure is part of a **revision** as specified in the Formulas overview (section 2.2.2), then there MUST be a **RevExtern** (section 2.5.97.80) in the **RgbExtra** (section 2.5.97.87) corresponding to this **PtgArea3d**, which specifies those sheets.



ptg (5 bits): Reserved. This value MUST be 0x1B.

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

ixti (2 bytes): If the formula containing this structure is not part of a revision as specified in the Formulas overview (section 2.2.2), then this value is an **XtiIndex** (section 2.5.97.103) that specifies the **Xti** (section 2.5.172) that specifies those sheets. Otherwise, it is undefined and MUST be ignored.

area (12 bytes): A value that specifies coordinates of the referenced range of a cell. If this **PtgArea3d** is part of a **NameParsedFormula** (section 2.5.97.12), then this is a **RgceAreaRel** (section 2.5.97.90) value. Otherwise, it is a **RgceArea** (section 2.5.97.89) value.

2.5.97.20 PtgAreaErr

This operand (section 2.5.97.88) specifies an invalid reference to a **cell range**.

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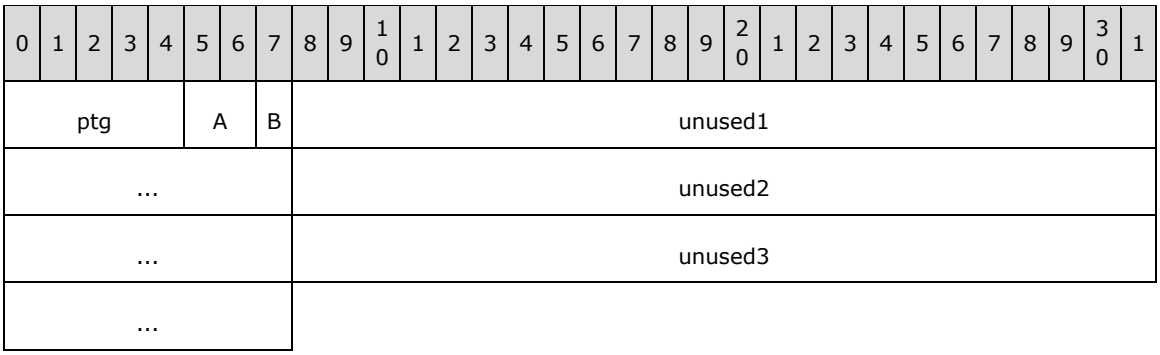


ptg (5 bits): Reserved. This value MUST be 0x0B.

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

unused1 (4 bytes): Undefined. This value MUST be ignored.

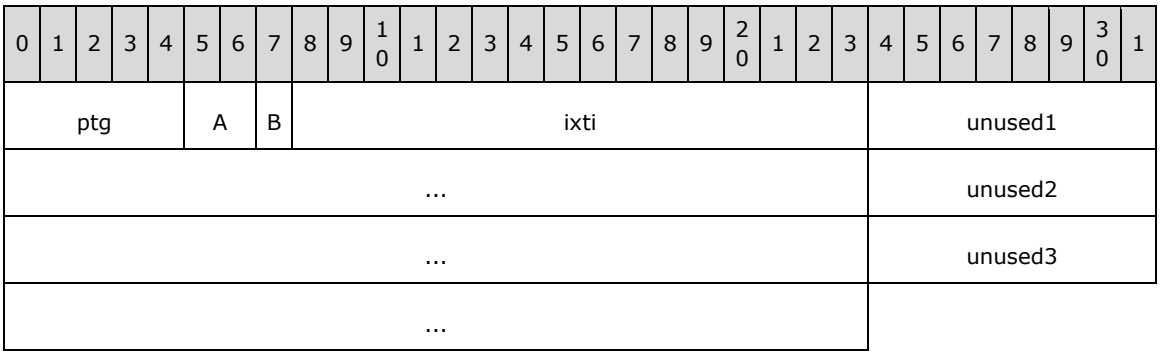
unused2 (4 bytes): Undefined. This value MUST be ignored.

unused3 (4 bytes): Undefined. This value MUST be ignored.

2.5.97.21 PtgAreaErr3d

The **PtgAreaErr3d** operand (section 2.5.97.88) specifies an invalid reference to the same rectangular **range** of **cells** on multiple **sheets**.

If the formula containing this structure is part of a **revision** as specified in the Formulas overview (section 2.2.2), then there MUST be a **RevExtern** (section 2.5.97.80) in the **RgbExtra** (section 2.5.97.87) corresponding to this **PtgAreaErr3d, which** specifies those sheets.



ptg (5 bits): Reserved. This value MUST be 0x1D.

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

ixti (2 bytes): If the formula containing this structure is not part of a revision as specified in the Formulas overview (section 2.2.2), then this value is an **XtiIndex** (section 2.5.97.103) that specifies the **Xti** (section 2.5.172) that specifies those sheets. Otherwise, it is undefined and MUST be ignored.

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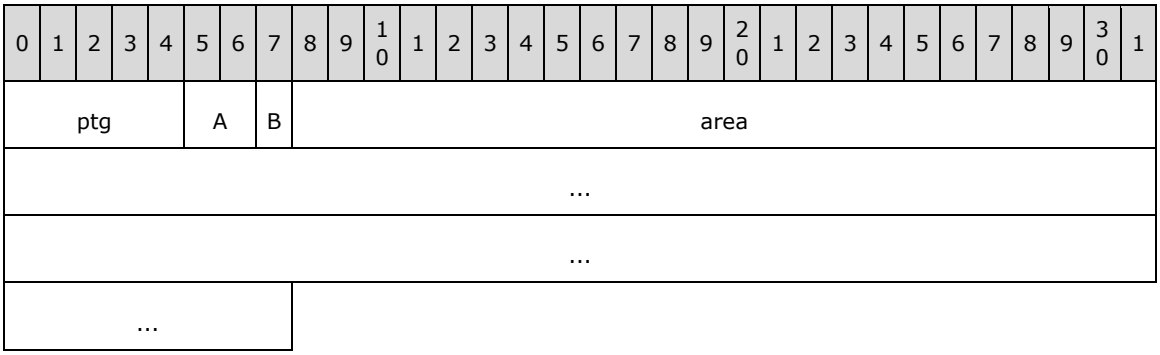
unused1 (4 bytes): Undefined. This value MUST be ignored.

unused2 (4 bytes): Undefined. This value MUST be ignored.

unused3 (4 bytes): Undefined. This value MUST be ignored.

2.5.97.22 PtgAreaN

The **PtgAreaN** operand (section 2.5.97.88) specifies a reference to a rectangular **range** of **cells** as an **RgceAreaRel** (section 2.5.97.90).



ptg (5 bits): Reserved. This value MUST be 0x0D.

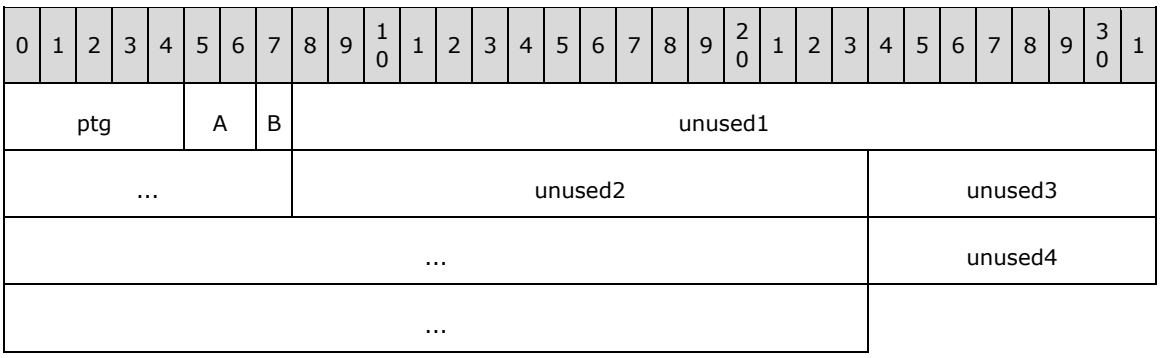
A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

area (12 bytes): An **RgceAreaRel** (section 2.5.97.90) structure that specifies the referenced range.

2.5.97.23 PtgArray

The **PtgArray** operand (section 2.5.97.88) specifies an array of values. There MUST be a **PtgExtraArray** (section 2.5.97.41) in the **RgbExtra** (section 2.5.97.87) corresponding to this **PtgArray**. The correspondence between **PtgArray** and **PtgExtraArray** structures is specified in **RgbExtra**.



ptg (5 bits): Reserved. This value MUST be 0x00.

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the array. This value MUST be 2 or 3.

B - reserved (1 bit): This value MUST be 0 and MUST be ignored.

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unused1 (4 bytes): Undefined. This value MUST be ignored.

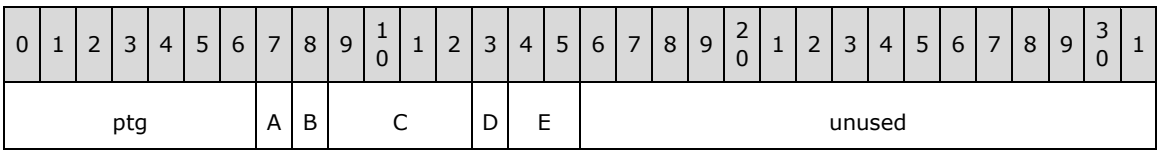
unused2 (2 bytes): Undefined. This value MUST be ignored.

unused3 (4 bytes): Undefined. This value MUST be ignored.

unused4 (4 bytes): Undefined. This value MUST be ignored.

2.5.97.24 PtgAttrBaxcel

The **PtgAttrBaxcel** structure specifies that the result of the **Rgce** (section 2.5.97.88) is to be assigned to a local variable used in a **macro sheet**.



ptg (7 bits): Reserved. This value MUST be 0x19.

A - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

B - bitSemi (1 bit): A bit that specifies whether or not this **Rgce** is **volatile**.

C - reserved2 (4 bits): This value MUST be 0, and MUST be ignored.

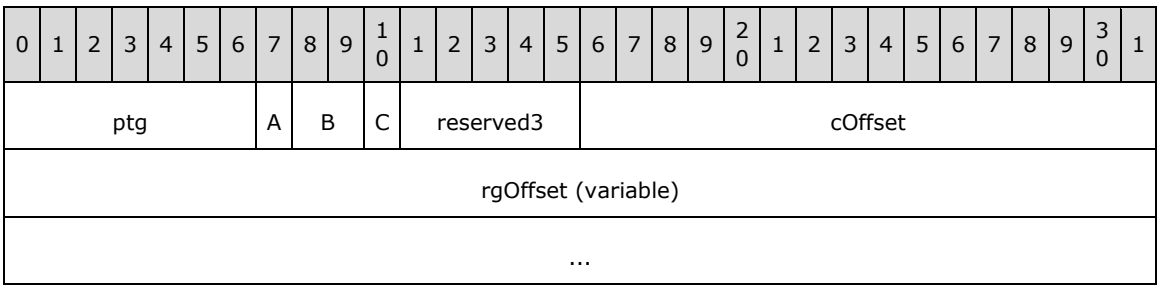
D - bitBaxcel (1 bit): Reserved. This value MUST be 1.

E - reserved3 (2 bits): This value MUST be 0, and MUST be ignored.

unused (2 bytes): Undefined. This value MUST be ignored.

2.5.97.25 PtgAttrChoose

The **PtgAttrChoose** structure specifies a control token (section 2.2.2.3).



ptg (7 bits): Reserved. This value MUST be 0x19.

A - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

B - reserved2 (2 bits): This value MUST be 0, and MUST be ignored.

C - bitChoose (1 bit): Reserved. This value MUST be 1.

reserved3 (5 bits): This value MUST be 0, and MUST be ignored.

cOffset (2 bytes): An unsigned integer that specifies a value that is 1 less than the number of elements in **rgOffset**.

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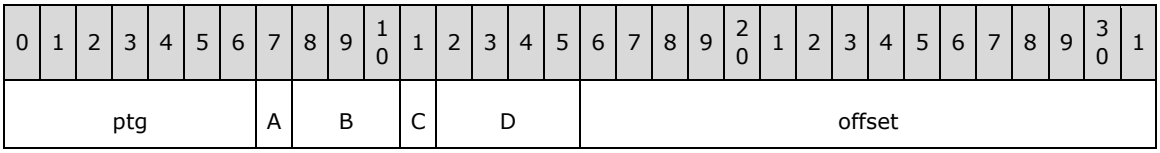
rgOffset (variable): An array of unsigned integers that specifies the byte offsets.

2.5.97.26 PtgAttrGoTo

The **PtgAttrGoTo** structure specifies a control token (section 2.2.2.3).



ptg (7 bits): Reserved. This value MUST be 0x19.

A - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

B - reserved2 (3 bits): This value MUST be 0, and MUST be ignored.

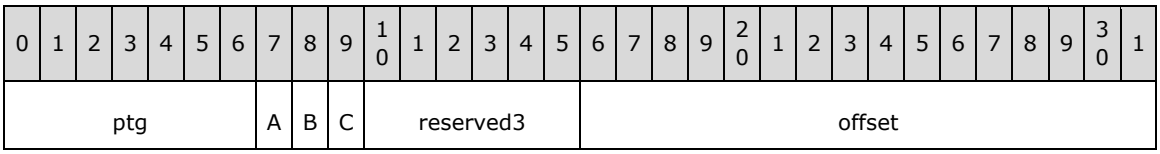
C - bitGoto (1 bit): Reserved. This value MUST be 1.

D - reserved3 (4 bits): This value MUST be 0, and MUST be ignored.

offset (2 bytes): An unsigned integer that specifies a value 1 less than the byte offset.

2.5.97.27 PtgAttrIf

The **PtgAttrIf** structure specifies a control token (section 2.2.2.3).



ptg (7 bits): Reserved. This value MUST be 0x19.

A - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

B - reserved2 (1 bit): This value MUST be 0, and MUST be ignored.

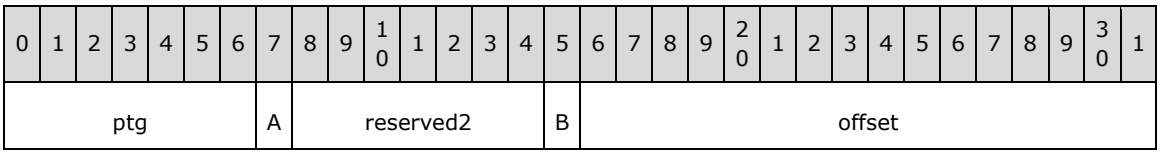
C - bitIf (1 bit): Reserved. This value MUST be 1.

reserved3 (6 bits): This value MUST be 0, and MUST be ignored.

offset (2 bytes): An unsigned integer that specifies the byte offset.

2.5.97.28 PtgAttrIfError

The **PtgAttrIfError** structure specifies a control token (section 2.2.2.3).



ptg (7 bits): Reserved. This value MUST be 0x19.

A - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

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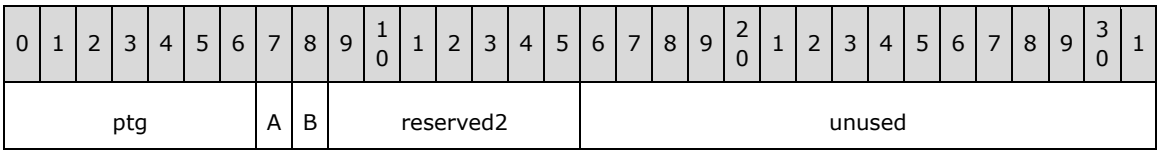
reserved2 (7 bits): This value MUST be 0, and MUST be ignored.

B - bitIfError (1 bit): Reserved. This value MUST be 1.

offset (2 bytes): An unsigned integer that specifies the byte offset.

2.5.97.29 PtgAttrSemi

The **PtgAttrSemi** structure specifies that this **Rgce** (section 2.5.97.88) is **volatile**.



ptg (7 bits): Reserved. This value MUST be 0x19.

A - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

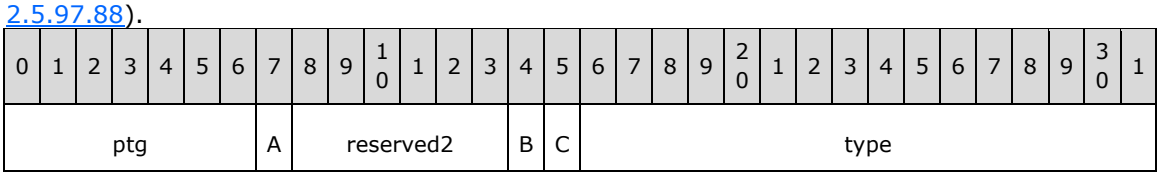
B - bitSemi (1 bit): Reserved. This value MUST be 1.

reserved2 (7 bits): This value MUST be 0, and MUST be ignored.

unused (2 bytes): Undefined. This value MUST be ignored.

2.5.97.30 PtgAttrSpace

The **PtgAttrSpace** display token (section 2.2.2.4) specifies the number of space or carriage return characters that are displayed around the **expression** in a display-precedence-expression (section 2.5.97.88).



ptg (7 bits): Reserved. This value MUST be 0x19.

A - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

reserved2 (6 bits): This value MUST be 0, and MUST be ignored.

B - bitSpace (1 bit): Reserved. This value MUST be 1.

C - reserved3 (1 bit): This value MUST be 0, and MUST be ignored.

type (2 bytes): A **PtgAttrSpaceType** (section 2.5.97.32) structure that specifies the number of space or carriage return characters and the position of those characters.

2.5.97.31 PtgAttrSpaceSemi

The **PtgAttrSpaceSemi** structure specifies the number of space or carriage return characters that are displayed around the **expression** in a display-precedence-expression (section 2.5.97.88). It also specifies that the **Rgce** (section 2.5.97.88) is **volatile**.

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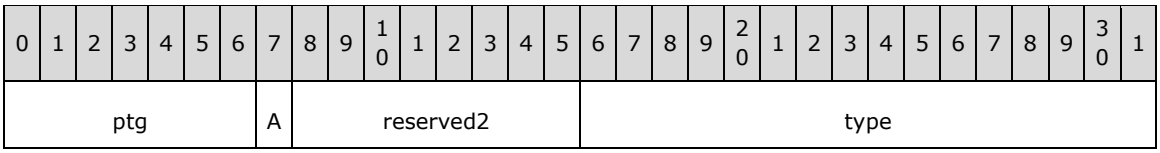


ptg (7 bits): Reserved. This value MUST be 0x19.

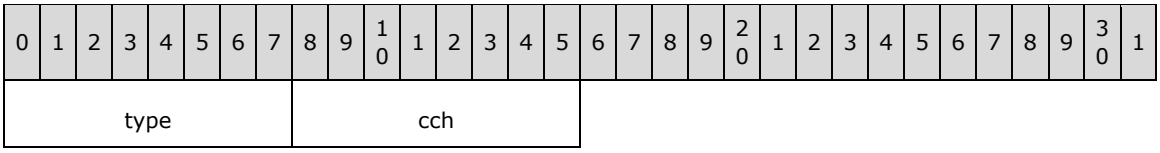
A - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

reserved2 (1 byte): Reserved. This value MUST be 0x41.

type (2 bytes): A **PtgAttrSpaceType** (section 2.5.97.32) structure that specifies the number of space or carriage return characters and position of those characters.

2.5.97.32 PtgAttrSpaceType

The **PtgAttrSpaceType** structure specifies the number of space or carriage return characters and the position of those characters.



type (1 byte): An unsigned integer that specifies the character and the position of the character. This value MUST correspond to the following table.

Value	Meaning
0x00	Specifies space characters before a base-expression (section 2.5.97.88).
0x01	Specifies carriage return characters before a base-expression.
0x02	Specifies space characters before the open parenthesis specified by **PtgParen** (section 2.5.97.64) in a display-precedence-specifier (section 2.5.97.88).
0x03	Specifies carriage return characters before the open parenthesis specified by **PtgParen** in a display-precedence-specifier.
0x04	Specifies space characters before the close parenthesis specified by **PtgParen** in a display-precedence-specifier.
0x05	Specifies carriage return characters before the close parenthesis specified by **PtgParen** in a display-precedence-specifier.
0x06	Specifies space characters before an **expression**.

cch (1 byte): An unsigned integer that specifies the number of characters.

2.5.97.33 PtgAttrSum

The **PtgAttrSum** structure specifies the sum of an **expression** as defined in function-call (section 2.5.97.88).

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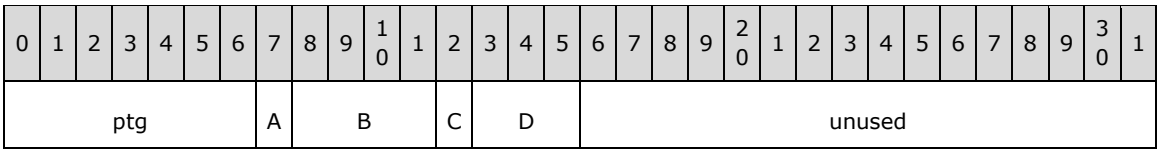


ptg (7 bits): Reserved. This value MUST be 0x19.

A - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

B - reserved2 (4 bits): This value MUST be 0, and MUST be ignored.

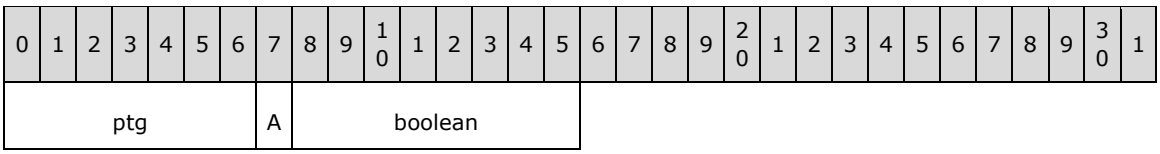
C - bitSum (1 bit): Reserved. This value MUST be 1.

D - reserved3 (3 bits): This value MUST be 0, and MUST be ignored.

unused (2 bytes): Undefined. This value MUST be ignored.

2.5.97.34 PtgBool

The **PtgBool** operand (section 2.5.97.88) specifies a **Boolean** (section 2.5.97.3) value.



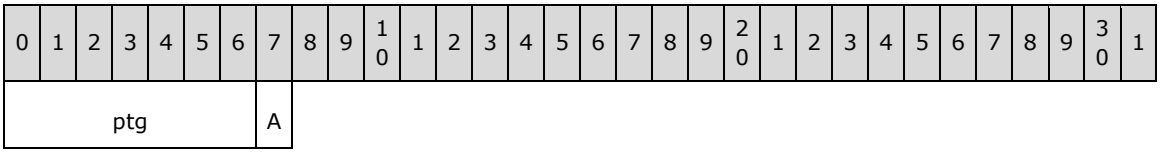
ptg (7 bits): Reserved. This value MUST be 0x1D.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

boolean (1 byte): A **Boolean** that specifies the value.

2.5.97.35 PtgConcat

The **PtgConcat** structure specifies a binary-value-operator (section 2.5.97.88) that appends the second **expression** in binary-value-expression (section 2.5.97.88) to the first.



ptg (7 bits): Reserved. This value MUST be 0x08.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.36 PtgDataType

The **PtgDataType** enumeration specifies the data type of a **Ptg** (section 2.5.97.16). It MUST be a value from the following table.

Name	Value	Meaning
REFERENCE	0x1	Specifies a reference to a **range**.
VALUE	0x2	Specifies a single value of a simple type. The type can be a **Boolean** (section 2.5.97.3),

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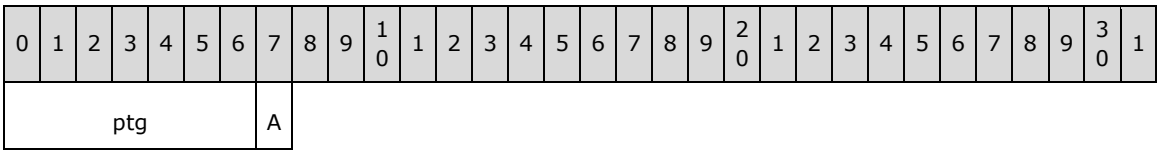
Name	Value	Meaning
		a number, a string, or an error code.
ARRAY	0x3	Specifies an array of values.

2.5.97.37 PtgDiv

The **PtgDiv** structure specifies a binary-value-operator (section 2.5.97.88) that divides the first **expression** in a binary-value-expression (section 2.5.97.88) by the second.

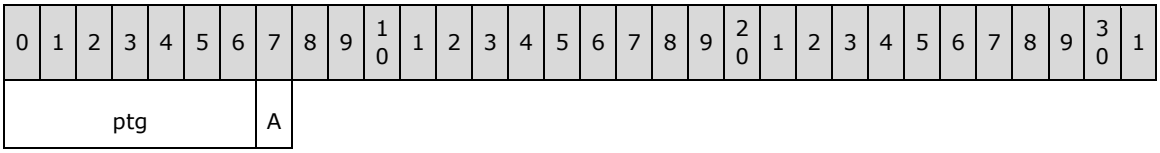


ptg (7 bits): Reserved. This value MUST be 0x06.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.38 PtgEq

The **PtgEq** structure specifies a binary-value-operator (section 2.5.97.88) that decides whether the second **expression** in a binary-value-expression (section 2.5.97.88) is equal to the first.

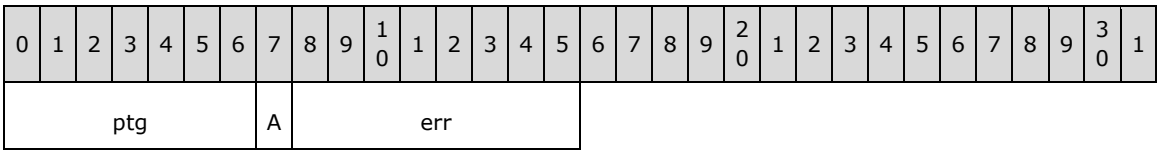


ptg (7 bits): Reserved. This value MUST be 0x0B.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.39 PtgErr

The **PtgErr** operand (section 2.5.97.88) specifies an error code.



ptg (7 bits): Reserved. This value MUST be 0x1C.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

err (1 byte): A **BErr** structure (section 2.5.97.2) that specifies the error code.

2.5.97.40 PtgExp

The **PtgExp** structure specifies that the containing **Rgce** (section 2.5.97.88) is part of an array formula (section 2.2.2) or shared formula and specifies the **row** of the **cell** in which that formula exists. The **column (1)** of the cell in which that formula exists is specified by the **col** field of the

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corresponding **PtgExtraCol** (section 2.5.97.42) in the **RgbExtra** (section 2.5.97.87) of the containing **Rgce**.

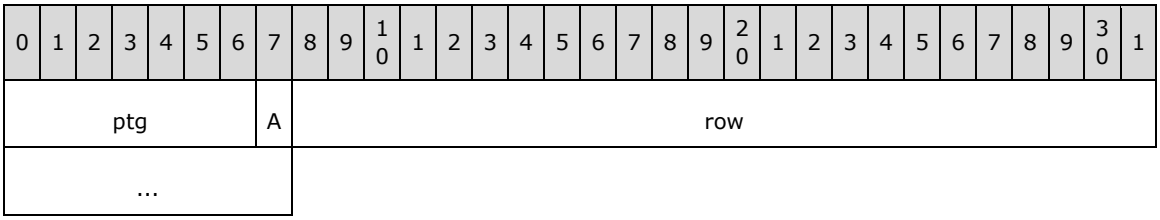
There MUST be a **PtgExtraCol** in the **RgbExtra** corresponding to this **PtgExp**.

There MUST be a **BrtFmlaString** (section 2.4.674), **BrtFmlaNum** (section 2.4.673), **BrtFmlaBool** (section 2.4.671), or **BrtFmlaError** (section 2.4.672) record specifying the array formula or shared formula. That record MUST have a **cell**.**col** field equal to the **col** field of the **PtgExtraCol**, and MUST be between a **BrtRowHdr** (section 2.4.746) record with a **rw** field equal to the **row** field and the next **BrtRowHdr** or **BrtEndSheetData** (section 2.4.546) record, as defined in the **Worksheet** part **ABNF** (section 2.1.7.62) and **Macro Sheet** (section 2.1.7.32) part ABNF.

The array formula or shared formula that the containing **Rgce** is a part of MUST be followed by either a **BrtShrFmla** (section 2.4.770) record or a **BrtArrFmla** (section 2.4.6) record.

If the record specifying the array formula or shared formula is followed by a **BrtShrFmla**, the **row** of this **PtgExp** MUST be greater than or equal to the value of the **rfx.rwFirst** field and less than or equal to the value of the **rfx.rwLast** field of the **BrtShrFmla**, and the **col** field of the **PtgExtraCol** MUST be greater than or equal to the value of the **rfx.colFirst** field and less than or equal to the value of the **rfx.colLast** field of the **BrtShrFmla**.

If the record specifying the array formula or shared formula is followed by a **BrtArrFmla**, the **row** of this **PtgExp** MUST be equal to the value of the **rfx.rwFirst** field of the **BrtArrFmla**, and the **col** field of the **PtgExtraCol** MUST be equal to the value of the **rfx.colFirst** field of the **BrtArrFmla**.



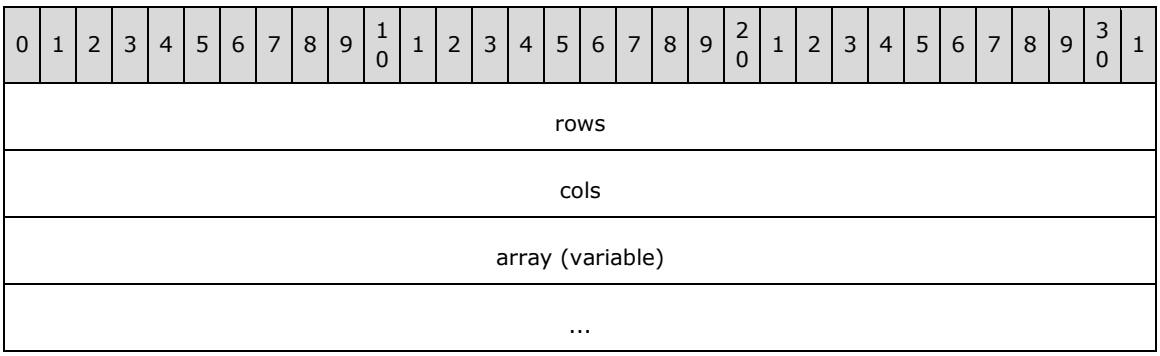
ptg (7 bits): Reserved. This value MUST be 0x01.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

row (4 bytes): An **Rw** (section 2.5.125) structure that specifies a zero-based index of the row of the cell on the current **sheet** that contains the array formula or shared formula that the containing **Rgce** is a part of. Its value MUST be less than or equal to 1048575.

2.5.97.41 PtgExtraArray

The **PtgExtraArray** structure specifies the values for the corresponding **PtgArray** (section 2.5.97.23) as specified in **RgbExtra** (section 2.5.97.87).



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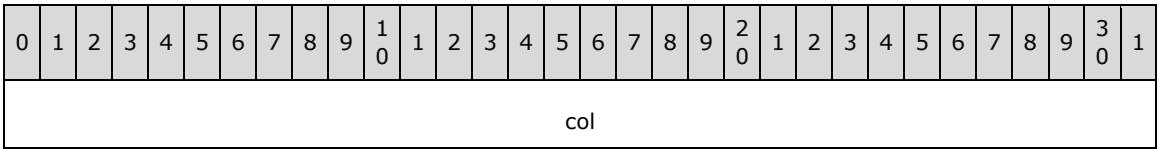
rows (4 bytes): A **DRw** (section 2.5.34) structure that specifies the number of **rows** in the array. This value MUST be greater than 0.

cols (4 bytes): A **DCol** (section 2.5.31) structure that specifies the number of **columns (1)** in the array. This value MUST be greater than 0.

array (variable): An array of **SerAr** (section 2.5.97.93) that specifies the values in row major order. The number of elements MUST be equal to the product of rows and **cols**.

2.5.97.42 PtgExtraCol

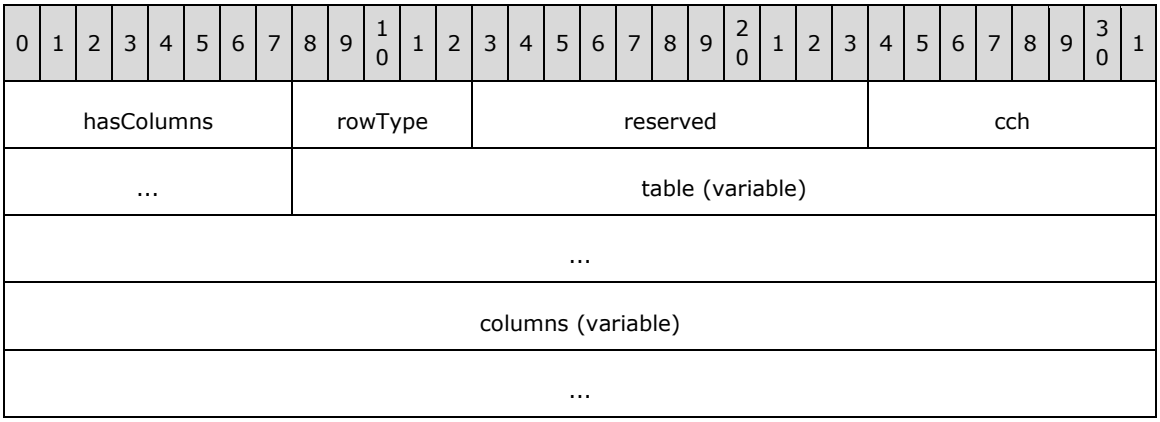
The **PtgExtraCol** structure specifies the **column (1)** for the corresponding **PtgExp** (section 2.5.97.40) as specified in **RgbExtra** (section 2.5.97.87).



col (4 bytes): A **Col** (section 2.5.22) structure that specifies the column (1).

2.5.97.43 PtgExtraList

The **PtgExtraList** structure specifies a **range** in a **table** that corresponds to a **PtgList** (section 2.5.97.52) as specified in **RgbExtra** (section 2.5.97.87).



hasColumns (1 byte): A **Boolean** (section 2.5.97.3) that specifies the set of **columns (1)** of the range. This value MUST be a value from the following table.

Value	Meaning
0x00	The columns (1) of the range consist of all the columns (1) in the table.
0x01	The columns (1) of the range consist of one or more columns (1) specified by **columns**.

rowType (5 bits): A **PtgRowType** (section 2.5.97.73) structure that specifies the **rows** in the range.

reserved (11 bits): This value MUST be 0, and MUST be ignored.

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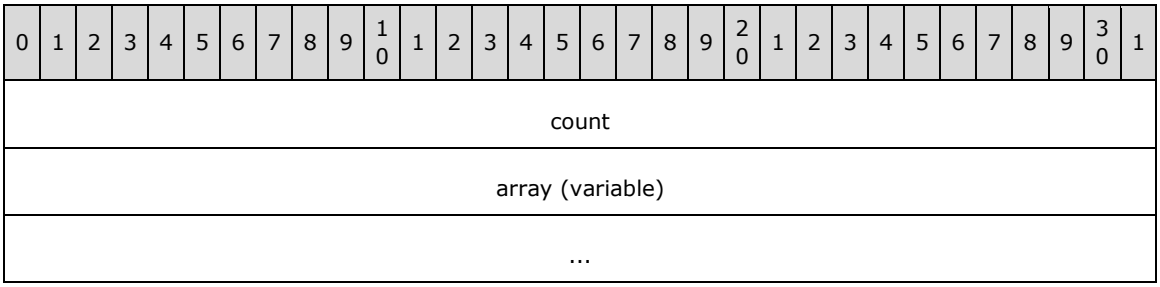
cch (2 bytes): An unsigned integer that specifies the number of 16-bit **Unicode** characters in **table**. This value MUST be less than 256.

table (variable): An array of 16-bit Unicode characters that specifies the string with the table name. The string MUST adhere to the grammar specified for **XLNameWideString** (section 2.5.165).

columns (variable): An **SxSu** (section 2.5.97.100) structure that specifies the columns (1). It MUST exist if and only if the value of **hasColumns** is not zero.

2.5.97.44 PtgExtraMem

The **PtgExtraMem** structure specifies a **range** that corresponds to a **PtgMemArea** (section 2.5.97.54) as specified in **RgbExtra** (section 2.5.97.87).

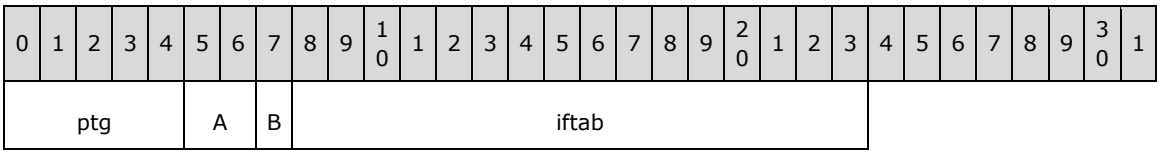


count (4 bytes): An unsigned integer that specifies the number of areas within the range.

array (variable): An array of **UncheckedRfX** (section 2.5.153) that specifies the range. The number of elements MUST be equal to **count**.

2.5.97.45 PtgFunc

The **PtgFunc** structure specifies a call to a **function** with a fixed number of parameters, as defined in section 2.5.97.88.



ptg (5 bits): Reserved. This value MUST be 0x01.

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

iftab (2 bytes): A **Ftab** (section 2.5.97.10) structure that specifies the function to be called. It MUST specify a function with a fixed number of parameters.

2.5.97.46 PtgFuncVar

The **PtgFuncVar** structure specifies a call to a **function** with a variable number of parameters, as defined in section 2.5.97.88.

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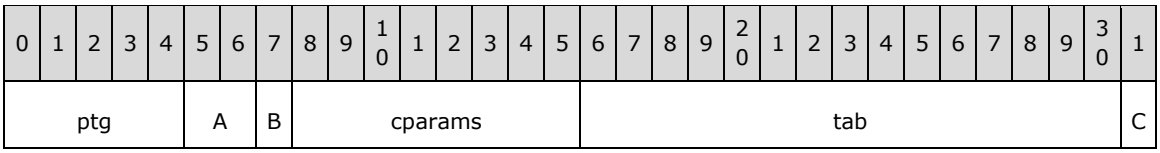


ptg (5 bits): Reserved. This value MUST be 0x02

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

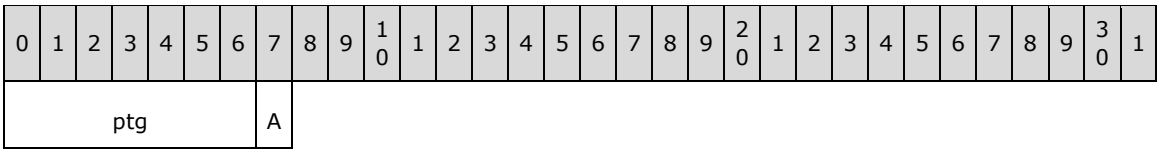
cparams (1 byte): An unsigned integer that specifies the number of parameters. This value MUST be within the **range** defined for the function specified by **tab**.

tab (15 bits): A structure that specifies the function to be called. If the value of **fCeFunc** is 1, then this field specifies a **Cetab** (section 2.5.97.5) value. If **fCeFunc** is 0, then this field specifies an **Ftab** value.

C - fCeFunc (1 bit): A bit that specifies whether **tab** specifies a **Cetab** value or a **Ftab** value.

2.5.97.47 PtgGe

The **PtgGe** structure specifies a binary-value-operator (section 2.5.97.88) that specifies whether or not the first **expression** in a binary-value-expression (section 2.5.97.88) is greater than or equal to the second.

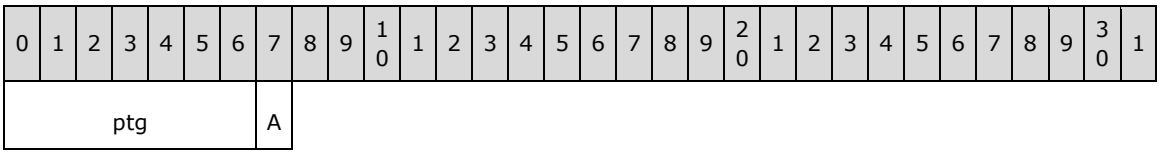


ptg (7 bits): Reserved. This value MUST be 0x0C.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.48 PtgGt

The **PtgGt** structure specifies a binary-value-operator (section 2.5.97.88) that specifies whether or not the first **expression** in a binary-value-expression (section 2.5.97.88) is greater than the second.



ptg (7 bits): Reserved. This value MUST be 0x0D.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.49 PtgInt

The **PtgInt** operand (section 2.5.97.88) specifies an unsigned integer value.

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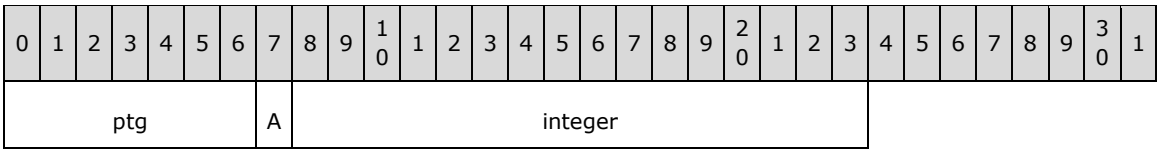


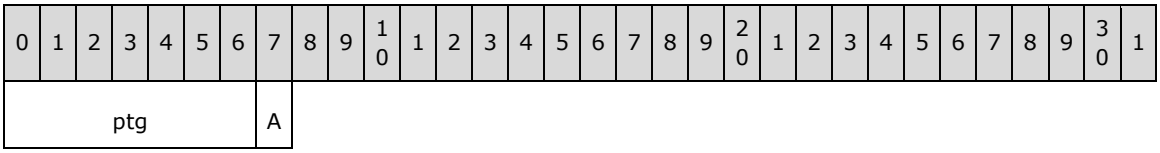
ptg (7 bits): Reserved. This value MUST be 0x1E.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

integer (2 bytes): An unsigned integer that specifies the integer value.

2.5.97.50 PtgIsect

The **PtgIsect** structure specifies a binary-reference-operator (section 2.5.97.88) that intersects the first **expression** in a binary-reference-expression (section 2.5.97.88) with the second.

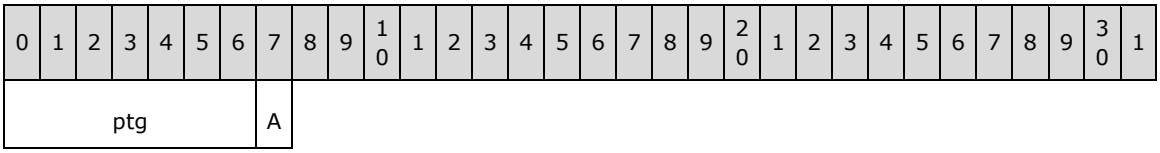


ptg (7 bits): Reserved. This value MUST be 0x0F.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.51 PtgLe

The **PtgLe** structure specifies a binary-value-operator (section 2.5.97.88) that specifies whether or not the first **expression** in a binary-value-expression (section 2.5.97.88) is less than or equal to the second.

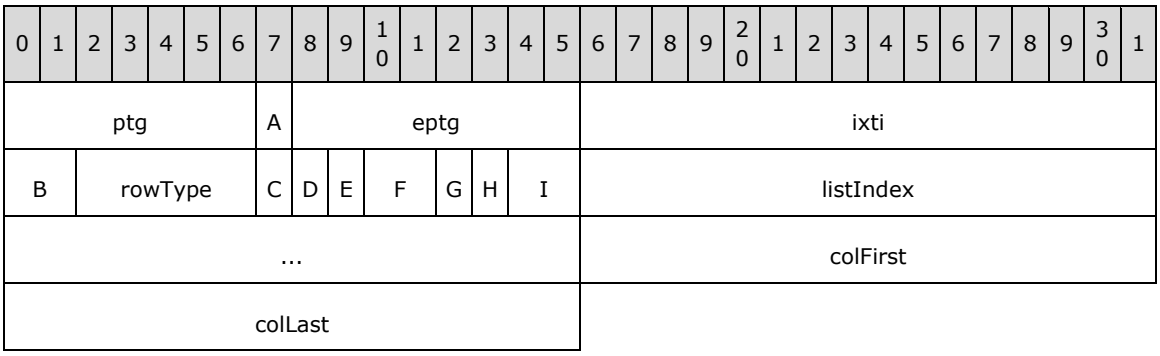


ptg (7 bits): Reserved. This value MUST be 0x0A.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.52 PtgList

The **PtgList** structure specifies a rectangular area of **cells** in a **table**.



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ptg (7 bits): Reserved. This value MUST be 0x18.

A - reserved1 (1 bit): This value MUST be 0, and MUST be ignored.

eptg (1 byte): Reserved. This value MUST be 0x19.

ixti (2 bytes): An **XtiIndex** (section 2.5.97.103) structure that specifies the location of the table.

B - columns (2 bits): An unsigned integer that specifies the **columns (1)** in the referenced area. If **invalid** is 1 or **nonresident** is 1, **columns** is unused and MUST be ignored. Otherwise, it MUST be a value from the following table.

Value	Meaning
0x00	The columns (1) of the rectangular area consist of all the columns (1) of the table.
0x01	The rectangular area is one column (1) wide; that column (1) is specified by **colFirst**.
0x02	The columns (1) of the rectangular area consist of the columns (1) between the column (1) specified by **colFirst** and the column (1) specified by **colLast**, inclusive.

rowType (5 bits): A **PtgRowType** (section 2.5.97.73) structure that specifies the **rows** of the referenced area. If **invalid** is 1 or **nonresident** is 1, **rowType** is unused and MUST be ignored.

C - squareBracketSpace (1 bit): A bit that specifies whether to display spacing around the intra-table portion of the string representation of this formula (section 2.2.2) element.

D - commaSpace (1 bit): A bit that specifies whether to display spacing between column (1) references in the string representation of this formula element.

E - unused (1 bit): Undefined. This value MUST be ignored.

F - type (2 bits): An unsigned integer that specifies the data type of this record. This value MUST be a value from the following table.

Value	Meaning
0x00	This structure contains a reference, as specified in **PtgDataType** (section 2.5.97.36).
0x01	This structure contains a value, as specified in **PtgDataType**.
0x02	This structure contains an array, as specified in **PtgDataType**.

G - invalid (1 bit): A bit that specifies whether or not this structure specifies an invalid area.

H - nonresident (1 bit): A bit that specifies whether or not the table is on a different **workbook** than the **Rgce** (section 2.5.97.88). It MUST be 1 if **ixti** specifies a different workbook than the workbook containing the **Rgce** and **invalid** is 0.

If the value of **invalid** is 1, **nonresident** is unused and MUST be ignored.

If the value of **nonresident** is 1, there MUST be a **PtgExtraList** (section 2.5.97.43) associated with this **PtgList** (section 2.5.97.52) in the **RgbExtra** (section 2.5.97.87). This associated **PtgExtraList** specifies the rectangular area.

I - reserved2 (2 bits): This value MUST be 0, and MUST be ignored.

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listIndex (4 bytes): An unsigned integer that specifies the numeric identifier of the referenced table. It MUST equal the **idList** of one of the **BrtBeginList** (section 2.4.99) records in this file.

If **invalid** is 1 or **nonresident** is 1, **listIndex** is unused and MUST be ignored.

colFirst (2 bytes): A **ColShort** (section 2.5.26) structure that specifies the first column (1) of the referenced area of the table, relative to the position of the referenced table. Its value MUST be less than the number of columns (1) in the referenced table.

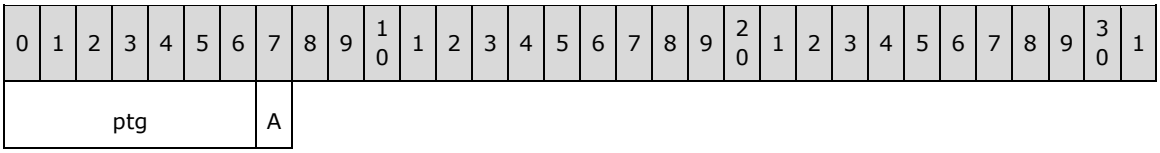
If **invalid** is 1, or **nonresident** is 1, or **columns** is 0, then **colFirst** is unused and MUST be ignored.

colLast (2 bytes): A **ColShort** structure that specifies the index of the last column (1) of the referenced area of the table, relative to the position of the referenced table. Its value MUST be greater than or equal to the value of **colFirst**, and less than the number of columns (1) in the table.

If **invalid** is 1, or **nonresident** is 1, or **columns** is 0, then **colLast** is unused and MUST be ignored.

2.5.97.53 PtgLt

The **PtgLt** structure specifies a binary-value-operator (section 2.5.97.88) that specifies whether or not the first **expression** in a binary-value-expression (section 2.5.97.88) is less than the second.

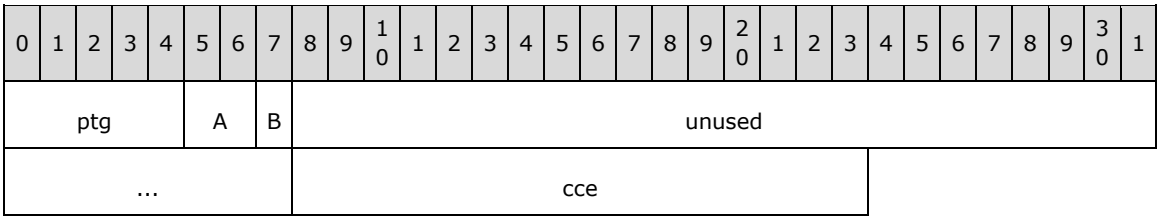


ptg (7 bits): Reserved. This value MUST be 0x09.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.54 PtgMemArea

The **PtgMemArea** mem token (section 2.2.2.5) specifies that the result of a binary-reference-expression (section 2.5.97.88) in a mem-area-expression (section 2.5.97.88) is a **range** of **cells**. The **RgbExtra** (section 2.5.97.87) corresponding to this structure MUST contain a **PtgExtraMem** (section 2.5.97.44) that specifies the range of cells.



ptg (5 bits): Reserved. This value MUST be 0x06.

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

unused (4 bytes): Undefined. This value MUST be ignored.

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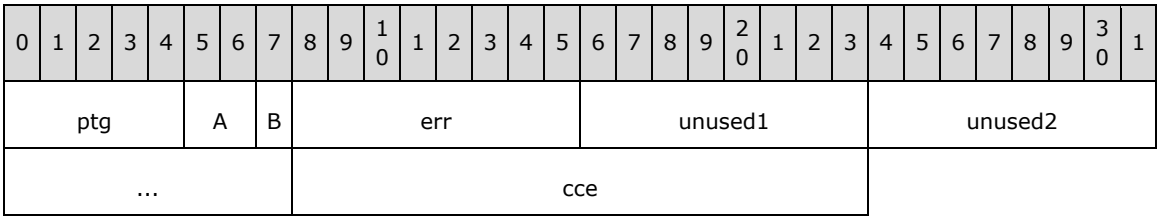
cce (2 bytes): An unsigned integer that specifies the count of bytes in the binary-reference-expression following this structure.

2.5.97.55 PtgMemErr

The **PtgMemErr** mem token (section 2.2.2.5) specifies that the result of a binary-reference-expression (section 2.5.97.88) in a mem-area-expression (section 2.5.97.88) is an error code.



ptg (5 bits): Reserved. This value MUST be 0x07.

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

err (1 byte): A **BErr** structure (section 2.5.97.2) that specifies the error code value.

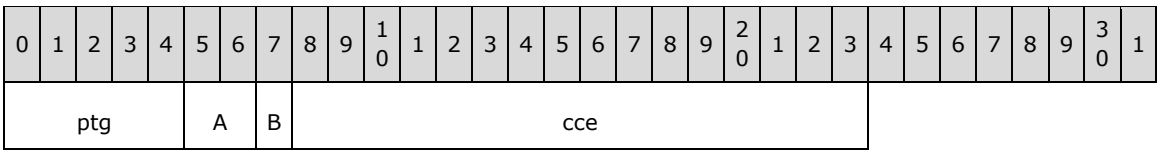
unused1 (1 byte): Undefined. This value MUST be ignored.

unused2 (2 bytes): Undefined. This value MUST be ignored.

cce (2 bytes): An unsigned integer that specifies the count of bytes in the binary-reference-expression following this structure.

2.5.97.56 PtgMemFunc

The **PtgMemFunc** mem token (section 2.2.2.5) specifies that the result of a binary-reference-expression in a mem-area-expression is variable (see section 2.5.97.88).



ptg (5 bits): Reserved. This value MUST be 0x09.

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

cce (2 bytes): An unsigned integer that specifies the count of bytes in the binary-reference-expression (section 2.5.97.88) following this structure .

2.5.97.57 PtgMemNoMem

The **PtgMemNoMem** mem token (section 2.2.2.5) specifies that the result of the binary-reference-expression in a mem-area-expression failed to cache (see section 2.5.97.88).

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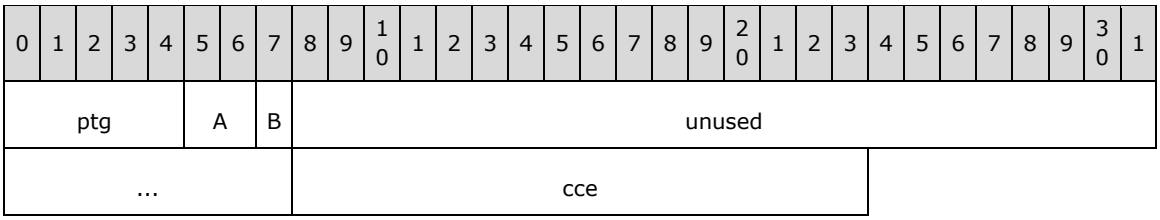


ptg (5 bits): Reserved. This value MUST be 0x08.

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

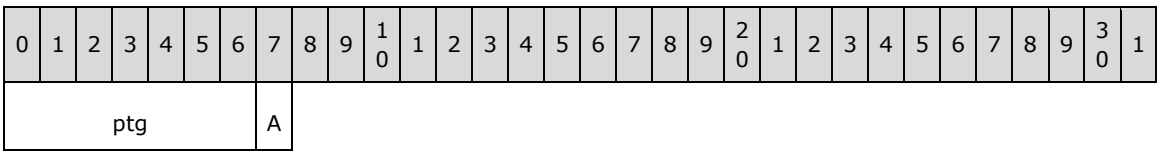
B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

unused (4 bytes): Undefined. This value MUST be ignored.

cce (2 bytes): An unsigned integer that specifies the count of bytes in the binary-reference-expression following this structure.

2.5.97.58 PtgMissArg

The **PtgMissArg** operand (section 2.5.97.88) specifies a missing value.

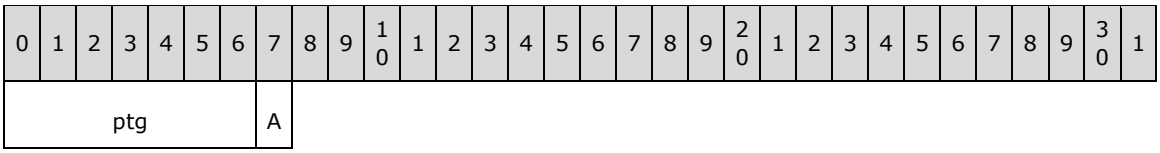


ptg (7 bits): Reserved. This value MUST be 0x16.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.59 PtgMul

The **PtgMul** structure specifies a binary-value-operator (section 2.5.97.88) that multiplies the first and second expressions in a binary-value-expression (section 2.5.97.88).



ptg (7 bits): Reserved. This value MUST be 0x05.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.60 PtgName

The **PtgName** operand (section 2.5.97.88) specifies a reference to a **defined name** in the same **workbook** as the containing **Rgce** (section 2.5.97.88).

If the formula containing this structure is part of a **revision** as specified in the Formulas overview (section 2.2.2), then there MUST be a **RevNameTabid** (section 2.5.97.85) in the **RgbExtra** (section 2.5.97.87) corresponding to this **PtgName**, which specifies those defined names.

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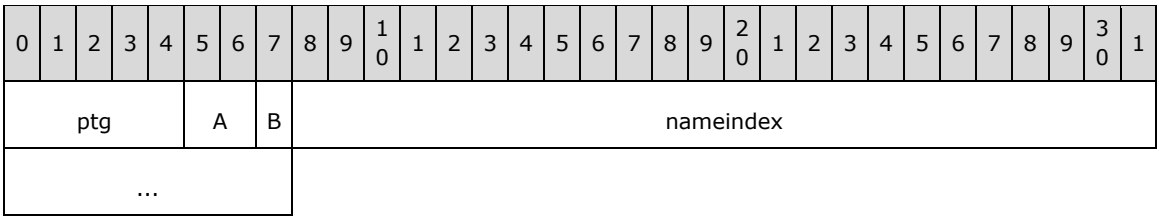


ptg (5 bits): Reserved. This value MUST be 0x03.

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

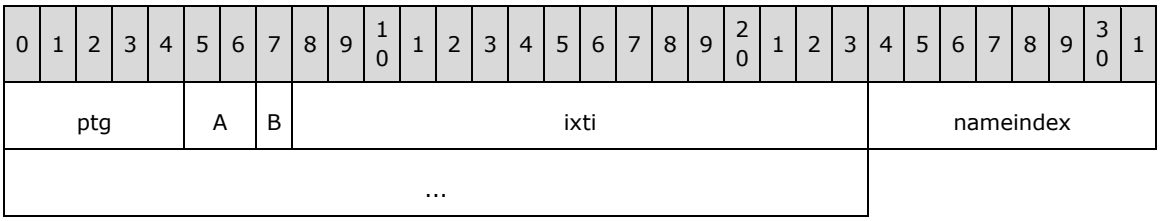
nameindex (4 bytes): If the formula containing this structure is part of a revision as specified in the Formulas overview (section 2.2.2), then this value is undefined and MUST be ignored. Otherwise, it is an unsigned integer that specifies a one-based index of a **BrtName** record in the collection of **BrtName** records in the **Workbook** (section 2.1.7.61) part. Its value MUST be greater than 0 and less than or equal to the number of **BrtName** records in the workbook.

2.5.97.61 PtgNameX

The **PtgNameX** structure specifies a reference to a **defined name** in an external workbook (section 2.1.10).

If the formula containing this structure is part of a **revision** as specified in the Formulas overview (section 2.2.2), then there MUST be a **RevName** (section 2.5.97.83) in the **RgbExtra** (section 2.5.97.87) corresponding to this **PtgNameX**, which specifies the defined name.

If the formula containing this structure is not part of a revision as specified in the Formulas overview (section 2.2.2), then the referenced defined name is specified by an **XtiIndex** (section 2.5.97.103).



ptg (5 bits): Reserved. This value MUST be 0x19.

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

ixti (2 bytes): If the formula containing this structure is not part of a revision as specified in the Formulas overview (section 2.2.2), this value is an **XtiIndex** that specifies the referenced defined name. The **XtiIndex** MUST specify an **Xti** (section 2.5.172) that is a reference to a **BrtSupBookSrc** (section 2.4.785) record.

If the formula containing this structure is part of a revision as specified in the Formulas overview (section 2.2.2), this value is undefined and MUST be ignored.

nameindex (4 bytes): If the formula containing this structure is not part of a revision as specified in the Formulas overview (section 2.2.2), this value is an unsigned integer that specifies the one-based index of a **BrtSupNameStart** (section 2.4.794) record in the collection of

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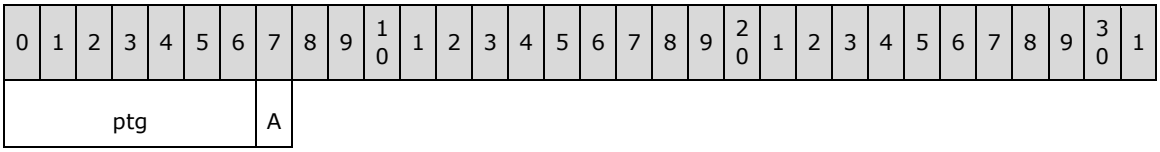
BrtSupNameStart records in the **External Link** (section 2.1.7.25) part **ABNF** that is specified by the **BrtSupBookSrc** record referenced by **ixti**. The referenced and its associated records specify the defined name referenced by this record.

If the formula containing this structure is part of a revision as specified in the Formulas overview (section 2.2.2), this value is undefined and MUST be ignored.

2.5.97.62 PtgNe

The **PtgNe** structure specifies a binary-value-operator (section 2.5.97.88) that specifies whether or not the second **expression** in a binary-value-expression (section 2.5.97.88) is equal to the first.

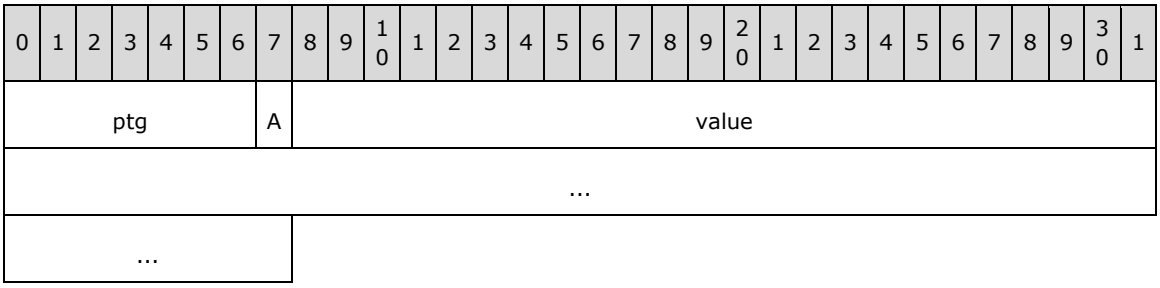


ptg (7 bits): Reserved. This value MUST be 0x0E.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.63 PtgNum

The **PtgNum** operand (section 2.5.97.88) specifies a floating point value.



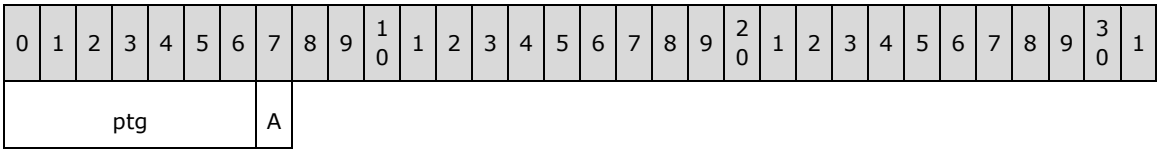
ptg (7 bits): Reserved. This value MUST be 0x1F.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

value (8 bytes): An **Xnum** (section 2.5.171) structure that specifies the value.

2.5.97.64 PtgParen

The **PtgParen** display token (section 2.2.2.4) specifies that parentheses are displayed around the **expression** in a display-precedence-expression (section 2.5.97.88).



ptg (7 bits): Reserved. This value MUST be 0x15.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

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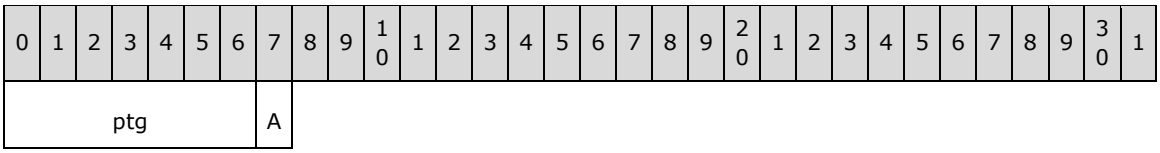
2.5.97.65 PtgPercent

The **PtgPercent** structure specifies a unary-operator that divides the **expression** in a unary-expression by 100 (see section 2.5.97.88).

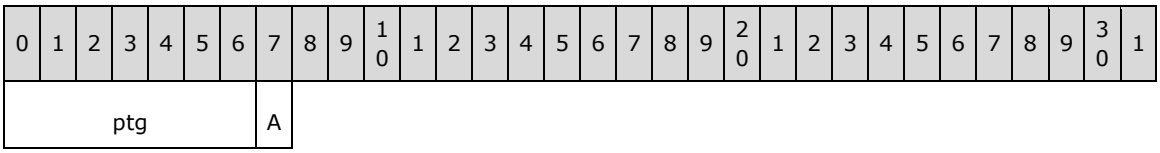


ptg (7 bits): Reserved. This value MUST be 0x14.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.66 PtgPower

The **PtgPower** structure specifies a binary-value-operator (section 2.5.97.88) that raises the first **expression** in a binary-value-expression (section 2.5.97.88) to the power of the second.

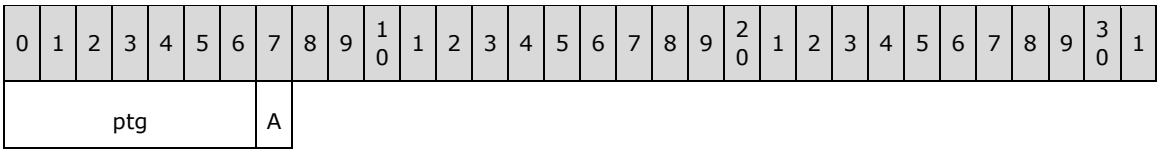


ptg (7 bits): Reserved. This value MUST be 0x07.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.67 PtgRange

The **PtgRange** structure specifies a binary-reference-operator (section 2.5.97.88) that returns the minimum bounding **range** of the first and second expressions in a binary-reference-expression (section 2.5.97.88).

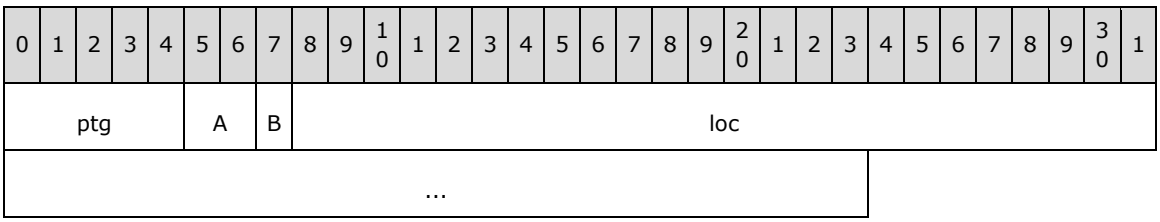


ptg (7 bits): Reserved. This value MUST be 0x11.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.68 PtgRef

The **PtgRef** operand (section 2.5.97.88) specifies a reference to a single **cell** as an **RgceLoc** (section 2.5.97.91)



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ptg (5 bits): Reserved. This value MUST be 0x04.

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

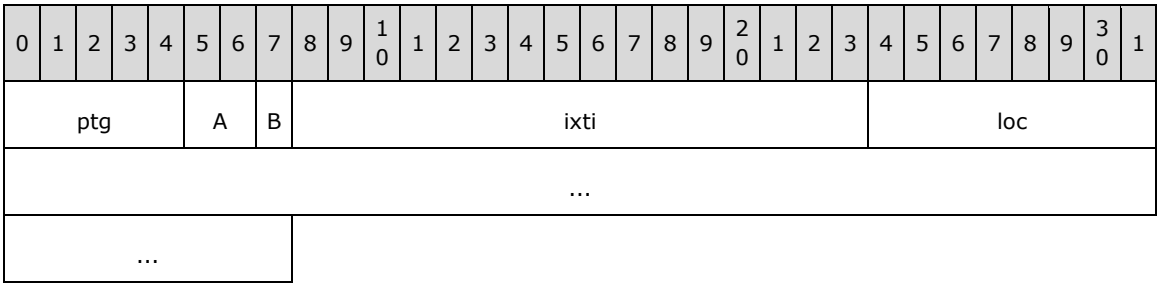
B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

loc (6 bytes): An **RgceLoc** value that specifies the coordinates of the referenced cell.

2.5.97.69 PtgRef3d

The **PtgRef3d** operand (section 2.5.97.88) specifies a reference to a single **cell** on one or more **sheets**.

If the formula containing this structure is part of a **revision** as specified in the Formulas overview (section 2.2.2), then there MUST be a **RevExtern** (section 2.5.97.80) in the **RgbExtra** (section 2.5.97.87) corresponding to this **PtgRef3d**, which specifies those sheets.



ptg (5 bits): Reserved. This value MUST be 0x1A.

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

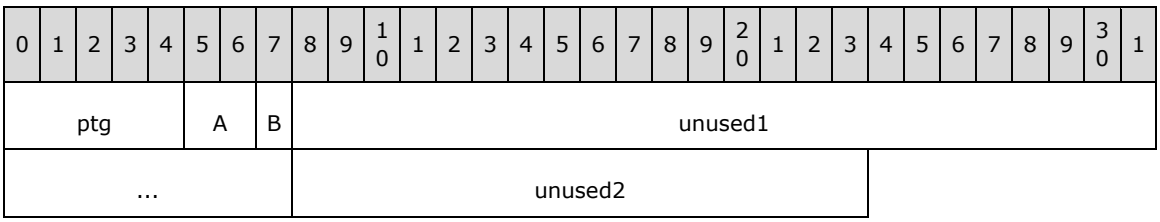
B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

ixti (2 bytes): If the formula containing this structure is not part of a revision as specified in the Formulas overview (section 2.2.2), then this value is an **XtiIndex** (section 2.5.97.103) that specifies the **Xti** (section 2.5.172) that specifies those sheets. Otherwise, it is undefined and MUST be ignored.

loc (6 bytes): A value that specifies coordinates of the referenced cell. If this **PtgRef3d** is part of a **NameParsedFormula** (section 2.5.97.12), then this is a **RgceLocRel** (section 2.5.97.92) value. Otherwise, it is a **RgceLoc** (section 2.5.97.91) value.

2.5.97.70 PtgRefErr

The **PtgRefErr** operand (section 2.5.97.88) specifies an invalid reference to a **cell**.



ptg (5 bits): Reserved. This value MUST be 0x0A.

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A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

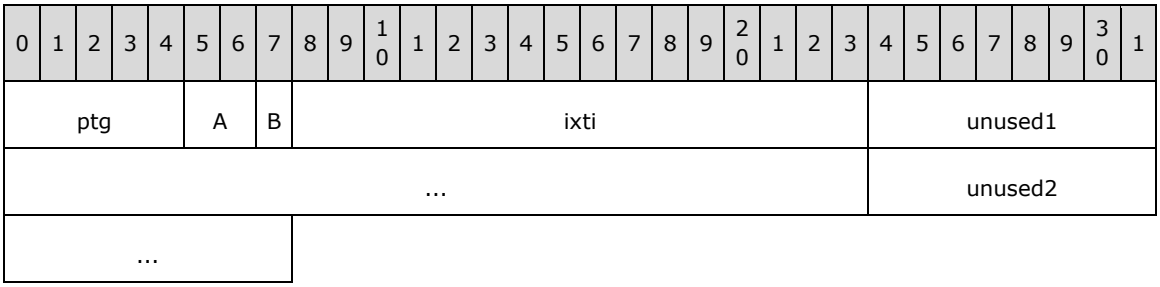
unused1 (4 bytes): Undefined. This value MUST be ignored.

unused2 (2 bytes): Undefined. This value MUST be ignored.

2.5.97.71 PtgRefErr3d

The **PtgRefErr3d** operand (section 2.5.97.88) specifies an invalid reference to a **cell** on one or more **sheets**.

If the formula containing this structure is part of a **revision** as specified in the Formulas overview (section 2.2.2), then there MUST be a **RevExtern** (section 2.5.97.80) in the **RgbExtra** (section 2.5.97.87) corresponding to this **PtgRefErr3d**, that specifies those sheets.



ptg (5 bits): Reserved. This value MUST be 0x1C.

A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this .

B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

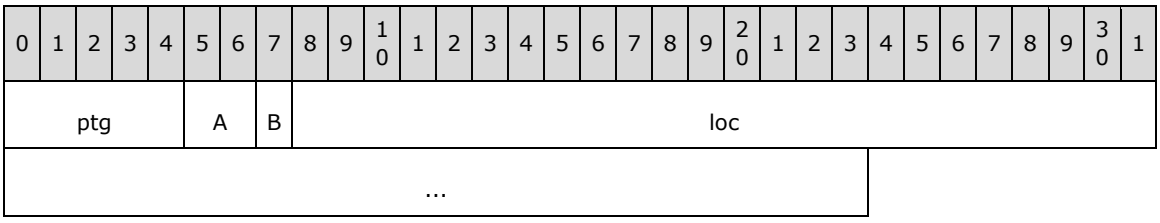
ixti (2 bytes): If the formula containing this structure is not part of a revision as specified in the Formulas overview (section 2.2.2), then this value is an **XtiIndex** (section 2.5.97.103) that specifies the **Xti** (section 2.5.172) that specifies those sheets. Otherwise, it is undefined and MUST be ignored.

unused1 (4 bytes): Undefined. This value MUST be ignored.

unused2 (2 bytes): Undefined. This value MUST be ignored.

2.5.97.72 PtgRefN

The **PtgRefN** operand (section 2.5.97.88) specifies a reference to a single **cell** as an **RgceLocRel** (section 2.5.97.92).



ptg (5 bits): Reserved. This value MUST be 0x0C.

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A - type (2 bits): A **PtgDataType** (section 2.5.97.36) structure that specifies the data type for the value of this **Ptg** (section 2.5.97.16).

B - reserved (1 bit): This value MUST be 0, and MUST be ignored.

loc (6 bytes): An **RgceLocRel** structure that specifies the referenced cell.

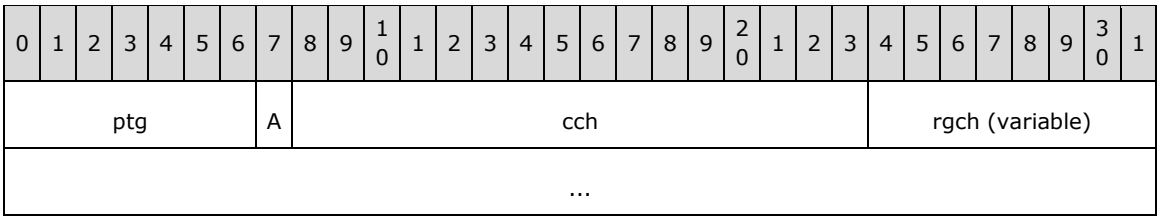
2.5.97.73 PtgRowType

The **PtgRowType** enumeration specifies the type of **rows** that make up a contiguous **range** in a **table**.

Name	Value	Meaning
DATA	0x00	The rows consist of the **data region** of the table.
ALL	0x01	The rows consist of all of the rows in the table.
HEADERS	0x02	The rows consist of the **table header**.
DATA2	0x04	The rows consist of the data region of the table.
DATAHEADERS	0x06	The rows consist of the table header and the data region of the table.
TOTALS	0x08	The rows consist of the **total row** of the table.
DATATOTALS	0x0C	The rows consist of the data region of the table and the total row of the table.
CURRENT	0x10	The rows consist of the current row.

2.5.97.74 PtgStr

The **PtgStr** operand (section 2.5.97.88) specifies a **Unicode** string value.



ptg (7 bits): Reserved. This value MUST be 0x17.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

cch (2 bytes): An unsigned integer that specifies the number of elements in **rgch**. Its value MUST be less than or equal to 255.

rgch (variable): An array of 16-bit Unicode characters.

2.5.97.75 PtgSub

The **PtgSub** structure specifies a binary-value-operator (section 2.5.97.88) that subtracts the second **expression** in a binary-value-expression (section 2.5.97.88) from the first.

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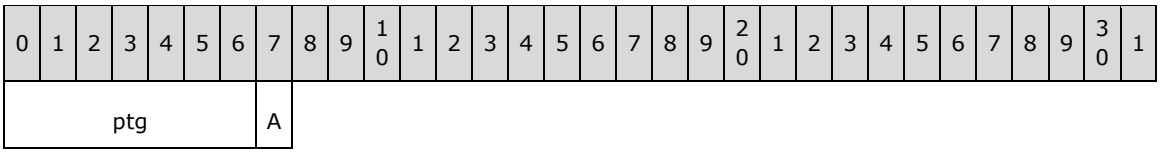
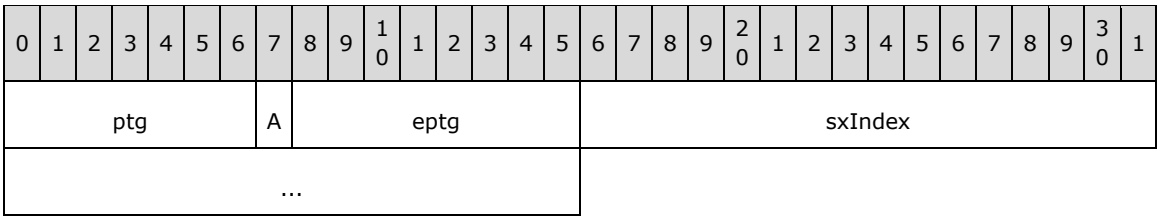


ptg (7 bits): Reserved. This value MUST be 0x04.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.76 PtgSxName

The **PtgSxName** structure specifies a reference to a calculated field or a calculated item found in a **PivotParsedFormula** (section 2.5.97.15). The **Rgce** (section 2.5.97.88) that contains this **Ptg** MUST be part of the **fldFmla** field of a **BrtBeginPCDField** (section 2.4.135) record or the **fmla** field of a **BrtBeginPCDCalcItem** (section 2.4.123) record.



ptg (7 bits): Reserved. This value MUST be 0x18.

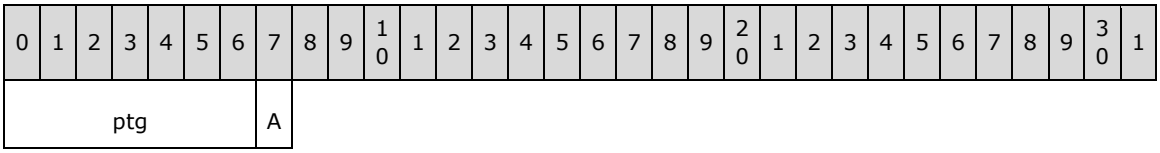
A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

eptg (1 byte): Reserved. This value MUST be 0x1D.

sxIndex (4 bytes): An unsigned integer that specifies the zero-based index of a **BrtBeginPName** (section 2.4.173) record in the collection of **BrtBeginPName** records that follows a **BrtBeginPCDField** record or a **BrtBeginPCDCalcItem** record. This value MUST be less than the number of **BrtBeginPName** records that follow **BrtBeginPCDField** or **BrtBeginPCDCalcItem**.

2.5.97.77 PtgUMinus

The **PtgUMinus** structure specifies a unary-operator that generates the additive inverse of a unary-expression (see section 2.5.97.88).



ptg (7 bits): Reserved. This value MUST be 0x13.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.78 PtgUnion

The **PtgUnion** structure specifies a binary-reference-operator (section 2.5.97.88) that specifies a union between the first **expression** in a binary-reference expression (section 2.5.97.88) and the second.

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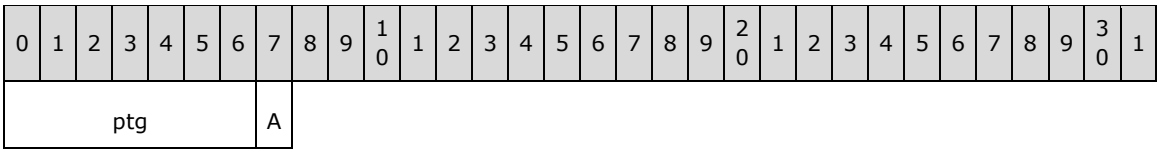
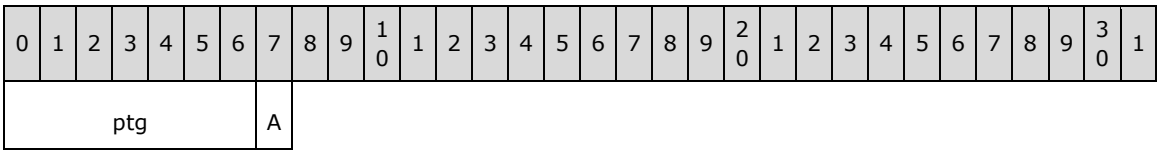


ptg (7 bits): Reserved. This value MUST be 0x10.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.79 PtgUPlus

The **PtgUPlus** structure specifies a unary-operator that leaves a unary-expression unchanged (see section 2.5.97.88).

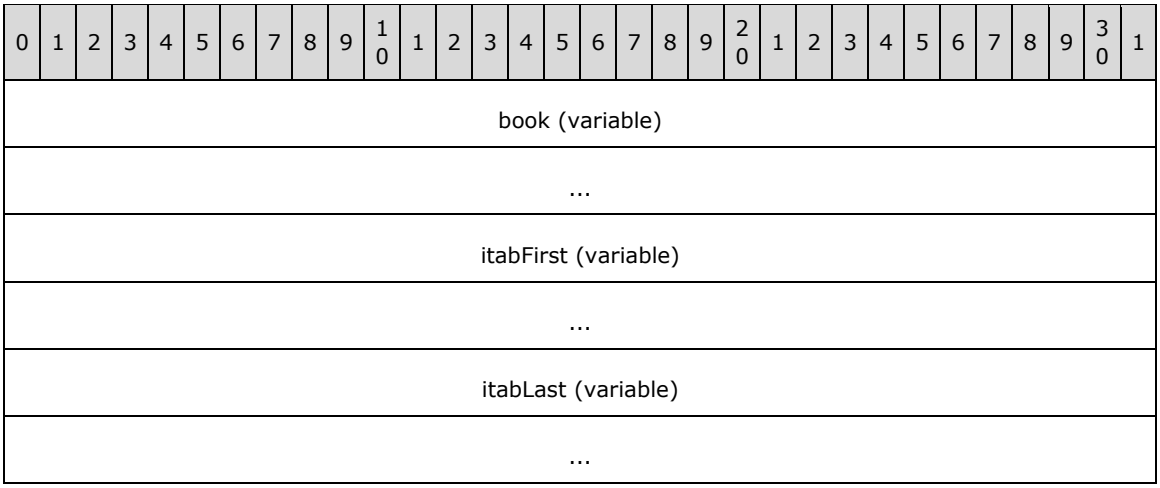


ptg (7 bits): Reserved. This value MUST be 0x12.

A - reserved0 (1 bit): This value MUST be 0, and MUST be ignored.

2.5.97.80 RevExtern

The **RevExtern** structure specifies a **range** of **sheets** on a **workbook** that is referenced by a formula in a **revision**, as specified in the Formulas overview (section 2.2.2).



book (variable): A structure that specifies the workbook based on the value of the first byte, according to the following table.

Value	Meaning
0x01	Specifies the current workbook. This field is two bytes in size. The second byte MUST be 0x02.
Any value except 0x01	This field is a **VirtualPath** (section 2.5.97.101) that specifies the workbook.

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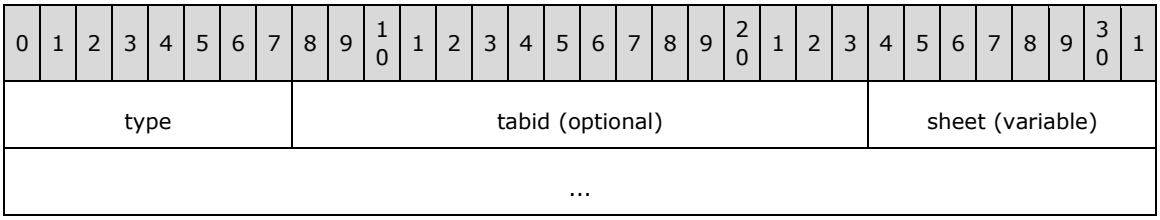
itabFirst (variable): A **RevItab** (section 2.5.97.81) structure that specifies the first sheet in the range.

itabLast (variable): A **RevItab** structure that specifies the last sheet in the range.

2.5.97.81 RevItab

The **RevItab** structure specifies a **sheet** of a **workbook** referenced by a formula in a **revision**, as specified in the Formulas overview (section 2.2.2)



type (1 byte): An unsigned integer that specifies the sheet. It MUST correspond to a value from the following table.

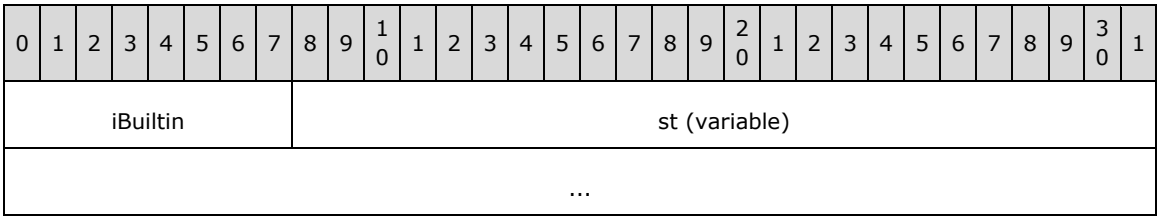
Value	Meaning
0x00	Specifies a sheet on the same workbook. The **tabid** field specifies the sheet.
0x01	Specifies a sheet on a different workbook. The **sheet** field specifies the sheet.
0x02	Specifies the same sheet specified by the preceding **RevItab**.
0x03	Specifies a missing sheet.

tabid (2 bytes): An unsigned integer that specifies a sheet in the current workbook. This field MUST be present only if the value of **type** is 0x00. This MUST equal the value of the **iTabID** field in an existing **BrtBundleSh** (section 2.4.311).

sheet (variable): An **XLUnicodeString** structure (section 2.5.97.102) that specifies the sheet name. This field MUST be present only if the value of **type** is 0x01.

2.5.97.82 RevLblName

The **RevLBlName** structure specifies the name of a **defined name** that is referenced by a formula in a **revision**, as specified in the Formulas overview (section 2.2.2).



iBuiltin (1 byte): An unsigned integer that specifies whether the defined name is a **built-in name**, and if so, which built-in name it is. Its value MUST correspond to the following table.

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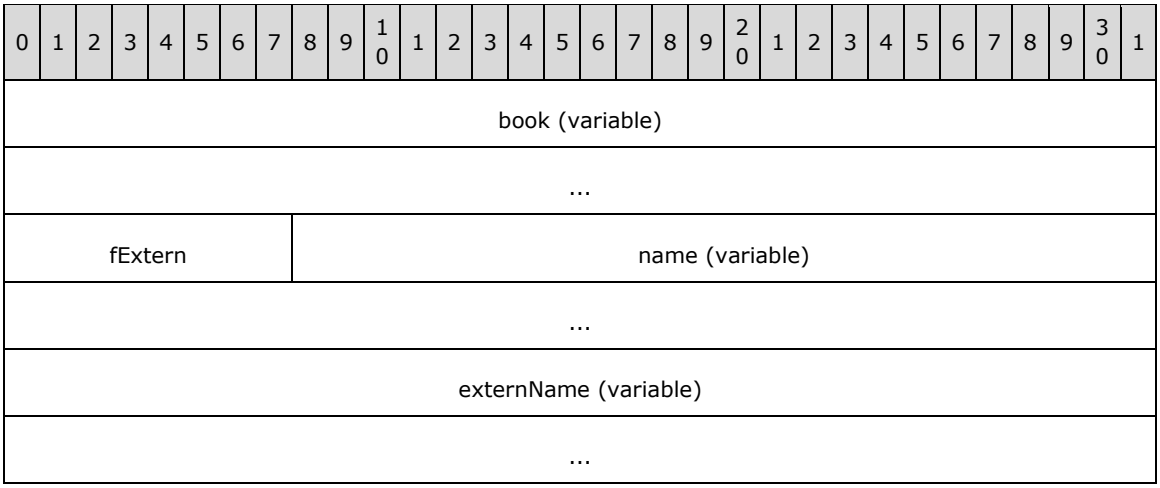
Value	Meaning
0x00	This is not a built-in name.
0x01	Consolidate_Area
0x02	Auto_Open
0x03	Auto_Close
0x04	Extract
0x05	Database
0x06	Criteria
0x07	Print_Area
0x08	Print_Titles
0x09	Recorder
0x0A	Data_Form
0x0B	Auto_Activate
0x0C	Auto_Deactivate
0x0D	Sheet_Title
0x0E	_FilterDatabase

st (variable): If the value of the **iBuiltin** field is 0x00, then this field is an **XLNameWideString** (section 2.5.165) that specifies the name of the defined name. Otherwise, this field is an **XLWideString** (section 2.5.168) and the name of the defined name is specified as the concatenation of the built-in name specified by **iBuiltin** and the value of this field. The concatenated string MUST match grammar specified for **XLNameWideString**.

2.5.97.83 RevName

The **RevName** structure specifies a **defined name** referenced by a formula in a **revision**, as specified in the Formulas overview (section 2.2.2).



book (variable): A structure that specifies the **workbook** based on the value of the first byte, according to the following table.

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Value	Meaning
0x01	Specifies the current workbook. This field is two bytes in size. The second byte MUST be 0x02.
Any value except 0x01	This field is a **VirtualPath** (section 2.5.97.101) that specifies the workbook.

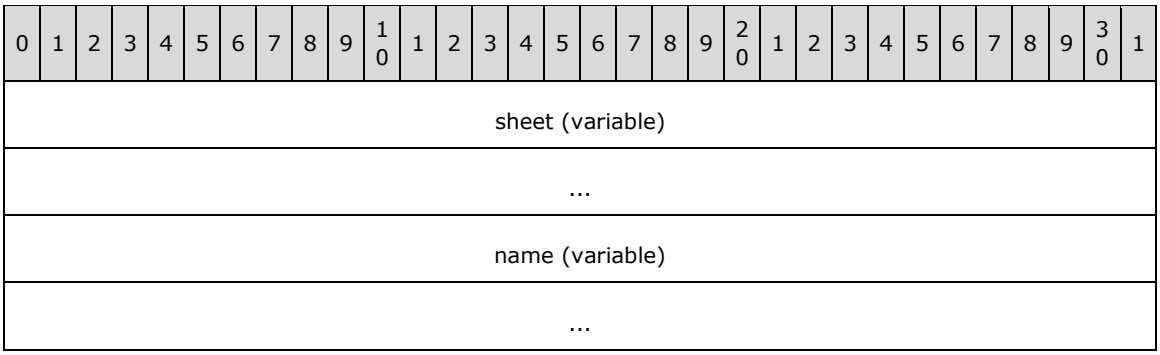
fExtern (1 byte): An unsigned integer that specifies whether the defined name is defined in the current workbook. It MUST be 0x00 if the first byte of **book** is 0x01, and 0x01 otherwise.

name (variable): A **RevNameTabid** (section 2.5.97.85) structure that specifies the name and the scope of the defined name. This field MUST be present only if **fExtern** is 0x00.

externName (variable): A **RevNamePly** (section 2.5.97.84) structure that specifies the name and the scope of the defined name. This field MUST be present only if **fExtern** is 0x01.

2.5.97.84 RevNamePly

The **RevNamePly** structure specifies a **defined name** in an external workbook (section 2.1.10) that is referenced by a formula in a **revision**, as specified in the Formulas overview (section 2.2.2), and the **sheet** on which it is defined.

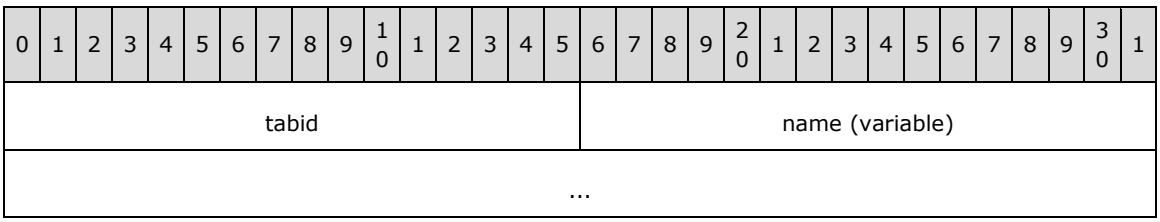


sheet (variable): A **RevSheetName** (section 2.5.97.86) structure that specifies the sheet on which the defined name is defined.

name (variable): A **RevLblName** (section 2.5.97.82) structure that specifies the defined name.

2.5.97.85 RevNameTabid

The **RevNameTabid** structure specifies a non-external **defined name** that is referenced by a formula in a revision, as specified in the Formulas overview (section 2.2.2).



tabid (2 bytes): An unsigned integer that specifies the scope of the defined name. This value MUST correspond to the following table.

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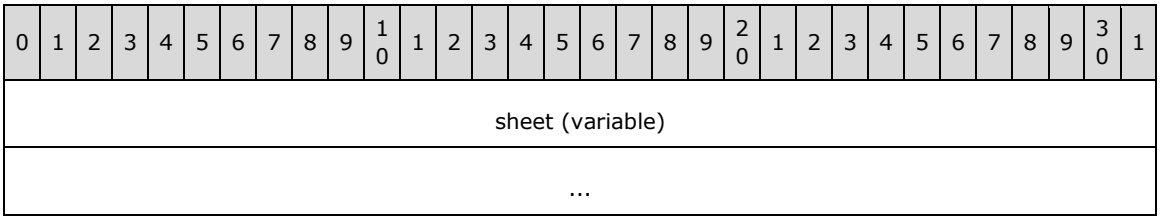
Value	Meaning
0xFFFF	Specifies that the scope is the entire **workbook**.
Greater than or equal to 1 and less than 0xFFFF	Specifies that the scope is a **sheet** from the workbook. This MUST equal the value of the **iTabID** field in a **BrtBundleSh** in the **Workbook** (section 2.1.7.61) part.

name (variable): A **RevLblName** structure that specifies the name of the defined name.

2.5.97.86 RevSheetName

The **RevSheetName** structure specifies the **sheet** or **workbook** on which a **defined name** is defined, when that defined name is referenced by a formula in a **revision**, as specified in the Formulas overview (section 2.2.2).



sheet (variable): A **XLUnicodeString** structure (section 2.5.97.102) that specifies the name of the sheet. The length of the string MUST be less than or equal to 31 characters. This field specifies the entire workbook if the length of the string is zero.

2.5.97.87 RgbExtra

The **RgbExtra** structure specifies a set of structures, laid out sequentially in the file, that correspond to and MUST exist for certain **Ptg**s (section 2.5.97.16) in the **Rgce** (section 2.5.97.88). The order of the structures MUST be the same as the order of the **Ptg**s in the **Rgce** that they correspond to.

The following **Ptg**s MUST have a corresponding structure in an **RgbExtra**.

Ptg	Required structure in an RgbExtra
PtgArray (section 2.5.97.23)	**PtgExtraArray** (section 2.5.97.41)
PtgMemArea (section 2.5.97.54)	**PtgExtraMem** (section 2.5.97.44)
PtgExp (section 2.5.97.40)	**PtgExtraCol** (section 2.5.97.42)

A **PtgList** (section 2.5.97.52) requires a corresponding structure in an **RgbExtra** if and only if the **ixti** field of the **PtgList** (section 2.5.97.52) refers to a different **workbook** and the value of the **invalid** field of the **PtgList** is 0.

Ptg	Required structure in an RgbExtra
PtgList (section 2.5.97.52)	**PtgExtraList** (section 2.5.97.43)

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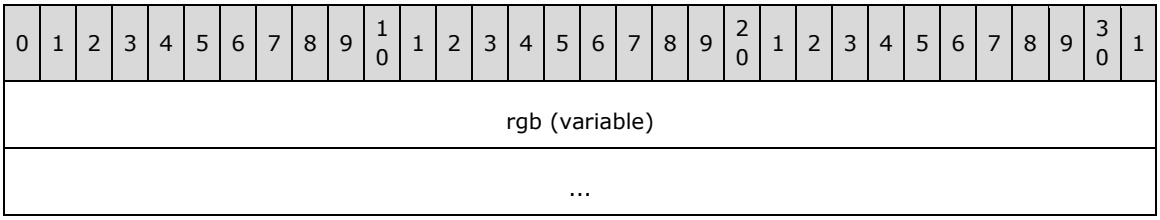
The following **Ptg** structures MUST have a corresponding structure in an **RgbExtra** only if the formula containing that **Ptg** is part of a **revision** as specified in the Formulas overview (section 2.2.2).

Ptg	Required structure in an RgbExtra
PtgName (section 2.5.97.60)	**RevNameTabid** (section 2.5.97.85)
PtgNameX (section 2.5.97.61)	**RevName** (section 2.5.97.83)
PtgRef3d (section 2.5.97.69)	**RevExtern** (section 2.5.97.80)
PtgRefErr3d (section 2.5.97.71)	**RevExtern**
PtgArea3d (section 2.5.97.19)	**RevExtern**
PtgAreaErr3d (section 2.5.97.21)	**RevExtern**



rgb (variable): An array that contains the sequence of these structures.

2.5.97.88 Rgce

The **Rgce** structure specifies a set of **Ptgs**, laid out sequentially in the file.

The sequence of **Ptg** (section 2.5.97.16) structures MUST adhere to the following grammar.

EXPRESSION_SIZE is the sum of the sizes of a contiguous set of **Ptgs** in bytes.

```
rgce = PtgExp / [PtgAttrBaxcel / PtgAttrSemi / PtgAttrSpaceSemi] expression

expression = *(PtgAttrSpace) base-expression
```

The value of the **type** field of each **PtgAttrSpace** (section 2.5.97.30) in an expression MUST be 0, 1, or 6.

```
base-expression = operand / unary-expression / binary-reference-expression / binary-value-
        expression / display-precedence-specifier / mem-area-expression / function-call

operand = PtgMissArg / PtgStr / PtgErr / PtgBool / PtgInt / PtgNum / PtgArray / PtgName / PtgRef
        / PtgArea / PtgRefErr / PtgAreaErr / PtgRefN / PtgAreaN / PtgNameX / PtgRef3d / PtgArea3d
        / PtgRefErr3d / PtgAreaErr3d / PtgList / PtgSxName
```

Each **Ptg** in this definition is an operand token (section 2.2.2.2).

```
unary-expression = val unary-operator

unary-operator = PtgUPlus / PtgUMinus / PtgPercent
```

Each **Ptg** in this definition is a unary operator token.

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```
binary-reference-expression = 2ref binary-reference-operator

binary-reference-operator = PtgIsect / PtgUnion / PtgRange
```

Each **Ptg** in this definition is a binary operator token.

```
binary-value-expression = 2val binary-value-operator

binary-value-operator = PtgAdd / PtgSub / PtgMul / PtgDiv / PtgPower / PtgConcat / PtgLt / PtgLe
       / PtgEq / PtgGe / PtgGt / PtgNe
```

Each **Ptg** in this definition is a binary operator token.

```
display-precedence-specifier = expression [PtgAttrSpace] PtgParen
```

The value of the **type** field of the **PtgAttrSpace** MUST be between 2 and 5 inclusive.

PtgAttrSpace and **PtgParen** (section 2.5.97.64) are display tokens (section 2.2.2.4).

```
mem-area-expression = mem-ptg binary-reference-expression
```

The **cce** field in the **Ptg** of the mem-ptg rule MUST be equal to the EXPRESSION_SIZE of the **Ptg**s that comprise the binary-reference-expression.

If mem-ptg is not equal to **PtgMemFunc** (section 2.5.97.56), then both expression elements in the binary-reference-expression MUST NOT contain any mem-ptg elements, **PtgFunc** (section 2.5.97.45), **PtgFuncVar** (section 2.5.97.46), **PtgName** (section 2.5.97.60), **PtgNameX** (section 2.5.97.61), **PtgList** (section 2.5.97.52), **PtgRef3d** (section 2.5.97.69), **PtgArea3d** (section 2.5.97.19), **PtgRefErr3d** (section 2.5.97.71), or **PtgAreaErr3d** (section 2.5.97.21).

```
mem-ptg = PtgMemArea / PtgMemErr / PtgMemNoMem / PtgMemFunc
```

Each **Ptg** in this definition is a mem token (section 2.2.2.5).

```
function-call = if-expression / iferror-expression / choose-expression / [params-fixed] PtgFunc /
       params-variable PtgFuncVar / params-cetab PtgFuncVar / expression PtgAttrSum
```

The params-fixed (section 2.5.97.10) element MUST NOT be specified if PtgFunc specifies a function that takes no parameters. Otherwise, it MUST conform to the **ABNF** rule for the function specified by PtgFunc.

```
if-expression = expression PtgAttrIf 1*2(expression PtgAttrGoTo) PtgFuncVar
```

The value of the **offset** field in the **PtgAttrIf** (section 2.5.97.27) MUST be equal to the EXPRESSION_SIZE of all **Ptg**s in the if-expression after the **PtgAttrIf** through the first **PtgAttrGoTo** (section 2.5.97.26).

The value of the **offset** field in each **PtgAttrGoTo** MUST be equal to one less than the EXPRESSION_SIZE of all **Ptg**s remaining in the if-expression after that **PtgAttrGoTo**.

The value of the **fCetab** field of the **PtgFuncVar** MUST be 0. The value of the **tab** field of the **PtgFuncVar** MUST be 0x0001, which represents the IF function.

```
iferror-expression = expression PtgAttrIfError expression PtgAttrGoTo PtgFunc
```

The value of the **offset** field in the **PtgAttrIfError** (section 2.5.97.28) MUST be equal to the EXPRESSION_SIZE of all **Ptg**s in the iferror-expression after the **PtgAttrIfError** through the first **PtgAttrGoTo**.

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The value of the **offset** field in the **PtgAttrGoTo** MUST be equal to one less than the EXPRESSION_SIZE of the **PtgFunc**.

The value of the **iftab** field of the **PtgFunc** MUST be 0x01E0, which represents the **IFERROR** function.

`choose-expression = expression` **`PtgAttrChoose`** `1*254(expression` **`PtgAttrGoTo`**`) ` **`PtgFuncVar`**

The value of the **cOffset** field in the **PtgAttrChoose** (section 2.5.97.25) MUST be equal to the number of times the expression in the repeated sequence group appears.

The first offset in the array of offsets in the **rgOffset** field in the **PtgAttrChoose** MUST be equal to four less than the size of the **PtgAttrChoose** in bytes.

For the n^{th} occurrence of the repeated sequence group, the $(n+1)^{th}$ offset in the array of offsets in the **rgOffset** field in the **PtgAttrChoose** MUST be equal to the EXPRESSION_SIZE of all **Ptg**s in the choose-expression after the **PtgAttrChoose** through the n^{th} **PtgAttrGoTo**.

The value of the **offset** field in each **PtgAttrGoTo** MUST equal one less than the EXPRESSION_SIZE of all **Ptg**s remaining in the choose-expression after that **PtgAttrGoTo**.

The value of the **fCetab** field of the **PtgFuncVar** MUST be 0. The value of the **tab** field of the **PtgFuncVar** MUST be 0x0064, which represents the CHOOSE function.

`val = expression`

Additional restrictions are specified under VALUE_TYPE. The **params-fixed**, **params-variable** (section 2.5.97.10), and **params-cetab** (section 2.5.97.5) rules also use val.

`ref = expression`

Additional restrictions are specified under VALUE_TYPE. The **params-fixed**, **params-variable**, and **params-cetab** rules also use ref.

Additional restrictions on the contents of this structure are specified in terms of a parse tree. For this purpose, a parse tree is a means of organizing the components of an **Rgce**. Each node in the parse tree represents a **Ptg** or an ABNF rule described earlier. Non-leaf nodes represent rules and have one child node for each element in the rule. Leaf nodes represent only a **Ptg**.

For a leaf node in the parse tree, NESTING_DEPTH is the number of function-call nodes in the path from the root node to that leaf.

For a node in the parse tree, OPERAND_COUNT is as follows:

- The OPERAND_COUNT of each **Ptg** appearing in the operand rule definition is one.
- The OPERAND_COUNT of all other **Ptg**s is 0.
- The OPERAND_COUNT of a node that has n child nodes with nonzero OPERAND_COUNT is equal to the maximum, across all the n child nodes, of (n-1) plus the OPERAND_COUNT of the n^{th} child that has nonzero OPERAND_COUNT.

For a node in the parse tree, VALUE_TYPE is a state indicating that the node represents a single value of a simple type or an array of such values. A node that is not a VALUE_TYPE represents a reference to a **range**. Elements in an expression MUST represent either values or references, based on the specific Ptgs used in the expression. The following rules specify how to traverse the parse tree from the bottom up and determine whether each node is a VALUE_TYPE, which determines whether the sequence of **Ptg** structures comprising the formula (section 2.2.2) correctly satisfies the requirements of each expression in the formula. A node is determined to be a VALUE_TYPE as follows:

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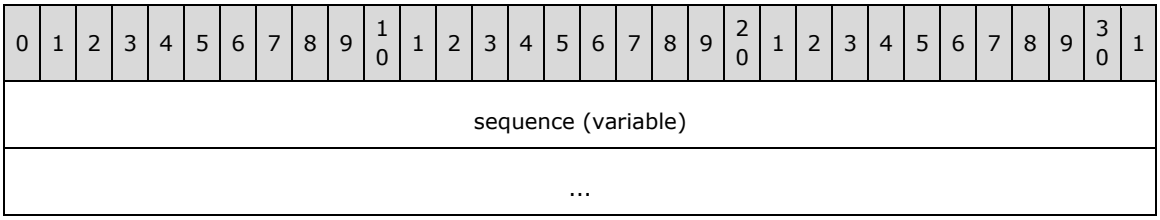
- Leaf nodes:
  - **PtgMissArg** (section 2.5.97.58), **PtgStr** (section 2.5.97.74), **PtgSxName** (section 2.5.97.76), **PtgErr** (section 2.5.97.39), **PtgBool** (section 2.5.97.34), **PtgInt** (section 2.5.97.49), **PtgNum** (section 2.5.97.63), **PtgArray** (section 2.5.97.23), **PtgRefErr** (section 2.5.97.70), **PtgAreaErr** (section 2.5.97.20), **PtgRefErr3d** (section 2.5.97.71), **PtgAreaErr3d** (section 2.5.97.21), **PtgUPlus** (section 2.5.97.79), **PtgUMinus** (section 2.5.97.77), **PtgPercent** (section 2.5.97.65), **PtgAdd** (section 2.5.97.17), **PtgSub** (section 2.5.97.75), **PtgMul** (section 2.5.97.59), **PtgDiv** (section 2.5.97.37), **PtgPower** (section 2.5.97.66), **PtgConcat** (section 2.5.97.35), **PtgLt** (section 2.5.97.53), **PtgLe** (section 2.5.97.51), **PtgEq** (section 2.5.97.38), **PtgGe** (section 2.5.97.47), **PtgGt** (section 2.5.97.48), and **PtgNe** leaf nodes are VALUE_TYPEs.
  - **PtgName** (section 2.5.97.60), **PtgRef** (section 2.5.97.68), **PtgArea** (section 2.5.97.18), **PtgRefN** (section 2.5.97.72), **PtgAreaN** (section 2.5.97.22), **PtgNameX** (section 2.5.97.61), **PtgRef3d** (section 2.5.97.69), **PtgArea3d** (section 2.5.97.19), **PtgFunc** (section 2.5.97.45), **PtgFuncVar** (section 2.5.97.46), **PtgMemArea** (section 2.5.97.54), **PtgMemErr** (section 2.5.97.55), **PtgMemNoMem** (section 2.5.97.57), and **PtgMemFunc** (section 2.5.97.56) leaf nodes are VALUE_TYPEs if and only if the value of the **type** field is value or array.
  - **PtgList** leaf nodes are VALUE_TYPEs if and only if the **type** field equals 1.
  - All other leaf nodes are not VALUE_TYPEs.
- Non-leaf nodes:
  - Any non-leaf node with a single child node MUST be a VALUE_TYPE if and only if the child node is a VALUE_TYPE.
  - Any non-leaf node with a mem-ptg, unary-operator, binary-value-operator, binary-reference-operator, **PtgAttrSum** (section 2.5.97.33), **PtgFunc** or **PtgFuncVar** child node is a VALUE_TYPE if and only if that child node is a VALUE_TYPE. Other child nodes are ignored for the purposes of determining whether the non-leaf node is a VALUE_TYPE.
  - Any non-leaf node corresponding to a val rule MUST be a VALUE_TYPE.
  - Any non-leaf node corresponding to a ref rule MUST NOT be a VALUE_TYPE.
  - Otherwise, a non-leaf node with an expression child node is a VALUE_TYPE if and only if that expression child node is a VALUE_TYPE.

A parse tree for an Rgce MUST meet the following conditions:

- The NESTING_DEPTH of each leaf node MUST NOT exceed 65.
- The OPERAND_COUNT of the root node MUST NOT exceed 1024.



sequence (variable): An array of **Ptg** that specifies the sequence of **Ptg** structures. sequence of **Ptg** (section 2.5.97.16) structures

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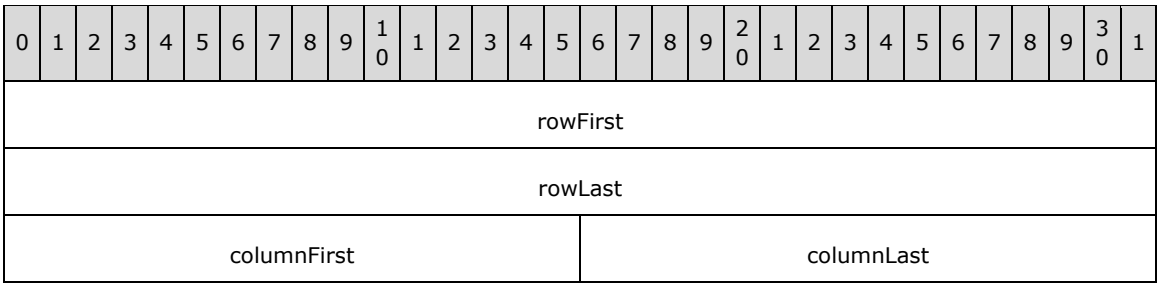
2.5.97.89 RgceArea

The **RgceArea** structure specifies a reference to a rectangular **range** of cells, where relative references are stored as coordinates.



rowFirst (4 bytes): An **UncheckedRw** (section 2.5.154) structure that specifies the first **row** of the **cell** range. Its value MUST be less than 1048576.

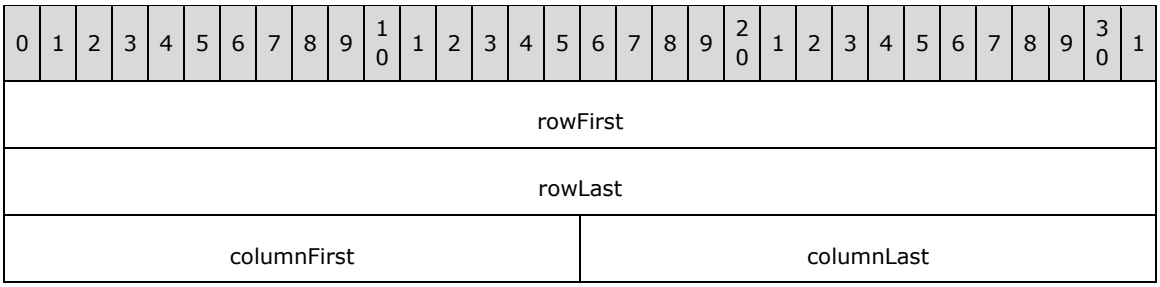
rowLast (4 bytes): An **UncheckedRw** structure that specifies the last row of the cell range. Its value MUST be less than 1048576.

columnFirst (2 bytes): A **ColRelShort** (section 2.5.25) structure that specifies the first **column (1)** of the cell range and relative reference information about the first column (1) and first row.

columnLast (2 bytes): A **ColRelShort** structure that specifies the last column (1) of the cell range and relative reference information about the last column (1) and last row.

2.5.97.90 RgceAreaRel

The **RgceAreaRel** structure specifies a rectangular **range** of **cells**, where the relative portions of **relative references** are specified as offsets from the cell in which the formula (section 2.2.2) is evaluated.



rowFirst (4 bytes): If **columnFirst.fRwRel** is 0, then **rowFirst** is an **UncheckedRw** (section 2.5.154) that specifies the first **row** coordinate of the **cell reference**. If **columnFirst.fRwRel** is 1, then **rowFirst** is a **RwRelNeg** (section 2.5.128) that specifies the first row as an offset from the cell in which the formula is evaluated.

rowLast (4 bytes): If **columnLast.fRwRel** is 0, then **rowLast** is an **UncheckedRw** that specifies the last row coordinate of the cell reference. If **columnLast.fRwRel** is 1, then **rowLast** is a **RwRelNeg** that specifies the last row as an offset from the cell in which the formula is evaluated.

columnFirst (2 bytes): A **ColRelShort** (section 2.5.25) structure that specifies information about the first row and **column (1)**. If **columnFirst.fColRel** is 0, then **columnFirst.col** specifies the first column (1) coordinate of the cell reference. If **columnFirst.fColRel** is 1, then **columnFirst.col** specifies the first column (1) as an offset from the cell in which the formula is evaluated.

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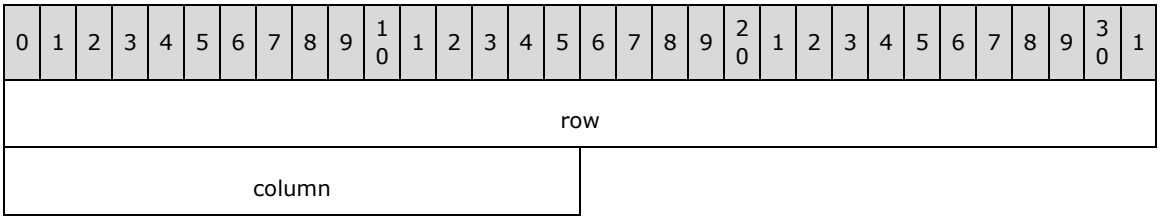
columnLast (2 bytes): A **ColRelShort** structure that specifies information about the last row and column (1). If **columnLast.fColRel** is 0, then **columnLast.col** specifies the last column (1) coordinate of the cell reference. If **columnLast.fColRel** is 1, then **columnLast.col** specifies the last column (1) as an offset from the cell in which the formula is evaluated.

2.5.97.91 RgceLoc

The **RgceLoc** structure specifies a reference to a single cell, where **relative references** are stored as coordinates.

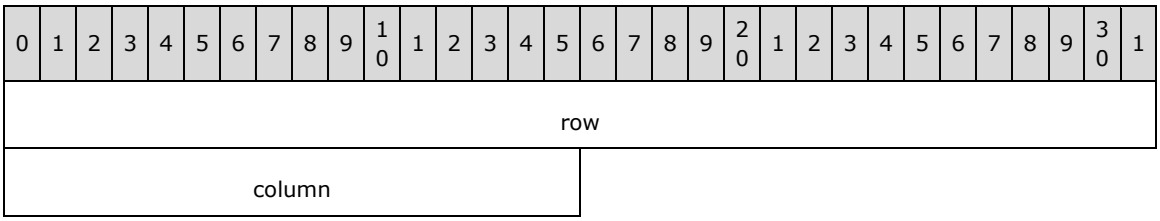


row (4 bytes): An **UncheckedRw** (section 2.5.154) structure that specifies the **row** coordinate of the **cell reference**. Its value MUST be less than 1048576.

column (2 bytes): A **ColRelShort** (section 2.5.25) structure that specifies the **column (1)** coordinate of the cell reference and that specifies relative reference information.

2.5.97.92 RgceLocRel

The **RgceLocRel** structure specifies a single **cell reference** where the relative portions of **relative references** are specified as offsets from the **cell** in which the formula (section 2.2.2) is evaluated.



row (4 bytes): If **column.fRwRel** is 0, then **row** is an **UncheckedRw** (section 2.5.154) that specifies the **row** coordinate of the cell reference. If **column.fRwRel** is 1, then **row** is a **RwRelNeg** (section 2.5.128) that specifies the row as an offset from the cell in which the formula is evaluated. If the signed result of the offset is a row index less than 0x00000000, the value is incremented by 0x00100000 so that it results in a valid row index. If the signed result of the offset is a row index greater than 0x000FFFFF, the value is decremented by 0x00100000.

column (2 bytes): A **ColRelShort** (section 2.5.25) structure that specifies information about the row and **column (1)**. If **column.fColRel** is 0, then **column.col** specifies the column (1) coordinate of the cell reference. If **column.fColRel** is 1, then **column.col** specifies the column (1) as an offset from the cell in which the formula is evaluated. If the signed result of the offset is a column (1) index less than 0x0000, the value is incremented by 0x4000 so that it results in a valid column (1) index. If the signed result of the offset is a column (1) index greater than 0x3FFF, the value is adjusted by 0x4000 so that it results in a valid column (1) index.

2.5.97.93 SerAr

The **SerAr** structure specifies a value in **PtgExtraArray** (section 2.5.97.41).

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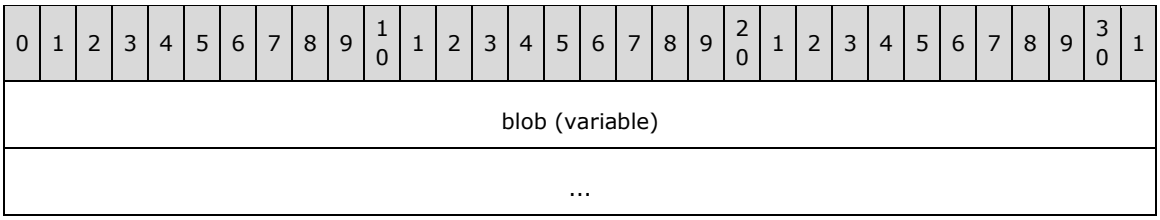
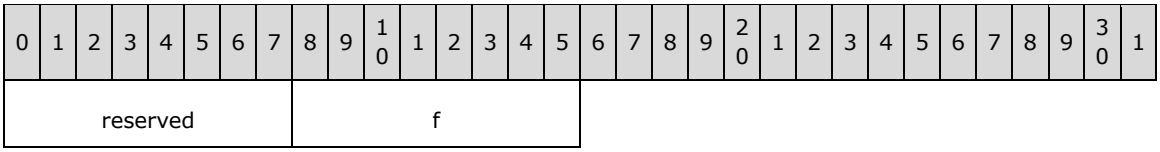


blob (variable): A structure that specifies a value in **PtgExtraArray**. MUST be one of the following structures: **SerNum** (section 2.5.97.96), **SerStr** (section 2.5.97.97), **SerBool** (section 2.5.97.94), or **SerErr** (section 2.5.97.95). The structure is specified by the first byte, which is the reserved byte in each of those structures.

2.5.97.94 SerBool

The **SerBool** structure specifies a **Boolean** (section 2.5.97.3) value in an array of values.

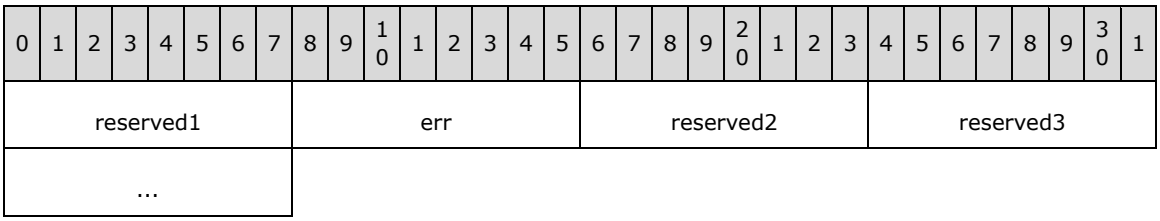


reserved (1 byte): Reserved. This value MUST be 0x02.

f (1 byte): A **Boolean** that specifies the value.

2.5.97.95 SerErr

The **SerErr** structure specifies an error value in an array of values.



reserved1 (1 byte): Reserved. This value MUST be 0x04.

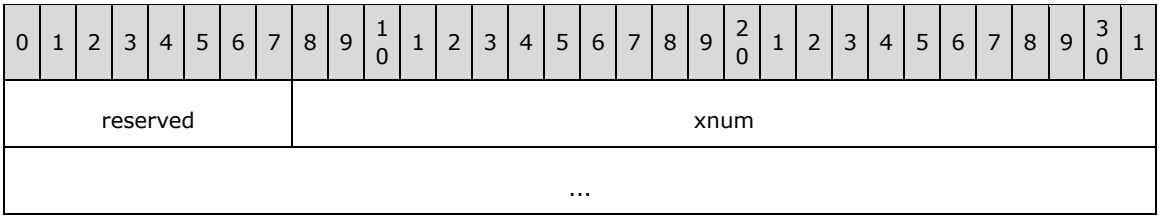
err (1 byte): A **BErr** (section 2.5.97.2) structure that specifies the error code value.

reserved2 (1 byte): This value MUST be 0, and MUST be ignored.

reserved3 (2 bytes): This value MUST be 0, and MUST be ignored.

2.5.97.96 SerNum

The **SerNum** structure specifies a numeric value in an array of values.



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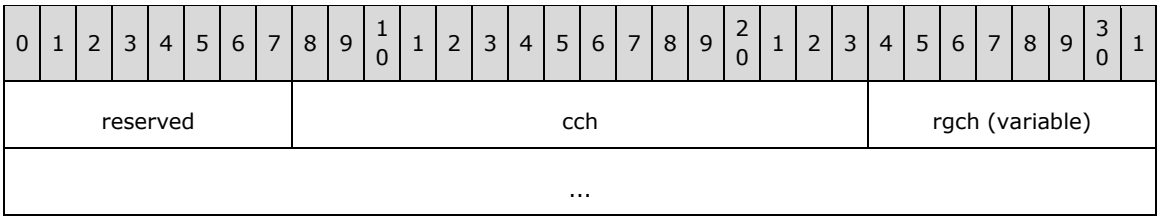
...

reserved (1 byte): Reserved. This value MUST be 0x00.

xnum (8 bytes): An **Xnum** (section 2.5.171) structure that specifies the value.

2.5.97.97 SerStr

The **SerStr** structure specifies a text string in an array of values.



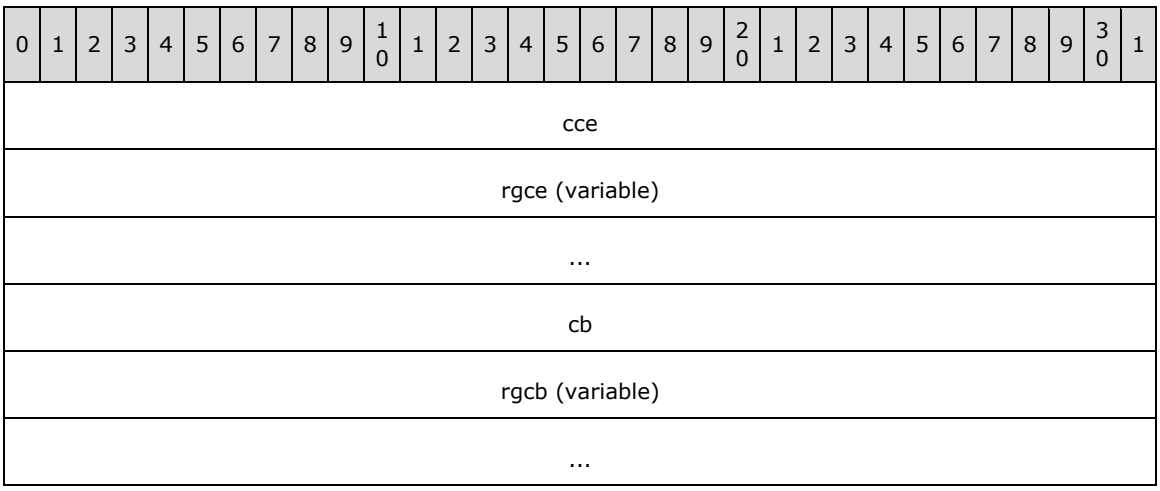
reserved (1 byte): Reserved. This value MUST be 0x01.

cch (2 bytes): An unsigned integer that specifies the number of characters in **rgch**. Its value MUST be less than 256.

rgch (variable): An array of 16-bit **Unicode** characters in the string.

2.5.97.98 SharedParsedFormula

The **SharedParsedFormula** structure specifies the formula (section 2.2.2) for a shared formula.



cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. Its value MUST be greater than 0 and less than 16385.

rgce (variable): An **Rgce** (section 2.5.97.88) that specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula. MUST NOT contain **PtgExp** (section 2.5.97.40), **PtgSxName** (section 2.5.97.76), **PtgIsect** (section 2.5.97.50), **PtgUnion** (section 2.5.97.78), **PtgRange** (section 2.5.97.67), **PtgArray** (section 2.5.97.23), **PtgRefErr** (section 2.5.97.70), **PtgAreaErr** (section 2.5.97.20), **PtgRef3d** (section 2.5.97.69), **PtgArea3d**, **PtgRefErr3d** (section 2.5.97.71), **PtgAreaErr3d** (section 2.5.97.21), **PtgNameX** (section 2.5.97.61), **PtgMemArea** (section

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2.5.97.54), **PtgMemErr** (section 2.5.97.55), **PtgMemNoMem** (section 2.5.97.57), or **PtgMemFunc** (section 2.5.97.56).

If this field contains a **PtgRef** (section 2.5.97.68), then the **loc.column.fColRel** and **loc.column.fRwRel** fields in the **PtgRef** MUST be 0.

If this field contains a **PtgArea** (section 2.5.97.18), then the **area.columnFirst.fColRel**, **area.columnFirst.fRwRel**, **area.columnLast.fColRel**, and **area.columnLast.fRwRel** fields in the **PtgArea** MUST be 0**.**

If this field contains a **PtgFuncVar** (section 2.5.97.46) and the **fCeFunc** field of the **PtgFuncVar** is 0, then the **tab** field of the **PtgFuncVar** MUST NOT be 0x017B.

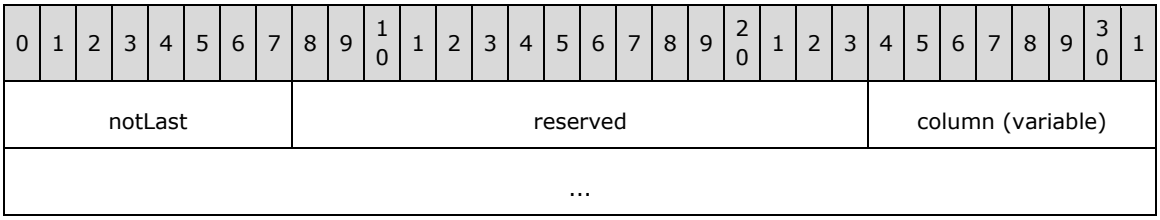
The root node of the parse tree of this field MUST be a VALUE_TYPE, as described in section 2.5.97.88.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An **RgbExtra** (section 2.5.97.87) structure that specifies ancillary data for the formula.

2.5.97.99 SxOs

The **SxOs** structure specifies a **column (1)** in a **table**.



notLast (1 byte): A **Boolean** that specifies which field of **SxSu** (section 2.5.97.100) is specified by this structure. Its value MUST correspond to the following table.

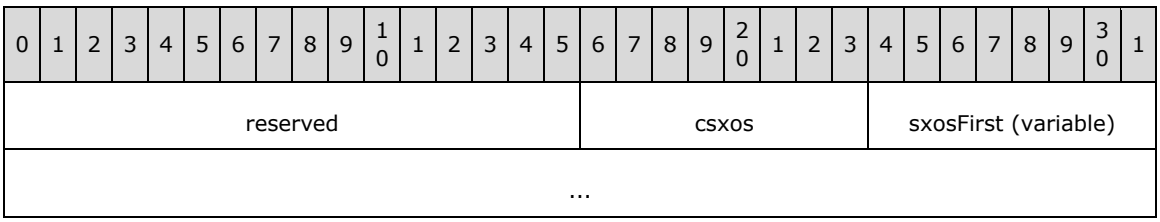
Value	Meaning
0x1	This structure specifies an **SxSu**.**sxosFirst** field**.**
0x0	This structure specifies an **SxSu**.**sxosLast** field**.**

reserved (2 bytes): Reserved. This value MUST be 0x0002.

column (variable): A **LPWideString** (section 2.5.91) structure that specifies the column (1) name. The value of **column**.**cchCharacters** MUST be greater than 0.

2.5.97.100 SxSu

The **SxSu** structure specifies a **range** of **columns (1)** in a **table**.



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sxosLast (variable)
...

reserved (2 bytes): Its value MUST be 0, and MUST be ignored.

csxos (1 byte): An unsigned integer that specifies the columns (1) in the range. Its value MUST correspond to the following table.

Value	Meaning
0x01	The columns (1) of the range consist of a single column (1) specified by **sxosFirst**.
0x02	The columns (1) of the range consist of the range of columns (1) between the column (1) specified by **sxosFirst**, and the column (1) specified by **sxosLast**, inclusive.

sxosFirst (variable): A **SxOs** structure (section 2.5.97.99) that specifies the first column (1). The value of **sxosFirst.notLast** MUST be 1 if **csxos** is 2. The value of **sxosFirst.notLast** MUST be 0 if **csxos** is 1.

sxosLast (variable): A **SxOs** structure that specifies the last column (1). The value of **sxosLast.notLast** MUST be 0.

2.5.97.101 VirtualPath

VirtualPath is an **XLUnicodeString** structure (section 2.5.97.102) that specifies a path, **workbook**, and optionally a **sheet**. This value MUST be a **XLUnicodeString** in the following grammar

```
virt-path = volume / unc-volume / rel-volume / transfer-protocol / startup / alt-startup / library

startup = %x0001 %x0006 file-path
```

This code specifies that the relative-path is relative to the **startup directory**.

```
alt-startup = %x0001 %x0007 file-path
```

This code specifies that the relative-path is relative to the **alternate startup directory**.

```
library = %x0001 %x0008 file-path
```

This code specifies that the relative-path is relative to the **library directory**.

```
transfer-protocol = %x0001 %x0005 count transfer-path
```

This code specifies that the path is a **transfer protocol** path. The value of **count** MUST be equal to the number of characters following **count** in transfer-path.

```
transfer-path = transfer-base-path / "[" transfer-base-path "]" sheet-name

transfer-base-path = transfer-type "://" file-path

transfer-type = "ftp" / "http" / "https"

volume = %x0001 %x0001 volume-character file-path
```


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This code specifies that the path is relative to a specific drive volume. The drive volume is specified in volume-character.

```
rel-volume = %x0001 %x0002 file-path
```

This code specifies that the path is relative to the drive volume of the workbook that contains the path.

```
unc-volume = %x0001 %x0001 %x0040 unc-path
```

This code specifies that the path is relative to a **UNC volume**. The computer name is specified in computer-name and the shared folder is specified in shared-folder.

```
unc-path = unc-base-path /  "[" unc-base-path "]" sheet-name

unc-base-path = computer-name %x0003 shared-folder %x0003 relative-path

volume-character = %x0041-%x005A / %0061-%x007A
```

This code specifies the volume title. The volume specified is a drive volume and volume-character is the character of that drive.

```
file-path = relative-path / "[" relative-path "]" sheet-name

sheet-name = sheet-start-end-character *sheet-character sheet-start-end-character /
sheet-start-end-character

sheet-start-end-character = %x0001-%xFFFF
```

This code specifies the sheet-start-end-character MUST also not include any character that matches invalid-sheet-start-end-character.

```
invalid-sheet-start-end-character = %x0003 /  "*" / "?" / "'" / "["  /  "]"  /  "\"  /
":"  /  "/"

sheet-character = %x0001-%xFFFF
```

This code specifies a sheet character. A sheet character MUST also not include any character that matches invalid-sheet-character.

```
invalid-sheet-character = %x0003 /  "*" / "?" / "["  /  "]"  /  "\"  /  ":"  /  "/"

relative-path = directory *(%x0003 directory)

directory = path-string

computer-name = path-string

shared-folder = path-string

path-string = 1*path-character

path-character = %x0020-%x0021 / %x0023-%x0029 / %x002B-%x002E / %x0030-%x0039 /
%x003B / %x003D / %x0040-%x005B / %x005D-%x007B / %x007D-%xFFFF
```

This code specifies a path character.

```
count = %x00-%xFF
```

Certain grammar rules have specific meanings, as specified in the following table.

Rule	Meaning
volume	Specifies that the path is relative to a specific drive volume.

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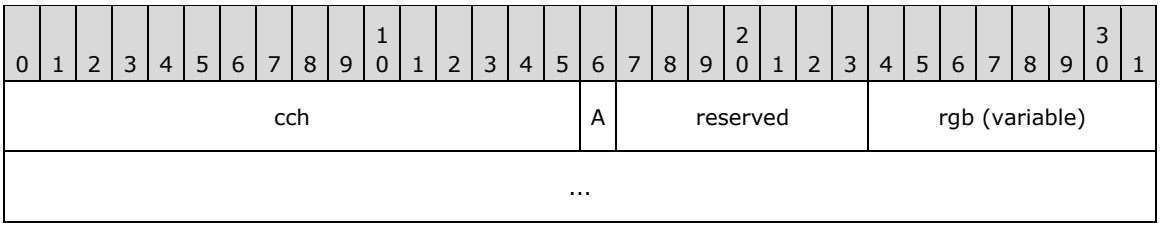
Rule	Meaning
	Volume-character specifies the drive volume.
unc-volume	Specifies that the path is relative to a UNC volume. Computer-name specifies the computer. Shared-folder specifies the shared folder.
transfer-protocol	Specifies that the path is a transfer protocol path. The count MUST equal the number of characters following **count** in the **XLUnicodeString**.
startup	Specifies that the relative-path is relative to the startup directory.
alt-startup	Specifies that the relative-path is relative to the alternate startup directory.
library	Specifies that the relative-path is relative to the library directory.
relative-path	Specifies a sequence of subdirectories that comprise the path from the volume or directory.
sheet-name	The name of the sheet in the workbook.

2.5.97.102 XLUnicodeString

The **XLUnicodeString** structure specifies a **Unicode** string.



cch (2 bytes): An unsigned integer that specifies the count of characters in the string.

A - fHighByte (1 bit): A bit that specifies whether the characters in **rgb** are double-byte characters. It MUST be a value from the following table.

Value	Meaning
0x0	All the characters in the string have a high byte of 0x00 and only the low bytes are in **rgb**.
0x1	All the characters in the string are saved as double-byte characters in **rgb**.

reserved (7 bits): This value MUST be 0, and MUST be ignored.

rgb (variable): An array of bytes that specifies the characters. If the value of **fHighByte** is 0x0, the size of the array MUST be equal to **cch**. If the value of **fHighByte** is 0x1, the size of the array MUST be equal to **cch***2.

2.5.97.103 XtiIndex

XtiIndex is a 2-byte unsigned integer that identifies an **Xti** (section 2.5.172) structure. Its value MUST correspond to the following table.

Value	Meaning
0xFFFF	Specifies an invalid **Xti**.
Greater than or equal to 0 and less than 0xFFFF	Specifies a zero-based index of an element

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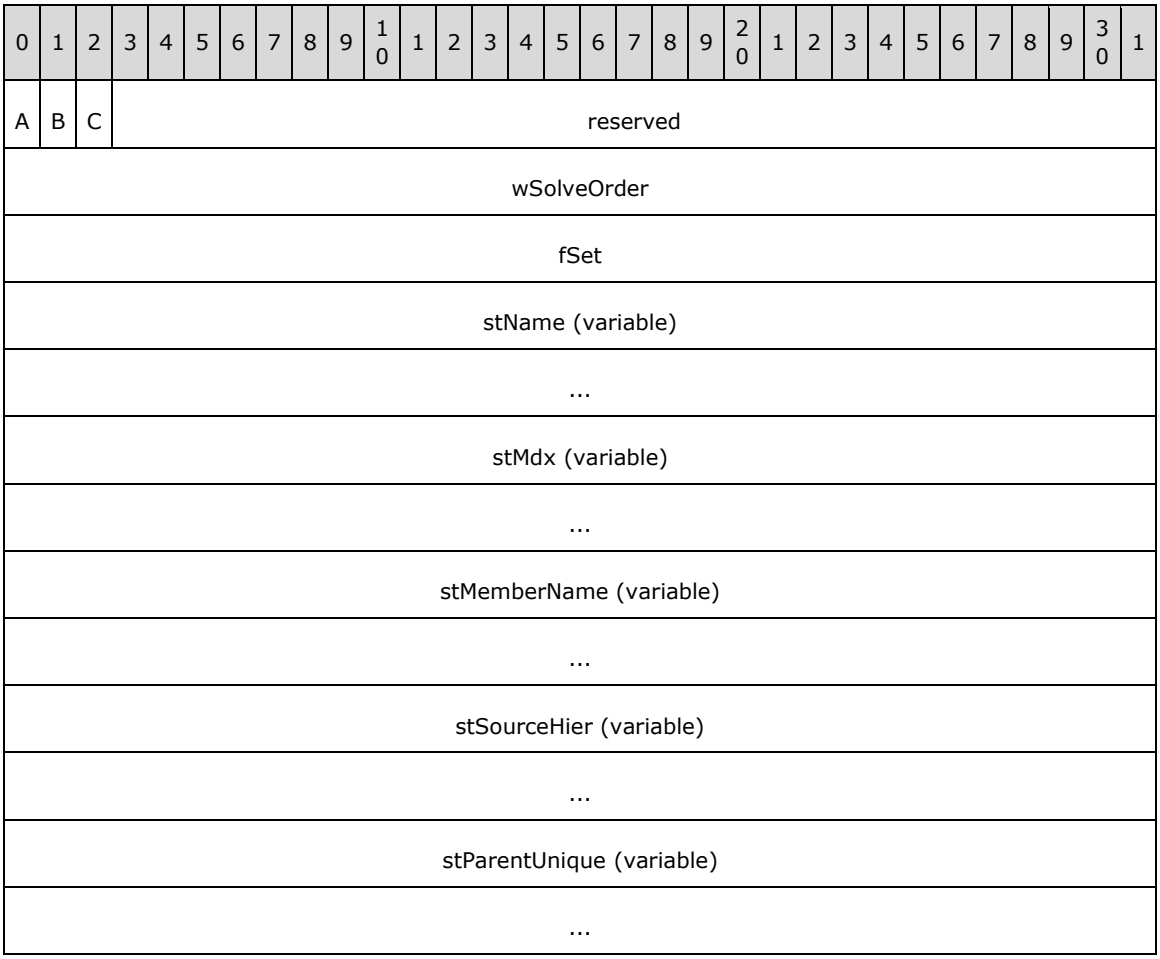
Value	Meaning
	in the array of **Xti** structures specified by the **rgXti** field of the **BrtExternSheet** (section 2.4.659) record in the **Workbook** (section 2.1.7.61) **part**. The value MUST be less than the value of the **cXti** field of the **BrtExternSheet** record.

2.5.98 PCDCalcMemCommon

The **PCDCalcMemCommon** structure specifies an OLAP calculated **member**.



A - fLoadMemberName (1 bit): A bit that specifies whether or not **stMemberName** exists. This value MUST be 1 if **fSet** is 0. It MUST be 0 if **fSet** is 1.

B - fLoadSourceHier (1 bit): A bit that specifies whether **stSourceHier** exists. This value MUST be 1 if **fSet** is 0. It MUST be 0 if **fSet** is 1.

C - fLoadParentUnique (1 bit): A bit that specifies whether **stParentUnique** exists. This value MUST be 0 if **fSet** is 1.

reserved (29 bits): This value MUST be 0, and MUST be ignored.

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wSolveOrder (4 bytes): A signed integer that specifies the order in which this OLAP calculated member is calculated in relation to other OLAP calculated members. The value is used in SOLVE_ORDER property in the **MDX** statement for creating the calculated member. The value MUST be ignored if **fSet** is 1.

fSet (4 bytes): A **Boolean** (section 2.5.97.3) that specifies whether this record specifies a named set (section 2.2.5.2.7.3) or an OLAP calculated member.

Value	Meaning
0x00000000	This record specifies an OLAP calculated member.
0x00000001	This record specifies a named set.

stName (variable): An **XLWideString** (section 2.5.168) that specifies the name of the OLAP calculated member. The length of this value MUST be greater than zero and MUST be less than 65536 characters.

stMdx (variable): An **XLWideString** that specifies the Multidimensional Expressions (MDX) of the OLAP calculated member. The length of this value MUST be greater than zero. If this OLAP calculated member is associated with an external connection (section 2.2.8) that is not associated with a **PivotCache** (section 2.2.5.2), the length of this value MUST be less than 32768 characters. Otherwise, if the **bVerCacheCreated** field of the **BrtBeginPivotCacheDef** (section 2.4.167) record that immediately precedes the containing record is greater than or equal to 3, then the length of this value MUST be less than 32768 characters, otherwise it MUST be less than 2049 characters.

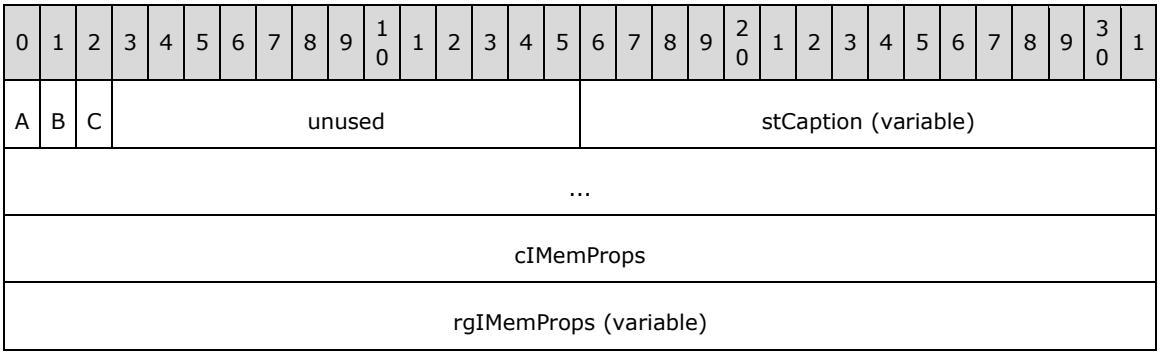
stMemberName (variable): An optional **XLWideString** that specifies the **MDX unique name** for the OLAP calculated member. The length of this value MUST be less than 65536 characters. It MUST exist only if **fLoadMemberName** is 1.

stSourceHier (variable): An optional **XLWideString** (section 2.5.168) that specifies the name of the cache hierarchy (section 2.2.5.2.7) to which the OLAP calculated member belongs. The length of this value MUST be less than 65536. It MUST exist only if **fLoadSourceHier** is 1.

stParentUnique (variable): An optional **XLWideString** that specifies the name of the parent **OLAP member** of the OLAP calculated member. The length of this value MUST be less than 65536. If this value does not exist, this OLAP calculated member has no parent OLAP member. It MUST exist only if **fLoadParentUnique** is 1.

2.5.99 PCDIAddlInfo

The **PCDIAddlInfo** structure specifies additional data associated with a cache item (section 2.2.5.2.3).



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...

A - fGhost (1 bit): A bit that specifies whether the cache item previously existed, but is no longer present in the source data (section 2.2.5.2.1).

B - fFmla (1 bit): A bit that specifies whether the cache item is a calculated item (section 2.2.5.2.6). This value MUST be equal to 0 if the cache item is in an **OLAP** **PivotCache**.

C - fCaption (1 bit): A bit that specifies whether **stCaption** exists. This value MUST be 0 if the cache item is not in an OLAP **PivotCache**, or if the **bVerCacheCreated** of the preceding **BrtBeginPivotCacheDef** (section 2.4.167) is less than 3.

unused (13 bits): This value is Undefined and MUST be ignored.

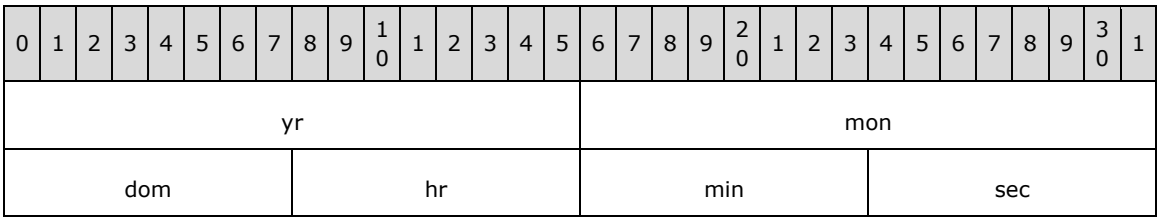
stCaption (variable): An **XLNullableWideString** (section 2.5.166) structure that specifies the caption for this cache item. It MUST exist only if **fCaption** is equal to 1. The length of this string MUST be less than or equal to 32767 characters.

cIMemProps (4 bytes): An unsigned integer that specifies the count of items in **rgIMemProps**. This value MUST be less than 0x1FFFFFFE. It MUST be equal to 0 if the cache item is not in an OLAP **PivotCache**. Otherwise, it MUST be less than or equal to the **cIsxtmps** of the preceding **BrtBeginPCDField** (section 2.4.135).

rgIMemProps (variable): An array of 4-byte signed integers. Each element of the array is a signed integer that specifies the cache item index, as specified by Cache Items, in the associated cache field (section 2.2.5.2.2). The associated cache field for the n^{th} element of this array is specified by the n^{th} element of the **rgisxtmp** array of the preceding **BrtBeginPCDField**. Each cache item specifies a **member** property value. Each element of this array MUST be greater than or equal to -1, where -1 specifies no cache item.

2.5.100 PCDIDateTime

The **PCDIDateTime** structure specifies a date-time value.



yr (2 bytes): An unsigned integer that specifies the year of the date. This value MUST be greater than or equal to 1900, and MUST be less than or equal to 9999. If **dom** is 0, **yr** MUST be 1900.

mon (2 bytes): An unsigned integer that specifies the month of the date. This value MUST be greater than or equal to 1 and MUST be less than or equal to 12. If **dom** is 0, **mon** MUST be 1.

dom (1 byte): An unsigned integer that specifies the day of month of the date. This value MUST be less than or equal to 31.

hr (1 byte): An unsigned integer that specifies the hour of the time. This value MUST be less than or equal to 23.

min (1 byte): An unsigned integer that specifies the minute of the time. This value MUST be less than or equal to 59.

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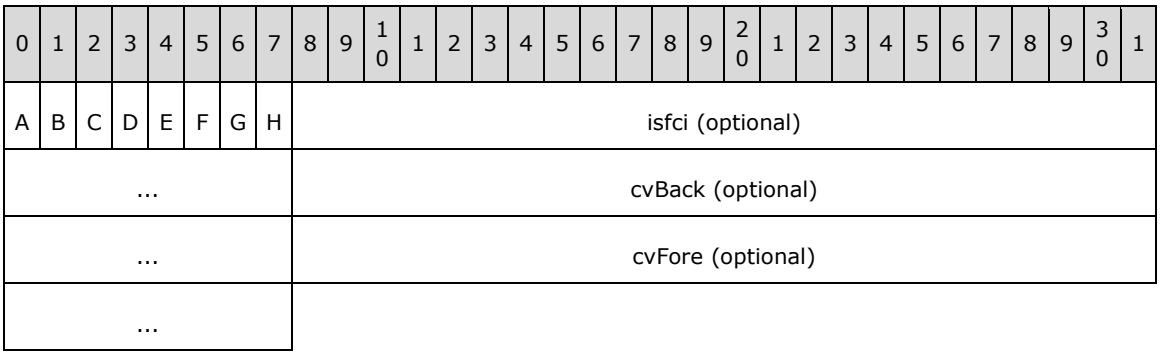
sec (1 byte): An unsigned integer that specifies the second of the time. This value MUST be less than or equal to 59.

2.5.101 PCDISrvFmt

The **PCDISrvFmt** structure specifies server formatting information associated with a cached **cube** value, as specified in (section 2.2.5.2.11).



A - fSrvFmtNum (1 bit): A bit that specifies whether the cube value has number formatting applied that was provided by an **OLAP** server. The number formatting is specified by **isfci**.

B - fSrvFmtBack (1 bit): A bit that specifies whether the cube value has a **background color** applied that was provided by an OLAP server.

C - fSrvFmtFore (1 bit): A bit that specifies whether the cube value has a **foreground color** applied that was provided by an OLAP server.

D - fSrvFmtItalic (1 bit): A bit that specifies whether the cube value has italic formatting applied that was provided by an OLAP server.

E - fSrvFmtUnderline (1 bit): A bit that specifies whether the cube value has underline formatting applied that was provided by an OLAP server.

F - fSrvFmtBold (1 bit): A bit that specifies whether the cube value has bold formatting applied that was provided by an OLAP server.

G - fSrvFmtStrikethrough (1 bit): A bit that specifies whether the cube value has strikethrough formatting applied that was provided by an OLAP server.

H - unused (1 bit): Undefined. This value MUST be ignored.

isfci (4 bytes): An unsigned integer that specifies a zero-based index to a **BrtPCDSFCIEntry** (section 2.4.728) record in the **BrtBeginPcdSFCIEntries** (section 2.4.164) collection in this tuple cache (section 2.2.5.2.11). The **BrtPCDSFCIEntry** record specifies the number formatting for the cube value. This value MUST exist only if **fSrvFmtNum** equals 1. It MUST be less than the value of the **centry** field of the **BrtBeginPcdSFCIEntries** record .

cvBack (4 bytes): A **SrvFmtCV** (section 2.5.138) structure that specifies the background color for the cube value. This value MUST exist only if **fSrvFmtBack** equals 1.

cvFore (4 bytes): A **SrvFmtCV** that specifies the foreground color for the cube value. This value MUST exist only if **fSrvFmtFore** equals 1.

2.5.102 PhRun

The **PhRun** structure specifies a **phonetic text run** that is displayed above a **text run**.

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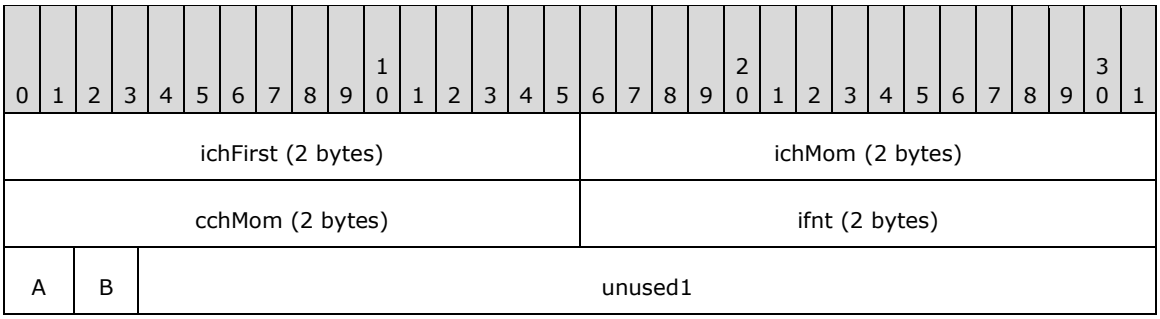

ichFirst (2 bytes): An unsigned integer that specifies the zero-based index of a character in the **phoneticStr** field of the associated **RichStr** (section 2.5.121), where the associated **RichStr** is the **RichStr** that contains the **rgsPhRun** that contains this **PhRun** (section 2.5.102). The **ichFirst** field specifies the first character of the phonetic text run. The value of **ichFirst** MUST be less than the number of characters in the **phoneticStr** field of the associated **RichStr**.

ichMom (2 bytes): An unsigned integer that specifies the zero-based index of a character in the **str** field of the associated **RichStr**. The **ichMom** field specifies the location where the phonetic text run begins. The value of **ichMom** MUST be less than the number of characters in the **str** field of the associated **RichStr**.

cchMom (2 bytes): An unsigned integer that specifies the number of characters in the **str** field of the associated **RichStr** that this phonetic text run applies to. The value of **cchMom** MUST be less than or equal to the number of characters in the **str** field of the associated **RichStr**.

A - ifnt (2 bytes): An unsigned integer that specifies the zero-based index of a **BrtFont** (section 2.4.677) record in the collection of all records directly following **BrtBeginFonts** (section 2.4.88). The referenced **BrtFont** specifies the font of the phonetic text run.

B - phType (2 bits): An unsigned integer that specifies a **character set** used to display the phonetic text run.

Value	Meaning
0x00	The phonetic text run is displayed using the narrow katakana character set. Ignored if the text is not Japanese.
0x01	The phonetic text run is displayed using the wide katakana character set. Ignored if the text is not Japanese.
0x02	The phonetic text run is displayed using the hiragana character set. Ignored if the text is not Japanese.
0x03	No character set conversion is performed to the phonetic text run. Text is displayed as entered.

alcH (2 bits): An unsigned integer that specifies the alignment of the phonetic text run.

Value	Meaning
0x00	Left justify All characters of All phonetic text runs above the entire base text.
0x01	Left justify the characters of each phonetic text run above its text run.
0x02	Center the characters of each phonetic text run above its text run.
0x03	Distribute the characters of each phonetic text run

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Value	Meaning
	above its text run.

unused1 (12 bits): Undefined. This value MUST be ignored.

2.5.103 PivotFilterType

PivotFilterType is a 4-byte unsigned integer that specifies the type of advanced **PivotTable** (section 2.1.7.40) filter. It is used by the **BrtBeginSXFILTER** (section 2.4.245) record. This value MUST correspond to the Value column in the following table.

Category	Value	Meaning
Value Filter	0x00000001	"count" filter
Value Filter	0x00000002	"percent" filter for numeric values
Value Filter	0x00000003	"sum" filter for numeric values
Label Filter	0x00000004	"equals" filter for field captions
Label Filter	0x00000005	"not equal" filter for field captions
Label Filter	0x00000006	"begins with" filter for field captions
Label Filter	0x00000007	"does not begin with" filter for field captions
Label Filter	0x00000008	"ends with" filter for field captions
Label Filter	0x00000009	"does not end with" filter for field captions
Label Filter	0x0000000A	"contains" filter for field captions
Label Filter	0x0000000B	"does not contain" filter for field captions
Label Filter	0x0000000C	"is greater than" filter for field captions
Label Filter	0x0000000D	"is greater than or equal to" filter for field captions
Label Filter	0x0000000E	"is less than" filter for field captions
Label Filter	0x0000000F	"is less than or equal to" filter for field captions
Label Filter	0x00000010	"is between" filter for field captions
Label Filter	0x00000011	"is not between" filter for field captions
Value Filter	0x00000012	"value equal" filter for text and numeric values
Value Filter	0x00000013	"value not equal" filter for text and numeric values
Value Filter	0x00000014	"value greater than" filter for text and numeric values
Value Filter	0x00000015	"value greater than or equal to" filter for text and numeric values
Value Filter	0x00000016	"value less than" filter for text and numeric values
Value Filter	0x00000017	"value less than or equal to" filter for text and numeric values
Value Filter	0x00000018	"value between" filter for text and numeric values
Value Filter	0x00000019	"value not between" filter for text and numeric values
Date Filter	0x0000001A	"equals" filter for date values
Date Filter	0x0000001B	"older than" filter for date values
Date Filter	0x0000001C	"newer than" filter for date values
Date Filter	0x0000001D	"between" filter for date values
Date Filter	0x0000001E	"tomorrow" filter for date values
Date Filter	0x0000001F	"today" filter for date values
Date Filter	0x00000020	"yesterday" filter for date values
Date Filter	0x00000021	"next week" filter for date values
Date Filter	0x00000022	"this week" filter for date values
Date Filter	0x00000023	"last week" filter for date values
Date Filter	0x00000024	"next month" filter for date values
Date Filter	0x00000025	"this month" filter for date values

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Category	Value	Meaning
Date Filter	0x00000026	"last month" filter for date values
Date Filter	0x00000027	"next quarter" filter for date values
Date Filter	0x00000028	"this quarter" filter for date values
Date Filter	0x00000029	"last quarter" filter for date values
Date Filter	0x0000002A	"next year" filter for date values
Date Filter	0x0000002B	"this year" filter for date values
Date Filter	0x0000002C	"last year" filter for date values
Date Filter	0x0000002D	"year-to-date" filter for date values
Date Filter	0x0000002E	"first quarter" filter for date values
Date Filter	0x0000002F	"second quarter" filter for date values
Date Filter	0x00000030	"third quarter" filter for date values
Date Filter	0x00000031	"fourth quarter" filter for date values
Date Filter	0x00000032	"January" filter for date values
Date Filter	0x00000033	"February" filter for date values
Date Filter	0x00000034	"March" filter for date values
Date Filter	0x00000035	"April" filter for date values
Date Filter	0x00000036	"May" filter for date values
Date Filter	0x00000037	"June" filter for date values
Date Filter	0x00000038	"July" filter for date values
Date Filter	0x00000039	"August" filter for date values
Date Filter	0x0000003A	"September" filter for date values
Date Filter	0x0000003B	"October" filter for date values
Date Filter	0x0000003C	"November" filter for date values
Date Filter	0x0000003D	"December" filter for date values
Date Filter	0x0000003E	"not equal" filter for date values
Date Filter	0x0000003F	"older than or equal to" filter for date values
Date Filter	0x00000040	"newer than or equal to" filter for date values
Date Filter	0x00000041	"not between" filter for date values

2.5.104 PivotItemType

The **PivotItemType** enumeration specifies the type of a pivot item (section 2.2.5.3.3) as specified by a **BrtBeginSXVI** (section 2.4.272) record, or that specifies the type of a pivot line (section 2.2.5.3.8.3) as specified by a **BrtBeginSXLI** (section 2.4.249) record.

Name	Value	Meaning
PITDATA	0x00	Specifies no subtotal, no grand total, or no blank line behavior.
PITDEFAULT	0x01	Specifies a subtotal using the **aggregation function** specified by the data items (section 2.2.5.3.7.5.1) included in this subtotal.
PITSUM	0x02	Specifies a subtotal using the Sum aggregation function.
PITCOUNTA	0x03	Specifies a subtotal using the Count aggregation function.
PITAVG	0x04	Specifies a subtotal using the Average aggregation function.
PITMAX	0x05	Specifies a subtotal using the Maximum aggregation function.

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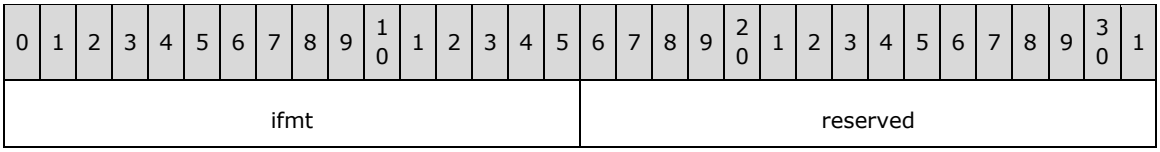
Name	Value	Meaning
PITMIN	0x06	Specifies a subtotal using the Minimum aggregation function.
PITPRODUCT	0x07	Specifies a subtotal using the Product aggregation function.
PITCOUNT	0x08	Specifies a subtotal using the Count Numbers aggregation function.
PITSTDDEV	0x09	Specifies a subtotal using the Standard Deviation aggregation function.
PITSTDDEVP	0x0A	Specifies a subtotal using the Standard Deviation of a Population aggregation function.
PITVAR	0x0B	Specifies a subtotal using the Variance aggregation function.
PITVARP	0x0C	Specifies a subtotal using the Variance of a Population aggregation function.
PITGRAND	0x0D	Specifies a grand total line.
PITBLANK	0x0E	Specifies a blank line.

2.5.105 PivotNumFmt

The **PivotNumFmt** structure specifies the **number format** used in **PivotTables** (section 2.1.7.40) and **PivotCaches** (section 2.2.5.2).



ifmt (2 bytes): An **Ifmt** (section 2.5.76) structure that specifies the number format used in PivotTables and PivotCaches.

reserved (2 bytes): This value MUST be 0, and MUST be ignored.

2.5.106 PivotNumFmtExt

A **PivotNumFmtExt** is an unsigned 32-bit integer that specifies the **number format** used in **PivotTables** (section 2.1.7.40) and **PivotCaches** (section 2.2.5.2).

Value	Meaning
0xFFFFFFFF	Default number format. Equivalent to a **PivotNumFmt** (section 2.5.105) with the value 0x00000000.
All other values	All other values are interpreted as a **PivotNumFmt**.

2.5.107 Pnn

Pnn is an enumeration that specifies a **pane**.

Name	Value	Meaning
PNNBOTRIGHT	0x00000000	Bottom-right pane.

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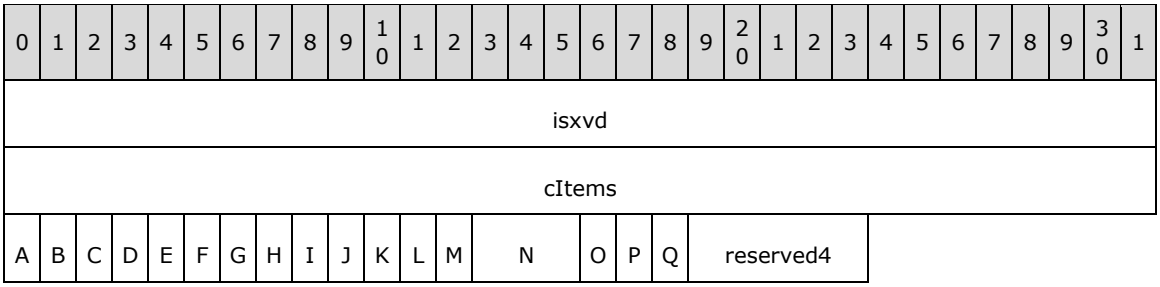
Name	Value	Meaning
PNNTOPRIGHT	0x00000001	Top-right pane.
PNNBOTLEFT	0x00000002	Bottom-left pane.
PNNTOPLEFT	0x00000003	Top-left pane.

2.5.108 PRFilter

The **PRFilter** record specifies information about the set of pivot items (section 2.2.5.3.3), data items (section 2.2.5.3.7.5.1), or cache items (section 2.2.5.2.3) associated with a pivot field (section 2.2.5.3.2), a data field (section 2.2.5.3.7.5.2), or a cache field (section 2.2.5.2.2) that specifies a **filter** for a **PivotTable** rule (section 2.2.5.3.9).



isxvd (4 bytes): A field that specifies the pivot field, data field, or cache field associated with this filter.

If the **pruleheaderdata.fCacheBased** field in the **BrtBeginPRule** (section 2.4.183) record that precedes this record is 1, then this field is a signed integer that specifies the cache field index for a calculated item (section 2.2.5.2.6).

If the **pruleheaderdata.fCacheBased** field in the **BrtBeginPRule** or **BrtBeginPRule14** (section 2.4.184) record that precedes this record is 0, then this field is an **ISXVD** (section 2.5.83) that specifies a pivot field or the data field in a PivotTable view and the value of this field MUST NOT be -1.

cItems (4 bytes): An unsigned integer that specifies the number of pivot items, data items, or cache items included in this filter. There MUST be an equivalent number of **BrtBeginPRFItem** (section 2.4.181) or **BrtBeginPRFItem14** records following **BrtBeginPRFilter** (section 2.4.177) or **BrtBeginPRFilter14** (section 2.4.178) that contain this record.

A - itmtypeData (1 bit): A bit that specifies whether this filter includes **cells** that are not subtotals, **grand totals**, or blank lines for the pivot field, data field, or cache field associated with this record.

B - itmtypeDEFAULT (1 bit): A bit that specifies whether the pivot field associated with this filter includes the default **aggregation function**, as specified in section 2.2.5.3.7.4.2. This value MUST be 0 if **itmtypeSUM**, **itmtypeCOUNTA**, **itmtypeAVERAGE**, **itmtypeMAX**, **itmtypeMIN**, **itmtypePRODUCT**, **itmtypeCOUNT**, **itmtypeSTDEV**, **itmtypeSTDEVP**, **itmtypeVAR**, or **itmtypeVARP** is 1.

C - itmtypeSUM (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the sum of the values (see section 2.2.5.3.7.4.2).

D - itmtypeCOUNTA (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the count of the values (see section 2.2.5.3.7.4.2).

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E - itmtypeAVERAGE (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the average of the values (see section 2.2.5.3.7.4.2).

F - itmtypeMAX (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the largest value (see section 2.2.5.3.7.4.2).

G - itmtypeMIN (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the smallest value (see section 2.2.5.3.7.4.2).

H - itmtypePRODUCT (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the product of the values (see section 2.2.5.3.7.4.2).

I - itmtypeCOUNT (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the count of numeric values (see section 2.2.5.3.7.4.2).

J - itmtypeSTDEV (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the estimated standard deviation for the values (see section 2.2.5.3.7.4.2).

K - itmtypeSTDEVP (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the standard deviation for the values (see section 2.2.5.3.7.4.2).

L - itmtypeVAR (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the estimated variance for the values (see section 2.2.5.3.7.4.2).

M - itmtypeVARP (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the variance for the values (see section 2.2.5.3.7.4.2).

N - reserved1 (3 bits): This value MUST be 0, and MUST be ignored.

O - fSelected (1 bit): A bit that specifies whether the header of the pivot field that this filter refers to is included in this filter. This value MUST be ignored if the **PivotTable** (section 2.1.7.40) is not displayed in **outline** form (see section 2.2.5.3.7.4.2). It MUST be ignored if this field is contained in **BrtBeginPRFilter14**.

P - reserved2 (1 bit): This value MUST be 0, and MUST be ignored.

Q - reserved3 (1 bit): This value MUST be 0, and MUST be ignored.

reserved4 (5 bits): This value MUST be 0, and MUST be ignored.

2.5.109 PrintErrorsAs

The **PrintErrorsAs** enumeration specifies how to represent **cells** containing errors when printing.

Name	Value	Meaning
IERRORSDISPLAYED	0x0000	Errors are printed as they are displayed.
IERRORSBLANK	0x0001	Errors are printed as blanks.
IERRORSDASH	0x0002	Errors are printed as series of dash characters.
IERRORSNA	0x0003	Errors are printed as "#N/A".

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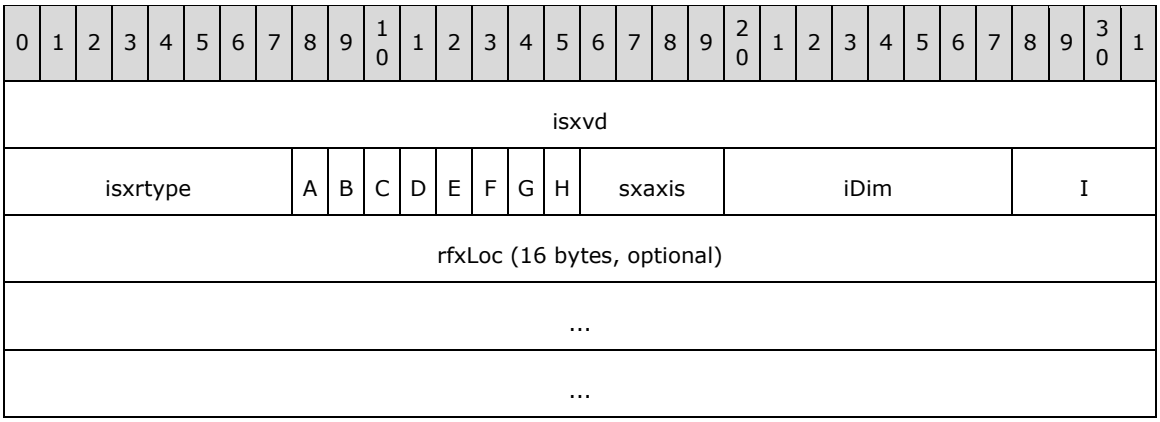
2.5.110 PRuleHeaderData

The **PRuleHeaderData** structure specifies information about a **PivotTable** rule (section 2.2.5.3.9).



isxvd (4 bytes): A signed integer that specifies the pivot field (section 2.2.5.3.2), data field (section 2.2.5.3.7.5.2), or cache field (section 2.2.5.2.2) information for this **PivotTable** rule.

If the record that contains this structure is in a **PivotCache Definition** (section 2.1.7.38) part, then **isxvd** MUST be -1. If **isxrtype** is **ISXRTYPE_BUTTON**, then this field is an **ISXVD** (section 2.5.83) that specifies the pivot field or data field and the value of this field MUST NOT be -1. If **isxrtype** is a value other than **ISXRTYPE_BUTTON** and there is no **BrtBeginPRFilter** record (section 2.4.177) or **BrtBeginPRFilter14** record (section 2.4.178) in the collection of records following the record that contains this structure, then the value of this field MUST be -1.

If **isxrtype** is a value other than **ISXRTYPE_BUTTON** and there is at least one **BrtBeginPRFilter** or **BrtBeginPRFilter14** record in the collection of records immediately following the record that contains this structure, then the pivot field, data field, or cache field (section 2.2.5.2.2) for this **PivotTable** rule is specified by the **PRFilter.isxvd** fields in the **BrtBeginPRFilter** or **BrtBeginPRFilter14** records, respectively. If the record that contains this structure is a **BrtBeginPRule** (section 2.4.183) then the value of **isxvd** MUST be either -1 or the same as the value of the **PRFilter.isxvd** field in the last **BrtBeginPRFilter** record in the collection of **BrtBeginPRFilter** records following the record that contains this structure. If the record that contains this structure is a **BrtBeginPRule14** (section 2.4.184) then the value of **isxvd** MUST be -1.

isxrtype (8 bits): An unsigned integer that specifies the area of the **PivotTable** (section 2.1.7.40) specified by this **PivotTable** rule. This value MUST be a value from the following table.

Name	Value	Description
ISXRTYPE_NONE	0x00	This rule specifies no area.

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Name	Value	Description
ISXRTYPE_NORMAL	0x01	This rule specifies the **cells** in the **row** area, **column (1)** area, page area (section 2.2.5.3.8.1.3), or data area (section 2.2.5.3.8.1.4) of the **PivotTable** report that correspond to the data items (section 2.2.5.3.7.5.1) or pivot items (section 2.2.5.3.3) associated with the collection of **BrtBeginPRFilter** or **BrtBeginPRFilter14** records that immediately follow the record that contains this structure. There MUST be a collection of **BrtBeginPRFilter** or **BrtBeginPRFilter14** records immediately following the record that contains this structure.
ISXRTYPE_DATA	0x02	This rule specifies the data area (section 2.2.5.3.8.1.4) of the **PivotTable** report that correspond to the data items or pivot items associated with the collection of **BrtBeginPRFilter** or **BrtBeginPRFilter14** records that immediately follow the record that contains this structure. There MUST be a collection of **BrtBeginPRFilter** or **BrtBeginPRFilter14** records immediately following the record that contains this structure.
ISXRTYPE_ALL	0x03	This rule specifies the entire **PivotTable** report. Collections of **BrtBeginPRFilter** or **BrtBeginPRFilter14** records MUST NOT immediately follow the record that contains this structure.
ISXRTYPE_ORIGIN	0x04	This rule specifies the cells at the **logical top-left** of the **PivotTable** report body. Collections of **BrtBeginPRFilter** or **BrtBeginPRFilter14** records MUST NOT immediately follow the record that contains this structure.
ISXRTYPE_BUTTON	0x05	This rule specifies the cell on the **PivotTable** report containing the pivot field caption. Collections of **BrtBeginPRFilter** or **BrtBeginPRFilter14** records MUST NOT immediately follow the record that contains this structure.

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Name	Value	Description
ISXRTYPE_TOPRIGHT	0x06	This rule specifies the cells at the **logical top-right** of the **PivotTable** report body. Collections of **BrtBeginPRFilter** or **BrtBeginPRFilter14** records MUST NOT immediately follow the record that contains this structure.

isxrtype MUST NOT be **ISXRTYPE_BUTTON** or **ISXRTYPE_TOPRIGHT** if the record that contains this structure is a **BrtBeginPRule14**.

A - fDataOnly (1 bit): A bit that specifies whether only the cells in the data area are included in this **PivotTable** rule. **fDataOnly** and **fLabelOnly** MUST NOT both be 1. This value MUST be 1 if **isxrtype** is **ISXRTYPE_DATA**, or if the record that contains this structure is a **BrtBeginPRule14**.

B - fLabelOnly (1 bit): A bit that specifies whether only cells in the page area, row area or column (1) area are included in this **PivotTable** rule. This value MUST be 1 if **isxrtype** is **ISXRTYPE_BUTTON** or **ISXRTYPE_TOPRIGHT**. **fDataOnly** and **fLabelOnly** MUST NOT both be 1.

C - fGrandRw (1 bit): A bit that specifies whether cells in the **grand total** row are included in this **PivotTable** rule.

D - fGrandCol (1 bit): A bit that specifies whether cells in the grand total column (1) are included in this **PivotTable** rule.

E - fCacheBased (1 bit): A bit that specifies whether **isxvd** specifies a cache field in the **PivotCache** (section 2.2.5.2) or a pivot field or the data field in a PivotTable view (section 2.2.5.3).

Value	Meaning
0	**isxvd** specifies a pivot field or the data field in a PivotTable view.
1	**isxvd** specifies a cache field in the **PivotCache**. **sxaxis** MUST be 0.

This value MUST be 1 if the record that contains this structure is in a **PivotCache Definition** (section 2.1.7.38) part. It MUST be 0 if the record that contains this structure is a **BrtBeginPRule14**.

F - fLineMode (1 bit): A bit that specifies whether the area of the **PivotTable** report specified by this **PivotTable** rule is displayed in **outline** form (see section 2.2.5.3.7.4.2).

G - fPart (1 bit): A bit that specifies whether only a partial area of the **PivotTable** report is specified by this **PivotTable** rule. If **fPart** is 1, **rfxLoc** specifies the partial area.

H - fFuzzy (1 bit): A bit that specifies whether the pivot items of the pivot field specified by this rule are treated as subtotals for the purposes of formatting when the pivot field is displayed in outline form (see section 2.2.5.3.7.4.2).

sxaxis (4 bits): An unsigned integer that specifies the PivotTable axis (section 2.2.5.3.7) that contains the pivot field or data field specified by **isxvd**. This value MUST be a value from the following table.

Name	Value	Description

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Name	Value	Description
SXAXIS_NULL	0x0	This rule specifies no axis.
SXAXIS_RW	0x1	This rule specifies the row axis.
SXAXIS_COL	0x2	This rule specifies the column (1) axis.
SXAXIS_PAGE	0x4	This rule specifies the page axis.
SXAXIS_DATA	0x8	This rule specifies the data axis.

MUST be SXAXIS_NULL if the record that contains this structure is a **BrtBeginPRule14**.

iDim (8 bits): An unsigned integer that specifies the position of the pivot field or data field specified by **isxvd** within the PivotTable axis for the record that contains this structure.

If **sxaxis** is SXAXIS_RW, then **iDim** MUST be less than the number of pivot fields on the row axis.

If **sxaxis** is SXAXIS_COL, then **iDim** MUST be less than the number of pivot fields on the column (1) axis.

If **sxaxis** is **SXAXIS_PAGE**, then **iDim** MUST be less than the number of pivot fields on the page axis.

If **sxaxis** is **SXAXIS_DATA**, then **iDim** is undefined and MUST be ignored.

If **sxaxis** is **SXAXIS_NULL**, then **iDim** is undefined and MUST be ignored.

I - reserved (4 bits): This value MUST be 0, and MUST be ignored.

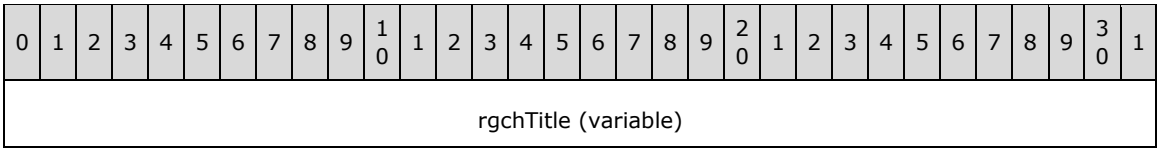
rfxLoc (16 bytes): An **UncheckedRfX** (section 2.5.153) that specifies the partial area within the **PivotTable** report specified by this **PivotTable** rule. The **range** is specified using a **relative reference** that specifies the offset from the logical top-left cell of the **PivotTable** report body as specified in **PivotTable** (section 2.2.5.3.8) layout. This field MUST exist only if **fPart** is 1.

2.5.111 QsiFieldId

QsiFieldId is a 4-byte unsigned integer that specifies a numeric identifier for a **query table column (1)**.

2.5.112 RangeProtectionTitleSDRel

The **RangeProtectionTitleSDRel** structure specifies the title of a **cell range** and the **security descriptor**.



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...
dwsdRel
pSDRel (variable)
...

rgchTitle (variable): An **XLWideString** (section 2.5.168) that specifies the title of the cell range. The value MUST be unique for the **sheet**. The number of characters in the string MUST be greater than or equal to 1, and less than or equal to 255. The string MUST conform to the following **ABNF** grammar.

```
string =  name-start-character *name-character

name-start-character = "_" / "\" / Unicode-character

name-character = name-start-character / Unicode-space / Unicode-digit / "?" / "."
```

In the preceding grammar, Unicode-character is any code point that is a character, as defined by the **Unicode** character properties, Chapter Four of [UNICODE4.0].

Unicode-digit is any code point that is a digit, as defined by the Unicode character properties, Chapter Four of [UNICODE4.0].

Unicode-space is any code point that is a space, as defined by the Unicode character properties, Chapter Four of [UNICODE4.0].

dwsdRel (4 bytes): An unsigned integer that specifies the size in bytes of the security descriptor in **pSDRel**. If the value is 0x00000000, then there is no security descriptor.

pSDRel (variable): An optional SECURITY_DESCRIPTOR structure, as defined in [MS-DTYP] section 2.4.6, that specifies a **relative security descriptor** that lists users who edit the cell range without providing the password. This field MUST exist only if **dwsdRel** is greater than 0.

2.5.113 ReadingOrder

The **ReadingOrder** enumeration specifies the **reading order**.

Name	Value	Meaning
READING_ORDER_CONTEXT	0x00	Context reading order.
READING_ORDER_LTR	0x01	Left-to-right reading order.
READING_ORDER_RTL	0x02	Right-to-left reading order.

2.5.114 RelID

RelID is an **XLNullableWideString** (section 2.5.166) structure that specifies a relationship identifier, as specified in [ISO/IEC29500-2:2012], section 9.3. The length of the string MUST NOT exceed 255 characters. The string MUST NOT contain a zero character (0x0000). A string that is NULL means that the relationship is not specified.

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2.5.115 RevisionLogSheetName

RevisionLogSheetName is an **XLWideString** structure that specifies the name of a **sheet** for records in the **Revision Log** (section 2.1.7.44) part **ABNF** of a shared workbook (section 2.2.12).

The string MUST have at least 4 characters and MUST have no more than 248 characters. Strings MUST follow the proceeding format.

[*filename*]*sheetName*

Opening square bracket followed by the name of the file, excluding directory information but including extension, followed by close-square-bracket followed by the sheet name.

The *filename* portion MUST be at least 1 character and MUST have no more than 215 characters. Any '[' (opening square bracket) characters in the *filename* portion MUST be replaced with '(' (opening parenthesis) characters and any ']' (closing square bracket) characters in the *filename* portion MUST be replaced with ')' (closing parenthesis) characters.

The *sheetName* portion MUST be a value that is valid in the **strName** field of **BrtBundleSh** (section 2.4.311).

2.5.116 RevisionType

The **RevisionType** structure specifies the type of the revision record.

Name	Value	Meaning
REVTINSRW	0x0000	Insert Row. This value is valid only in record type **BrtRRInsDel** (section 2.4.757).
REVTINSCOL	0x0001	Insert Column. This value is valid only in record type **BrtRRInsDel**.
REVTDELRW	0x0002	Delete Row. This value is valid only in record type **BrtRRInsDel**.
REVTDELCOL	0x0003	Delete Column. This value is valid only in record type **BrtRRInsDel**.
REVTMOVE	0x0004	Move cell. This value is valid only in record type **BrtRRMove** (section 2.4.759).
REVTINSERTSH	0x0005	Insert **sheet**. This value is valid only in record type **BrtRRInsertSh** (section 2.4.758).
REVTCHANGECELL	0x0008	Change cell content, including inline formatting. This value is valid only in record type **BrtRRChgCell** (section 2.4.748).
REVTRENSHEET	0x0009	Rename sheet. This value is valid only in record type **BrtRRRenSheet** (section 2.4.761).
REVTDEFNAME	0x000A	Define name. This value is valid only in record type **BrtRRDefName** (section 2.4.750).
REVTFORMAT	0x000B	Change cell format. This value is valid only in record type **BrtRRFormat** (section 2.4.755).
REVTAUTOFMT	0x000C	Change autoformat. This value is valid only in record type **BrtRRAutoFmt** (section 2.4.747).
REVTNOTE	0x000D	Change comment. This value is valid only in record type **BrtRRNote** (section 2.4.760).

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Name	Value	Meaning
REVTHEADER	0x0020	Revision header. This value is valid only in record type **BrtRRHeader** (section 2.4.756).
REVTCONFLICT	0x0025	This value is valid only in record type **BrtRRConflict** (section 2.4.749).
REVTADDVIEW	0x002B	This value is valid only in record type **BrtRRUserView** (section 2.4.764).
REVTDELVIEW	0x002C	This value is valid only in record type **BrtRRUserView**.
REVTOLDNAME	0x0022	This value is valid only in record type **BrtRRDefName**.
REVTTRASHQTFIELD	0x002E	This value is valid only in record **BrtRRTQSIF** (section 2.4.763).

2.5.117 RfX

The **Rfx** structure specifies a **range**. The range MUST NOT include any cell that lies outside the **sheet's** used range, as specified by **BrtWsDim** (section 2.4.841).

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rwFirst																															
rwLast																															
colFirst																															
colLast																															

rwFirst (4 bytes): A **Rw** (section 2.5.125) structure that specifies the first **row** of the range.

rwLast (4 bytes): A **Rw** structure that specifies the last row of the range. This value MUST NOT be less than the value of **rwFirst**.

colFirst (4 bytes): A **Col** (section 2.5.22) structure that specifies the first **column (1)** of the range.

colLast (4 bytes): A **Col** structure that specifies the last column (1) of the range. This value MUST NOT be less than the value of **colFirst**.

2.5.118 RfXRel

The **RfXRel** structure specifies a **range** that can contain a **relative reference**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rwFirst																															
rwLast																															
colFirst																															
colLast																															

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rwFirst (4 bytes): An **UncheckedRw** (section 2.5.154) structure that specifies the first **row** of the range.

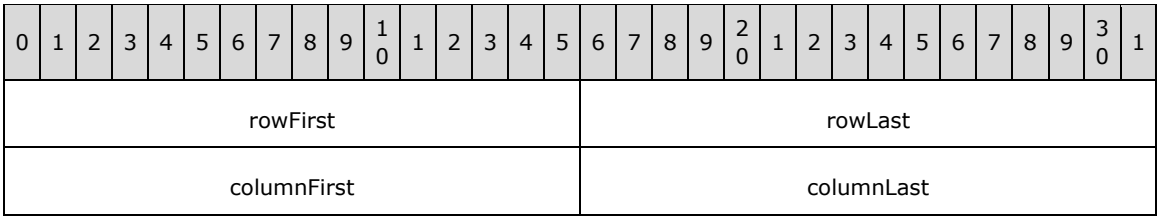
rwLast (4 bytes): An **UncheckedRw** structure that specifies the last row of the range. This value MUST NOT be less than the value of **rwFirst**.

colFirst (4 bytes): A **ColRel** (section 2.5.24) structure that specifies the first **column (1)** of the range. The associated row is **rwFirst**.

colLast (4 bytes): A **ColRel** structure that specifies the last column (1) of the range. The associated row is **rwLast**. The specified column (1) index MUST NOT be less than the column (1) index specified by **colFirst**.

2.5.119 RgceAreaSmall

The **RgceAreaSmall** structure is a variant of the **RgceArea** (section 2.5.97.89) structure that is limited to a range reference in the first 256 **columns (1)** and 65536 **rows** of a **sheet**.



rowFirst (2 bytes): A **RwShort** (section 2.5.129) structure that specifies the zero-based index of the first row of the **range**. This value MUST be less than 65536.

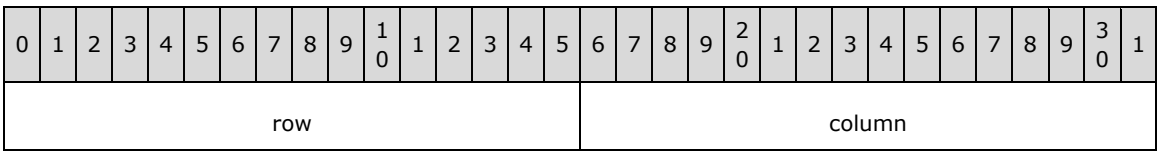
rowLast (2 bytes): A **RwShort** structure that specifies the zero-based index of the last row of the range. This value MUST be greater than or equal to **rowFirst**, and MUST be less than 65536.

columnFirst (2 bytes): A **ColRelShort** (section 2.5.25) structure that specifies the first column (1) of the **cell** range and that specifies **relative reference** information about the first column (1) and first row. The value of **columnFirst.col** MUST be less than 256.

columnLast (2 bytes): A **ColRelShort** structure that specifies the last column (1) of the cell range and that specifies relative reference information about the last column (1) and last row. The value of **columnLast.col** MUST be greater than or equal to **columnFirst.col** and MUST be less than 256.

2.5.120 RgceLocSmall

The **RgceLocSmall** structure is a variant of the **RgceLoc** (section 2.5.97.91) structure that is limited to a **cell reference** in the first 256 **columns (1)** and 65536 **rows** of a **sheet**.



row (2 bytes): A **RwShort** (section 2.5.129) structure that specifies the zero-based index of the row of the cell reference. This value MUST be less than 65536.

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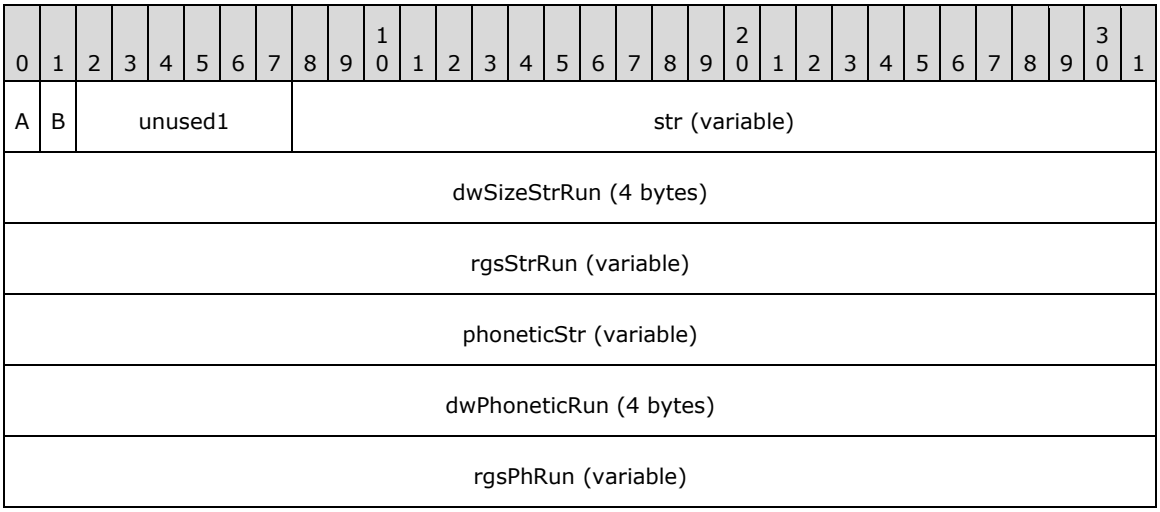
column (2 bytes): A **ColRelShort** (section 2.5.25) structure that specifies the zero-based column (1) index of the column (1) of the cell reference and that specifies **relative reference** information. The value of **column.col** MUST be less than 256.

2.5.121 RichStr

The **RichStr** structure specifies a rich string.



A - fRichStr (1 bit): A bit that specifies whether **dwSizeStrRun** and **rgsStrRun** exist.

B - fExtStr (1 bit): A bit that specifies whether **phoneticStr, dwPhoneticRun,** and **rgsPhRun** exist.

unused1 (6 bits): Undefined. This value MUST be ignored.

str (variable): An **XLWideString** (section 2.5.168) structure that specifies the string. The number of **Unicode** characters MUST be less than or equal to 0x7FFF.

dwSizeStrRun (4 bytes): An unsigned integer that specifies the number of **StrRun** (section 2.5.143) in **rgsStrRun**. MUST be less than or equal to 0x7FFF.

rgsStrRun (variable): An array of **StrRun**. Each **StrRun** specifies formatting that is applied to a **text run** of characters within **str**. Every **StrRun**, except the last **StrRun** in the array, specifies formatting for a text run that begins with the character specified by the **ich** field of the **StrRun** and that ends with the character that precedes the character specified by the **ich** field of the subsequent **StrRun** in the array. The last **StrRun** in the array specifies formatting for a text run that begins with the character specified by its **ich** field and ends with the last character in **str**. The value of each **ich** field of a **StrRun** in the array MUST be less than the **ich** field of the subsequent **StrRun** in the array.

phoneticStr (variable): An XLWideString structure that specifies the **phonetic string**.

dwPhoneticRun (4 bytes): An unsigned integer that specifies the number of **PhRun** (section 2.5.102) in **rgsPhRun**. This value MUST be less than or equal to 0x7FFF.

rgsPhRun (variable): An array of **PhRun**. Each **PhRun** specifies a **phonetic text run** within **phoneticStr** that is displayed above a text run within **str**. The first character in the phonetic text run is the character specified by the **ichFirst** field of **PhRun**. The first character in the **str** that the phonetic text run appears above is specified by the **ichMom** field of **PhRun**. The number of characters in the **str** that phonetic text run appears above is specified by the **cchMom** field of **PhRun**. The value of each **ichMom** field of a **PhRun** in the array MUST be less than the **ichMom** field of the subsequent **PhRun** in the array. The value of each **ichFirst** field of a **PhRun** in the array MUST be less than the

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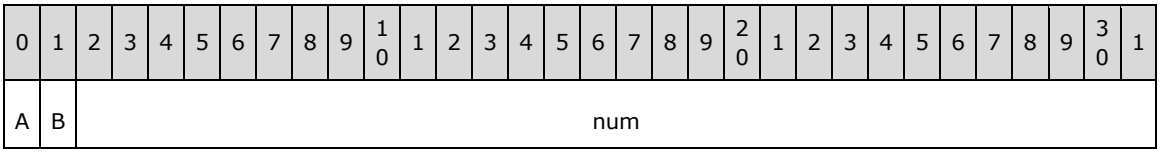
ichFirst field of the subsequent **PhRun** in the array. The sum of the **cchMom** fields of all **PhRun** in the array MUST be less than or equal to the number of characters in **str**.

2.5.122 RkNumber

The **RkNumber** structure specifies a numeric value.



A - fx100 (1 bit): A bit that specifies whether or not **num** is the value of the **RkNumber** or 100 times the value of the **RkNumber**. This value MUST be a value from the following table.

Value	Meaning
0	The value of **RkNumber** is the value of **num**.
1	The value of **RkNumber** is the value of **num** divided by 100.

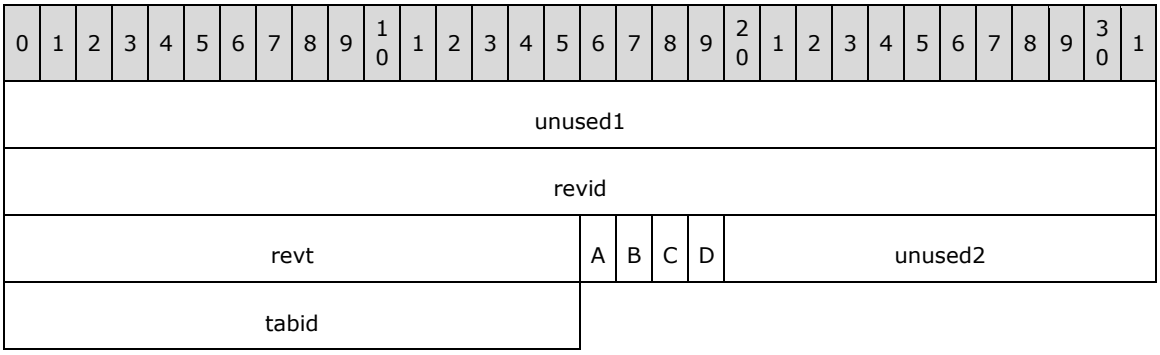
B - fInt (1 bit): A bit that specifies the type of **num**.

num (30 bits): A variable type field whose type and meaning is specified by the value of **fInt**, as defined in the following table.

Value of fInt	Type of num
0	**num** is the 30 most significant bits of a 64-bit binary floating-point number, as defined in [IEEE754]. The remaining 34-bits of the floating-point number MUST be 0.
1	**num** is a signed integer.

2.5.123 RRd

The **RRd** structure specifies the revision record (section 2.2.12.4) information used to track changes in a shared workbook (section 2.2.12).



unused1 (4 bytes): Undefined. This value MUST be ignored.

revid (4 bytes): An unsigned integer that specifies the reviewable revision identifier of this revision record. The value MUST be 0, or greater than or equal to **revidMin** and less than or equal to **revidMax** as defined in the **BrtRRHeader** (section 2.4.756) record for this revision part, or the

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same as another revision record's **revid** if this record's type is **REVTCONFLICT**. If this value is 0, this revision record cannot be reviewed.

revt (2 bytes): A **RevisionType** (section 2.5.116) structure that specifies the type of this revision record.

A - fAccepted (1 bit): A bit that specifies whether or not this revision record has been reviewed.

B - fUndoAction (1 bit): A bit that specifies whether or not the revision record occurred because of rejected changes.

C - reserved1 (1 bit): A bit that specifies whether or not the revision record occurred because of a redo of the rejected changes.

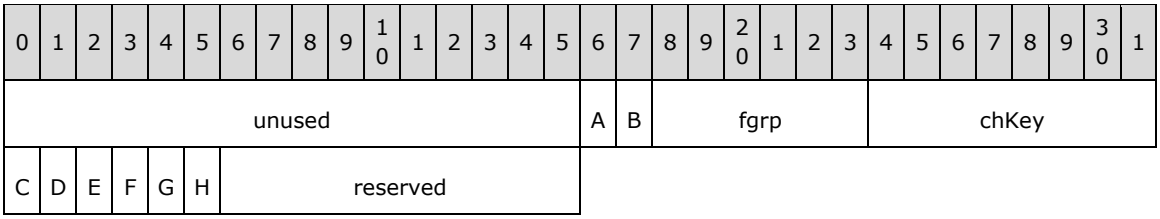
D - reserved2 (1 bit): A bit that specifies whether or not the **row** or **column (1)** that is being deleted is at the edge of a sorted **range**. If the value is 1, then **revt** MUST be 0x0002 or 0x0003.

unused2 (12 bits): Undefined. This value MUST be ignored.

tabid (2 bytes): An unsigned integer that specifies the **tabid** of the **sheet** associated with the revision record. If the value is 65535, this revision record does not apply to any sheet. Otherwise, the value MUST equal the value of the **iTabID** field in a **BrtBundleSh** (section 2.4.311) record.

2.5.124 RRdDnGrbit

The **RRdDnGrbit** structure specifies additional information, as specified by the **BrtRRDefName** (section 2.4.750) record.



unused (2 bytes): Undefined. This value MUST be ignored.

A - fPli (1 bit): fPli (1 bit): A bit that specifies that one or more of the fields **stDescription**, **stHelptopic**, **stCustommenu**, **stStatustext**, **stOldDescription**, **stOldHelptopic**, **stOldCustommenu**, or **stOldStatustext** specified in the **BrtRRDefName** record MUST NOT be empty.

B - fFunc (1 bit): A bit that specifies whether or not the **BrtRRDefName** record specifies a name that refers to a **function**.

fgrp (6 bits): An **FnGroupID** (section 2.5.51) structure that specifies the **function category** classification of a name that refers to a new function.

chKey (8 bits): An unsigned integer that specifies the shortcut key. This value MUST have the same restrictions as the **chKey** field from the **BrtName** (section 2.4.705) record.

C - fHidden (1 bit): A bit that specifies whether or not the **range** specified by the **BrtRRDefName** record is hidden.

D - fCustommenu (1 bit): A bit that specifies whether or not the **stCustommenu** field from the **BrtRRDefName** record is not empty.

E - fDescription (1 bit): A bit that specifies whether or not the **stDescription** field from the **BrtRRDefName** record is empty.

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F - fHelptopic (1 bit): A bit that specifies whether or not the **stHelptopic** field from the **BrtRRDefName** record is empty.

G - fStatustext (1 bit): A bit that specifies whether or not the **stStatustext** field from the **BrtRRDefName** record is empty.

H - fCorruptComment (1 bit): This value MUST be 0 and MUST be ignored.

reserved (10 bits): This value MUST be 0, and MUST be ignored.

2.5.125 Rw

Rw is a signed 32-bit integer that specifies a single **row** in a **sheet** using a zero-based index. This value MUST be between 0 and 1048575, inclusive, and MUST be between **rwFirst** and **rwLast,** inclusive, on the **UncheckedRfX** (section 2.5.153) structure specified by the **rfx** field on the sheet's **BrtWsDim** (section 2.4.841) record.

2.5.126 Rw_Col

Rw_Col is a 4-byte unsigned integer that specifies either a zero-based **row** index or a zero-based **column (1)** index. This value MUST be greater than or equal to 0 and less than or equal to 1048575.

2.5.127 RwNullable

RwNullable is a signed 32-bit integer that specifies a single **row** in a **sheet**.

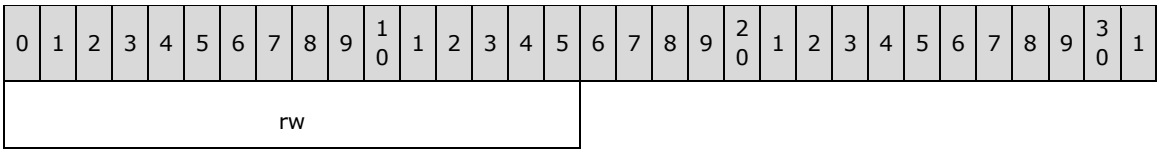
Value	Meaning
0xFFFFFFFFL	Null value.
	All other values are interpreted as an **UncheckedRw** (section 2.5.154).

2.5.128 RwRelNeg

RwRelNeg is a 32-bit signed integer that specifies the zero-based offset of a **row** index. This value MUST be greater than -1048576 and less than 1048576.

2.5.129 RwShort

The **RwShort** structure specifies a single **row** in a **sheet**.



rw (2 bytes): An unsigned integer that specifies a single row in a sheet using a zero-based index.

2.5.130 Script

The **Script** enumeration specifies the superscript or subscript style.

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Name	Value	Meaning
SSSNONE	0x0000	Normal script
SSSSUPER	0x0001	Superscript
SSSSUB	0x0002	Subscript

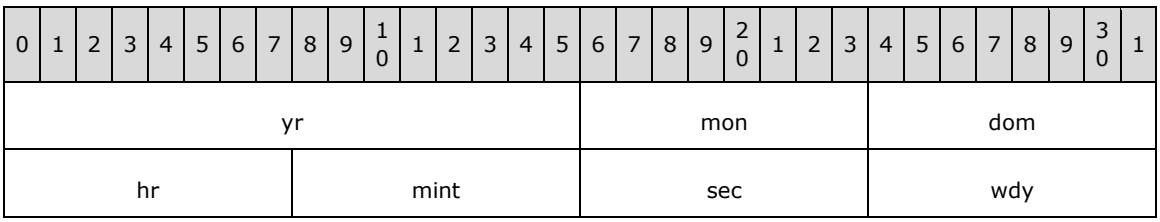
2.5.131 SdSetSortOrder

SdSetSortOrder is an enumeration that specifies the sorting order of an MDX set metadata (section 2.2.4.8.2) or a tuple cache set (section 2.2.5.2.11).

Name	Value	Meaning
SSONONE	0x00000000	No sorting order.
SSOASC	0x00000001	Ascending order by tuple.
SSODESC	0x00000002	Descending order by tuple.
SSOALPHAASC	0x00000003	Ascending order by the caption.
SSOALPHADESC	0x00000004	Descending order by the caption.
SSONATURALASC	0x00000005	Ascending order by the natural order of the data, as defined by the **data source**.
SSONATURALDESC	0x00000006	Descending order by the natural order of the data, as defined by the data source.

2.5.132 ShortDtr

The **ShortDtr** structure specifies a date and time that is accurate down to the second. The year, month, day, and weekday values MUST be consistent with the Gregorian calendar.



yr (2 bytes): An unsigned integer that specifies the year. This value MUST be greater than or equal to 1900, and MUST be less than or equal to 9999.

mon (1 byte): An unsigned integer that specifies the month. This value MUST be greater than or equal to 1 and less than or equal to 12.

dom (1 byte): An unsigned integer that specifies the day. This value MUST be greater than or equal to 1 and less than or equal to 31.

hr (1 byte): An unsigned integer that specifies the hour. This value MUST be greater than or equal to 0 and less than or equal to 23.

mint (1 byte): An unsigned integer that specifies the minute. This value MUST be greater than or equal to 0 and less than or equal to 59.

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sec (1 byte): An unsigned integer that specifies the second. This value MUST be greater than or equal to 0 and less than or equal to 59.

wdy (1 byte): An unsigned integer that specifies the weekday. The value MUST be a value from the following table.

Value	Meaning
0x01	Monday
0x02	Tuesday
0x03	Wednesday
0x04	Thursday
0x05	Friday
0x06	Saturday
0x07	Sunday

2.5.133 ShowDataAs

A **ShowDataAs** enumeration specifies display format values. It MUST be a value from the following table.

Name	Value	Meaning
NORMAL	0x00000000	Normal data type.
DIFFERENCE	0x00000001	Difference from.
PERCENT	0x00000002	Percentage of.
PERCENTDIFF	0x00000003	Percentage difference of.
RUNTOTAL	0x00000004	Running total in.
PERCENTOFROW	0x00000005	Percentage of **row**.
PERCENTOFCOL	0x00000006	Percentage of **column (1)**.
PERCENTOFTOTAL	0x00000007	Percentage of total.
INDEX	0x00000008	Index.
PERCENTOFPARENTROW	0x00000009	Percentage of parent row.
PERCENTOFPARENTCOL	0x0000000A	Percentage of parent column (1).
PERCENTOFPARENT	0x0000000B	Percentage of ancestor.
PERCENTOFRUNTOTAL	0x0000000C	Percentage of running total.
RANKASCENDING	0x0000000D	Rank Ascending.
RANKDESCENDING	0x0000000E	Rank Descending.

2.5.134 SlicerCacheLevelData

The **SlicerCacheLevelData** record specifies the properties of an **OLAP level** in the **OLAP hierarchy** specified by this slicer cache (section 2.2.14.1), whose OLAP members with no data are not displayed.

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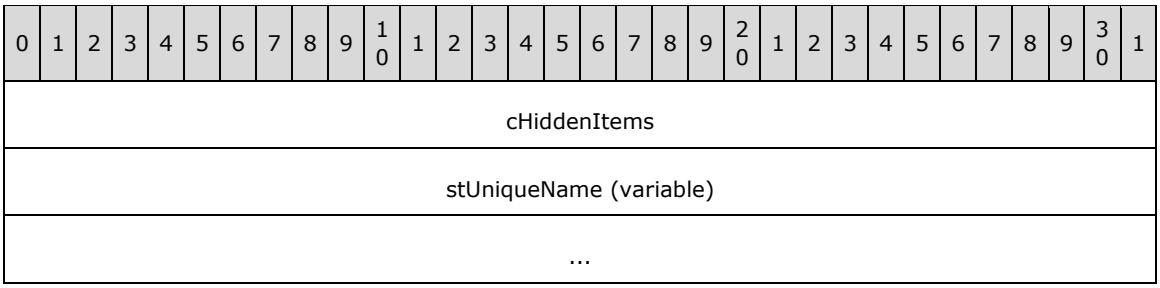
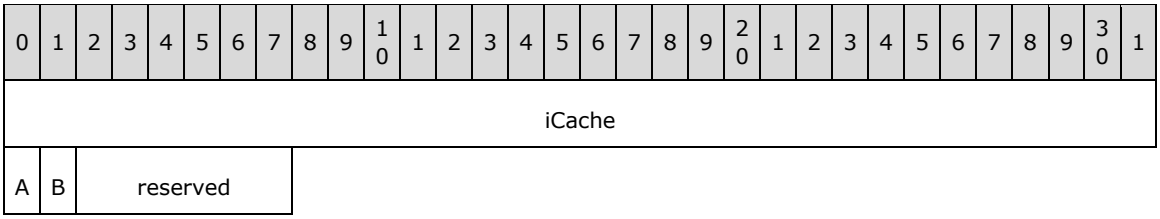


cHiddenItems (4 bytes): An unsigned integer that specifies how many of the **OLAP members** in this OLAP level that are used in slicer cross filtering (section 2.2.14.1.5) are not displayed.

stUniqueName (variable): An **XLWideString** (section 2.5.168) that specifies the **MDX unique name** of this OLAP level within the OLAP hierarchy specified by this slicer cache, whose OLAP members with no data are not displayed. The length of this string MUST be at least 1 character and MUST NOT exceed 32,767 characters.

2.5.135 SlicerCacheNativeItem

A **SlicerCacheNativeItem** structure specifies non-OLAP slicer item (section 2.2.14.1.4.1) properties in a **BrtSlicerCacheNativeItem** (section 2.4.774) record.



iCache (4 bytes): An unsigned integer that specifies an index of the cache item (section 2.2.5.2.3) associated with this non-OLAP slicer item. This value MUST be within the range of items as specified by the **crecords** field of the **BrtBeginPivotCacheRecords** (section 2.4.170) record of the associated non-**OLAP** pivot cache (section 2.2.5.2) specified by the **dwcacheId** field of the **BrtBeginSlicerCacheNative** (section 2.4.207) record.

A - fSelected (1 bit): A bit that specifies whether or not this non-OLAP slicer item is selected for filtering.

B - fNoData (1 bit): A bit that specifies whether or not this non-OLAP slicer item contains data. This value MUST be equal to 0 if the **fCrossFilter** field of the **BrtBeginSlicerCacheNative** record is equal to 0x0. For more information see section 2.2.14.1.5.

reserved (6 bits): This value MUST be 0 and MUST be ignored.

2.5.136 SlicerCachePivotTable

The **SlicerCachePivotTable** structure specifies either a PivotTable view (section 2.2.5.3) within the **BrtSlicerCachePivotTables** (section 2.4.776) record or a Non-Worksheet PivotTable (section 2.2.5.5) within the **BrtSlicerCacheBookPivotTables** (section 2.4.772) record.

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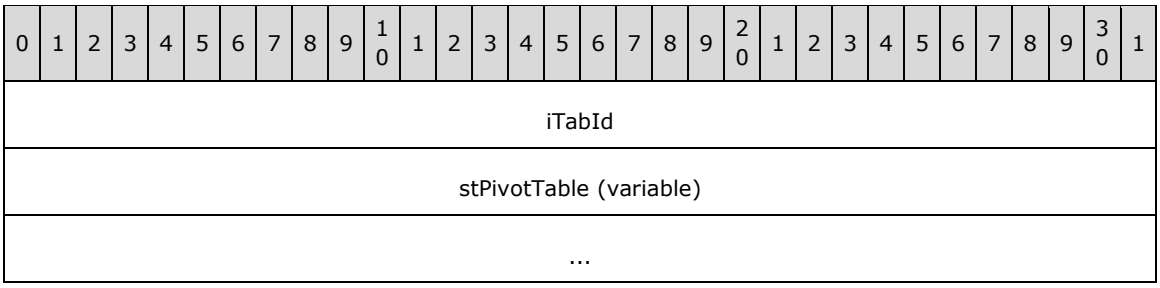
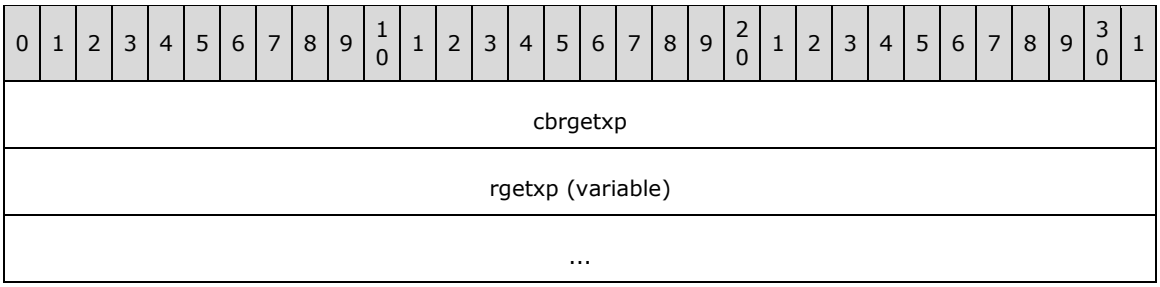


iTabId (4 bytes): An unsigned integer that specifies the **worksheet** which contains the PivotTable view specified by this structure. This value MUST match an **iTabId** of an existing **BrtBundleSh** (section 2.4.311) record. This value MUST be -1 if this record specifies a Non-Worksheet PivotTable (section 2.2.5.5) within the **BrtSlicerCacheBookPivotTables** (section 2.4.772) record.

stPivotTable (variable): An **XLWideString** (section 2.5.168) that specifies the PivotTable view within the scope of the worksheet specified by **iTabId**. This value MUST match an **irstName** of an existing **BrtBeginSXView** (section 2.4.273) record.

2.5.137 SqEtxp

The **SqEtxp** structure specifies a collection of **Etxp** (section 2.5.41) that specifies the font information for a **BrtRRChgCell** (section 2.4.748) record.

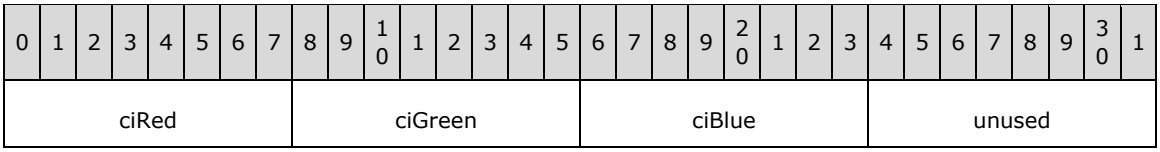


cbrgetxp (4 bytes): An unsigned integer that specifies the number of elements in **rgetxp** multiplied by 100. This value MUST be a multiple of 100.

rgetxp (variable): An array of **Etxp**. The number of elements in the array MUST be equal to **cbrgetxp** divided by 100.

2.5.138 SrvFmtCV

The **SrvFmtCV** record specifies an indexed color definition in **RGB**.



ciRed (1 byte): An unsigned integer that specifies the intensity of the color red.

ciGreen (1 byte): An unsigned integer that specifies the intensity of the color green.

ciBlue (1 byte): An unsigned integer that specifies the intensity of the color blue.

unused (1 byte): Undefined. This value MUST be ignored.

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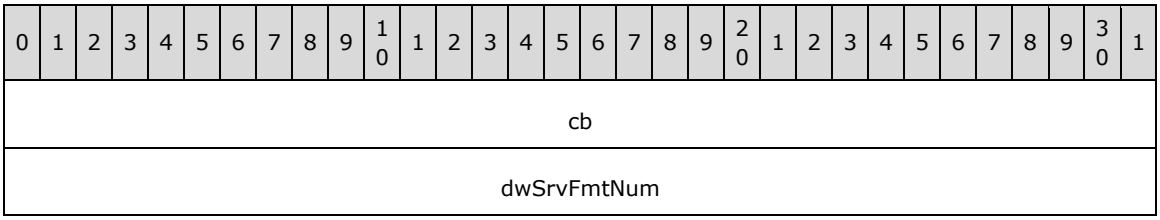
2.5.139 SrvFmtData

The **SrvFmtData** structure specifies the **number format** on the server.



cb (4 bytes): An unsigned integer that specifies the size in bytes of the data that follows this field. Its value MUST be equal to 0x00000004.

dwSrvFmtNum (4 bytes): An unsigned integer that specifies the number format on the server, and whose value is dictated by the value of **sff.fSrvFmtNumStr** of the associated **BrtBeginMdxTuple** (section 2.4.109) record, as specified in the following table.

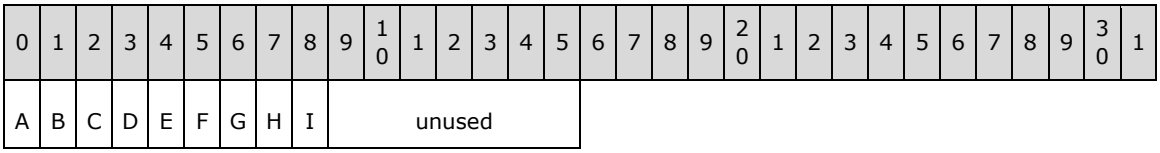
Value of sff.fSrvFmtNumStr	Meaning of dwSrvFmtNum
0	Value specifies one of the built-in number formats as described in the following table.
1	Value is an index to a string in the metadata string store (section 2.2.4.7). That string contains information about how to format the number. For more information about how **format strings** are interpreted, see [ISO/IEC29500-1:2016], section 18.8.31. The **ABNF** grammar for the format string is specified in [MS-XLS] section 2.4.126.

The value of **dwSrvFmtNum** MUST be a value from the following table when the value of **sff.fSrvFmtNumStr** is 0.

Value	Format specification	Example formatted data
0x00000000	General	3.14159
0x0000000E	0.00%	20.73%
0x00000013	m/d/yyyy	1/13/1999

2.5.140 SrvFmtFlags

The **SrvFmtFlags** structure specifies the properties of applied server-specified formatting.



A - fSrvFmtNum (1 bit): A bit that specifies whether or not the number formatting is applied.

B - fSrvFmtNumCurrency (1 bit): A bit that specifies whether or not the currency formatting is applied.

C - fSrvFmtNumStr (1 bit): A bit that specifies whether or not the number formatting is stored in the metadata string store.

D - fSrvFmtBack (1 bit): A bit that specifies whether or not the **background color** is applied.

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E - fSrvFmtFore (1 bit): A bit that specifies whether or not the **foreground color** is applied.

F - fSrvFmtItalic (1 bit): A bit that specifies whether or not the italic formatting is applied.

G - fSrvFmtUnderline (1 bit): A bit that specifies whether or not the underline formatting is applied.

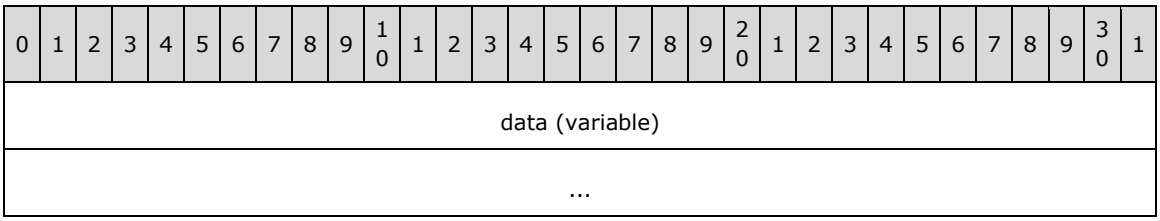
H - fSrvFmtBold (1 bit): A bit that specifies whether or not the bold formatting is applied.

I - fSrvFmtStrikethrough (1 bit): A bit that specifies whether or not the **strikethrough formatting** is applied.

unused (7 bits): Undefined. This value MUST be ignored.

2.5.141 SrvFmtNum

The **SrvFmtNum** structure specifies the number or currency formatting in the **BrtBeginMdxTuple** (section 2.4.109) record.



data (variable): A field whose type and value are dictated by the value of the **sff.fSrvFmtNumCurrency** field of the associated **BrtBeginMdxTuple** record, as specified in the following table.

Value of sff.fSrvFmtNumCurrency	Type of data
0	Value is a **SrvFmtData** (section 2.5.139).
1	Value is an **XLNullableWideString** (section 2.5.166) that specifies a language tag used to determine the currency symbol to display for currency values. For example, if the language tag is "en-us", the application formats the values with a dollar sign. If the language tag is "fr-fr" the application formats the values with a euro sign. This value MUST<69> conform to the language tagging conventions of [RFC3066]. The pattern <language>-<COUNTRY/REGION> is used, for example "en-us" or "fr-fr".

2.5.142 ST_SheetState

The **ST_SheetState** enumeration specifies the visibility state of a **sheet**.

Name	Value	Meaning
VISIBLE	0x00000000	The sheet is **visible**.
HIDDEN	0x00000001	The sheet is hidden.
VERYHIDDEN	0x00000002	The sheet is hidden and cannot be displayed by using the user interface.

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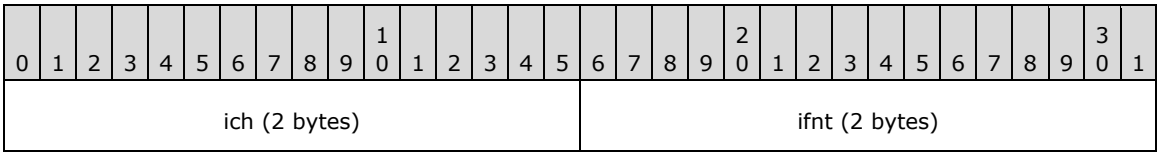
2.5.143 StrRun

The **StrRun** structure specifies a **text run**.

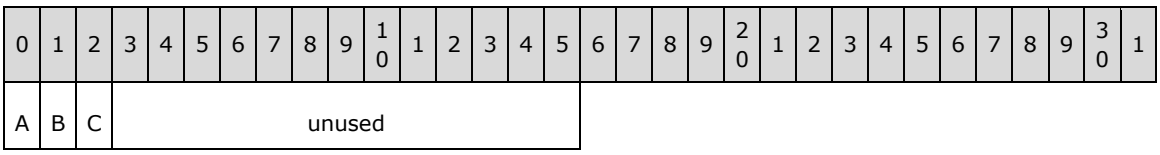


ich (2 bytes): An unsigned integer that specifies the zero-based index of a character in the **str** field of the **RichStr** (section 2.5.121) that contains the **rgsStrRun** array that contains this **StrRun**. The value of **ich** MUST be less than the number of characters in the **str** field of the associated **RichStr**.

ifnt (2 bytes): An unsigned integer that specifies the zero-based index of a **BrtFont** (section 2.4.677) record in the collection of all records directly following **BrtBeginFonts** (section 2.4.88). The referenced **BrtFont** specifies the font for the text run.

2.5.144 StyleFlags

The **StyleFlags** structure specifies properties of a **BrtStyle** (section 2.4.783) record.



A - fBuiltIn (1 bit): A bit that specifies whether or not the associated cell style (section 2.2.6.1.2) is a built-in cell style.

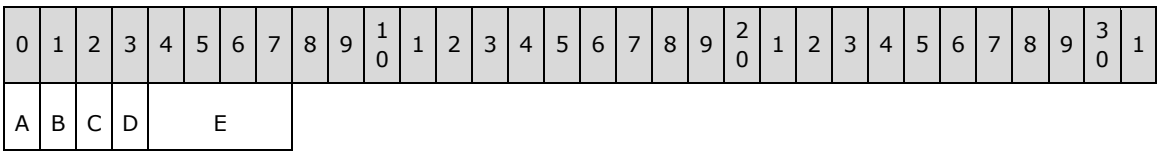
B - fHidden (1 bit): A bit that specifies whether or not the associated cell style is displayed in the UI.

C - fCustom (1 bit): A bit that specifies whether or not the associated cell style is a built-in cell style that is customized. If this bit is set, the **fBuiltIn** bit MUST be set. Customized built-in cell styles MUST be saved with the workbook, even if they are not currently in use.

unused (13 bits): This value MUST be 0, and MUST be ignored.

2.5.145 SXAxis

The **SXAxis** structure specifies which PivotTable axis (section 2.2.5.3.7) is being referred to.



A - sxaxisRw (1 bit): A bit that specifies whether or not the **row** axis is being referred to.

B - sxaxisCol (1 bit): A bit that specifies whether or not the **column (1)** axis is being referred to.

C - sxaxisPage (1 bit): A bit that specifies whether or not the page axis (section 2.2.5.3.7.1) is being referred to.

D - sxaxisData (1 bit): A bit that specifies whether or not the data axis is being referred to.

E - reserved (4 bits): This value MUST be 0, and MUST be ignored.

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2.5.146 SXET

The **SXET** enumeration specifies the type of the modified value in the PivotTable data area using PivotTable What if Analysis (section 2.2.5.3.10).

Name	Value	Meaning
SXET_FMLA	0x01	Formula value.
SXET_NUM	0x02	Numerical value.
SXET_DATETIME	0x03	Date and time value.
SXET_STRING	0x04	String value.
SXET_BOOL	0x05	Boolean value.
SXET_ERROR	0x07	Error value.

2.5.147 SXMA

The **SXMA** enumeration specifies the allocation method for the **PivotTable** What-if Analysis (section 2.2.5.3.10).

Name	Value	Meaning
EQUAL_ALLOCATION	0x00000000	Equal allocation.
EQUAL_INCREMENT	0x00000001	Equal increment allocation.
WEIGHTED_ALLOCATION	0x00000002	Weighted allocation.
WEIGHTED_INCREMENT	0x00000003	Weighted increment allocation.

2.5.148 TagFnMdx

The **TagFnMdx** enumeration specifies **cube function** types.

Name	Value	Meaning
TFNCUBEMEMBER	0x00000001	CUBEMEMBER.
TFNCUBEVALUE	0x00000002	CUBEVALUE.
TFNCUBESET	0x00000003	CUBESET.
TFNCUBESETCOUNT	0x00000004	CUBESETCOUNT.
TFNCUBERANKEDMEMBER	0x00000005	CUBERANKEDMEMBER.
TFNCUBEMEMBERPROPERTY	0x00000006	CUBEMEMBERPROPERTY.
TFNCUBEKPIPROPERTY	0x00000007	CUBEKPIMEMBER.

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2.5.149 TSEType

TSEType is an unsigned integer that specifies the area of the **table**, **PivotTable** (section 2.1.7.40), slicer (section 2.2.14) or timeline (section 2.2.15) to which a table style element (section 2.2.6.2.2) applies.

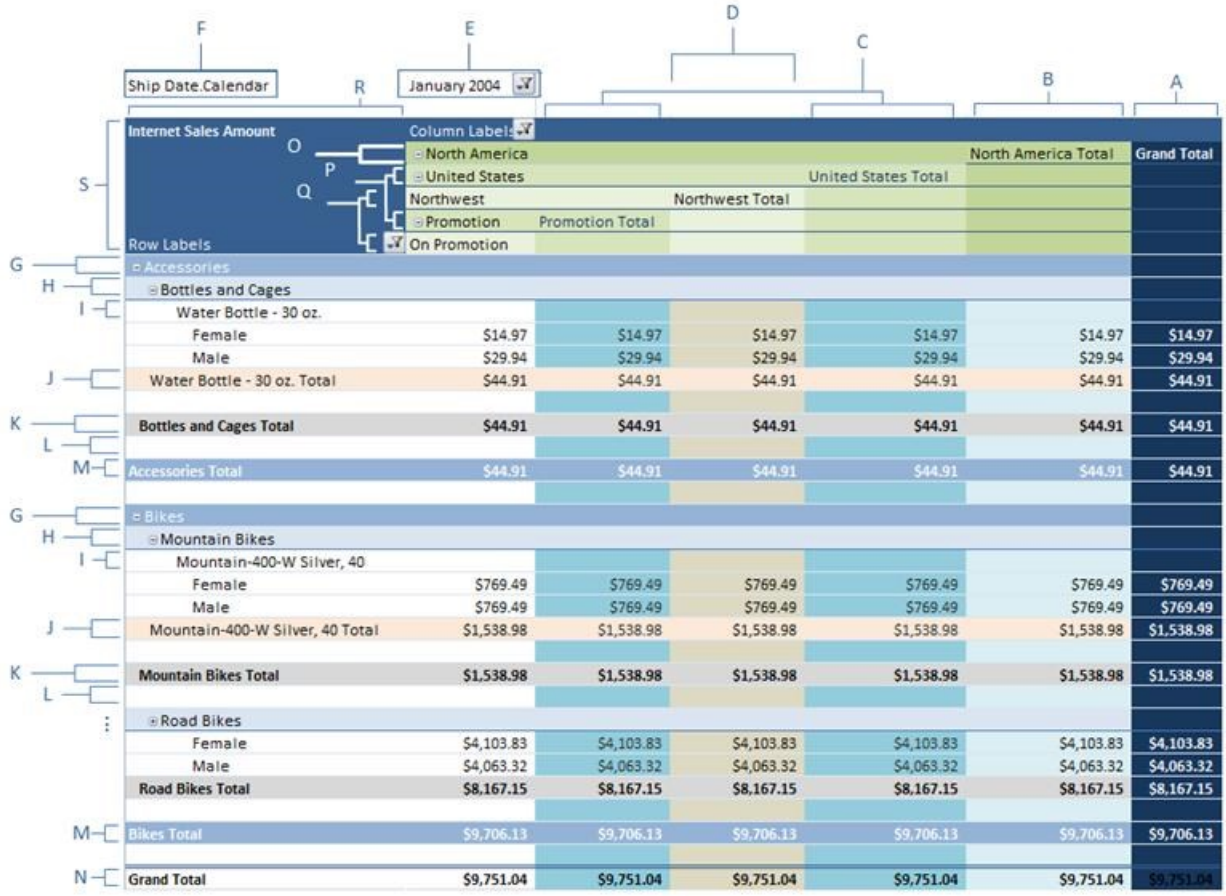

Figure 19: PivotTable Style Diagram

MUST be a value from the following table:

Name	Value	Meaning
TSEWHOLETABLE	0x00000000	Whole table, slicer or timeline. If this table style (section 2.2.6.3) is applied to a **PivotTable**, this formatting type also applies to page field captions and page item captions.
TSEHEADERROW	0x00000001	**Header row**. If this table style is applied to a **PivotTable**, this formatting type applies to the collection of **rows** above the **data region**. See *S* in the preceding **PivotTable** Style Diagram.
TSETOTALROW	0x00000002	**Total row**. If this table style is applied to a **PivotTable**, this formatting type applies to the **grand total** row. See *N* in the preceding **PivotTable** Style Diagram. Does not apply to slicers (section 2.2.14).

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Name	Value	Meaning
TSEFIRSTCOLUMN	0x00000003	First **column (1)**. If this table style is applied to a PivotTable, this formatting type applies to the row label area, which can span multiple columns (1). See *R* in the preceding PivotTable Style Diagram. Does not apply to slicers.
TSELASTCOLUMN	0x00000004	Last column (1). If this table style is applied to a PivotTable, this formatting type applies to the grand total column (1). See *A* in the preceding PivotTable Style Diagram. Does not apply to slicers.
TSEROWSTRIPE1	0x00000005	Row **stripe band** 1. Does not apply to slicers.
TSEROWSTRIPE2	0x00000006	Row stripe band 2. Does not apply to slicers.
TSECOLUMNSTRIPE1	0x00000007	Column (1) stripe band 1. Does not apply to slicers.
TSECOLUMNSTRIPE2	0x00000008	Column (1) stripe band 2. Does not apply to slicers.
TSEFIRSTHEADERCELL	0x00000009	First **cell** of header row. If this table style is applied to a PivotTable, this formatting type applies to cells contained in the area intersected by the header row and first column (1). Does not apply to slicers.
TSELASTHEADERCELL	0x0000000A	Last cell of header row. MUST be ignored if this table style is applied to a PivotTable. Does not apply to slicers.
TSEFIRSTTOTALCELL	0x0000000B	First cell of total row. MUST be ignored if this table style is applied to a PivotTable. Does not apply to slicers.
TSELASTTOTALCELL	0x0000000C	Last cell of total row. MUST be ignored if this table style is applied to a PivotTable. Does not apply to slicers.
TSESUBTOTALCOLUMN1	0x0000000D	Outermost subtotal columns (1) in a PivotTable, specified by the columns (1) displaying subtotals for the first **SXVD** (section 2.5.83) record in the **ISXVDCOLS** collection (see section 2.1.7.40). See *B* in the preceding PivotTable Style Diagram. Used for PivotTables only.
TSESUBTOTALCOLUMN2	0x0000000E	Alternating even subtotal columns (1) in a PivotTable, specified by the columns (1) displaying subtotals for **SXVD** records for which the zero-based index in the record in the **ISXVDCOLS** collection is an odd number. See *C* in the preceding PivotTable Style Diagram. Used for PivotTables only.
TSESUBTOTALCOLUMN3	0x0000000F	Alternating odd subtotal columns (1) in a PivotTable, specified by the columns (1) displaying subtotals for **SXVD** records for which the zero-based index in the record in the **ISXVDCOLS** collection is an even number greater than 0. See *D* in the preceding PivotTable Style Diagram. Used for PivotTables

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Name	Value	Meaning
		only.
TSESUBTOTALROW1	0x00000010	Outermost subtotal rows in a PivotTable, specified by the rows displaying subtotals for the first **SXVD** record in the **ISXTHRWS** collection (see section 2.1.7.40). See *M* in the preceding PivotTable Style Diagram. Used for PivotTables only.
TSESUBTOTALROW2	0x00000011	Alternating even subtotal rows in a PivotTable, specified by the rows displaying subtotals for **SXVD** records for which the zero-based index in the **SXVD** record in the **ISXTHRWS** collection is an odd number. See *K* in the preceding PivotTable Style Diagram. Used for PivotTables only.
TSESUBTOTALROW3	0x00000012	Alternating odd subtotal rows in a PivotTable, specified by the rows displaying subtotals for **SXVD** records for which the zero-based index in the **SXVD** record in the **ISXTHRWS** collection is an even number greater than 0. See *J* in the preceding PivotTable Style Diagram. Used for PivotTables only.
TSEBLANKROW	0x00000013	Empty rows after each subtotal row. See *L* in the preceding PivotTable Style Diagram. Used for PivotTables only.
TSECOLUMNSUBHEADING1	0x00000014	Outermost column (1) subheadings in a PivotTable, specified by the columns (1) displaying pivot field (section 2.2.5.3.2) captions for the first **SXVD** record in the **ISXVDCOLS** collection. See *O* in the preceding PivotTable Style Diagram. Used for PivotTables only.
TSECOLUMNSUBHEADING2	0x00000015	Alternating even column (1) subheadings in a PivotTable, specified by the columns (1) displaying pivot field captions for **SXVD** records for which the zero-based index in the **ISXVDCOLS** collection is an odd number. See *P* in the preceding PivotTable Style Diagram. Used for PivotTables only.
TSECOLUMNSUBHEADING3	0x00000016	Alternating odd column (1) subheadings in a PivotTable, specified by the columns (1) displaying pivot field captions for **SXVD** records for which the zero-based index in the **ISXVDCOLS** collection is an even number greater than 0. See *Q* in the preceding PivotTable Style Diagram. Used for PivotTables only.
TSEROWSUBHEADING1	0x00000017	Outermost row subheadings in a PivotTable, specified by the rows displaying pivot field captions for the first **SXVD** record in the **ISXTHRWS** collection. See *G* in the preceding PivotTable Style Diagram. Used for PivotTables only.
TSEROWSUBHEADING2	0x00000018	Alternating even row subheadings in a PivotTable, specified by the rows displaying pivot field captions for **SXVD** records for which the

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Name	Value	Meaning
		zero-based index in the **ISXTHRWS** collection is an odd number. See *H* in the preceding PivotTable Style Diagram. Used for PivotTables only.
TSEROWSUBHEADING3	0x00000019	Alternating odd row subheadings in a PivotTable, specified by the rows displaying pivot field captions for **SXVD** records for which the zero-based index in the **ISXTHRWS** collection is an even number greater than 0. See *I* in the preceding PivotTable Style Diagram. Used for PivotTables only.
TSEPAGEFIELDLABELS	0x0000001A	Page field captions in a PivotTable, specified by the cells displaying pivot field captions for the **SXVD** records in the **SXPIS** rule (defined in section 2.1.7.40).. See *F* in the PivotTable Style Diagram. Used for PivotTables only.
TSEPAGEFIELDVALUES	0x0000001B	Page item captions in a **PivotTable**, specified by the cells displaying pivot item (section 2.2.5.3.3) captions for the **SXVD** records in the **SXPIS**. See *E* in the preceding **PivotTable** Style Diagram. Used for PivotTables only.
TSESLICERITEMUNSELECTED	0x0000001C	A slicer item with data that is not **selected**. Used for slicers only.
TSESLICERITEMNODATA	0x0000001D	A slicer item with no data that is not selected. Used for slicers only.
TSESLICERITEMSELECTED	0x0000001E	A selected slicer item with data. Used for slicers only.
TSESLICERITEMNODATASELECTED	0x0000001F	A selected slicer item with no data. Used for slicers only.
TSESLICERITEMUNSELECTEDHOVER	0x00000020	A slicer item with data that is not selected and over which the mouse is hovering. Used for slicers only.
TSESLICERITEMSELECTEDHOVER	0x00000021	A selected slicer item with data and over which the mouse is hovering. Used for slicers only.
TSESLICERITEMNODATAHOVER	0x00000022	A slicer item with no data that is not selected and over which the mouse is hovering. Used for slicers only.
TSESLICERITEMNODATASELECTEDHOVER	0x00000023	A selected slicer item with no data and over which the mouse is hovering. Used for slicers only.
TSETIMELINESELECTIONLABEL	0x00000024	Timeline style element that applies to the selection label which is the label that indicates the period that has been selected on the timeline. Used for timelines only.
TSETIMELINETIMELEVEL	0x00000025	Timeline style element that applies to the time level which is the level that indicates the time granularity of the timeline. Used for timelines only.
TSETIMELINEPERIODLABEL1	0x00000026	Timeline style element that applies to the upper

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Name	Value	Meaning
		row of the time block labels. Used for timelines only.
TSETIMELINEPERIODLABEL2	0x00000027	Timeline style element that applies to the lower row of the time block labels. Used for timelines only.
TSETIMELINESELECTEDTIMEBLOCK	0x00000028	Timeline style element that applies to the selected time blocks which are the segments on the timeline that have been selected by the user. Used for timelines only.
TSETIMELINEUNSELECTEDTIMEBLOCK	0x00000029	Timeline style element that applies to the unselected time blocks which are the segments on the timeline that have not been selected by the user. Used for timelines only.
TSETIMELINESELECTEDTIMEBLOCKSPACE	0x0000002A	Timeline style element that applies to the area between any two selected time blocks. Used for timelines only.

2.5.150 Tws

The **Tws** enumeration specifies type of an object published.

Name	Value	Meaning
TWSWORKBOOK	0x00	Entire workbook.
TWSSHEET	0x01	Entire sheet.
TWSPRINTAREA	0x02	Print area.
TWSAUTOFILTER	0x03	AutoFilter.
TWSREF	0x04	A rectangular **range** of cells.
TWSCHART	0x05	Chart.
TWSPIVOTTABLE	0x06	**PivotTable**.
TWSQUERY	0x07	**Query table**.
TWSLABEL	0x08	Named range of cells.

2.5.151 TypeSql

The **TypeSql** signed integer specifies the SQL data type. Example data types supported by **ODBC** are specified in the following table. For more information about ODBC, see [MSDN-OpenDBConnectivity].

Value	SQL Type	Data Type
0x0001	SQL_CHAR	Fixed-length string of ANSI characters .

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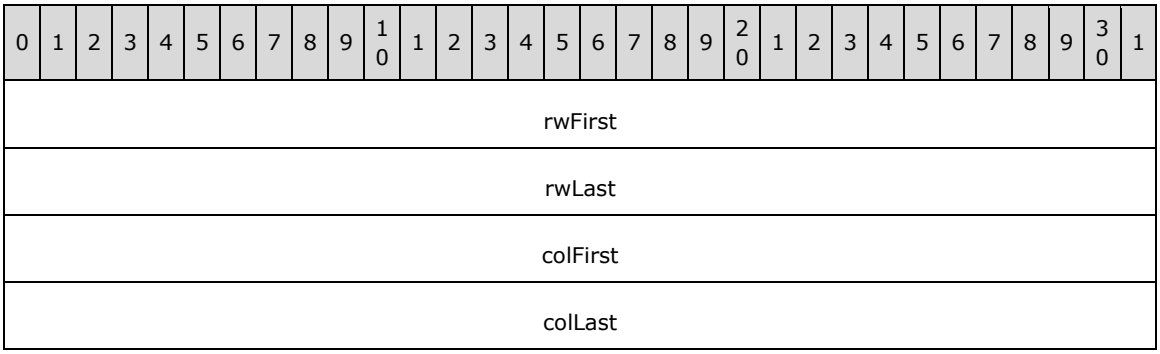
Value	SQL Type	Data Type
0x0003	SQL_DECIMAL	Fixed-precision, Fixed-scale numbers.
0x0004	SQL_INTEGER	32-bit signed integer.
0x0005	SQL_SMALLINT	16-bit signed integer.
0x0006	SQL_FLOAT	User-specified precision floating-point.
0x0007	SQL_REAL	Single-precision floating-point.
0x0008	SQL_DOUBLE	Double-precision floating-point.
0x000B	SQL_TIMESTAMP	Date and Time.
0x000C	SQL_VARCHAR	Variable-length string of characters .
0xFFF9	SQL_BIT	Bit (1 or 0).
0xFFFE	SQL_BINARY	Fixed-length binary data.

2.5.152 UncheckedCol

UncheckedCol is a signed 32-bit integer that specifies a single **column (1)** in a **sheet** using a zero-based index. Its value MUST be greater than or equal to 0 and less than or equal to 16383.

2.5.153 UncheckedRfX

The **UncheckedRfX** structure specifies an unchecked **cell range**. The range can reference cells that lie outside the **sheet's** used range, as specified by **BrtWsDim** (section 2.4.841). When all the fields in this structure are set to their maximum value, the structure specifies an invalid cell range.



rwFirst (4 bytes): An **UncheckedRw** (section 2.5.154) structure that specifies the first **row** of the range.

rwLast (4 bytes): An **UncheckedRw** structure that specifies the last row of the range. Its value MUST NOT be less than **rwFirst**.

colFirst (4 bytes): An **UncheckedCol** (section 2.5.152) structure that specifies the first **column (1)** of the range.

colLast (4 bytes): An **UncheckedCol** structure that specifies the last column (1) of the range. Its value MUST NOT be less than **colFirst**.

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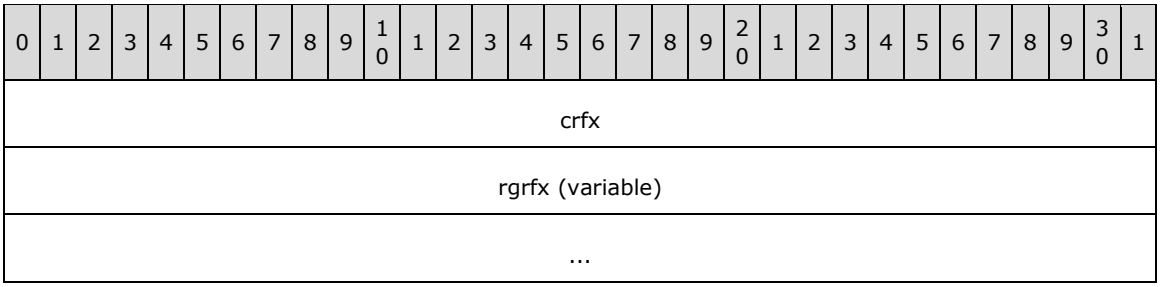
2.5.154 UncheckedRw

UncheckedRW is a signed 32-bit integer that specifies a single **row** in a **sheet** using a zero-based index. Its value MUST be greater than or equal to 0 and less than or equal to 1048575.

2.5.155 UncheckedSqRfX

The **UncheckedSqRfX** structure specifies a set of unchecked **ranges**.



crfx (4 bytes): A signed integer that specifies the count of **UncheckedRfX** (section 2.5.153) in **rgrfx**. The value MUST be greater than or equal to -1 and less than or equal to 2147483647. A value of -1 specifies that the **rgrfx** is null. A value of 0 specifies that the **rgrfx** is empty.

rgrfx (variable): An array of **UncheckedRfX** that specifies the set of ranges.

2.5.156 Underline

The **Underline** enumeration specifies the underline style.

Name	Value	Meaning
ULSNONE	0x0000	No underline.
ULSSINGLE	0x0001	Single.
ULSDOUBLE	0x0002	Double.
ULSSINGLEACCOUNTANT	0x0021	**Single accounting**.
ULSDOUBLEACCOUNTANT	0x0022	**Double accounting**.

2.5.157 VertAlign

The **VertAlign** enumeration specifies the vertical alignment.

Name	Value	Meaning
ALCVTOP	0x00	Top alignment.
ALCVCTR	0x01	Center alignment.
ALCVBOT	0x02	Bottom alignment.
ALCVJUST	0x03	Justify alignment.
ALCVDIST	0x04	Distributed alignment.

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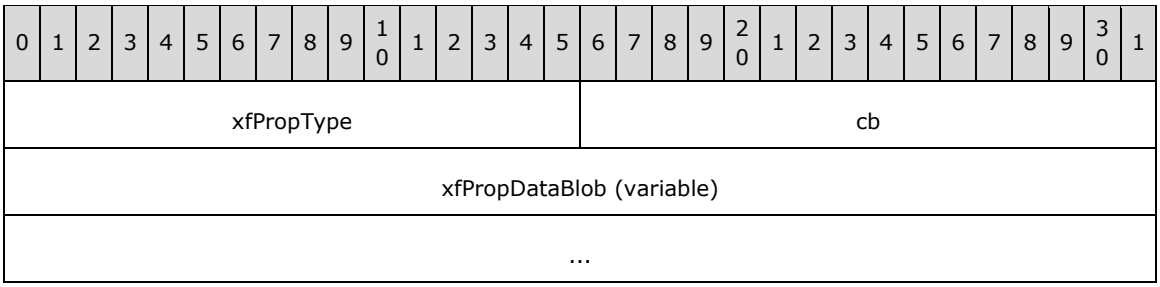
2.5.158 XFProp

The **XFProp** structure specifies a formatting property. Instances of this structure appear as elements in the **xfPropArray** field of an **XFProps** (section 2.5.163) structure.



xfPropType (2 bytes): An unsigned integer that specifies the type of the formatting property. This value MUST be greater than or equal to 0x0000 and less than or equal to 0x002C, and it MUST NOT be equal to 0x0027 or 0x0028. For more information about the meaning of this field, see the table in the description for **xfPropDataBlob**.

cb (2 bytes): An unsigned integer that specifies the size of this **XFProp** (section 2.5.158) structure.

xfPropDataBlob (variable): A field that specifies the formatting property data. The size and data type of this field varies based on the property type as specified in **xfPropType**.

xfPropType value	xfPropDataBlob field Data and Meaning
0x0000	A **FillPattern** (section 2.5.50) that specifies the **fill pattern**.
0x0001	An **XFPropColor** (section 2.5.160) that specifies the foreground color.
0x0002	An **XFPropColor** that specifies the **background color**.
0x0003	An **XFPropGradient** (section 2.5.161) that specifies the **gradient fill**. This is often followed in the same **xfPropArray** field of the **XFProps** record by one or more **XFProp** structures with **xfPropType** equal to 0x0004, which provides additional specifications for the gradient fill.
0x0004	An **XFPropGradientStop** (section 2.5.162) that specifies a **gradient stop** for a preceding **XFProp** with **xfPropType** equal to 0x0003 in the same **xfPropArray** field in the **XFProps** record.
0x0005	An **XFPropColor** that specifies the text color.
0x0006	An **XFPropBorder** (section 2.5.159) that specifies the top **border formatting**.
0x0007	An **XFPropBorder** that specifies the bottom border formatting.
0x0008	An **XFPropBorder** that specifies the left border formatting.
0x0009	An **XFPropBorder** that specifies the right border formatting.
0x000A	An **XFPropBorder** that specifies the diagonal border formatting.
0x000B	An **XFPropBorder** that specifies the vertical border formatting.
0x000C	An **XFPropBorder** that specifies the horizontal border formatting.
0x000D	A 1-byte unsigned integer that specifies whether a **diagonal-up border** is used. Its value MUST be 0 or 1. A value of 1 means that a diagonal-up border is used.
0x000E	A 1-byte unsigned integer that specifies whether a **diagonal-down** border is used. Its value MUST be 0 or 1. A value of 1 means that a diagonal-down border is used.
0x000F	A **HorizAlign** (section 2.5.73) that specifies the **horizontal alignment**.
0x0010	A **VertAlign** (section 2.5.157) that specifies the **vertical alignment**.
0x0011	An **XFPropTextRotation** (section 2.5.164) that specifies the text rotation.
0x0012	A 2-byte unsigned integer that specifies the absolute text **indentation level**. This value MUST be less than or equal to 15. The absolute indentation level replaces any previous indentation.

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xfPropType value	xfPropDataBlob field Data and Meaning
0x0013	A **ReadingOrder** (section 2.5.113) that specifies the **reading order**.
0x0014	A 1-byte unsigned integer that specifies whether **cell** text is wrapped. This value MUST be 0 or 1. A value of 1 means that the text is wrapped.
0x0015	A 1-byte unsigned integer that specifies whether cell text is **justify distributed**. This value MUST be 0 or 1. A value of 1 means that the text is justify distributed. If this value is 1, then an **XFProp** with **xfPropType** equal to 0x000F MUST exist in this **xfPropArray** field of **XFProps** and MUST equal 0x07.
0x0016	A 1-byte unsigned integer that specifies whether the cell is **shrink to fit**. This value MUST be 0 or 1. A value of 1 means that the cell is shrink to fit.
0x0017	A 1-byte unsigned integer that specifies whether the cell is merged. This value MUST be 0 or 1. A value of 1 means that the cell is merged.
0x0018	An **LPWideString** (section 2.5.91) that specifies the font name used by the cell data. This value MUST be less than or equal to 32 characters in length.
0x0019	A **Bold** (section 2.5.5) that specifies the **font face weight**.
0x001A	An **Underline** (section 2.5.156) that specifies the underline style.
0x001B	A **Script** (section 2.5.130) that specifies the superscript or subscript style.
0x001C	A 1-byte unsigned integer that specifies whether text is italicized. This value MUST be 0 or 1. The value of 1 means that the text is italic.
0x001D	A 1-byte unsigned integer that specifies whether text has **strikethrough formatting** applied. This value MUST be 0 or 1. A value of 1 means that the text has strikethrough formatting applied.
0x001E	A 1-byte unsigned integer that specifies whether text has an outline style. This value MUST be 0 or 1. A value of 1 means that the text is outline style.
0x001F	A 1-byte unsigned integer that specifies whether text has a shadow style. This value MUST be 0 or 1. A value of 1 means that the text is shadow style.
0x0020	A 1-byte unsigned integer that specifies whether text is condensed. This value MUST be 0 or 1. A value of 1 means that the text is condensed.
0x0021	A 1-byte unsigned integer that specifies whether text is extended. This value MUST be 0 or 1. A value of 1 means that the text is extended.
0x0022	A 1-byte unsigned integer that specifies a **character set**. For more information about character sets, see the Windows API LOGFONT structure in [MSDN-FONTS].
0x0023	A 1-byte unsigned integer that specifies a **font family**. For more information about font families, see the Windows API LOGFONT structure in [MSDN-FONTS]. This value MUST be greater than or equal to 0 and less than or equal to 5.
0x0024	A 4-byte unsigned integer that specifies text size in **twips**. This value MUST be greater than or equal to 20 and less than or equal to 8191.
0x0025	A **FontScheme** (section 2.5.53) structure that specifies the **font scheme** of a **theme font**.
0x0026	A **number format** as specified by [MS-XLS] section 2.5.126 that specifies the number **format string**.
0x0029	An **Ifmt** (section 2.5.76) that specifies the identifier of a number format.
0x002A	A 2-byte signed integer that specifies the relative text indentation level. The relative indentation level is added to any previous indentation. The value MUST either be greater than or equal to -15 and less than or equal to 15, or it MUST be 255. Values -15 through 15 specify a relative indentation level, and the value 255 specifies the absence of a relative indentation level.
0x002B	A 1-byte unsigned integer that specifies whether or not the **locked protection** property is set to true. This value MUST be 0 or 1. A value of 1 means that the property is set to true.
0x002C	A 1-byte unsigned integer that specifies whether the **hidden protection** property is set to true. This value MUST be 0 or 1. A value of 1 means that the property is set to true.

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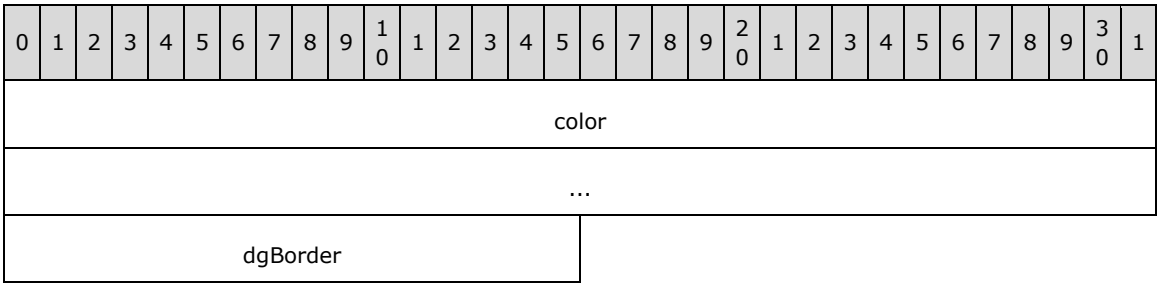
2.5.159 XFPropBorder

The **XFPropBorder** structure specifies **border formatting**.

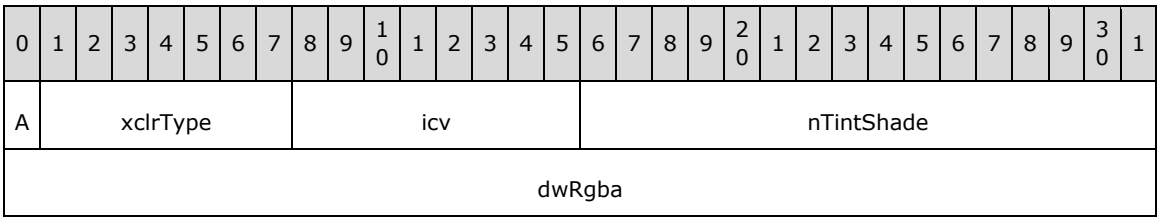


color (8 bytes): An **XFPropColor** (section 2.5.160) structure that specifies the **border** color.

dgBorder (2 bytes): A **BorderStyle** (section 2.5.7) structure that specifies the border **line style**.

2.5.160 XFPropColor

The **XFPropColor** structure specifies a color.



A - fValidRGBA (1 bit): A bit that specifies whether the **xclrType, icv** and **nTintShade** fields are used to set the **dwRgba** field.

xclrType (7 bits): An unsigned integer that specifies how the color information is stored. This value MUST be a value from the following table:

Value	Meaning
0x00	Automatic foreground and **background colors**
0x01	**Palette color**. The value of **icv** MUST be less than or equal to 220.
0x02	**RGBA** color
0x03	**Theme** color. The value of **icv** MUST be less than or equal to 11.
0x04	Color not set.

icv (1 byte): An unsigned integer that specifies color information. The type and meaning of this field depends on the value of the **xclrType** field and is specified by the following tables.

Value of xclrType	Meaning of icv field
0x00	Undefined and MUST be ignored.
0x01	An **Icv** (section 2.5.75) that specifies a color from a color palette.
0x02	Undefined and MUST be ignored.

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Value of xclrType	Meaning of icv field
0x03	An unsigned integer that specifies a subelement of the **clrScheme** element in the **Theme** (section 2.1.7.52) part **ABNF**, as defined in [ISO/IEC29500-1:2016], section 20.1.6.2, that specifies a color. The following table specifies which subelement of **clrScheme** to use for each legal value of the index.

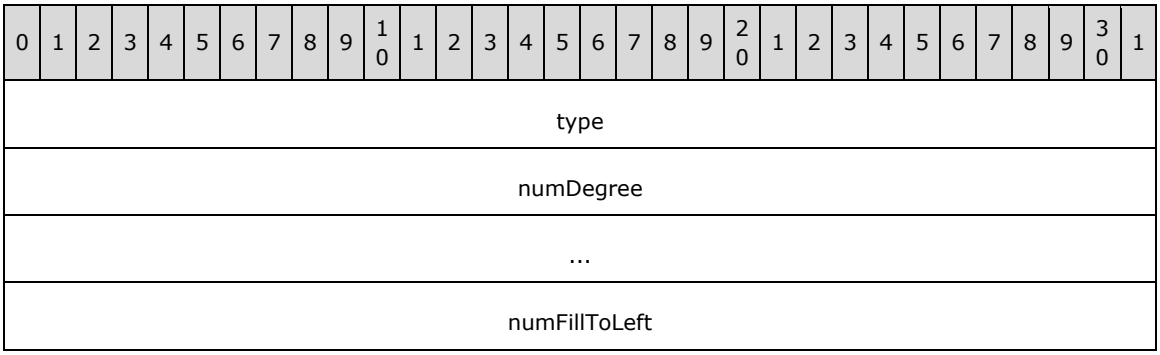
Value of index	Sub-element of clrScheme
0x00	dk1
0x01	lt1
0x02	dk2
0x03	lt2
0x04	accent1
0x05	accent2
0x06	accent3
0x07	accent4
0x08	accent5
0x09	accent6
0x0A	hlink
0x0B	folHlink

nTintShade (2 bytes): A signed integer that specifies the tint of the color. This value is mapped to the range -1.0 to 1.0. Positive values lighten the color and negative values darken the color. This value MUST NOT equal -32768.

dwRgba (4 bytes): A **LongRGBA** (section 2.5.89) structure that specifies the color.

2.5.161 XFPropGradient

The **XFPropGradient** structure specifies a **gradient fill**.



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...
numFillToRight
...
numFillToTop
...
numFillToBottom
...

type (4 bytes): A signed integer that specifies the gradient type. This value MUST be a value from the following table.

Value	Meaning
0x00000000	**Linear gradient**.
0x00000001	**Rectangular gradient**.

numDegree (8 bytes): An **Xnum** (section 2.5.171) structure that specifies the gradient angle, in degrees, for linear gradients. The gradient angle specifies the angle at which gradient strokes are drawn. If **type** equals 0x00000001, this value MUST equal 0.0.

numFillToLeft (8 bytes): An **Xnum** structure that specifies the left coordinate of the **inner rectangle** for rectangular gradients, where (0.0,0.0) is the upper-left corner of the inner rectangle. This value MUST be greater than or equal to 0.0 and less than or equal to 1.0. If **type** equals 0x00000000, this value MUST equal 0.0.

numFillToRight (8 bytes): An **Xnum** structure that specifies the right coordinate of the inner rectangle for rectangular gradients, where (0.0,0.0) is the upper-left corner of the inner rectangle. This value MUST be greater than or equal to 0.0 and less than or equal to 1.0. If **type** equals 0x00000000, this value MUST equal 0.0.

numFillToTop (8 bytes): An **Xnum** structure that specifies the top coordinate of the inner rectangle for rectangular gradients, where (0.0,0.0) is the upper-left corner of the inner rectangle. This value MUST be greater than or equal to 0.0 and less than or equal to 1.0. If **type** equals 0x00000000, this value MUST equal 0.0.

numFillToBottom (8 bytes): An **Xnum** structure that specifies the bottom coordinate of the inner rectangle for rectangular gradients, where (0.0,0.0) is the upper-left corner of the inner rectangle. This value MUST be greater than or equal to 0.0 and less than or equal to 1.0. If **type** equals 0x00000000, this value MUST equal 0.0.

2.5.162 XFPropGradientStop

The **XFPropGradientStop** structure specifies a **gradient stop** for a **gradient fill**.

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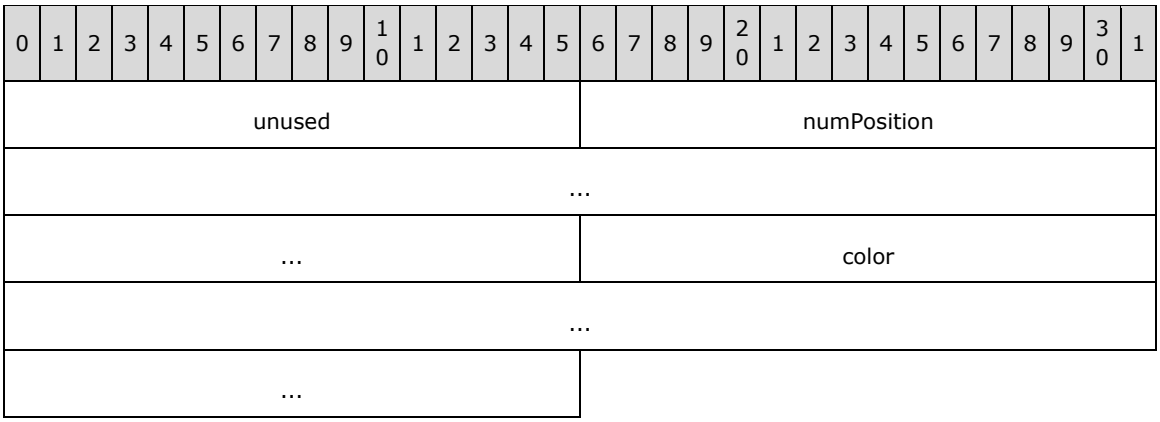


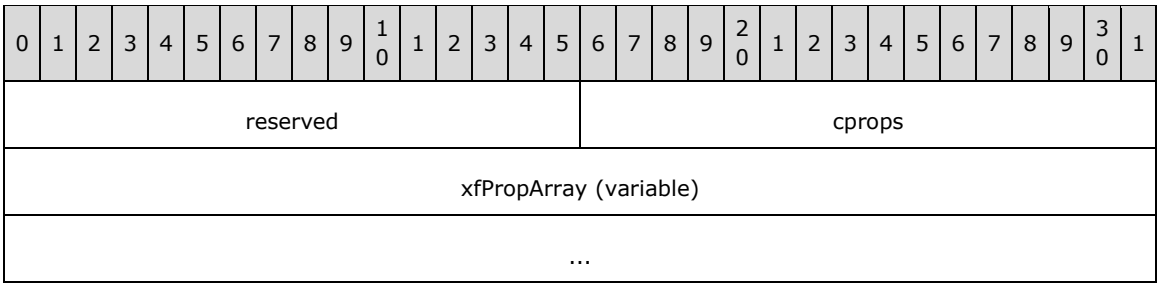
unused (2 bytes): Undefined. This value MUST be ignored.

numPosition (8 bytes): An **Xnum** (section 2.5.171) structure that specifies the gradient stop position. The gradient stop position is the position within the gradient range where this gradient stop's color begins. This value MUST be greater than or equal to 0.0 and less than or equal to 1.0.

color (8 bytes): An **XFPropColor** (section 2.5.160) structure that specifies the gradient stop color.

2.5.163 XFProps

The **XFProps** structure specifies an array of formatting properties.



reserved (2 bytes): This value MUST be 0 and MUST be ignored.

cprops (2 bytes): An unsigned integer that specifies the number of **XFProp** (section 2.5.158) structures in **xfPropArray.** This value MUST match the number of **XFProp** structures.

xfPropArray (variable): An array of **XFProp**. Each array element specifies a formatting property. The array of properties specifies the full set of formatting properties. If the array contains an **XFProp** with an **xfPropType** field equaling 0, the array MUST NOT contain any **XFProp** elements with **xfPropType** fields equaling 3 or 4. If the array contains an **XFProp** with an **xfPropType** field equaling 3 or 4, the array MUST NOT contain any **XFProp** elements with an **xfPropType** field equaling 0.

2.5.164 XFPropTextRotation

The **XFPropTextRotation** structure specifies the text rotation.

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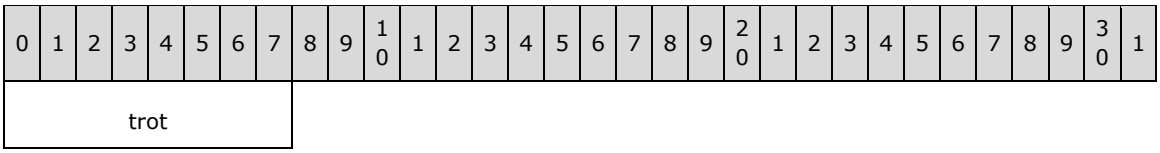
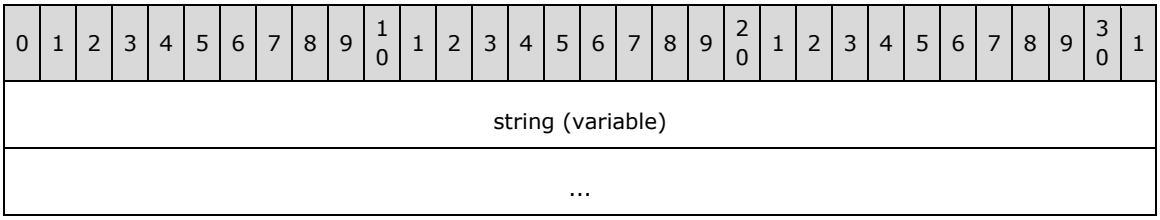


trot (1 byte): An unsigned integer that specifies the text rotation. This value MUST correspond to the following table.

Value	Meaning
0x00 to 0x5A (0 to 90)	Text rotated counterclockwise 0 to 90 degrees.
0x5B to 0xB4 (91 to 180)	Text rotated clockwise 1 to 90 degrees.
0xFE (254)	Context dependent text rotation.
0xFF (255)	Vertical text.

2.5.165 XLNameWideString

The **XLNameWideString** structure specifies a **defined name**.



string (variable): An **XLWideString** (section 2.5.168) structure that specifies the name. The length of the string MUST NOT exceed 255 characters.

The string MUST adhere to the following grammar:

```
string =  name-start-character *name-character

name-start-character =  "_" /   "\" / az-letter / Unicode-character

name-character =  name-start-character  / "?" / 0x061F / "."  /  Unicode-digit
```

This applies where Unicode-character is any code point greater than 0x7F that is a character as defined by the **Unicode** character properties, section 4 of [UNICODE4.0].

Unicode-digit is any code point that is a digit as defined by the Unicode character properties, Chapter Four of [UNICODE4.0].

The string MUST NOT equal "TRUE" or "FALSE" (case-insensitive).

The string MUST NOT be an **A1 cell reference** and MUST NOT begin with an **R1C1** cell reference.

An R1C1 cell reference is defined to be:

```
R1C1-cell-reference =  R1C1-row / R1C1-column / R1C1-row R1C1-column / R1C1-column R1C1-row

R1C1-row = letter-r row-number

letter-r = "R" / "r"
```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```
R1C1-column = letter-c column-number

letter-c = "C" / "c"


column-number = 1-16384

    ; A string composed of Unicode digits (see earlier definition) that represents an
    unsigned integer that is greater than or equal to 1 and less than or equal to 16384


row-number = 1-1048576

    ; A string composed of Unicode digits (see earlier definition) that represents an
    unsigned integer that is greater than or equal to 1 and less than or equal to
    1048576.
```

An A1 cell reference is defined to be:

```
A1-reference  = A1-column A1-Row

A1-row = row-number

    ; See definition of row-number in R1C1 cell reference grammar earlier.


A1-column = 1*2 az-letter / aw-letter az-letter az-letter / "X" ae-letter az-letter / "X" "F"
ad-letter

ad-letter = "A" / "B" / "C" / "D" / "a" / "b" / "c" / "d"
```

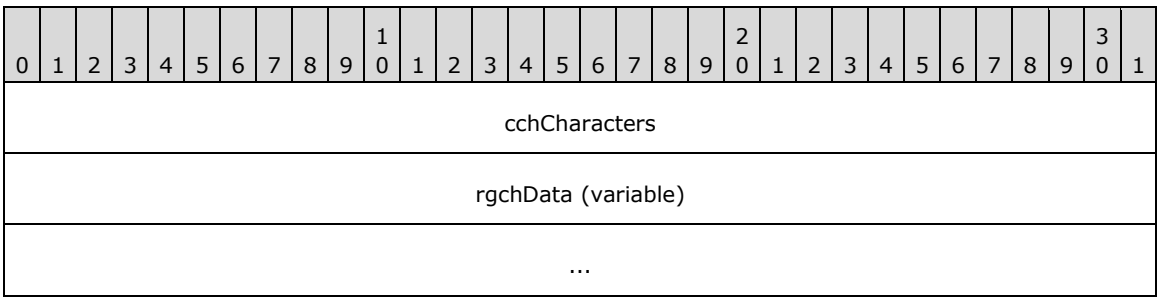
ae-letter = ad-letter / "E" / "e"

```
aw-letter = ae-letter / "F" / "G" / "H" / "I" / "J" / "K" / "L" / "M" / "N" / "O" / "P" / "Q"
/ "R" / "S" / "T" / "U" / "V" / "W" / "f" / "g" / "h" / "i" / "j" / "k" / "l" / "m" / "n" /
"o" / "p" / "q" / "r" / "s" / "t" / "u" / "v" / "w"

az-letter = aw-letter / "X" / "Y" / "Z" / "x" / "y" / "z"
```

2.5.166 XLNullableWideString

The **XLNullableWideString** specifies a length-prefixed **Unicode** string that can additionally specify a string that is NULL. For convenience, references to characters in a string specified by this or a derived type use those Unicode characters.



cchCharacters (4 bytes): An unsigned integer that specifies the number of characters. This value MUST be 0xFFFFFFFF if a NULL string is specified.

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rgchData (variable): An array of Unicode characters that specifies the characters of the string. If a NULL string is specified, the size of this array in bytes MUST be 0. If a NULL string is not specified, the size of this array in bytes MUST equal the following formula:

size = **cchCharacters** * 2

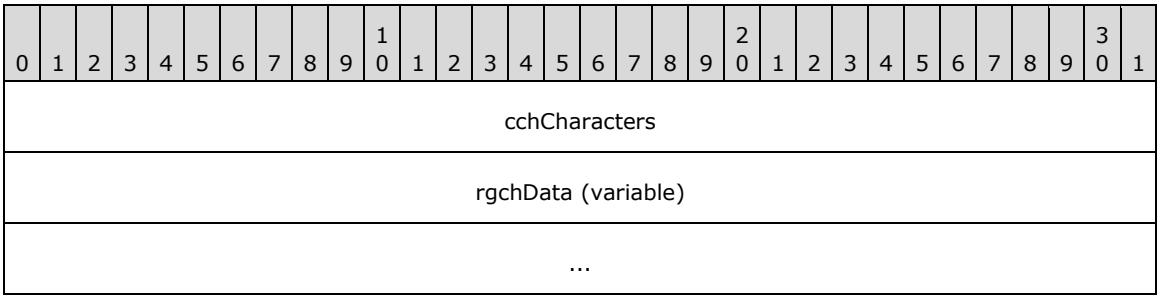
2.5.167 XLView

The **XLView** enumeration specifies the way information is displayed in a **sheet view**.

Name	Value	Meaning
XLVNORMAL	0x00000000	Information is displayed in **Normal view**.
XLVSHEETLAYOUTVIEW	0x00000001	Information is displayed in **Page Break Preview view**.
XLVPAGELAYOUTVIEW	0x00000002	Information is displayed in **Page Layout view**.

2.5.168 XLWideString

The **XLWideString** type specifies a length-prefixed **Unicode** string. For convenience, references to characters in a string specified by this or a derived type use those Unicode characters.



cchCharacters (4 bytes): An unsigned integer that specifies the number of characters. This value MUST be greater than or equal to 0x00000000 and less than 0xFFFFFFFF.

rgchData (variable): An array of Unicode characters that specifies the characters of the string. The size of this array in bytes MUST equal the following formula:

cchCharacters * 2

2.5.169 XmlDataType

An **XMLDataType** enumeration specifies a subset of **XML** data types, as specified by [W3C-XSD]. It MUST correspond to a value from the following table. Note that the following table uses *xs* as the prefix for the namespace "http://www.w3.org/2001/XMLSchema".

Name	Value	Meaning
MSOXIDTSTRING	0x00000001	Specifies the xs:string type.
MSOXIDTNORMALIZEDSTRING	0x00000002	Specifies the xs:normalizedString type.
MSOXIDTTOKEN	0x00000003	Specifies the xs:token type.
MSOXIDTBYTE	0x00000004	Specifies the xs:byte type.

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Name	Value	Meaning
MSOXIDTUNSIGNEDBYTE	0x00000005	Specifies the xs:unsignedByte type.
MSOXIDTBASE64BINARY	0x00000006	Specifies the xs:base64Binary type.
MSOXIDTHEXBINARY	0x00000007	Specifies the xs:hexBinary type.
MSOXIDTINTEGER	0x00000008	Specifies the xs:integer type.
MSOXIDTPOSITIVEINTEGER	0x00000009	Specifies the xs: positiveInteger type.
MSOXIDTNEGATIVEINTEGER	0x0000000A	Specifies the xs:negativeInteger type.
MSOXIDTNONPOSITIVEINTEGER	0x0000000B	Specifies the xs:nonPositiveInteger type.
MSOXIDTNONNEGATIVEINTEGER	0x0000000C	Specifies the xs:nonNegativeInteger type.
MSOXIDTINT	0x0000000D	Specifies the xs:int type.
MSOXIDTUNSIGNEDINT	0x0000000E	Specifies the xs:unsignedInt type.
MSOXIDTLONG	0x0000000F	Specifies the xs:long type.
MSOXIDTUNSIGNEDLONG	0x00000010	Specifies the xs:unsignedLong type.
MSOXIDTSHORT	0x00000011	Specifies the xs:short type.
MSOXIDTUNSIGNEDSHORT	0x00000012	Specifies the xs:unsignedShort type.
MSOXIDTDECIMAL	0x00000013	Specifies the xs:decimal type.
MSOXIDTFLOAT	0x00000014	Specifies the xs:float type.
MSOXIDTDOUBLE	0x00000015	Specifies the xs:double type.
MSOXIDTBOOLEAN	0x00000016	Specifies the xs:boolean type.
MSOXIDTTIME	0x00000017	Specifies the xs:time type.
MSOXIDTDATETIME	0x00000018	Specifies the xs:dateTime type.
MSOXIDTDURATION	0x00000019	Specifies the xs:duration type.
MSOXIDTDATE	0x0000001A	Specifies the xs:date type.
MSOXIDTMONTH	0x0000001B	Specifies the xs:gMonth type.
MSOXIDTYEAR	0x0000001C	Specifies the xs:gYear type.
MSOXIDTYEARMONTH	0x0000001D	Specifies the xs:gYearMonth type.
MSOXIDTDAY	0x0000001E	Specifies the xs:gDay type.
MSOXIDTMONTHDAY	0x0000001F	Specifies the xs:gMonthDay type.
MSOXIDTNAME	0x00000020	Specifies the xs:Name type.
MSOXIDTQNAME	0x00000021	Specifies the xs:QName type.
MSOXIDTNCNAME	0x00000022	Specifies the xs:NCName type.
MSOXIDTANYURI	0x00000023	Specifies the xs:anyURI type.
MSOXIDTLANGUAGE	0x00000024	Specifies the xs:language type.

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Name	Value	Meaning
MSOXIDTID	0x00000025	Specifies the xs:ID type.
MSOXIDTIDREF	0x00000026	Specifies the xs:IDREF type.
MSOXIDTIDREFS	0x00000027	Specifies the xs:IDREFS type.
MSOXIDTENTITY	0x00000028	Specifies the xs:ENTITY type.
MSOXIDTENTITIES	0x00000029	Specifies the xs:ENTITIES type.
MSOXIDTNOTATION	0x0000002A	Specifies the xs:NOTATION type.
MSOXIDTNMTOKEN	0x0000002B	Specifies the xs:NMTOKEN type.
MSOXIDTNMTOKENS	0x0000002C	Specifies the xs: NMTOKENS type.
MSOXIDTANYTYPE	0x0000002D	Specifies the xs:anyType type.

2.5.170 XmlMappedXpath

The **XmlMappedXpath** structure is an **XLWideString** (section 2.5.168) structure that represents the **XPath** to the element this **column (1)** is associated with. The length of this string MUST be greater than or equal to 1 and less than or equal to 31999.

An XPath specified by this structure MUST have the following properties.

- The XPath MUST be an absolute path.
- The XPath MUST return a simple content element or an attribute (as described in [XPATH])
- The XPath MUST NOT express an explicit XPath axes (as described in [XPATH]).

If an XPath specifies an XPath predicate (as described in [XPATH]), it MUST have the following properties.

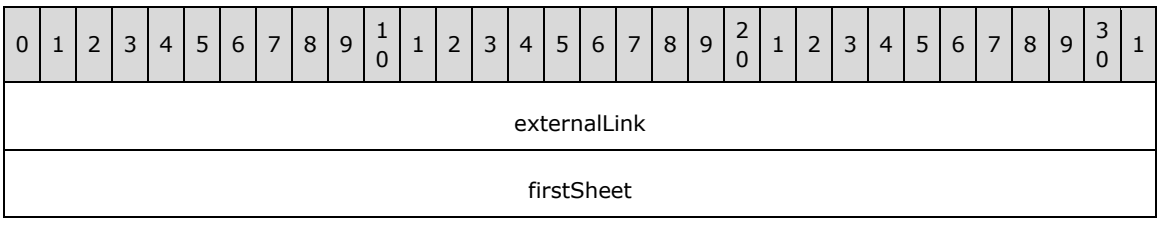
- The XPath predicate MUST immediately follow a simple content element name.
- The XPath predicate MUST contain a single **XPath expression** comparing an attribute identified by name (as described in [XPATH]) of the preceding element to a specific value.

2.5.171 Xnum

Xnum is a 64-bit binary **floating-point number** as defined in [IEEE754]. This value MUST NOT<70> be infinity, denormalized, not-a-number (NaN), or negative zero.

2.5.172 Xti

The **Xti** structure specifies a supporting link record and scope information for a Supporting Link (section 2.2.7.2).



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lastSheet

externalLink (4 bytes): An unsigned integer that specifies a zero-based index to a supporting link record in the collection of supporting link records (section 2.2.7.3) in the **Workbook** (section 2.1.7.61) part **ABNF**. This value MUST be less than the count of the supporting link records in that part.

firstSheet (4 bytes): A signed integer that specifies the scope of the supporting link. If **externalLink** refers to a **BrtSupAddin** (section 2.4.784), a **BrtSupSame** (section 2.4.797), or a **BrtSupBookSrc** (section 2.4.785) that specifies a DDE data source (section 2.2.7.4.2) or OLE data source (section 2.2.7.4.3), this field MUST be -2.

If **externalLink** refers to a **BrtSupSelf** (section 2.4.798) or a **BrtSupBookSrc** that specifies an external workbook link (section 2.2.7.4.1), this field MUST be a value from the following table.

Value	Meaning
-2	Workbook-level reference that applies to the entire **workbook**.
-1	Sheet-level reference. The first **sheet** in the reference cannot be found.
>= 0	Sheet-level reference. This value specifies the first sheet in the reference. If **externalLink** specifies a **BrtSupSelf** record, then this value specifies a zero-based index of a **BrtBundleSh** (section 2.4.311) record in the collection of all records directly following **BrtBeginBundleShs** (section 2.4.13) in the **Workbook** (section 2.1.7.61) **part**. If **externalLink** specifies a **BrtSupBookSrc** record, then this value specifies a zero-based index of an **XLWideString** in the array specified by the **sheetNames** field in the **BrtSupTabs** (section 2.4.799) record in the **External Link** (section 2.1.7.25) part ABNF external link part that is specified by the **BrtSupBookSrc** record. The sheet specified by the part specified by the **BrtBundleSh** record, or the sheet identified by the sheet name specified by the item in the **sheetNames** field, MUST be a worksheet or macro sheet.

lastSheet (4 bytes): A signed integer that specifies the scope of the supporting link. If **externalLink** refers to a **BrtSupAddin**, a **BrtSupSame**, or a **BrtSupBookSrc** that specifies a DDE Data Source or OLE Data Source, this field MUST be -2.

If **externalLink** refers to a **BrtSupSelf** or a **BrtSupBookSrc** that specifies an external workbook link, this field MUST be a value from the following table.

Value	Meaning
-2	Workbook-level reference. MUST be used if **firstSheet** equals -2.
-1	Sheet-level reference. The last sheet in the reference cannot be found.<71> MUST NOT be used if **firstSheet** equals -2.

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Value	Meaning
>= 0	Sheet-level reference. This value specifies the last sheet in the reference. MUST NOT be used if **firstSheet** equals -2. If **externalLink** specifies a **BrtSupSelf** record, then this value specifies a zero-based index of a **BrtBundleSh** record in the collection of all records directly following **BrtBeginBundleShs** in the **Workbook** (section 2.1.7.61) **part**. If **externalLink** specifies a **BrtSupBookSrc** record, then this value specifies a zero-based index of an **XLWideString** in the array specified by the **sheetNames** field in the **BrtSupTabs** record in the external link part that is specified by the **BrtSupBookSrc** record. The sheet specified by the part specified by the **BrtBundleSh** record, or the sheet identified by the sheet name specified by the item in the **sheetNames** field, MUST be a worksheet or macro sheet. This value MUST be greater than or equal to **firstSheet.**

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3 Structure Examples

This section contains examples of some of the most commonly used data structures in Excel Binary File Format files. The examples are meant to be a starting point for an implementer learning the file format. They are not meant to cover all records in the file format.

The following conventions are followed for all of the examples, unless noted otherwise:

- The order of the records, structures, and field within the example match their corresponding order in the file format.
- The examples begin with the first record relevant to the example and end with the last record relevant to the example. An example cannot be used as a complete and standalone MS-XLSB file.
- The examples are self-contained and contiguous; no records or structures are omitted in the middle of an example.
- Undefined and ignored fields are not included in the field explanations.
- Offsets for records and structures are omitted because these values can vary depending on how the files are created and what optional records applications choose to include in files.

3.1 Conditional Formatting

In this example, **cell** A2 has had **conditional formatting** applied such that the cell displays a light red background when the **cell value** is greater than or equal to 1.5 and less than or equal to 2.5, as illustrated in the following figure.

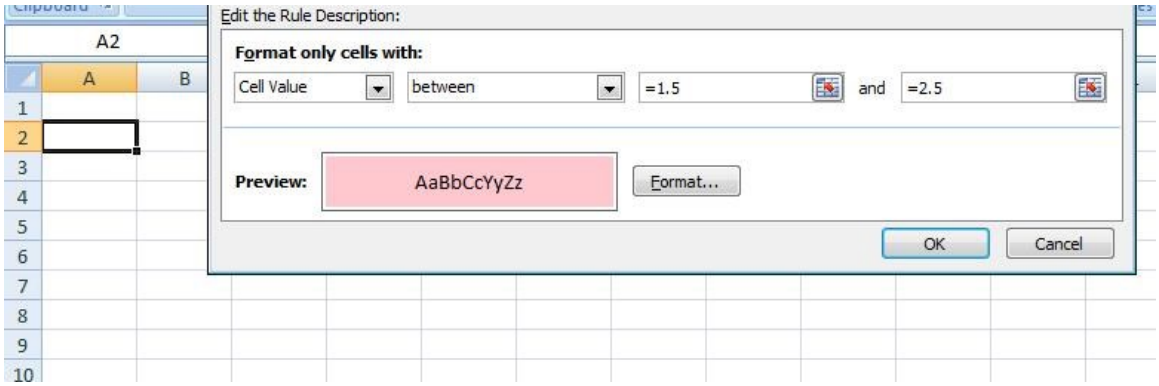

Figure 20: Conditional formatting within a sheet

The set of records in this example includes all records in the **Worksheet** part **ABNF** (section 2.1.7.62) appear between the **BrtBeginConditionalFormatting** (section 2.4.33) and **BrtEndConditionalFormatting** (section 2.4.385) records.

The **range** of cells to which the formatting is applied is defined in the **BrtBeginConditionalFormatting** record. Then, a **BrtBeginCFRule** (section 2.4.22) record specifies the properties of the conditional formatting rule; it contains a **BrtBeginCFRule** record that defines the conditional formatting rule.

3.1.1 Conditional Formatting: BrtBeginConditionalFormatting

In this example, **cell** A2 has had **conditional formatting** applied such that the cell displays a light red background when the **cell value** is greater than or equal to 1.5 and less than or equal to 2.5.

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This set of records in this example includes all records in the **Worksheet** part **ABNF** (section 2.1.7.62) appear between the **BrtBeginConditionalFormatting** (section 2.4.33) and **BrtEndConditionalFormatting** (section 2.4.385) records.

The **range** to which the formatting is applied is defined in the **BrtBeginConditionalFormatting** record. A **BrtBeginCFRule** (section 2.4.22) record specifies the rule properties of the conditional formatting. A **BrtDXF** (section 2.4.354) record specifies the cell formatting properties of the conditional formatting.

The first record in this example, **BrtBeginConditionalFormatting**, specifies the target range of cells to which the conditional formatting is applied, as specified in the following table.

Size	Structure	Value
001C	BrtBeginConditionalFormatting **- BrtBeginConditionalFormatting**	
0004	LONG **- ccf**	0x00000001
0004	BOOL **- fPivot**	0x00000000
0014	SQRFX **- sqrfx**	
0004	LONG **- crfx**	0x00000001
0010	UncheckedRgRfX **- rgrfx**	
0010	UncheckedRfX **- rfx[0]**	
0004	LONG **- rwFirst**	0x00000001
0004	LONG **- rwLast**	0x00000001
0004	LONG **- colFirst**	0x00000000
0004	LONG **- colLast**	0x00000000

Structure of BrtBeginConditionalFormatting

ccf: 0x00000001 specifies that there is one related **BrtBeginCFRule** record in the **BrtBeginConditionalFormatting** collection.

fPivot: 0x00000000 specifies that this conditional formatting rule applies to cells that are not part of a **PivotTable** (section 2.1.7.40).

sqrfx: An **UncheckedSqRfX** (section 2.5.155) that specifies a set of **UncheckedRfX** (section 2.5.153).

sqrfx.crfx: 0x00000001 specifies that there is one **UncheckedRfX** structure in **sqrfx.rgrfx**.

sqrfx.rgrfx: An array of **UncheckedRfX** structures.

sqrfx.rgrfx.rfx[0]: An **UncheckedRfX** structure that specifies the conditional formatting rule's target range.

sqrfx.rgrfx.rfx[0].rwFirst: 0x00000001 specifies that the first **row** in the target range is row 2.

sqrfx.rgrfx.rfx[0].rwLast: 0x00000001 specifies that the last row in the target range is row 2.

sqrfx.rgrfx.rfx[0].colFirst: 0x00000000 specifies that the first **column (1)** in the target range is column (1) A.

sqrfx.rgrfx.rfx[0].colLast: 0x00000000 specifies that the last column (1) in the target range is column (1) A.

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3.1.2 Conditional Formatting: BrtBeginCFRule

This record specifies a conditional formatting rule for the range defined in the **BrtBeginConditionalFormatting** (section 2.4.33) record, as specified in the following table.

Size	Structure	Value
0050	BrtBeginCFRule **- BrtBeginCFRule**	
0004	CFType **- iType**	0x00000001
0004	CFTemp **- iTemplate**	0x00000000
0004	DWORD **- dxfId**	0x00000000
0004	LONG **- iPri**	0x00000001
0004	LONG **- iParam**	0x00000001
0004	LONG **- reserved1**	0x00000000
0004	LONG **- reserved2**	0x00000000
1 bit	WORD **- reserved3**	0x0
1 bit	WORD **- fStopTrue**	0x0
1 bit	WORD **- fAbove**	0x0
1 bit	WORD **- fBottom**	0x0
1 bit	WORD **- fPercent**	0x0
11 bits	WORD **- reserved4**	0x000
0004	DWORD **- cbfmla1**	0x00000009
0004	DWORD **- cbfmla2**	0x00000009
0004	DWORD **- cbfmla3**	0x00000000
0004	XLNullableWideString **- strParam**	null string
0011	CFParsedFormula **- rgce1**	
0004	DWORD **- cce**	0x00000009
0009	Rgce **- rgce**	
0009	ptg **- rgce[0]**	
0009	PtgNum **- PtgNum**	
7 bits	BYTE **- ptg**	0x1F
1 bit	BYTE **- reserved0**	0x0
0008	Double **- value**	0x3FF8000000000000
0004	DWORD **- cb**	0x00000000
0011	CFParsedFormula **- rgce2**	
0004	DWORD **- cce**	0x00000009

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Size	Structure	Value
0009	Rgce **- rgce**	
0009	ptg **- rgce[0]**	
0009	PtgNum **- PtgNum**	
7 bits	BYTE **- ptg**	0x1F
1 bit	BYTE **- reserved0**	0x0
0008	Double **- value**	0x4004000000000000
0004	DWORD **- cb**	0x00000000

Structure of BrtBeginCFRule

iType: 0x00000001 corresponds to the **CFType** (section 2.5.17) value of CF_TYPE_CELLIS and specifies that cells will be formatted based on their values.

iTemplate: 0x00000000 corresponds to the **CFTemp** (section 2.5.15) value of CF_TEMPLATE_EXPR and is required because **iType** is equal to CF_TYPE_CELLIS. This value specifies that cells will be formatted based on their values.

dxfId: 0x00000000 specifies that the formatting style applied to the **cells** when the condition is true is specified in the first **BrtDXF** (section 2.4.354) record in the collection of records directly following **BrtBeginDXFs** (section 2.4.57) in the **Styles** (section 2.1.7.50) part **ABNF**.

iPri: 0x00000001 specifies that this rule is evaluated first when multiple **BrtBeginCFRule** (section 2.4.22) records are present.

iParam: 0x00000001 corresponds to the **CFOper** (section 2.5.14) value of CF_OPER_BN. This value specifies that this rule evaluates to True when the **cell value** is greater than or equal to the value specified by **rgce1** and less than or equal to the value specified by **rgce2**.

fStopTrue: 0x0 specifies that **conditional formatting** rules with larger **iPri** values than this **BrtBeginCFRule** will be evaluated whether the rule evaluates to True or False.

fAbove: 0x0 because **iTemplate** is not equal to CF_TEMPLATE_ABOVEAVERAGE or CF_TEMPLATE_EQUALABOVEAVERAGE.

fBottom: 0x0 because **iType** is not equal to CF_TYPE_FILTER.

fPercent: 0x0 because **iType** is not equal to CF_TYPE_FILTER.

cbfmla1: 0x00000009 specifies that there are 9 bytes in **rgce1.rgce**.

cbfmla2: 0x00000009 specifies that there are 9 bytes in **rgce2.rgce**.

cbfmla3: 0x00000000 specifies that **rgce3** does not exist.

strParam: A null string because the value of **iTemplate** is not CF_TEMPLATE_CONTAINSTEXT.

rgce1.cce: 0x00000009 specifies that there are 9 bytes in **rgce1.rgce**.

rgce1.rgce: A **CFParsedFormula** (section 2.5.97.6) that specifies the first formula (section 2.2.2) used in this conditional formatting rule.

rgce1.rgce.rgce[0]: An **Rgce** (section 2.5.97.88) that specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula.

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rgce1.rgce.rgce[0].PtgNum: An operand (section 2.5.97.88) that specifies a floating point value. This is the lower limit for the Between condition of this conditional formatting rule.

rgce1.rgce.rgce[0].PtgNum.ptg: 0x1F specifies that this parse token, as specified in section 2.2.2, is of type **PtgNum** (section 2.5.97.63).

rgce1.rgce.rgce[0].PtgNum.value: 0x3FF8000000000000 specifies a 64-bit binary **floating-point number** as defined in [IEEE754], representing a value of 1.5.

rgce1.cb: 0x00000000 specifies that the **rgcb** field does not exist.

rgce2.cce: 0x00000009 specifies that there are 9 bytes in **rgce2.rgce**.

rgce2.rgce.rgce[0]: An **Rgce** (section 2.5.97.88) that specifies the sequence of **Ptg** structures for the formula.

rgce2.rgce.rgce[0].PtgNum: An operand (section 2.5.97.88) that specifies a floating point value. This is the upper limit for the Between condition of this conditional formatting rule.

rgce2.rgce.rgce[0].PtgNum.ptg: 0x1F specifies that this parse token is of type **PtgNum**.

rgce2.rgce.rgce[0].PtgNum.value: 0x4004000000000000 specifies a 64-bit binary floating-point number as defined in [IEEE754], representing a value of 2.5.

rgce2.cb: 0x00000000 specifies that the **rgcb** field does not exist.

3.1.3 Conditional Formatting: BrtEndCFRule

This record indicates the end of the **conditional formatting** rule, as specified in the following table.

Size	Structure
0000	BrtEndCFRule **- BrtEndCFRule**

Structure of BrtEndCFRule

3.1.4 Conditional Formatting: BrtEndConditionalFormatting

This record indicates the end of **conditional formatting** information for a **range**, as specified in the following table.

Size	Structure
0000	BrtEndConditionalFormatting **- BrtEndConditionalFormatting**

Structure of BrtEndConditionalFormatting

3.1.5 Conditional Formatting: BrtDXF

The next record in this example is the BrtDXF referenced by the **dxfId** field of the BrtBeginCFRule record, which specifies the formatting that will be applied to the range specified by BrtBeginConditionalFormatting when the condition evaluates to True. This BrtDXF record is specified in the following table.

Size	Structure	Value
0012	BrtDXF **- BrtDxf**	
15 bits	WORD **- unused**	0x0000

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Size	Structure	Value
1 bit	WORD **- fNewBorder**	0x1
0010	XFProps **- xfprops**	
0002	USHORT **- reserved**	0x0000
0002	USHORT **- cprops**	0x0001
000C	XfPropArray **- xfPropArray**	
000C	XFProp **- xfProp[0]**	
0002	USHORT **- xfpropType**	0x0002
0002	USHORT **- cb**	0x000C
0008	XfPropDataBlob **- xfPropDataBlob**	
0008	XFPropColor **- XfPropColor**	
1 bit	BYTE **- fValidRGBA**	0x1
7 bits	BYTE **- xclrType**	0x02
0001	XFPropColorICV **- icv**	
0002	SHORT **- nTintShade**	0x0000
0004	LongRGBA **- dwRgba**	
0001	BYTE **- red**	0xFF
0001	BYTE **- green**	0xC7
0001	BYTE **- blue**	0xCE
0001	BYTE **- alpha**	0xFF

Structure of BrtDxf

fNewBorder: 0x1 specifies that internal **border formatting** can be used in the XFProps specified in **xfprops**.

xfprops: An XFProps structure that specifies cell formatting properties.

xfprops.cprops: 0x0001 specifies that there is one XFProp structure in **xfprops.xfPropArray**.

xfprops.xfPropArray: An array of XFProp structures. Each array element specifies a cell formatting property.

xfprops.xfPropArray.xfProp[0]: An XFProp structure that specifies a cell formatting property.

xfprops.xfPropArray.xfProp[0].xfpropType: 0x0002 specifies that this cell formatting property specifies a cell **background color**.

xfprops.xfPropArray.xfProp[0].cb: 0x000C specifies that the size of this XFProp structure is 12 bytes.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob: A variable field that specifies the cell formatting property data.

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xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor: An XFPropColor structure that specifies the background color that will be applied to the **cell** if the **conditional formatting** rule evaluates to True.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.fValidRGBA: 0x1 specifies that the **xclrType**, **icv** and **nTintShade** fields have been used to set the **dwRgba** field.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.xclrType: 0x02 specifies that the color information is stored as **RGBA**.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.icv: Undefined and ignored because **xclrType** is 0x02.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.nTintShade: 0x0000 specifies that the color defined in **dwRgba** will be used without being lightened or darkened.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.dwRgba: A LongRGBA that specifies a light red background color.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.dwRgba.red: 0xFF specifies the relative intensity of the red component of this color.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.dwRgba.green: 0xC7 specifies the relative intensity of the green component of this color.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.dwRgba.blue: 0xCE specifies the relative intensity of the blue component of this color.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.dwRgba.alpha: 0xFF specifies the alpha component of this color.

3.2 Defined Name

This example shows a **defined name** that refers to the absolute **cell reference** E4 on the second **sheet** of the file, as illustrated in the following figure. The defined name is specified by a **BrtName** (section 2.4.705) record.

This example includes all of the records that define supporting links (section 2.2.7.2) for the defined name. Together, these records specify which **workbook** and which sheet the defined name is referring to. Two records are stored between the **BrtBeginExternals** (section 2.4.81) and **BrtEndExternals** (section 2.4.430) records: **BrtSupSelf** (section 2.4.798) and **BrtExternSheet** (section 2.4.659).

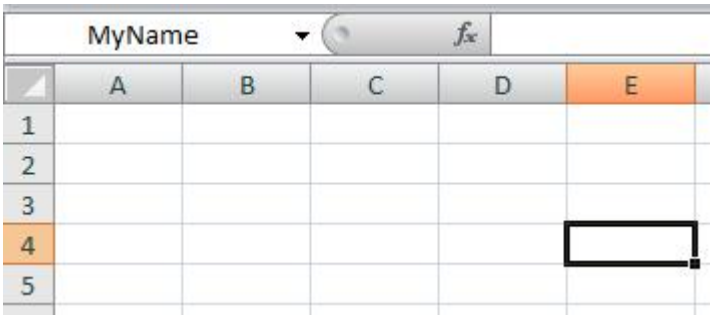

Figure 21: Defined name within a sheet

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3.2.1 Defined Name: BrtName

The first record in this example, **BrtName** (section 2.4.705), defines the properties of the **defined name**, as specified in the following table.

Size	Structure	Value
002E	BrtName **- BrtName**	
1 bit	DWORD **- fHidden**	0x0
1 bit	DWORD **- fFunc**	0x0
1 bit	DWORD **- fOB**	0x0
1 bit	DWORD **- fProc**	0x0
1 bit	DWORD **- fCalcExp**	0x0
1 bit	DWORD **- fBuiltin**	0x0
9 bits	DWORD **- fgrp**	0x000
1 bit	DWORD **- fPublished**	0x0
1 bit	DWORD **- fWorkbookParam**	0x0
1 bit	DWORD **- unused**	0x0
14 bits	DWORD **- reserved**	0x0000
0001	BYTE **- chKey**	0x00
0004	DWORD **- itab**	0xFFFFFFFF
0010	XLNameWideString **- name**	MyName
0011	NameParsedFormula **- formula**	
0004	DWORD **- cce**	0x00000009
0009	Rgce **- rgce**	
0009	PtgRef3d **- PtgRef3d**	
0001	BYTE **- ptg**	0x1A
0001	PtgDataType **- type**	0x01
0001	BYTE **- reserved**	0x00
0002	USHORT **- ixti**	0x0000
0006	RgceLoc **- loc**	
0004	UncheckedRw **- row**	0x00000003
0002	ColRelShort **- column**	
14 bits	USHORT **- col**	0x0004
1 bit	DWORD **- fColRel**	0x0
1 bit	DWORD **- fRwRel**	0x0

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Size	Structure	Value
0004	DWORD **- cb**	0x00000000
0004	XLNullableWideString **- comment**	

Structure of BrtName

fHidden: 0x0 specifies that the defined name is not **hidden**.

fFunc: 0x0 specifies that the defined name does not represent an **XLM macro**.

fOB: 0x0 specifies that the defined name does not represent a **VBA** macro.

fProc: 0x0 specifies that the defined name does not represent a macro.

fCalcExp: 0x0 specifies that the **formula.rgce** field does not contain a call to a **function** that can return an array.

fBuiltin: 0x0 specifies that the defined name does not represent a **built-in name**.

fPublished: 0x0 specifies that the defined name was not **published**.

fWorkbookParam: 0x0 specifies that the defined name is not a **workbook** parameter.

chKey: 0x00 specifies that there is no shortcut key for the macro represented by the defined name. This is equal to 0 because **fProc** is 0.

itab: 0xFFFFFFFF specifies that the scope of the defined name is the entire workbook.

name: "MyName" specifies the name of the defined name.

formula: A **NameParsedFormula** (section 2.5.97.12) that contains the formula (section 2.2.2) that specifies the **sheet** and **cell range** of the workbook associated with the name.

formula.cce: 0x00000009 specifies that there are 9 bytes in **formula.rgce**.

formula.rgce: An **Rgce** (section 2.5.97.88) that contains the **Ptg** (section 2.5.97.16) structures that make up the formula.

formula.rgce.PtgRef3d: A **Ptg** in the formula.

formula.rgce.PtgRef3d.ptg: 0x1A specifies that this **Ptg** is of type **PtgRef3d** (section 2.5.97.69).

formula.rgce.PtgRef3d.type: 0x01 specifies that this **PtgRef3d** specifies a reference to a range of cells.

formula.rgce.PtgRef3d.ixti: 0x0000 specifies that this **PtgRef3d** refers to the first **Xti** (section 2.5.172) in the **BrtExternSheet** (section 2.4.659) record shown in this example.

formula.rgce.PtgRef3d.loc: A **RgceLoc** (section 2.5.97.91) that specifies the coordinates of the referenced cell.

formula.rgce.PtgRef3d.loc.row: 0x00000003 specifies that the defined name refers to **row** 4 of the **worksheet**.

formula.rgce.PtgRef3d.loc.column: Specifies the **column (1)** and that the row and column (1) references are **absolute references**.

formula.rgce.PtgRef3d.loc.column.col: 0x0004 specifies that the defined name refers to column (1) E of the worksheet.

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formula.rgce.PtgRef3d.loc.column.fColRel: 0x0 specifies that the column (1) is an absolute reference.

formula.rgce.PtgRef3d.loc.column.fRwRel: 0x0 specifies that the row is an absolute reference.

comment: An **XLNullableWideString** (section 2.5.166) that specifies a NULL string, which means that there is no comment.

3.2.2 Defined Name: BrtBeginExternals

The next record in this example, **BrtBeginExternals** (section 2.4.81), specifies the beginning of a collection of supporting links (section 2.2.7.2), as specified in the following table.

Size	Structure
0000	BrtBeginExternals **- BrtBeginExternals**

Structure of BrtBeginExternals

3.2.3 Defined Name: BrtSupSelf

The next record in this example, a **BrtSupSelf** (section 2.4.798) record, specifies that this supporting link (section 2.2.7.2) points back into the same **workbook**, as specified in the following table.

Size	Structure
0000	BrtSupSelf **- BrtSupSelf**

Structure of BrtSupSelf

3.2.4 Defined Name: BrtExternSheet

The next record in this example, **BrtExternSheet** (section 2.4.659), contains the set of supporting links (section 2.2.7.2) and specifies the scope of those links, as specified in the following table.

Size	Structure	Value
0010	BrtExternSheet **- BrtExternSheet**	
0004	DWORD **- cXti**	0x00000001
000C	RgXti **- rgXti**	
000C	Xti **- xti[0]**	
0004	DWORD **- externalLink**	0x00000000
0004	LONG **- firstSheet**	0x00000001
0004	LONG **- lastSheet**	0x00000001

Structure of BrtExternSheet

cXti: 0x00000001 specifies that there is 1 **Xti** (section 2.5.172) record in the **rgXti** field.

rgXti.xti[0].externalLink: 0x00000000 specifies that this **Xti** record refers to the first supporting link record (section 2.2.7.3) in the collection of supporting link records (section 2.2.7.3), which is the **BrtSupSelf** (section 2.4.798) record as specified earlier.

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rgXti.xti[0].firstSheet: 0x00000001 specifies that the first **sheet** referenced by the **defined name** is the second sheet in the **workbook** (Sheet2). The related **BrtBundleSh** (section 2.4.311) record has been omitted for brevity.

rgXti.xti[0].lastSheet: 0x00000001 specifies that the last sheet referenced by the defined name is the second sheet in the workbook (Sheet2).

3.2.5 Defined Name: BrtEndExternals

The last record in this example, **BrtEndExternals** (section 2.4.430), specifies the end of a collection of supporting links (section 2.2.7.2), as specified in the following table.

Size	Structure
0000	BrtEndExternals **- BrtEndExternals**

Structure of BrtEndExternals

3.3 Table

This example is a **workbook** where the range C4:E7 contains values and is formatted as a **table**. The **column (1)** "Sales Tax" is a **calculated column** that contains the formula (section 2.2.2) "=Table1[[#This Row],[Price]]*.08". The following figure shows a possible implementation of the table in this example.

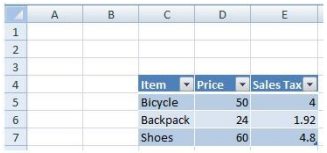

Figure 22: Table within a sheet

This example specifies a table as a collection of records between **BrtListPart** (section 2.4.694) and **BrtEndList** (section 2.4.448) records in the **Worksheet** part **ABNF** (section 2.1.7.62) The table properties are specified with the **BrtBeginList** (section 2.4.99), **BrtBeginListCols** (section 2.4.101), **BrtBeginListCol** (section 2.4.100), **BrtEndListCol** (section 2.4.449), **BrtEndListCols** (section 2.4.450), **BrtListCCFmla** (section 2.4.693), **BrtTableStyleClient** (section 2.4.818) records in the **Table** (section 2.1.7.51) part ABNF. The table **AutoFilter** settings are specified with **BrtBeginAFilter** (section 2.4.8) and **BrtEndAFilter** (section 2.4.360) in the **Worksheet** part.

3.3.1 Table: BrtListPart

The first record in this example is the **BrtListPart** (section 2.4.694) record, which appears in the **Worksheet** part **ABNF** (section 2.1.7.62) and indicates the **Table** (section 2.1.7.51) part ABNF associated with the **table**. The example **BrtListPart** record is specified in the following table.

Size	Structure	Value
000C	BrtListPart **- BrtListPart**	
000C	RelID **- stRelID**	rId3

Structure of BrtListPart

stRelID: "rId3" specifies the **RelID** (section 2.5.114) listed in the relationship (section 2.1.3) part (section 2.1.2) for this **sheet**. This **RelID** identifies the relationship (section 2.1.3) element that specifies the path to the **Table** (section 2.1.7.51) part ABNF within the **package** (section 2.1.1).

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3.3.2 Table: BrtBeginList

The next record in this example, **BrtBeginList** (section 2.4.99), specifies the **table** properties and specifies the beginning of the collection of records that specify this table. The example **BrtBeginList** record is specified in the following table.

Size	Structure	Value
0064	BrtBeginList **- BrtBeginList**	
0010	RfX **- rfxList**	
0004	LONG **- rwFirst**	0x00000003
0004	LONG **- rwLast**	0x00000006
0004	LONG **- colFirst**	0x00000002
0004	LONG **- colLast**	0x00000004
0004	ListType **- lt**	0x00000000
0004	DWORD **- idList**	0x00000001
0004	DWORD **- crwHeader**	0x00000001
0004	DWORD **- crwTotals**	0x00000000
1 bit	DWORD **- fShownTotalRow**	0x0
1 bit	DWORD **- fSingleCell**	0x0
1 bit	DWORD **- fForceInsertToBeVisible**	0x0
1 bit	DWORD **- fInsertRowInsCells**	0x0
1 bit	DWORD **- fPublished**	0x0
27 bits	DWORD **- reserved**	0x0000000
0004	DWORD **- nDxfHeader**	0xFFFFFFFF
0004	DWORD **- nDxfData**	0xFFFFFFFF
0004	DWORD **- nDxfAgg**	0xFFFFFFFF
0004	DWORD **- nDxfBorder**	0xFFFFFFFF
0004	DWORD **- nDxfHeaderBorder**	0xFFFFFFFF
0004	DWORD **- nDxfAggBorder**	0xFFFFFFFF
0004	DWORD **- dwConnID**	0x00000000
0004	XLNullableWideString **- stName**	null string
0010	XLNullableWideString **- stDisplayName**	Table1
0004	XLNullableWideString **- stComment**	empty string
0004	CellStyleName **- stStyleHeader**	null string
0004	CellStyleName **- stStyleData**	null string

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Size	Structure	Value
0004	CellStyleName **- stStyleAgg**	null string

Structure of BrtBeginList

rfxList: This specifies the **range** of **cells** that the table occupies. This refers to the range C4:E7.

rfxList.rwFirst: 0x00000003 specifies that the first **row** of the range is 4.

rfxList.rwLast: 0x00000006 specifies that the last row of the range is 7.

rfxList.colFirst: 0x00000002 specifies that the first **column (1)** of the range is C.

rfxList.colLast: 0x00000004 specifies that the last column (1) of the range is E.

lt: 0x00000000 specifies that the table is a standard table.

idList: 0x00000001 specifies that the numeric identifier of the table is 1.

crwHeader: 0x00000001 specifies that the **header row** is displayed.

crwTotals: 0x00000000 specifies that the **total row** is **hidden**.

fShownTotalRow: 0x0 specifies that the table total row has never been displayed for this table.

fSingleCell: 0x0 specifies that the table is not a single cell table.

fForceInsertToBeVisible: 0x0 specifies that the table **insert row** is not displayed.

fInsertRowInsCells: 0x0 specifies that cells in the **sheet** were not automatically inserted when the table insert row was displayed for this table.

fPublished: 0x0 specifies that the table is not **published**.

nDxfHeader: 0xFFFFFFFF specifies that differential formatting (section 2.2.6.2) is not applied to the **table header** row.

nDxfData: 0xFFFFFFFF specifies that differential formatting is not applied to the table **data region**.

nDxfAgg: 0xFFFFFFFF specifies that differential formatting is not applied to the table total row.

nDxfBorder: 0xFFFFFFFF specifies that differential formatting is not applied to the **borders** of the table data region.

nDxfHeaderBorder: 0xFFFFFFFF specifies that differential formatting is not applied to the borders of the table header row.

nDxfAggBorder: 0xFFFFFFFF specifies that differential formatting is not applied to the borders of the table total row.

dwConnID: 0x00000000 specifies that there is no external connection (section 2.2.8) for this table. This value is required in this field because the **lt** field is not equal to LTXML.

stName: NULL string specifies that the **stDisplayName** field is the name used for programmatic purposes.

stDisplayName: "Table1" specifies the string identifier of the table. This identifier is used for both programmatic purposes and for the displayed string in formulas (section 2.2.2) because **stName** is NULL.

stComment: The empty string specifies that there is no comment.

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stStyleHeader: NULL specifies that no cell style (section 2.2.6.1.2) is applied to the table header row.

stStyleData: NULL specifies that no cell style is applied to the table data region.

stStyleAgg: NULL specifies that no cell style is applied table total row.

3.3.3 Table: BrtBeginAFilter

The next record in this example, **BrtBeginAFilter** (section 2.4.8), specifies the **range** of cells the **AutoFilter** applies to and specifies the beginning of the collection of records that specifies the AutoFilter for the **table**. The example **BrtBeginAFilter** (section 2.4.8) record is specified in the following table.

Size	Structure	Value
0010	BrtBeginAFilter **- BrtBeginAfilter**	
0010	UncheckedRfX **- rfx**	
0004	LONG **- rwFirst**	0x00000003
0004	LONG **- rwLast**	0x00000006
0004	LONG **- colFirst**	0x00000002
0004	LONG **- colLast**	0x00000004

Structure of BrtBeginAfilter

rfx: Specifies the range of cells the AutoFilter applies to. This range, which is the same as the range of the table, is C4:E7.

rfx.rwFirst: 0x00000003 specifies the first **row** of the range is 4.

rfx.rwLast: 0x00000006 specifies the last row of the range is 7.

rfx.colFirst: 0x00000002 specifies the first **column (1)** of the range is C.

rfx.colLast: 0x00000004 specifies the last column (1) of the range is E.

3.3.4 Table: BrtEndAFilter

The next record in this example, **BrtEndAFilter** (section 2.4.360), specifies the end of the collection of records that specify the **AutoFilter** for the **table**. No filtering is applied because there are zero records between the preceding **BrtBeginAFilter** record and this record. The example **BrtEndAFilter** record is specified in the following table.

Size	Structure
0000	BrtEndAFilter **- BrtEndAfilter**

Structure of BrtEndAfilter

3.3.5 Table: BrtBeginListCols

The next record in this example, **BrtBeginListCols** (section 2.4.101), specifies the number of **table columns (1)** and specifies the beginning of the collection of records that specifies the set of table columns (1) for this table. The example **BrtBeginListCols** record is specified in the following table.

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Size	Structure	Value
0004	BrtBeginListCols **- BrtBeginListCols**	
0004	ULONG **- nCols**	0x00000003

Structure of BrtBeginListCols

nCols: 0x00000003 specifies that the table has three columns (1).

3.3.6 Table: BrtBeginListCol 1

The next record in this example, **BrtBeginListCol** (section 2.4.100)**,** specifies the properties of the first **column (1)** in the **table**, which begins with the header "Item" and specifies the beginning of a collection of records that specify additional properties of the table column (1). The example **BrtBeginListCol** record is specified in the following table.

Size	Structure	Value
0038	BrtBeginListCol **- BrtBeginListCol**	
0004	DWORD **- idField**	0x00000001
0004	ListTotalRowFunction **- ilta**	0x00000000
0004	DWORD **- nDxfHdr**	0xFFFFFFFF
0004	DWORD **- nDxfInsertRow**	0xFFFFFFFF
0004	DWORD **- nDxfAgg**	0xFFFFFFFF
0004	DWORD **- idqsif**	0x00000000
0004	XLNullableWideString **- stName**	null string
000C	XLNullableWideString **- stCaption**	Item
0004	XLNullableWideString **- stTotal**	null string
0004	CellStyleName **- stStyleHeader**	null string
0004	CellStyleName **- stStyleInsertRow**	null string
0004	CellStyleName **- stStyleAgg**	null string

Structure of BrtBeginListCol

idField: 0x00000001 specifies the numeric identifier of the table column (1).

ilta: 0x00000000 specifies that no operation is performed in the **total row aggregation function** for this table column (1).

nDxfHdr: 0xFFFFFFFF specifies that no differential formatting (section 2.2.6.2) is applied to the **header row**. This value is required because the **crwHeader** field of the preceding **BrtBeginList** (section 2.4.99) record is equal to 1.

nDxfInsertRow: 0xFFFFFFFF specifies that no differential formatting is applied to the table **insert row** of this table column (1).

nDxfAgg: 0xFFFFFFFF specifies that no differential formatting is applied to the table total row of this table column (1).

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idqsif: 0x00000000 specifies that there is no query table column (1) associated with this column (1). This value is required because the **lt** field of the preceding **BrtBeginList** record is not equal to LTEXTDATA.

stName: NULL string because the **lt** field of the preceding **BrtBeginList** record is equal to LTRANGE.

stCaption: "Item" specifies the caption of this table column (1) displayed in the **sheet**.

stTotal: NULL specifies that no text is displayed in the table total row of this table column (1).

stStyleHeader: NULL string because the **crwHeader** field of the preceding **BrtBeginList** record is equal to 1.

stStyleInsertRow: NULL specifies that no cell style (section 2.2.6.1.2) is applied to the table insert row of this table column (1).

stStyleAgg: NULL specifies that no cell style is applied to the total row of this table column (1).

3.3.7 Table: BrtEndListCol 1

The next record in this example, **BrtEndListCol** (section 2.4.449), specifies the end of the collection of records that specifies the first **table column (1)**. The table column (1) does not have a **calculated column** formula (section 2.2.2), a **total row** formula, or any **XML map** information because this collection is empty. The example **BrtEndListCol** record is specified in the following table.

Size	Structure
0000	BrtEndListCol **- BrtEndListCol**

Structure of BrtEndListCol

3.3.8 Table: BrtBeginListCol 2

The next record in this example, **BrtBeginListCol** (section 2.4.100), specifies the second **column (1)** in the **table**. This is the second column (1) of the example table, and it has the header "Price". The example **BrtBeginListCol** record is specified in the following table.

Size	Structure	Value
003A	BrtBeginListCol **- BrtBeginListCol**	
0004	DWORD **- idField**	0x00000002
0004	ListTotalRowFunction **- ilta**	0x00000000
0004	DWORD **- nDxfHdr**	0xFFFFFFFF
0004	DWORD **- nDxfInsertRow**	0xFFFFFFFF
0004	DWORD **- nDxfAgg**	0xFFFFFFFF
0004	DWORD **- idqsif**	0x00000000
0004	XLNullableWideString **- stName**	null string
000E	XLNullableWideString **- stCaption**	Price
0004	XLNullableWideString **- stTotal**	null string
0004	CellStyleName **- stStyleHeader**	null string

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Size	Structure	Value
0004	CellStyleName **- stStyleInsertRow**	null string
0004	CellStyleName **- stStyleAgg**	null string

Structure of BrtBeginListCol

Fields in this record that are explained in previous records in this example are omitted for brevity.

idField: 0x00000002 specifies the numeric identifier of the table column (1).

stCaption: "Price" specifies the caption of this table column (1) displayed in the **sheet**.

3.3.9 Table: BrtEndListCol 2

The next record in this example, **BrtEndListCol** (section 2.4.449), specifies the end of the collection of records that specifies the second **table column (1)**. The second table column (1) does not have a **calculated column** formula (section 2.2.2), a **total row** formula, or any **XML map** information because this collection is empty. The example **BrtEndListCol** record is specified in the following table.

Size	Structure
0000	BrtEndListCol **- BrtEndListCol**

Structure of BrtEndListCol

3.3.10 Table: BrtBeginListCol 3

The next record in this example, **BrtBeginListCol** (section 2.4.100), specifies the properties of the third **table column (1)** and specifies the beginning of the collection of records that specifies additional properties of that table column (1). The third column (1) of the table has the header "Sales Tax" and contains a **calculated column**. The example **BrtBeginListCol** record is specified in the following table.

Size	Structure	Value
0042	BrtBeginListCol **- BrtBeginListCol**	
0004	DWORD **- idField**	0x00000003
0004	ListTotalRowFunction **- ilta**	0x00000000
0004	DWORD **- nDxfHdr**	0xFFFFFFFF
0004	DWORD **- nDxfInsertRow**	0x00000000
0004	DWORD **- nDxfAgg**	0xFFFFFFFF
0004	DWORD **- idqsif**	0x00000000
0004	XLNullableWideString **- stName**	null string
0016	XLNullableWideString **- stCaption**	Sales Tax
0004	XLNullableWideString **- stTotal**	null string
0004	CellStyleName **- stStyleHeader**	null string
0004	CellStyleName **- stStyleInsertRow**	null string

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Size	Structure	Value
0004	CellStyleName **- stStyleAgg**	null string

Structure of BrtBeginListCol

Fields in this record that are explained in previous records in this example are omitted for brevity.

idField: 0x00000003 specifies the numeric identifier of the table column (1).

stCaption: "Sales Tax" specifies the caption of the table column (1) displayed in the **sheet**.

3.3.11 Table: BrtListCCFmla

The next record in this example, the **BrtListCCFmla** (section 2.4.693) record between the third **BrtBeginListCol** (section 2.4.100) and the third **BrtEndListCol** (section 2.4.449), specifies the **calculated column** formula (section 2.2.2) for the third **table column (1)**. The example **BrtListCCFmla** record is specified in the following table.

Size	Structure	Value
0021	BrtListCCFmla **- BrtListCcFmla**	
1 bit	BYTE **- reserved1**	0x0
1 bit	BYTE **- fArray**	0x0
6 bits	BYTE **- reserved2**	0x00
0020	ListParsedFormula **- formula**	
0004	DWORD **- cce**	0x00000018
0018	Rgce **- rgce**	
000E	Ptg **- Ptg[0]**	
000E	PtgList **- PtgList**	
7 bits	BYTE **- ptg**	0x18
1 bit	BYTE **- reserved1**	0x0
8 bits	BYTE **- eptg**	0x19
0002	USHORT **- ixti**	0x0000
2 bits	BYTE **- columns**	0x1
5 bits	PtgRowType **- rowType**	0x10
1 bit	BYTE **- squareBracketSpace**	0x0
1 bit	BYTE **- commaSpace**	0x0
1 bit	BYTE **- unused**	0x1
2 bits	BYTE **- type**	0x1
1 bit	BYTE **- invalid**	0x0
1 bit	BYTE **- nonresident**	0x0

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Size	Structure	Value
2 bits	BYTE **- reserved2**	0x0
0004	DWORD **- listIndex**	0x00000001
0002	WORD **- colFirst**	0x0001
0002	WORD **- colLast**	0x0001
0009	Ptg **- Ptg[1]**	
0009	PtgNum **- PtgNum**	
7 bits	BYTE **- ptg**	0x1F
1 bit	BYTE **- reserved0**	0x0
0008	Double **- value**	0x3FB47AE147AE147B
0001	Ptg **- Ptg[2]**	
0001	PtgMul **- PtgMul**	
7 bits	BYTE **- ptg**	0x05
1 bit	BYTE **- reserved0**	0x0
0004	DWORD **- cb**	0x00000000

Structure of BrtListCcFmla

fArray: 0x0 specifies that the calculated column formula is not an array formula.

formula: Specifies the calculated column formula associated with the table column (1). This formula is "=Table1[[#This Row],[Price]]*.08". The **Ptg** (section 2.5.97.16) structures that specify this formula conform to the **ABNF** grammar in **ListParsedFormula** (section 2.5.97.11).

formula.cce: 0x00000018 specifies that the **rgce** field is 18 bytes long.

formula.rgce: Specifies the sequence of **Ptg** structures for the formula "=Table1[[#This Row],[Price]]*.08".

formula.rgce.Ptg[0].PtgList: Specifies that the first parse token in the formula is a **PtgList** (section 2.5.97.52) operand token (section 2.2.2.2) that specifies a rectangular **range** of **cells** in a table that corresponds to the reference "Table1[[#This Row],[Price]]" in the formula.

formula.rgce.Ptg[0].PtgList.ptg: 0x18 is required in this field.

formula.rgce.Ptg[0].PtgList.eptg: 0x19 is required in this field.

formula.rgce.Ptg[0].PtgList.ixti: 0x0000 specifies that the first **Xti** (section 2.5.172) structure in the **rgXti** field of the **BrtExternSheet** (section 2.4.659) record that specifies the location of the table. This location is the first **sheet** of this **workbook**. This record is omitted from this example for brevity. For an example of the **BrtExternSheet** record, see the External References (section 3.5) or Defined Name (section 2.2.7.4.1.1) examples.

formula.rgce.Ptg[0].PtgList.columns: 0x1 specifies that the rectangular area is one column (1) wide.

formula.rgce.Ptg[0].PtgList.rowType: 0x10 specifies that the **rows** of the referenced area consist of the current row.

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formula.rgce.Ptg[0].PtgList.squareBracketSpace: 0x0 specifies not to display spacing around the intra-table portion of the string representation of this formula element.

formula.rgce.Ptg[0].PtgList.commaSpace: 0x0 specifies not to display spacing between column (1) references in the string representation of this formula element.

formula.rgce.Ptg[0].PtgList.type: 0x1 specifies that this structure contains a value.

formula.rgce.Ptg[0].PtgList.invalid: 0x0 specifies that this structure specifies a valid area.

formula.rgce.Ptg[0].PtgList.nonresident: 0x0 specifies that the table is in the same workbook as the **Rgce** (section 2.5.97.88) structure.

formula.rgce.Ptg[0].PtgList.listIndex: 0x00000001 specifies the numeric identifier of the referenced table.

formula.rgce.Ptg[0].PtgList.colFirst: 0x0001 specifies that the first column (1) of the referenced area of the table is the second column (1) of the table.

formula.rgce.Ptg[0].PtgList.colLast: 0x0001 specifies the that last column (1) of the referenced area of the table is the second column (1) of the table.

formula.rgce.Ptg[1].PtgNum: Specifies that the second parse token in the formula is a **PtgNum** (section 2.5.97.63) operand token that specifies the floating point value (0.08) in the formula.

formula.rgce.Ptg[1].PtgNum.ptg: 0x1F is required in this field.

formula.rgce.Ptg[1].PtgNum.value: 0x3FB47AE147AE147B specifies the **Xnum** (section 2.5.171) representation of the value 0.08.

formula.rgce.Ptg[2].PtgMul: Specifies that the third parse token in the formula is the **PtgMul** (section 2.5.97.59) binary-value-operator (section 2.5.97.88). This **Ptg** specifies that the first and second expressions in the binary-value-expression (section 2.5.97.88), which in this formula correspond to the PtgList and PtgNum operator tokens, are multiplied together.

formula.rgce.Ptg[2].PtgMul.ptg: 0x05 is required in this field.

formula.cb: 0x00000000 specifies the length of **rgcb** in bytes.

3.3.12 Table: BrtEndListCol 3

The next record in this example, **BrtEndListCol** (section 2.4.449), specifies the end of the collection of records that specifies the third **table column (1)**. The second table column (1) does not have a **total row** formula (section 2.2.2), or any **XML map** information, because this collection only contained a **BrtListCCFmla** (section 2.4.693). The example **BrtEndListCol** record is specified in the following table.

Size	Structure
0000	BrtEndListCol **- BrtEndListCol**

Structure of BrtEndListCol

3.3.13 Table: BrtEndListCols

The next record in this example, **BrtEndListCols** (section 2.4.450), specifies the end of the collection of records that specifies the **table columns (1)** for this table. The example **BrtEndListCols** record is specified in the following table.

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Size	Structure
0000	BrtEndListCols **- BrtEndListCols**

Structure of BrtEndListCols

3.3.14 Table: BrtTableStyleClient

The next record in this example, **BrtTableStyleClient** (section 2.4.818), specifies information about the table style (section 2.2.6.3) applied to the **table**. The example **BrtTableStyleClient** record is specified in the following table.

Size	Structure	Value
0028	BrtTableStyleClient **- BrtTableStyleClient**	
1 bit	WORD **- fFirstColumn**	0x0
1 bit	WORD **- fLastColumn**	0x0
1 bit	WORD **- fRowStripes**	0x1
1 bit	WORD **- fColumnStripes**	0x0
1 bit	WORD **- fRowHeaders**	0x0
1 bit	WORD **- fColumnHeaders**	0x0
10 bits	WORD **- reserved**	0x000
0026	TableStyleName **- stStyleName**	TableStyleMedium9

Structure of BrtTableStyleClient

fFirstColumn: 0x0 specifies that the first **column (1)** in the table does not have the table style element (section 2.2.6.2.2) applied.

fLastColumn: 0x0 specifies that the last column (1) in the table does not have the table style element applied.

fRowStripes: 0x1 specifies that the table has the **row stripe formatting** table style element applied.

fColumnStripes: 0x0 specifies that the table does not have the column (1) stripe formatting table style element applied.

fRowHeaders: 0x0 is ignored because this is a table.

fColumnHeaders: 0x0 is ignored because this is a table.

stStyleName: "TableStyleMedium9" specifies the table style (section 2.2.6.3) applied to the table.

Records specifying the table style itself are omitted from this example for brevity.

3.3.15 Table: BrtEndList

The next record in this example, **BrtEndList** (section 2.4.448), specifies the end of the collection of records that specifies this **table**. The example **BrtEndList** record is specified in the following table.

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Size	Structure
0000	BrtEndList **- BrtEndList**

Structure of BrtEndList

3.4 Filters

This example shows how an **AutoFilter** is applied to a **range** of **cells** (C4:C8) on a **sheet**. The AutoFilter displays numbers that are greater than 70, as illustrated in the following figure.

The example includes all of the records between **BrtBeginAFilter** (section 2.4.8) and **BrtEndAFilter** (section 2.4.360) in the **Worksheet** (section 2.1.7.62) part. In this example, these are **BrtBeginFilterColumn** (section 2.4.83), **BrtBeginCustomFilters** (section 2.4.39), **BrtCustomFilter** (section 2.4.343), **BrtEndCustomFilters** (section 2.4.391) and **BrtEndFilterColumn** (section 2.4.432).

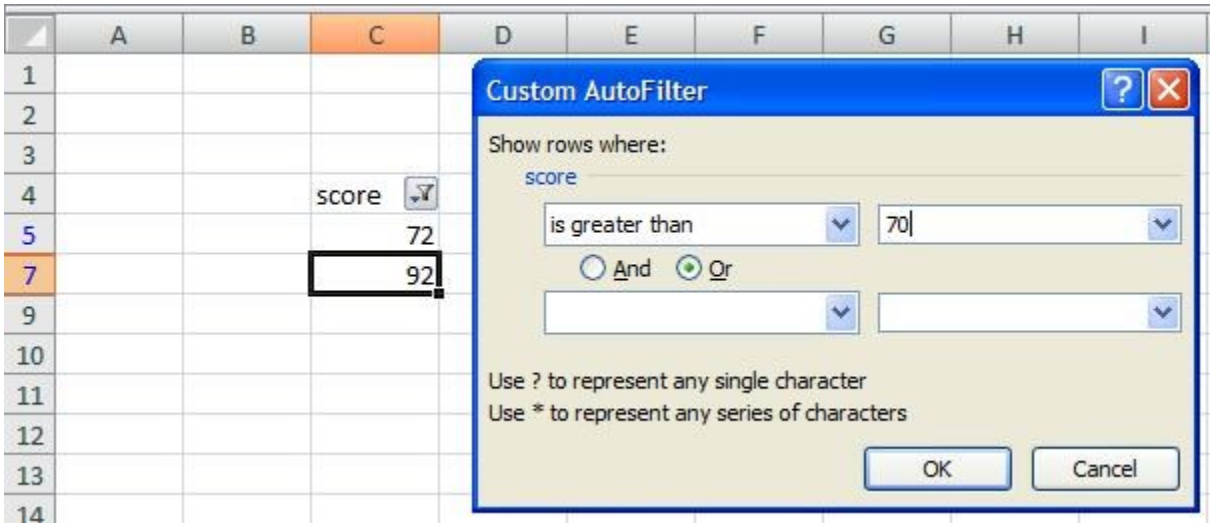

Figure 23: AutoFilter within a sheet

3.4.1 Filters: BrtBeginAFilter

The **BrtBeginAFilter** (section 2.4.8) specifies the beginning of a collection of records that define the **AutoFilter** and specifies the **range** of **cells** the AutoFilter applies to, as specified in the following table.

Size	Structure	Value
0010	BrtBeginAFilter **- BrtBeginAfilter**	
0010	UncheckedRfX **- rfx**	
0004	LONG **- rwFirst**	0x00000003
0004	LONG **- rwLast**	0x00000007
0004	LONG **- colFirst**	0x00000002
0004	LONG **- colLast**	0x00000002

Structure of BrtBeginAfilter

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rfx: an **UncheckedRfX** (section 2.5.153) that specifies that the AutoFilter is applied to the range C4:C8.

rfx.rwFirst: 0x00000003 specifies that the first **row** of the filtered range is row 4 of the **sheet**.

rfx.rwLast: 0x00000007 specifies that the last row of the filtered range is row 8 of the sheet.

rfx.colFirst: 0x00000002 specifies that the first **column (1)** of the filtered range is column (1) C of the sheet.

rfx.colLast: 0x00000002 specifies that the last column (1) of the filtered range is column (1) C of the sheet.

3.4.2 Filters: BrtBeginFilterColumn

The next record in this example, **BrtBeginFilterColumn** (section 2.4.83), specifies the properties of an **AutoFilter column (1)**, as specified in the following table.

Size	Structure	Value
0006	BrtBeginFilterColumn **- BrtBeginFilterColumn**	
0004	DWORD **- dwCol**	0x00000000
1 bit	WORD **- fHideArrow**	0x0
1 bit	WORD **- fNoBtn**	0x0
14 bits	WORD **- reserved**	0x0000

Structure of BrtBeginFilterColumn

dwCol: 0x00000000 specifies that the properties are applied to the first column (1) in the range to which the AutoFilter is applied. This is column (1) C in this example.

fHideArrow: 0x0 specifies that the user interface that displays the AutoFilter button is displayed.

fNoBtn: 0x0 specifies that the user interface that displays the AutoFilter button does not get displayed in the next column (1).

3.4.3 Filters: BrtBeginCustomFilters

The next record in this example, **BrtBeginCustomFilters** (section 2.4.39)**,** specifies additional properties that are set on the **AutoFilter**, as specified in the following table.

Size	Structure	Value
0004	BrtBeginCustomFilters **- BrtBeginCustomFilters**	
0004	DWORD **- fAnd**	0x00000000

Structure of BrtBeginCustomFilters

fAnd: 0x00000000 specifies that a logical AND relationship is used when evaluating filtering criteria, stored in the **BrtCustomFilter** (section 2.4.343) records that follow.

3.4.4 Filters: BrtCustomFilters

The next record in this example, **BrtCustomFilter** (section 2.4.343), specifies the filtering criteria used for this **AutoFilter**, as specified in the following table.

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Size	Structure	Value
000A	BrtCustomFilter **- BrtCustomFilter**	
0001	BYTE **- vts**	0x04
0001	BYTE **- grbitSgn**	0x04
0008	Xnum **- union**	0x4051800000000000

Structure of BrtCustomFilter

vts: 0x04 specifies that filtering will be based on the criteria specified by a numeric value.

grbitSgn: 0x04 specifies that the comparison operation is Greater Than.

union: 0x4051800000000000 specifies the floating-point value of 70. This is the value used for the comparison criteria by this AutoFilter.

3.4.5 Filters: BrtEndCustomFilters

The next record in this example, **BrtEndCustomFilters** (section 2.4.391), specifies the end of the collection that was started by the previous **BrtBeginCustomFilters** (section 2.4.39) record, as specified in the following table.

Size	Structure
0000	BrtEndCustomFilters **- BrtEndCustomFilters**

Structure of BrtEndCustomFilters

3.4.6 Filters: BrtEndFilterColumn

The next record in this example, **BrtEndFilterColumn** (section 2.4.432), specifies the end of the collection that was started by the **BrtBeginFilterColumn** (section 2.4.83) record, as specified in the following table.

Size	Structure
0000	BrtEndFilterColumn **- BrtEndFilterColumn**

Structure of BrtEndFilterColumn

3.4.7 Filters: BrtEndAFilter

The last record in this example, **BrtEndAFilter** (section 2.4.360)**,** specifies the end of the collection that was started by the **BrtBeginAFilter** (section 2.4.8) record, as specified in the following table.

Size	Structure
0000	BrtEndAFilter **- BrtEndAfilter**

Structure of BrtEndAfilter

3.5 External References

This example shows how a cell (F5) contains a reference to a cell (B3) in a different **workbook** (Book1.xlsb). The workbook that contains this example and Book1.xlsb are in the same folder. The cell (B3) in Book1.xlsb contains the string "External Cell", as illustrated by the following figure.

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This example includes the **BrtRowHdr** (section 2.4.746) and **BrtFmlaString** (section 2.4.674) records that appear in the **Worksheet** (section 2.1.7.62) part.

This example also includes all records between **BrtBeginSupBook** (section 2.4.232) and **BrtEndSupBook** (section 2.4.580) in the external link (section 2.1.7.25) part. In this example these records are the **BrtBeginSupBook**, **BrtSupTabs** (section 2.4.799), **BrtExternTableStart** (section 2.4.661), **BrtExternRowHdr** (section 2.4.658), **BrtExternCellString** (section 2.4.657), **BrtExternTableEnd** (section 2.4.660), and **BrtEndSupBook** records.

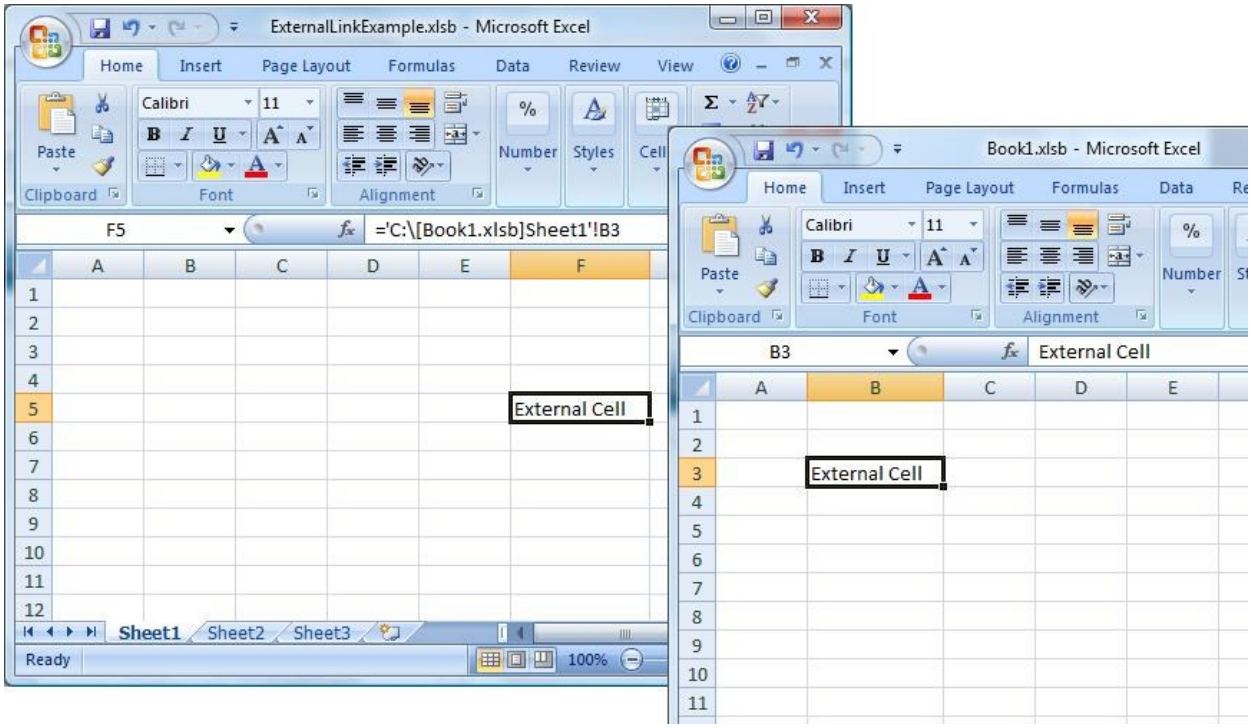

Figure 24: External reference within a sheet

3.5.1 External References: BrtRowHdr

The first record in this example, **BrtRowHdr** (section 2.4.746), specifies information about the **row** that contains the external reference and specifies the beginning of a collection of records that contain information about the row, as specified in the following table.

Size	Structure	Value
0019	BrtRowHdr **- BrtRowHdr**	
0004	ULONG **- rw**	0x00000004
0004	DWORD **- ixfe**	0x00000000
0002	WORD **- miyRw**	0x012C
1 bit	BYTE **- fExtraAsc**	0x0
1 bit	BYTE **- fExtraDsc**	0x0
6 bits	BYTE **- reserved1**	0x00

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Size	Structure	Value
3 bits	BYTE **- iOutLevel**	0x0
1 bit	BYTE **- fCollapsed**	0x0
1 bit	BYTE **- fDyZero**	0x0
1 bit	BYTE **- fUnsynced**	0x0
1 bit	BYTE **- fGhostDirty**	0x0
1 bit	BYTE **- fReserved**	0x0
1 bit	BYTE **- fPhShow**	0x0
7 bits	BYTE **- reserved2**	0x00
0004	DWORD **- ccolspan**	0x00000001
0008	BrtColSpan **- rgBrtColspan**	
0008	BrtColSpan **- brtBrtColspan[0]**	
0004	ULONG **- colMic**	0x00000005
0004	ULONG **- colLast**	0x00000005

Structure of BrtRowHdr

rw: 0x00000004 specifies that the external reference is in row 5 of the **worksheet**.

ixfe: 0x00000000 specifies that the formatting properties of the cell are specified by the first **BrtXF** (section 2.4.845) record in the collection of records directly following the **BrtBeginCellXFs** (section 2.4.21) record in the **Styles** (section 2.1.7.50) part. The referenced **BrtXF** and **BrtBeginCellXFs** records are not included in this example for brevity.

miyRw: 0x012C specifies that the height of this row is 300 twips.

fExtraAsc: 0x0 specifies not to allocate padding to the top of this row.

fExtraDsc: 0x0 specifies not to allocate padding to the bottom of this row.

iOutLevel: 0x0 specifies the **outline level** for this row.

fCollapsed: 0x0 specifies that zero rows with an **iOutLevel** greater than 0 are in the collapsed outline state.

fDyZero: 0x0 specifies that this row is not hidden.

fUnsynced: 0x0 specifies that the height of this row is not manually specified.

fGhostDirty: 0x0 specifies that the row style (section 2.2.6) as specified by **ixfe** is not applied.

fPhShow: 0x0 specifies that this row defaults to having the **phonetic guide** disabled.

ccolspan: 0x00000001 specifies that there is one **BrtColSpan** (section 2.5.8) element in **rgBrtColspan**. This means that the external reference is in the first 1024 **columns (1)** of the row specified by this **BrtRowHdr** (section 2.4.746).

rgBrtColspan: An array with one **BrtColSpan** element.

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rgBrtColspan.brtBrtColspan[0]: The **BrtColSpan** element that specifies the cells that contain data in the first 1024 column (1) wide segment of this row.

rgBrtColspan.brtBrtColspan[0].colMic: 0x00000005 specifies that the first cell that contains data in the row specified by this **BrtRowHdr** is in column (1) F.

rgBrtColspan.brtBrtColspan[0].colLast: 0x00000005 specifies that the last cell that contains data in the row specified by this **BrtRowHdr** (section 2.4.746) is in column (1) F.

3.5.2 External References: BrtFmlaString

The next record in this example, **BrtFmlaString** (section 2.4.674), specifies that the cell that contains the external reference contains a formula (section 2.2.2) that most recently evaluated to a string value, as specified in the following table. That string value is the string value contained in the cell in the external workbook (section 2.2.7.4.1) named Book1.xlsb.

Size	Structure	Value
0039	BrtFmlaString **- BrtFmlaString**	
0008	Cell **- cell**	
0004	LONG **- column**	0x00000005
24 bits	DWORD **- iStyleRef**	0x000000
1 bit	DWORD **- fPhShow**	0x0
7 bits	DWORD **- reserved**	0x00
001E	XLWideString **- value**	External Cell
0002	GrbitFmla **- grbitFlags**	
1 bit	WORD **- reserved**	0x0
1 bit	WORD **- fAlwaysCalc**	0x0
14 bits	WORD **- unused**	0x0000
0011	CellParsedFormula **- formula**	
0004	DWORD **- cce**	0x00000009
0009	Rgce **- rgce**	
0009	Ptg **- sequence**	
0009	PtgRef3d **- PtgRef3D**	
5 bits	BYTE **- ptg**	0x1A
2 bits	PtgDataType **- type**	0x2
1 bit	BYTE **- reserved**	0x0
0002	USHORT **- ixti**	0x0000
0006	RgceLoc **- loc**	
0004	UncheckedRw **- row**	0x00000002

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Size	Structure	Value
0002	ColRelShort **- column**	0xC001
0004	DWORD **- cb**	0x00000000

Structure of BrtFmlaString

cell: A **Cell** (section 2.5.9) that specifies information about the **cell** that contains the external reference.

cell.column: 0x00000005 specifies that the cell is in **column (1)** F.

cell.iStyleRef: 0x000000 specifies that the formatting properties of the cell are specified by the first **BrtXF** (section 2.4.845) record in the collection of records directly following the **BrtBeginCellXFs** (section 2.4.21) record in the **Styles** (section 2.1.7.50) part. For brevity, the referenced **BrtXF** and **BrtBeginCellXFs** records are not included in this example.

cell.fPhShow: 0x0 specifies that the cell does not show **phonetic information**.

value: "External Cell" specifies the string value to which the formula (section 2.2.2) in this cell evaluated. This is the string value contained in the external referenced cell.

grbitFlags.fAlwaysCalc: 0x0000 specifies that this formula is not to be reevaluated when the document is loaded.

formula: A **CellParsedFormula** (section 2.5.97.4) that specifies the formula (section 2.2.2) stored in this cell. This formula contains the information necessary to reference the cell in the external workbook (section 2.2.7.4.1) named Book1.xlsb.

formula.cce: 0x00000009 specifies that the length of the **formula.rgce** field is 9 bytes.

formula.rgce: An **Rgce** (section 2.5.97.88) that specifies a sequence of **Ptg** (section 2.5.97.16) structures for the formula.

formula.rgce.sequence: A sequence of **Ptg** structures that contains a single **Ptg**.

formula.rgce.sequence.PtgRef3D: An operand that references the cell in the external workbook (section 2.2.7.4.1), Book1.xslb.

formula.rgce.sequence.PtgRef3D.ptg: 0x1A specifies that this **Ptg** is a **PtgRef3D** (section 2.5.97.69).

formula.rgce.sequence.PtgRef3D.type: 0x2 specifies that this **Ptg** specifies a single value, which is a string simple type.

formula.rgce.sequence.PtgRef3D.ixti: 0x0000 specifies that the external link information is specified by the first **Xti** (section 2.5.172) record in the collection of records directly following the **BrtExternSheet** (section 2.4.659) record. The referenced **Xti** record is not included in this example for brevity.

formula.rgce.sequence.PtgRef3D.loc: Specifies the coordinates of the referenced cell in the external workbook (section 2.2.7.4.1).

formula.rgce.sequence.PtgRef3D.loc.row: 0x00000002 specifies that the referenced cell is in **row** 3.

formula.rgce.sequence.PtgRef3D.loc.column: 0x0001 specifies that the referenced cell is in column (1) B.

formula.cb: 0x00000000 specifies that there is no ancillary data for this formula (section 2.2.2).

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3.5.3 External References: BrtBeginSupBook

The next record in this example, **BrtBeginSupBook** (section 2.4.232), specifies the properties of the external link (section 2.2.7.4) and specifies the beginning of a collection of records that specify information about the external link, as specified in the following table.

Size	Structure	Value
0012	BrtBeginSupBook **- BrtBeginSupBook**	
0002	ExternalReferenceType **- sbt**	0x0000
000C	RelID **- string1**	rId1
0004	XLNullableWideString **- string2**	

Structure of BrtBeginSupBook

sbt: 0x0000 specifies that the external link (section 2.2.7.4) type is an external workbook link (section 2.2.7.4.1).

string1: "rId1" specifies a **RelID** (section 2.5.114) that specifies the external workbook. The entity referenced by the **RelID** is not included in this example for brevity.

string2: A NULL string because the external link type is an external workbook link.

3.5.4 External References: BrtSupTabs

The next record in this example, **BrtSupTabs** (section 2.4.799), specifies the names of the **sheets** in the external workbook (section 2.1.10), Book1.xlsb, as specified in the following table.

Size	Structure	Value
0034	BrtSupTabs **- BrtSupTabs**	
0004	DWORD **- ctab**	0x00000003
0030	XLWideString **- sheetNames**	
0010	XLWideString **- sheetNames[0]**	Sheet1
0010	XLWideString **- sheetNames[1]**	Sheet2
0010	XLWideString **- sheetNames[2]**	Sheet3

Structure of BrtSupTabs

ctab: 0x00000003 specifies that there are three sheets in the external workbook (section 2.1.10).

sheetNames: Specifies the array of sheet names in the external workbook.

sheetNames.sheetNames[0]: "Sheet1" specifies the name of the first sheet in the external workbook.

sheetNames.sheetNames[1]: "Sheet2" specifies the name of the second sheet in the external workbook.

sheetNames.sheetNames[2]: "Sheet3" specifies the name of the third and last sheet in the external workbook.

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3.5.5 External References: BrtExternTableStart 1

The next record in this example, **BrtExternTableStart** (section 2.4.661), specifies properties of the External Cell Cache (section 2.2.7.4.1.2) and specifies the beginning of a collection of records that specify the External Cell Cache, as specified in the following table.

Size	Structure	Value
0005	BrtExternTableStart **- BrtExternTableStart**	
0004	DWORD **- itab**	0x00000000
1 bit	BYTE **- fRefreshError**	0x0
7 bits	BYTE **- reserved**	0x00

Structure of BrtExternTableStart

itab: 0x00000000 specifies that the External Cell Cache (section 2.2.7.4.1.2) references the first **sheetNames** field in the **BrtSupTabs** (section 2.4.799) record in this external link (section 2.2.7.4).

fRefreshError: 0x0 specifies that no error occurred during the last refresh of this External Cell Cache.

3.5.6 External References: BrtExternRowHdr

The next record in this example, **BrtExternRowHdr** (section 2.4.658), specifies properties of the **row** that contains data from the external workbook (section 2.2.7.4.1) in the External Cell Cache (section 2.2.7.4.1.2), and specifies the beginning of a collection of records that specifies information about this row, as specified in the following table.

Size	Structure	Value
0004	BrtExternRowHdr **- BrtExternRowHdr**	
0004	DWORD **- rw**	0x00000002

Structure of BrtExternRowHdr

rw: 0x00000002 specifies that the referenced row in the External Cell Cache (section 2.2.7.4.1.2) is row 3.

3.5.7 External References: BrtExternCellString

The next record in this example, **BrtExternCellString** (section 2.4.657), specifies an External Cell (section 2.2.7.4.1.2.1) in the External Cell Cache (section 2.2.7.4.1.2) that contains the string value from the external workbook (section 2.2.7.4.1), as specified in the following table.

Size	Structure	Value
0022	BrtExternCellString **- BrtExternCellString**	
0004	UncheckedCol **- col**	0x00000001
001E	XLWideString **- value**	External Cell

Structure of BrtExternCellString

col: 0x00000001 specifies that the **column (1)** of the External Cell (section 2.2.7.4.1.2.1) in the External Cell Cache (section 2.2.7.4.1.2) is column (1) B.

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value: "External Cell" is the value of the External Cell in the External Cell Cache.

3.5.8 External References: BrtExternTableEnd 1

The next record in this example, **BrtExternTableEnd** (section 2.4.660), specifies the end of the collection of records that specify the External Cell Cache (section 2.2.7.4.1.2), as specified in the following table.

Size	Structure
0000	BrtExternTableEnd **- BrtExternTableEnd**

Structure of BrtExternTableEnd

3.5.9 External References: BrtExternTableStart 2

The next record in this example, **BrtExternTableStart** (section 2.4.661), is present because the external workbook (section 2.2.7.4.1) contains a second **worksheet**. There is no relevant data in this worksheet, as specified in the following table.

Size	Structure	Value
0005	BrtExternTableStart **- BrtExternTableStart**	
0004	DWORD **- itab**	0x00000001
0001	ExternTableStartBit **- grbit**	
0001	BYTE **- fRefreshError**	0x00
0001	BYTE **- reserved**	0x00

Structure of BrtExternTableStart

Fields in this record that are explained in previous records in this example are omitted for brevity.

itab: 0x00000001 specifies that the External Cell Cache (section 2.2.7.4.1.2) references the second **sheetNames** field in the **BrtSupTabs** (section 2.4.799) record in this external link part.

3.5.10 External References: BrtExternTableEnd 2

The next record in this example, **BrtExternTableEnd** (section 2.4.660), specifies the end of the collection of records that specify the External Cell Cache (section 2.2.7.4.1.2) for the second **worksheet**, as specified in the following table.

Size	Structure
0000	BrtExternTableEnd **- BrtExternTableEnd**

Structure of BrtExternTableEnd

3.5.11 External References: BrtExternTableStart 3

The next record in this example, **BrtExternTableStart** (section 2.4.661), is present because the external workbook (section 2.2.7.4.1) contains a third **worksheet**, as specified in the following table. There is no relevant data in this worksheet.

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Size	Structure	Value
0005	BrtExternTableStart **- BrtExternTableStart**	
0004	DWORD **- itab**	0x00000002
0001	ExternTableStartBit **- grbit**	
0001	BYTE **- fRefreshError**	0x00
0001	BYTE **- reserved**	0x00

Structure of BrtExternTableStart

Fields in this record that are explained in previous records in this example are omitted for brevity.

itab: 0x00000002 specifies that the External Cell Cache (section 2.2.7.4.1.2) references the third **sheetNames** field in the **BrtSupTabs** (section 2.4.799) record in this external link part.

3.5.12 External References: BrtExternTableEnd 3

The next record in this example, **BrtExternTableEnd** (section 2.4.660), specifies the end of the collection of records that specify the External Cell Cache (section 2.2.7.4.1.2) for the third **worksheet**, as specified in the following table.

Size	Structure
0000	BrtExternTableEnd **- BrtExternTableEnd**

Structure of BrtExternTableEnd

3.5.13 External References: BrtEndSupBook

The next record in this example, **BrtEndSupBook** (section 2.4.580), specifies the end of the collection of records that specify information about the external link (section 2.2.7.4), as specified in the following table.

Size	Structure
0000	BrtEndSupBook **- BrtEndSupBook**

Structure of BrtEndSupBook

3.6 Formatting

In this example, **cell** formatting and **number formats** are applied to the following three cells in the **sheet**:

Cell B3 contains the value 1.2345 and is formatted using the built-in "0.00" number format.

Cell B4 contains the value 1.2345 and is formatted using the custom "0.00000" number format.

Cell B5 contains the value 1.2345 and is formatted with a yellow **background color**, the **font** is bold, and the font color is blue.

This example is illustrated by the following figure.

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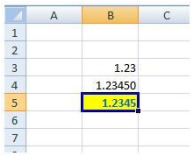

Figure 25: Formatting within a sheet

This example begins with **BrtCellReal** (section 2.4.321) records in the **Worksheet** (section 2.1.7.62) part **ABNF** that specify the **cell value** and number formats for each of the three cells. Number formats are specified with **BrtBeginFmts** (section 2.4.86), **BrtFmt** (section 2.4.675), and **BrtEndFmts** (section 2.4.435) records in the **Styles** (section 2.1.7.50) part ABNF. Cell formatting is specified with **BrtBeginFonts** (section 2.4.88), **BrtFont** (section 2.4.677), **BrtEndFonts** (section 2.4.437), **BrtBeginFills** (section 2.4.82), **BrtFill** (section 2.4.668), **BrtEndFills** (section 2.4.431), **BrtBeginCellStyleXFs** (section 2.4.19), **BrtXF** (section 2.4.845), **BrtEndCellStyleXFs** (section 2.4.371), **BrtBeginCellXFs** (section 2.4.21), **BrtXF**, and **BrtEndCellXFs** (section 2.4.373) records in the **Styles** part ABNF.

3.6.1 Formatting: BrtCellReal 1

This is the first of three **BrtCellReal** (section 2.4.321) records that each specifies a **cell value** and **cell** formatting. This record specifies cell B3, as specified in the following table.

Size	Structure	Value
0010	BrtCellReal **- BrtCellReal**	
0008	Cell **- cell**	
0004	LONG **- column**	0x00000001
24 bits	DWORD **- iStyleRef**	0x000001
1 bit	DWORD **- fPhShow**	0x0
7 bits	DWORD **- reserved**	0x00
0008	Xnum **- xnum**	0x3FF3C083126E978D

Structure of BrtCellReal

cell: Specifies a cell that contains the real number 1.2345 formatted using the cell formatting specified by the second **BrtXF** (section 2.4.845) record following **BrtBeginCellXFs** (section 2.4.21) as defined by the **Styles** (section 2.1.7.50) part **ABNF**.

cell.column: 0x00000001 specifies that the cell is in **column (1)** B.

cell.iStyleRef: 0x000001 specifies that the cell formatting applied to the cell is specified by the second **BrtXF** record in the collection of all records following **BrtBeginCellXFs** as defined by the **Styles** part ABNF.

cell.fPhShow: 0x0 specifies that the cell does not show **phonetic information**.

xnum: 0x3FF3C083126E978D specifies the **floating-point number** 1.2345.

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3.6.2 Formatting: BrtCellReal 2

The next **BrtCellReal** (section 2.4.321) record in this example specifies the **cell value** and cell formatting for **cell** B4, as specified in the following table.

Size	Structure	Value
0010	BrtCellReal **- BrtCellReal**	
0008	Cell **- cell**	
0004	LONG **- column**	0x00000001
24 bits	DWORD **- iStyleRef**	0x000002
1 bit	DWORD **- fPhShow**	0x0
7 bits	DWORD **- reserved**	0x00
0008	Xnum **- xnum**	0x3FF3C083126E978D

Structure of BrtCellReal

Fields in this record that are explained in previous records in this example are omitted for brevity.

cell: Specifies a cell that contains the real number 1.2345 formatted using the cell formatting specified by the third **BrtXF** (section 2.4.845) record following **BrtBeginCellXFs** (section 2.4.21) as defined by the **Styles** (section 2.1.7.50) part **ABNF**.

cell.iStyleRef: 0x000002 specifies that the cell formatting applied to the cell is specified by the third **BrtXF** record in the collection of all records following **BrtBeginCellXFs** as defined by the **Styles** part ABNF.

3.6.3 Formatting: BrtCellReal 3

The next **BrtCellReal** (section 2.4.321) record in this example specifies the **cell value** and cell formatting for **cell** B5, as specified in the following table.

Size	Structure	Value
0010	BrtCellReal **- BrtCellReal**	
0008	Cell **- cell**	
0004	LONG **- column**	0x00000001
24 bits	DWORD **- iStyleRef**	0x000003
1 bit	DWORD **- fPhShow**	0x0
7 bits	DWORD **- reserved**	0x00
0008	Xnum **- xnum**	0x3FF3C083126E978D

Structure of BrtCellReal

Fields in this record that are explained in previous records in this example are omitted for brevity.

cell: Specifies a cell that contains the real number 1.2345 formatted using the cell formatting specified by the fourth **BrtXF** (section 2.4.845) record following **BrtBeginCellXFs** (section 2.4.21) as defined by the **Styles** (section 2.1.7.50) part **ABNF**.

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cell.iStyleRef: 0x000003 specifies that the cell formatting applied to the cell is specified by the fourth **BrtXF** record in the collection of all records following **BrtBeginCellXFs** as defined by the **Styles** part ABNF.

3.6.4 Formatting: BrtBeginFmts

The next record in this example, **BrtBeginFmts** (section 2.4.86), specifies the beginning of a collection of **BrtFmt** (section 2.4.675) records, as specified in the following table.

Size	Structure	Value
0004	BrtBeginFmts **- BrtBeginFmts**	
0004	ULONG **- cfmts**	0x00000001

Structure of BrtBeginFmts

cfmts: 0x00000001 specifies that there is one **BrtFmt** (section 2.4.675) record in the collection that specifies custom **number formats**. This custom number format is referenced by the **iFmt.ifmt** of the **BrtXF** (section 2.4.845) record that is referenced by the **cell.iStyleRef** field of the **BrtCellReal** (section 2.4.321) record that specifies **cell** B4.

3.6.5 Formatting: BrtFmt

The next record in this example, **BrtFmt** (section 2.4.675), specifies the **number format** properties for the first number format in the collection of custom number formats, as specified in the following table. This format is applied to cell B4.

Size	Structure	Value
0014	BrtFmt **- BrtFmt**	
0002	WORD **- ifmt**	0x00A6
0012	XLWideString **- stFmtCode**	0.00000

Structure of BrtFmt

ifmt: 0x00A6 specifies the identifier for the custom number format "0.00000".

stFmtCode: "0.00000" specifies the **format string** for this number format.

3.6.6 Formatting: BrtEndFmts

The next record in this example, **BrtEndFmts** (section 2.4.435), specifies the end of the collection of **BrtFmt** (section 2.4.675) records, as specified in the following table.

Size	Structure
0000	BrtEndFmts **- BrtEndFmts**

Structure of BrtEndFmts

3.6.7 Formatting: BrtBeginFonts

The next record in this example, **BrtBeginFonts** (section 2.4.88), specifies a count of **BrtFont** (section 2.4.677) records and the beginning of a collection of **BrtFont** records that specifies the **fonts** used in the **workbook**, as specified in the following table.

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Size	Structure	Value
0004	BrtBeginFonts **- BrtBeginFonts**	
0004	ULONG **- cfonts**	0x00000002

Structure of BrtBeginFonts

cfonts: 0x00000002 specifies that there are two **BrtFont** (section 2.4.677) records in this collection.

3.6.8 Formatting: BrtFont 1

The next record in this example, **BrtFont** (section 2.4.677), specifies the properties of the default **font** used by cells in this workbook, as specified in the following table. This record is referenced in **iFmt.ifmt** of the **BrtXF** (section 2.4.845) record that is referenced by the **cell.iStyleRef** field of the **BrtCellReal** (section 2.4.321) records that specify **cells** B3 and B4.

Size	Structure	Value
0027	BrtFont **- BrtFont**	
0002	SHORT **- dyHeight**	0x00DC
0002	FontFlags **- grbit**	
1 bit	WORD **- unused1**	0x0
1 bit	WORD **- fItalic**	0x0
1 bit	WORD **- unused2**	0x0
1 bit	WORD **- fStrikeout**	0x0
1 bit	WORD **- fOutline**	0x0
1 bit	WORD **- fShadow**	0x0
1 bit	WORD **- fCondense**	0x0
1 bit	WORD **- fExtend**	0x0
8 bits	WORD **- unused3**	0x00
0002	SHORT **- bls**	0x0190
0002	SHORT **- sss**	0x0000
0001	BYTE **- uls**	0x00
0001	BYTE **- bFamily**	0x02
0001	BYTE **- bCharSet**	0x00
0001	BYTE **- unused**	0x00
0008	BrtColor **- brtColor**	
1 bit	BYTE **- fValidRGB**	0x1
7 bits	XColorType **- xColorType**	0x03
0001	BYTE **- index**	0x01

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Size	Structure	Value
0002	SHORT **- nTintAndShade**	0x0000
0001	BYTE **- bRed**	0x00
0001	BYTE **- bGreen**	0x00
0001	BYTE **- bBlue**	0x00
0001	BYTE **- bAlpha**	0xFF
0001	BYTE **- bFontScheme**	0x02
0012	XLWideString **- name**	Calibri

Structure of BrtFont

dyHeight: 0x00DC specifies that the height of the font is 220 **twips**.

grbit: Specifies the font attributes.

grbit.fItalic: 0x0000 specifies that the font is not italic.

grbit.fStrikeout: 0x0000 specifies that the font does not have **strikethrough formatting**.

grbit.fOutline: 0x0000 specifies that the font is not an outline.

grbit.fShadow: 0x0000 specifies that the font does not have a shadow applied.

grbit.fCondense: 0x0000 specifies that the font is not condensed.

grbit.fExtend: 0x0000 specifies that the font is not extended.

bls: 0x0190 specifies that the font is normal weight.

sss: 0x0000 specifies that the font is not a superscript font or a subscript font.

uls: 0x00 specifies that the font has no underline type.

bFamily: 0x02 specifies that the font belongs to the Swiss **font family**.

bCharSet: 0x00 specifies that the font belongs to the **ANSI character set**.

brtColor: This **BrtColor** (section 2.4.332) record specifies the color properties of the font.

brtColor.fValidRGB: 0x1 specifies that the color specified by **brtColor.index** matches the color specified by **brtColor.bRed**, **brtColor.bGreen**, **brtColor.bBlue**, and **brtColor.bAlpha**.

brtColor.xColorType: 0x03 specifies that the color is a **theme** color and is specified by **brtColor.index**.

brtColor.index: 0x01 specifies an **Icv** (section 2.5.75) that specifies a color from a color palette. The color is black.

brtColor.nTintAndShade: 0x0000 specifies that no tint or shade is applied.

brtColor.bRed: 0x00 specifies that the color has no red intensity.

brtColor.bGreen: 0x00 specifies that the color has no green intensity.

brtColor.bBlue: 0x00 specifies that the color has no blue intensity.

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brtColor.bAlpha: 0xFF specifies that the color is completely opaque.

bFontScheme: 0x02 specifies that the font belongs to the **minor scheme**.

name: "Calibri" specifies the name of the font.

3.6.9 Formatting: BrtFont 2

The next record in this example, **BrtFont** (section 2.4.677), specifies the properties of the **font** used in **cell** B5, as specified in the following table.

Size	Structure	Value
0027	BrtFont **- BrtFont**	
0002	SHORT **- dyHeight**	0x00DC
0002	FontFlags **- grbit**	
1 bit	WORD **- unused1**	0x0
1 bit	WORD **- fItalic**	0x0
1 bit	WORD **- unused2**	0x0
1 bit	WORD **- fStrikeout**	0x0
1 bit	WORD **- fOutline**	0x0
1 bit	WORD **- fShadow**	0x0
1 bit	WORD **- fCondense**	0x0
1 bit	WORD **- fExtend**	0x0
8 bits	WORD **- unused3**	0x00
0002	SHORT **- bls**	0x02BC
0002	SHORT **- sss**	0x0000
0001	BYTE **- uls**	0x00
0001	BYTE **- bFamily**	0x02
0001	BYTE **- bCharSet**	0x00
0001	BYTE **- unused**	0x00
0008	BrtColor **- brtColor**	
1 bit	BYTE **- fValidRGB**	0x1
7 bits	XColorType **- xColorType**	0x02
0001	BYTE **- index**	0xFF
0002	SHORT **- nTintAndShade**	0x0000
0001	BYTE **- bRed**	0x00
0001	BYTE **- bGreen**	0x70

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Size	Structure	Value
0001	BYTE **- bBlue**	0xC0
0001	BYTE **- bAlpha**	0xFF
0001	BYTE **- bFontScheme**	0x02
0012	XLWideString **- name**	Calibri

Structure of BrtFont

Fields in this record that are explained in previous records in this example are omitted for brevity.

bls: 0x02BC specifies that the font is bold.

brtColor.fValidRGB: 0x01 because **brtColor.xColorType** is 0x02.

brtColor.xColorType: 0x02 specifies that this color is a standard **RGBA** color and is specified by the values in **brtColor.bRed**, **brtColor.bGreen**, **brtColor.bBlue**, and **brtColor.bAlpha**.

brtColor.index: This field is ignored because **brtColor.xColorType** is 0x02.

brtColor.bRed: 0x00 specifies that the color has no red intensity.

brtColor.bGreen: 0x70 specifies that the color has a medium green intensity.

brtColor.bBlue: 0xC0 specifies that the color has a medium-strong blue intensity.

3.6.10 Formatting: BrtEndFonts

The next record in this example, **BrtEndFonts** (section 2.4.437), specifies the end of the collection of **BrtFont** (section 2.4.677) records, as specified in the following table.

Size	Structure
0000	BrtEndFonts **- BrtEndFonts**

Structure of BrtEndFonts

3.6.11 Formatting: BrtBeginFills

The next record in this example, **BrtBeginFills** (section 2.4.82), specifies the count of **BrtFill** (section 2.4.668) records and the beginning of a collection of **BrtFill** records that specifies the **cell fill pattern** applied to the cells in the example, as specified in the following table.

Size	Structure	Value
0004	BrtBeginFills **- BrtBeginFills**	
0004	ULONG **- cfills**	0x00000003

Structure of BrtBeginFills

cfills: 0x00000003 specifies that there are three **BrtFill** records in this collection.

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3.6.12 Formatting: BrtFill 1

The next record in this example, **BrtFill** (section 2.4.668), specifies the default **fill pattern** (no fill) applied to cells, as specified in the following table. The **cells** that reference this fill pattern in this example are cells B3 and B4.

Size	Structure	Value
0044	BrtFill **- BrtFill**	
0004	DWORD **- fls**	0x00000000
0008	BrtColor **- brtColorFore**	
1 bit	BYTE **- fValidRGB**	0x1
7 bits	XColorType **- xColorType**	0x01
0001	BYTE **- index**	0x40
0002	SHORT **- nTintAndShade**	0x0000
0001	BYTE **- bRed**	0x00
0001	BYTE **- bGreen**	0x00
0001	BYTE **- bBlue**	0x00
0001	BYTE **- bAlpha**	0xFF
0008	BrtColor **- brtColorBack**	
1 bit	BYTE **- fValidRGB**	0x1
7 bits	XColorType **- xColorType**	0x01
0001	BYTE **- index**	0x41
0002	SHORT **- nTintAndShade**	0x0000
0001	BYTE **- bRed**	0xFF
0001	BYTE **- bGreen**	0xFF
0001	BYTE **- bBlue**	0xFF
0001	BYTE **- bAlpha**	0xFF
0004	LONG **- iGradientType**	0x00000000
0008	Xnum **- xnumDegree**	0x0000000000000000
0008	Xnum **- xnumFillToLeft**	0x0000000000000000
0008	Xnum **- xnumFillToRight**	0x0000000000000000
0008	Xnum **- xnumFillToTop**	0x0000000000000000
0008	Xnum **- xnumFillToBottom**	0x0000000000000000
0004	DWORD **- cNumStop**	0x00000000

Structure of BrtFill

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Fields in this record that are explained in previous records in this example are omitted for brevity.

fls: 0x00000000 specifies that no fill pattern is applied.

brtColorFore: Specifies the **foreground color** of the cell fill pattern. Because **fls** is 0x00000000, which specifies that no fill pattern is applied, values for **brtColorFore.fValidRGB**, **brtColorFore.xColorType**, **brtColorFore.index**, **brtColorFore.nTintAndShade**, **brtColorFore.bRed**, **brtColorFore.bGreen**, **brtColorFore.bBlue**, and **brtColorFore**.**bAlpha** are ignored and are omitted for brevity.

brtColorBack: Specifies the **background color** of the cell fill pattern. Because **fls** is 0x00000000, which specifies that no fill pattern is applied, values for **brtColorBack.fValidRGB**, **brtColorBack.xColorType**, **brtColorBack.index**, **brtColorBack.nTintAndShade**, **brtColorBack.bRed**, **brtColorBack.bGreen**, **brtColorBack.bBlue**, and **brtColorBack**.**bAlpha** are ignored and are omitted for brevity.

iGradientType: 0x00000000 specifies that the **gradient fill** applied is a **linear gradient**. This field is 0 and is ignored because **fls** is not 0x0028, which specifies that no gradient fill is applied.

xnumDegree: 0x0000000000000000 specifies that the **gradient vector** applied is horizontal from left to right. This field is 0 and is ignored because **fls** is not 0x0028, which specifies that no gradient fill is applied.

xnumFillToLeft: 0x0000000000000000 specifies that the left edge of the **inner rectangle** is the left edge of the cell. This field is 0 and is ignored because **fls** is not 0x0028, which specifies that no gradient fill is applied.

xnumFillToRight: 0x0000000000000000 specifies that the right edge of the inner rectangle is the right edge of the cell. This field is 0 and is ignored because **fls** is not 0x0028, which specifies that no gradient fill is applied.

xnumFillToTop: 0x0000000000000000 specifies that the top edge of the inner rectangle is the top edge of the cell. This field is 0 and is ignored because **fls** is not 0x0028, which specifies that no gradient fill is applied.

xnumFillToBottom: 0x0000000000000000 specifies that the bottom edge of the inner rectangle is the bottom edge of the cell. This field is 0 and is ignored because **fls** is not 0x0028, which specifies that no gradient fill is applied.

cNumStop: 0x00000000 specifies that there are no **GradientStop** (section 2.5.67) structures. This field is 0 and is ignored because **fls** is not 0x0028, which specifies that no gradient fill is applied.

The next record in this example, **BrtFill** (section 2.4.668), specifies a legacy fill pattern that is written but not referenced by this example and is omitted for brevity.

3.6.13 Formatting: BrtFill 2

The next record in this example, **BrtFill** (section 2.4.668), specifies the **fill pattern** applied to **cell** B5, as specified in the following table.

Size	Structure	Value
0044	BrtFill **- BrtFill**	
0004	DWORD **- fls**	0x00000001
0008	BrtColor **- brtColorFore**	
1 bit	BYTE **- fValidRGB**	0x1

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Size	Structure	Value
7 bits	XColorType **- xColorType**	0x02
0001	BYTE **- index**	0xFF
0002	SHORT **- nTintAndShade**	0x0000
0001	BYTE **- bRed**	0xFF
0001	BYTE **- bGreen**	0xFF
0001	BYTE **- bBlue**	0x00
0001	BYTE **- bAlpha**	0xFF
0008	BrtColor **- brtColorBack**	
1 bit	BYTE **- fValidRGB**	0x1
7 bits	XColorType **- xColorType**	0x01
0001	BYTE **- index**	0x40
0002	SHORT **- nTintAndShade**	0x0000
0001	BYTE **- bRed**	0x00
0001	BYTE **- bGreen**	0x00
0001	BYTE **- bBlue**	0x00
0001	BYTE **- bAlpha**	0xFF
0004	LONG **- iGradientType**	0x00000000
0008	Xnum **- xnumDegree**	0x0000000000000000
0008	Xnum **- xnumFillToLeft**	0x0000000000000000
0008	Xnum **- xnumFillToRight**	0x0000000000000000
0008	Xnum **- xnumFillToTop**	0x0000000000000000
0008	Xnum **- xnumFillToBottom**	0x0000000000000000
0004	DWORD **- cNumStop**	0x00000000

Structure of BrtFill

Fields in this record that are explained in previous records in this example are omitted for brevity.

fls: 0x00000001 specifies that the fill pattern is a solid fill.

brtColorFore: Specifies that the **foreground color** of the cell fill pattern is yellow.

brtColorFore.fValidRGB: 0x01 specifies that the color specified by **brtColor.index** matches the color specified by **brtColor.bRed**, **brtColor.bGreen**, **brtColor.bBlue**, and **brtColor.bAlpha**

brtColorFore.xColorType: 0x02 specifies that this color is a standard **RGBA** color and is specified by the values in **brtColorFore.bRed**, **brtColorFore.bGreen**, **brtColorFore.bBlue**, and **brtColorFore.bAlpha**.

brtColorFore.index: This field is ignored because **brtColor.xColorType** is 0x02.

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brtColorFore.nTintAndShade: 0x0000 specifies that no tint or shade is applied.

brtColorFore.bRed: 0xFF specifies that the color has maximum red intensity.

brtColorFore.bGreen: 0xFF specifies that the color has maximum green intensity.

brtColorFore.bBlue: 0x00 specifies that the color has no blue intensity.

brtColorFore.bAlpha: 0xFF specifies that the color is completely is completely opaque.

brtColorBack: Specifies the **background color** of the cell fill pattern. Because **fls** is 0x00000000, which specifies that no fill pattern is applied, values for **brtColorBack.fValidRGB**, **brtColorBack.xColorType**, **brtColorBack.index**, **brtColorBack.nTintAndShade**, **brtColorBack.bRed**, **brtColorBack.bGreen**, **brtColorBack.bBlue**, and **brtColorBack.bAlpha** are ignored and are omitted for brevity.

3.6.14 Formatting: BrtEndFills

The next record in this example, **BrtEndFills** (section 2.4.431), specifies the end of the collection of **BrtFill** (section 2.4.668) records, as specified in the following table.

Size	Structure
0000	BrtEndFills **- BrtEndFills**

Structure of BrtEndFills

3.6.15 Formatting: BrtBeginCellStyleXFs

The next record in this example, **BrtBeginCellStyleXFs** (section 2.4.19), specifies a count of **BrtXF** (section 2.4.845) records and the beginning of a collection of **BrtXF** records that specifies the cell style XFs (section 2.2.6.1.2.1) in the **workbook**, as specified in the following table.

Size	Structure	Value
0004	BrtBeginCellStyleXFs **- BrtBeginCellStyleXfs**	
0004	DWORD **- cxfs**	0x00000001

Structure of BrtBeginCellStyleXfs

cxfs: 0x00000001 specifies that there is one **BrtXF** record in this collection.

3.6.16 Formatting: BrtXF 1

The next record in this example, **BrtXF** (section 2.4.845), specifies the formatting properties for the cell style XFs (section 2.2.6.1.2.1), as specified in the following table.

Size	Structure	Value
0010	BrtXF **- BrtXf**	
0002	WORD **- ixfeParent**	0xFFFF
0002	Ifmt **- iFmt**	
0002	WORD **- ifmt**	0x0000
0002	WORD **- iFont**	0x0000

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Size	Structure	Value
0002	WORD **- iFill**	0x0000
0002	WORD **- ixBorder**	0x0000
0001	BYTE **- trot**	0x00
0001	BYTE **- indent**	0x00
3 bits	BYTE **- alc**	0x0
3 bits	BYTE **- alcv**	0x2
1 bit	BYTE **- fWrap**	0x0
1 bit	BYTE **- fJustLast**	0x0
1 bit	BYTE **- fShrinkToFit**	0x0
1 bit	BYTE **- fMergeCell**	0x0
2 bits	BYTE **- iReadingOrder**	0x0
1 bit	BYTE **- fLocked**	0x1
1 bit	BYTE **- fHidden**	0x0
1 bit	BYTE **- fSxButton**	0x0
1 bit	BYTE **- f123Prefix**	0x0
6 bits	WORD **- xfGrbitAtr**	0x00
10 bits	WORD **- unused**	0x000

Structure of BrtXf

ixfeParent: 0xFFFF specifies that this record is a cell style (section 2.2.6.1.2) **BrtXF** (section 2.4.845) record.

iFmt: Specifies the index of the **BrtFmt** (section 2.4.675) that specifies the **number format** of the **cell**.

iFmt.ifmt: 0x0000 specifies that the number format of the cell is specified by the first **BrtFmt** record following **BrtBeginFmts** (section 2.4.86).

iFont: 0x0000 specifies that the **font** of the cell is specified by the first **BrtFont** (section 2.4.677) record following **BrtBeginFonts** (section 2.4.88).

iFill: 0x0000 specifies that the fill properties of the cell are specified by the first **BrtFill** (section 2.4.668) record following **BrtBeginFills** (section 2.4.82).

ixBorder: 0x0000 specifies that the **border** properties of the cell are specified by the first **BrtBorder** (section 2.4.309) record following **BrtBeginBorders** (section 2.4.12). **BrtBorder** records are omitted for brevity.

trot: 0x00 specifies that the text rotation is horizontal.

indent: 0x00 specifies that there is no indentation for the text in the cell.

alc: 0x00 specifies that the cell has a general **horizontal alignment**.

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alcv: 0x02 specifies that the cell has a bottom **vertical alignment**.

fWrap: 0x00 specifies that the text in the cell is not line-wrapped within the cell.

fJustLast: 0x00 specifies that the **justify alignment** or **distributed alignment** is not applied to the last line of text in the cell.

fShrinkToFit: 0x00 specifies that **shrink to fit** is not applied to the text in the cell.

fMergeCell: 0x00 specifies that the cell is not a part of a **merged cell**.

iReadingOrder: 0x00 specifies that the **reading order** of the cell is context-dependent.

fLocked: 0x01 specifies that the cell is **locked** for user editing.

fHidden: 0x00 specifies that the cell is not **hidden**.

fSxButton: 0x00 specifies that the cell does not have a **PivotTable** (section 2.2.5) dropdown button.

f123Prefix: 0x00 specifies that the text in the cell is not prefixed by a single quote mark.

xfGrbitAtr: 0x0000 specifies the cell formatting properties applied to the cell according to the following table:

Offset	Field Name	Bits	Meaning
0	ibitAtrNum	1	0x0 specifies that the number property of the formatting for this cell is applied.
1	ibitAtrFnt	1	0x0 specifies that the font property of the formatting for this cell is applied.
2	ibitAtrAlc	1	0x0 specifies that the alignment property of the formatting for this cell is applied.
3	ibitAtrBdr	1	0x0 specifies that the border property of the formatting for this cell is applied.
4	ibitAtrPat	1	0x0 specifies that the fill property of the formatting for this cell is applied.
5	ibitAtrProt	1	0x0 specifies that the **protection** property of the formatting for this cell is applied.

3.6.17 Formatting: BrtEndCellStyleXFs

The next record in this example, **BrtEndCellStyleXFs** (section 2.4.371), specifies the end of the collection of **BrtXF** (section 2.4.845) records that specifies all cell style XFs (section 2.2.6.1.2.1) in the **workbook**, as specified in the following table.

Size	Structure
0000	BrtEndCellStyleXFs **- BrtEndCellStyleXfs**

Structure of BrtEndCellStyleXfs

3.6.18 Formatting: BrtBeginCellXFs

The next record in this example, **BrtBeginCellXFs** (section 2.4.21), specifies a count of **BrtXF** (section 2.4.845) records and the beginning of a collection of **BrtXF** records that specifies all cell **XFs** (section 2.2.6.1.1) in the **workbook**, as specified in the following table.

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Size	Structure	Value
0004	BrtBeginCellXFs **- BrtBeginCellXfs**	
0004	ULONG **- cxfs**	0x00000004

Structure of BrtBeginCellXfs

cxfs: 0x00000004 specifies that there are four **BrtXf** records in this collection.

3.6.19 Formatting: BrtXF 2

The next record in this example, **BrtXF** (section 2.4.845), specifies the default **cell** formatting for the **workbook**, as specified in the following table.

Size	Structure	Value
0010	BrtXF **- BrtXf**	
0002	WORD **- ixfeParent**	0x0000
0002	Ifmt **- iFmt**	
0002	WORD **- ifmt**	0x0000
0002	WORD **- iFont**	0x0000
0002	WORD **- iFill**	0x0000
0002	WORD **- ixBorder**	0x0000
0001	BYTE **- trot**	0x00
0001	BYTE **- indent**	0x00
3 bits	BYTE **- alc**	0x0
3 bits	BYTE **- alcv**	0x2
1 bit	BYTE **- fWrap**	0x0
1 bit	BYTE **- fJustLast**	0x0
1 bit	BYTE **- fShrinkToFit**	0x0
1 bit	BYTE **- fMergeCell**	0x0
2 bits	BYTE **- iReadingOrder**	0x0
1 bit	BYTE **- fLocked**	0x1
1 bit	BYTE **- fHidden**	0x0
1 bit	BYTE **- fSxButton**	0x0
1 bit	BYTE **- f123Prefix**	0x0
6 bits	WORD **- xfGrbitAtr**	0x00
10 bits	WORD **- unused**	0x000

Structure of BrtXf

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Fields in this record that are explained in previous records in this example are omitted for brevity.

ixfeParent: 0x0000 specifies that the parent cell style (section 2.2.6.1.2) is the first **BrtXF** (section 2.4.845) in the **BrtBeginCellStyleXFs** (section 2.4.19) collection.

xfGrbitAtr: 0x0000 specifies the cell formatting properties that are overwritten according to the following table:

Offset	Field Name	Bits	Meaning
0	ibitAtrNum	1	0x0 specifies that the number property of the formatting for this cell is not inherited.
1	ibitAtrFnt	1	0x0 specifies that the **font** property of the formatting for this cell is not inherited.
2	ibitAtrAlc	1	0x0 specifies that the alignment property of the formatting for this cell is not inherited.
3	ibitAtrBdr	1	0x0 specifies that the **border** property of the formatting for this cell is not inherited.
4	ibitAtrPat	1	0x0 specifies that the fill property of the formatting for this cell is not inherited.
5	ibitAtrProt	1	0x0 specifies that the **protection** property of the formatting for this cell is not inherited.

3.6.20 Formatting: BrtXF 3

The next record in this example, **BrtXF** (section 2.4.845), specifies the formatting for **cells** in this workbook, as specified in the following table. The cell that references this formatting in this example is cell B3.

Size	Structure	Value
0010	BrtXF **- BrtXf**	
0002	WORD **- ixfeParent**	0x0000
0002	Ifmt **- iFmt**	
0002	WORD **- ifmt**	0x0002
0002	WORD **- iFont**	0x0000
0002	WORD **- iFill**	0x0000
0002	WORD **- ixBorder**	0x0000
0001	BYTE **- trot**	0x00
0001	BYTE **- indent**	0x00
3 bits	BYTE **- alc**	0x0
3 bits	BYTE **- alcv**	0x2
1 bit	BYTE **- fWrap**	0x0
1 bit	BYTE **- fJustLast**	0x0
1 bit	BYTE **- fShrinkToFit**	0x0

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Size	Structure	Value
1 bit	BYTE **- fMergeCell**	0x0
2 bits	BYTE **- iReadingOrder**	0x0
1 bit	BYTE **- fLocked**	0x1
1 bit	BYTE **- fHidden**	0x0
1 bit	BYTE **- fSxButton**	0x0
1 bit	BYTE **- f123Prefix**	0x0
6 bits	WORD **- xfGrbitAtr**	0x01
10 bits	WORD **- unused**	0x000

Structure of BrtXf

Fields in this record that are explained in previous records in this example are omitted for brevity.

iFmt.ifmt: 0x0002 specifies that the **number format** of the cell is specified by the third **BrtFmt** (section 2.4.675) record following **BrtBeginFmts** (section 2.4.86).

xfGrbitAtr: 0x0001 specifies the cell formatting properties that are overwritten according to this table:

Offset	Field Name	Bits	Meaning
0	ibitAtrNum	1	0x1 specifies that the number property of the formatting for this cell is overwritten.
1	ibitAtrFnt	1	0x0 specifies that the **font** property of the formatting for this cell is not inherited.
2	ibitAtrAlc	1	0x0 specifies that the alignment property of the formatting for this cell is not inherited.
3	ibitAtrBdr	1	0x0 specifies that the **border** property of the formatting for this cell is not inherited.
4	ibitAtrPat	1	0x0 specifies that the fill property of the formatting for this cell is not inherited.
5	ibitAtrProt	1	0x0 specifies that the **protection** property of the formatting for this cell is not inherited.

3.6.21 Formatting: BrtXF 4

The next record in this example, **BrtXF** (section 2.4.845), specifies the formatting for **cell** B4, as specified in the following table.

Size	Structure	Value
0010	BrtXF **- BrtXf**	
0002	WORD **- ixfeParent**	0x0000
0002	Ifmt **- iFmt**	
0002	WORD **- ifmt**	0x00A6
0002	WORD **- iFont**	0x0000

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Size	Structure	Value
0002	WORD **- iFill**	0x0000
0002	WORD **- ixBorder**	0x0000
0001	BYTE **- trot**	0x00
0001	BYTE **- indent**	0x00
3 bits	BYTE **- alc**	0x0
3 bits	BYTE **- alcv**	0x2
1 bit	BYTE **- fWrap**	0x0
1 bit	BYTE **- fJustLast**	0x0
1 bit	BYTE **- fShrinkToFit**	0x0
1 bit	BYTE **- fMergeCell**	0x0
2 bits	BYTE **- iReadingOrder**	0x0
1 bit	BYTE **- fLocked**	0x1
1 bit	BYTE **- fHidden**	0x0
1 bit	BYTE **- fSxButton**	0x0
1 bit	BYTE **- f123Prefix**	0x0
6 bits	WORD **- xfGrbitAtr**	0x01
10 bits	WORD **- unused**	0x000

Structure of BrtXf

Fields in this record that are explained in previous records in this example are omitted for brevity.

iFmt.ifmt: 0x00A6 specifies the identifier of the custom **number format** for cell B4.

3.6.22 Formatting: BrtXF 5

The next record in this example, **BrtXF** (section 2.4.845), specifies the formatting for **cell** B5, as specified in the following table.

Size	Structure	Value
0010	BrtXF **- BrtXf**	
0002	WORD **- ixfeParent**	0x0000
0002	Ifmt **- iFmt**	
0002	WORD **- ifmt**	0x0000
0002	WORD **- iFont**	0x0001
0002	WORD **- iFill**	0x0002
0002	WORD **- ixBorder**	0x0000

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Size	Structure	Value
0001	BYTE **- trot**	0x00
0001	BYTE **- indent**	0x00
3 bits	BYTE **- alc**	0x0
3 bits	BYTE **- alcv**	0x2
1 bit	BYTE **- fWrap**	0x0
1 bit	BYTE **- fJustLast**	0x0
1 bit	BYTE **- fShrinkToFit**	0x0
1 bit	BYTE **- fMergeCell**	0x0
2 bits	BYTE **- iReadingOrder**	0x0
1 bit	BYTE **- fLocked**	0x1
1 bit	BYTE **- fHidden**	0x0
1 bit	BYTE **- fSxButton**	0x0
1 bit	BYTE **- f123Prefix**	0x0
6 bits	WORD **- xfGrbitAtr**	0x12
10 bits	WORD **- unused**	0x000

Structure of BrtXf

Fields in this record that are explained in previous records in this example are omitted for brevity.

iFont: 0x0001 specifies that the **font** of cell B5 is specified by the second **BrtFont** (section 2.4.677) record following **BrtBeginFonts** (section 2.4.88).

iFill: 0x0002 specifies that the fill properties of cell B5 are specified by the third **BrtFill** (section 2.4.668) record following **BrtBeginFills** (section 2.4.82).

xfGrbitAtr: 0x0012 specifies the cell formatting properties that are overwritten according to the following table:

Offset	Field Name	Bits	Meaning
0	ibitAtrNum	1	0x0 specifies that the number property of the formatting for this cell is overwritten.
1	ibitAtrFnt	1	0x1 specifies that the font property of the formatting for this cell is not overwritten.
2	ibitAtrAlc	1	0x0 specifies that the alignment property of the formatting for this cell is overwritten.
3	ibitAtrBdr	1	0x0 specifies that the **border** property of the formatting for this cell is overwritten.
4	ibitAtrPat	1	0x1 specifies that the fill property of the formatting for this cell is not overwritten.
5	ibitAtrProt	1	0x0 specifies that the **protection** property of the formatting for this cell is overwritten.

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3.6.23 Formatting: BrtEndCellXFs

This **BrtEndCellXFs** (section 2.4.373) record specifies the end of the collection of **BrtXF** (section 2.4.845) records that specifies all cell **XFs** (section 2.2.6.1.1) in the **workbook**, as specified in the following table.

Size	Structure
0000	BrtEndCellXFs **- BrtEndCellXfs**

Structure of BrtEndCellXfs

3.7 Workbook

This example shows a **workbook** that contains three worksheets (section 2.1.7.62). The **sheet** names are Sheet1, Sheet2 and Sheet3. On Sheet1, there is content in the following **cells**:

- Cell B4 has a string "Number"
- Cell B5 has the number 1
- Cell B6 has a string "Formula"
- Cell B7 has the following formula (section 2.2.2): =SQRT(B5*2)

Sheet2 and Sheet3 are empty sheets and their record details are not documented in this example.

This example is illustrated by the following figure.

The **BrtBeginBook** (section 2.4.10) and **BrtEndBook** (section 2.4.362) records and all the records in between are contained in the **Workbook** (section 2.1.7.61) part **ABNF**.

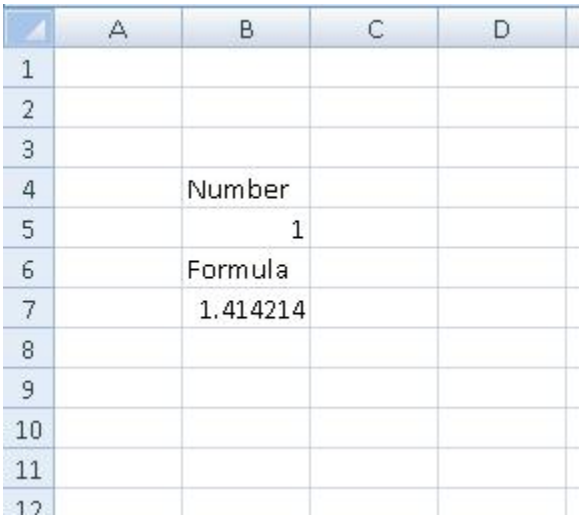

Figure 26: Sheet within a workbook

3.7.1 Workbook: BrtBeginBook

The first record in this example specifies the beginning of a collection of records that specifies properties of a **workbook**, as specified in the following table.

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Size	Structure
0000	BrtBeginBook **- BrtBeginBook**

Structure of BrtBeginBook

3.7.2 Workbook: BrtFileVersion

This next record in this example, **BrtFileVersion** (section 2.4.667), specifies which application and which versions of that application accessed the data contained in the file, as specified in the following table.

Size	Structure	Value
0030	BrtFileVersion **- BrtFileVersion**	
0010	GUID **- guidCodeName**	0x00000000000000000000000000000000
0008	XLNullableWideString **- stAppName**	xl
0006	XLNullableWideString **- stLastEdited**	4
0006	XLNullableWideString **- stLowestEdited**	4
000C	XLNullableWideString **- stRupBuild**	4505

Structure of BrtFileVersion

guidCodeName: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 specifies that the **VBA project** needs to be recompiled on load.

stAppName: "xl" specifies that Excel is the application name.

stLastEdited: "4" specifies that Microsoft Office Excel 2007 is the version of the application that last saved the file.

stLowestEdited: "4" specifies that Office Excel 2007 is the earliest version of the application that saved the file.

stRupBuild: "4505" specifies the **build number** of the application.

3.7.3 Workbook: BrtWbProp

The next record in this example, **BrtWbProp** (section 2.4.836), specifies properties of the **workbook**, as specified in the following table.

Size	Structure	Value
000C	BrtWbProp **- BrtWbProp**	
1 bit	BOOL **- f1904**	0x0
1 bit	BOOL **- reserved1**	0x0
1 bit	BOOL **- fHideBorderUnselLists**	0x0
1 bit	BOOL **- fFilterPrivacy**	0x0
1 bit	BOOL **- fBuggedUserAboutSolution**	0x0
1 bit	BOOL **- fShowInkAnnotation**	0x1

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Size	Structure	Value
1 bit	BOOL **- fBackup**	0x0
1 bit	BOOL **- fNoSaveSup**	0x0
2 bits	DWORD **- grbitUpdateLinks**	0x0
1 bit	BOOL **- fHidePivotTableFList**	0x0
1 bit	BOOL **- fPublishedBookItems**	0x0
1 bit	BOOL **- fCheckCompat**	0x0
2 bits	DWORD **- mdDspObj**	0x0
1 bit	BOOL **- fShowPivotChartFilter**	0x0
1 bit	BOOL **- fAutoCompressPictures**	0x1
1 bit	BOOL **- reserved2**	0x0
1 bit	BOOL **- fRefreshAll**	0x0
13 bits	DWORD **- unused**	0x0000
0004	DWORD **- dwThemeVersion**	0x0001E542
0004	CodeName **- strName**	empty string

Structure of BrtWbProp

f1904: 0x0 specifies that the 1900 **date system** is the date system used in this workbook.

fHideBorderUnselLists: 0x0 specifies that **table borders** are not **visible** when a table is not active.

fFilterPrivacy: 0x0 specifies that personally identifiable information is not removed from this workbook on save.

fBuggedUserAboutSolution: 0x0 specifies that a warning will not appear before opening a **smart document manifest** file.

fShowInkAnnotation: 0x1 specifies that **ink** comments are visible in this workbook.

fBackup: 0x0 specifies that the backup feature is not enabled for the workbook.

fNoSaveSup: 0x0 specifies that the **external link** values are not cached with the workbook on save.

grbitUpdateLinks: 0x0 specifies that the link update behavior is application specific.

fHidePivotTableFList: 0x0 specifies that PivotTable view (section 2.2.5.3) field lists are not hidden.

fPublishedBookItems: 0x0 specifies each **sheet** is **published** according to its own publishing state as specified by the **fPublish** field of the **BrtWsProp** (section 2.4.844) structure.

fCheckCompat: 0x0 specifies that the **file format compatibility checker** for the workbook is not enabled.

mdDspObj: 0x0 specifies that the **shapes** in the workbook are visible.

fShowPivotChartFilter: 0x0 specifies that the pivot chart (section 2.2.3.2) filter pane is not visible.

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fAutoCompressPictures: 0x1 specifies that the pictures in the workbook are compressed when the workbook is saved.

fRefreshAll: 0x0 specifies that external connections (section 2.2.8) in the workbook are not refreshed when the workbook is opened.

dwThemeVersion: 0x0001E542 specifies the version number of the **theme** applied to the workbook.

strName: The empty string specifies this workbook doesn't contain a **VBA project**.

3.7.4 Workbook: BrtBeginBookViews

The next record in this example, **BrtBeginBookViews** (section 2.4.11), specifies the beginning of a collection of **BrtBookView** (section 2.4.308) records, as specified in the following table.

Size	Structure
0000	BrtBeginBookViews **- BrtBeginBookViews**

Structure of BrtBeginBookViews

3.7.5 Workbook: BrtBookView

The next record in this example, **BrtBookView** (section 2.4.308) specifies a single **workbook view**, as specified in the following table.

Size	Structure	Value
001D	BrtBookView **- BrtBookView**	
0004	LONG **- xWn**	0x00000078
0004	LONG **- yWn**	0x0000001E
0004	DWORD **- dxWn**	0x00005CD0
0004	DWORD **- dyWn**	0x00003930
0004	DWORD **- iTabRatio**	0x00000258
0004	DWORD **- itabFirst**	0x00000000
0004	DWORD **- itabCur**	0x00000000
1 bit	BYTE **- fHidden**	0x0
1 bit	BYTE **- fVeryHidden**	0x0
1 bit	BYTE **- fIconic**	0x0
1 bit	BYTE **- fDspHScroll**	0x1
1 bit	BYTE **- fDspVScroll**	0x1
1 bit	BYTE **- fBotAdornment**	0x1
1 bit	BYTE **- fAFDateGroup**	0x1
1 bit	BYTE **- unused**	0x0

Structure of BrtBookView

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xWn: 0x00000078 specifies that the X coordinate for the top-left corner of the window that contains the **workbook** is 120 **twips**.

yWn: 0x0000001E specifies that the Y coordinate for the top-left corner of the window that contains the workbook is 30 twips.

dxWn: 0x00005CD0 specifies that the width of the window that contains the workbook is 23760 twips.

dyWn: 0x00003930 specifies that the height of the window that contains the workbook is 14640 twips.

iTabRatio: 0x00000258 specifies that the ratio of the width of the **sheet tabs** to the width of the horizontal scroll bar is 600.

itabFirst: 0x00000000 specifies the first **sheet** in this workbook view, which is the **BrtBundleSh** (section 2.4.311) record in the collection of all records directly following **BrtBeginBundleShs** (section 2.4.13).

itabCur: 0x00000000 specifies the **active sheet** in this workbook view, which is the **BrtBundleSh** record in the collection of all records directly following **BrtBeginBundleShs**.

fHidden: 0x0 specifies that the window that contains the workbook is not hidden.

fVeryHidden: 0x0 specifies that the window that contains the workbook is not hidden.

fIconic: 0x0 specifies that the window that contains the workbook is not minimized.

fDspHScroll: 0x1 specifies that the horizontal scrollbar is displayed in the workbook view.

fDspVScroll: 0x1 specifies that the vertical scrollbar is displayed in the workbook view.

fBotAdornment: 0x1 specifies that the sheet tabs are displayed in the workbook view.

fAFDateGroup: 0x1 specifies to group dates with the filtering options in the user interface.

3.7.6 Workbook: BrtEndBookViews

The next record in this example, **BrtEndBookViews** (section 2.4.363), specifies the end of a collection of **BrtBookView** (section 2.4.308) records, as specified in the following table.

Size	Structure
0000	BrtEndBookViews **- BrtEndBookViews**

Structure of BrtEndBookViews

3.7.7 Workbook: BrtBeginBundleShs

The next record in this example, **BrtBeginBundleShs** (section 2.4.13), specifies the beginning of a collection of **BrtBundleSh** (section 2.4.311) records, as specified in the following table.

Size	Structure
0000	BrtBeginBundleShs **- BrtBeginBundleShs**

Structure of BrtBeginBundleShs

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3.7.8 Workbook: BrtBundleSh 1

The next record in this example, **BrtBundleSh** (section 2.4.311), specifies the first **sheet** in the **workbook**, as specified in the following table.

Size	Structure	Value
0024	BrtBundleSh **- BrtBundleSh**	
0004	ST_SheetState **- hsState**	0x00000000
0004	DWORD **- itabID**	0x00000001
000C	RelID **- strRelID**	rId1
0010	XLWideString **- strName**	Sheet1

Structure of BrtBundleSh

hsState: 0x00000000 specifies that the sheet is **visible**.

itabID: 0x00000001 specifies the unique identifier for the sheet.

strRelID: "rId1" specifies the **RelID** (section 2.5.114) listed in the sheet1.bin.rels part that identifies the path to the **table** part within the package.

strName: "Sheet1" specifies the unique case-insensitive name of the sheet.

3.7.9 Workbook: BrtBundleSh 2

The next record in this example specifies the second **sheet** in the **workbook**, as specified in the following table.

Size	Structure	Value
0024	BrtBundleSh **- BrtBundleSh**	
0004	ST_SheetState **- hsState**	0x00000000
0004	DWORD **- itabID**	0x00000002
000C	RelID **- strRelID**	rId2
0010	XLWideString **- strName**	Sheet2

Structure of BrtBundleSh

Fields in this record are explained in a previous record in this example and are omitted for brevity.

3.7.10 Workbook: BrtBundleSh 3

The next record in this example specifies the third **sheet** in the **workbook**, as specified in the following table.

Size	Structure	Value
0024	BrtBundleSh **- BrtBundleSh**	
0004	ST_SheetState **- hsState**	0x00000000
0004	DWORD **- itabID**	0x00000003

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Size	Structure	Value
000C	RelID **- strRelID**	rId3
0010	XLWideString **- strName**	Sheet3

Structure of BrtBundleSh

Fields in this record are explained in a previous record in this example and are omitted for brevity.

3.7.11 Workbook: BrtEndBundleShs

The next record in this example, **BrtEndBundleShs** (section 2.4.365), specifies the end of a collection of **BrtBundleSh** (section 2.4.311) records, as specified in the following table.

Size	Structure
0000	BrtEndBundleShs **- BrtEndBundleShs**

Structure of BrtEndBundleShs

3.7.12 Workbook: BrtCalcProp

The next record in this example, **BrtCalcProp** (section 2.4.313), specifies **workbook** calculation properties, as specified in the following table.

Size	Structure	Value
001A	BrtCalcProp **- BrtCalcProp**	
0004	DWORD **- recalcID**	0x0001EB1D
0004	LONG **- fAutoRecalc**	0x00000001
0004	DWORD **- cCalcCount**	0x00000064
0008	Xnum **- xnumDelta**	0x3F50624DD2F1A9FC
0004	LONG **- cUserThreadCount**	0x00000001
1 bit	WORD **- fFullCalcOnLoad**	0x0
1 bit	WORD **- fRefA1**	0x1
1 bit	WORD **- fIter**	0x0
1 bit	WORD **- fFullPrec**	0x1
1 bit	WORD **- fSomeUncalced**	0x0
1 bit	WORD **- fSaveRecalc**	0x1
1 bit	WORD **- fMTREnabled**	0x1
1 bit	WORD **- fUserSetThreadCount**	0x0
1 bit	WORD **- fNoDeps**	0x0
7 bits	WORD **- reserved**	0x00

Structure of BrtCalcProp

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recalcID: 0x0001EB1D specifies the version of the calculation engine that was last used to calculate values in the workbook.

fAutoRecalc: 0x00000001 specifies that the workbook is in **automatic calculation mode**.

cCalcCount: 0x00000064 specifies that the number of iterations to run when calculating a workbook in **iterative calculation** mode is 100.

xnumDelta: 0x3F50624DD2F1A9FC specifies an **Xnum** (section 2.5.171) value of 0.001 that specifies that the application stops calculating after **cCalcCount** iterations or after all values in the circular reference change by less than .001 between iterations, whichever comes first.

cUserThreadCount: 0x00000001 specifies that one concurrent calculation process is to be used to calculate this workbook.

fFullCalcOnLoad: 0x0 specifies not to perform a full calculation on load.

fRefA1: 0x1 specifies that the **A1** reference style is used in the workbook.

fIter: 0x0 specifies that the application does not attempt to calculate formulas (section 2.2.2) that contain circular references.

fFullPrec: 0x1 specifies that the **precision as displayed** mode is not selected.

fSomeUncalced: 0x0 specifies that the workbook is recalculated fully before save.

fSaveRecalc: 0x1 specifies that the application will recalculate values in the workbook on save when in **manual calculation mode**.

fMTREnabled: 0x1 specifies that concurrent calculation processes are enabled for this workbook.

fUserSetThreadCount: 0x0 specifies that the user has not set the number of concurrent calculation processes for this workbook.

fNoDeps: 0x0 specifies that dependencies are respected and only formulas that depend on **cells** that changed in the workbook are calculated.

3.7.13 Workbook: BrtWbFactoid

The next record in this example, **BrtWbFactoid** (section 2.4.835), specifies a collection of properties for **smart tags**, as specified in the following table.

Size	Structure	Value
0001	BrtWbFactoid **- BrtWbFactoid**	
1 bit	BYTE **- fEmbedFactoids**	0x0
2 bits	BYTE **- mdFactoidDisplay**	0x0
5 bits	BYTE **- unused**	0x00

Structure of BrtWbFactoid

fEmbedFactoids: 0x00 specifies that smart tags are not saved with the **workbook**.

mdFactoidDisplay: 0x00 specifies that the **smart tag actions button** and the **smart tag indicator** are **visible** at runtime.

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3.7.14 Workbook: BrtFileRecover

The next record in this example, **BrtFileRecover** (section 2.4.664), specifies the state of the **workbook** file for **AutoRecover** information, as specified in the following table.

Size	Structure	Value
0001	BrtFileRecover **- BrtFileRecover**	
1 bit	BYTE **- fDontAutoRecover**	0x0
1 bit	BYTE **- fSavedDuringRecovery**	0x0
1 bit	BYTE **- fCreatedViaMinimalSave**	0x0
1 bit	BYTE **- fOpenedViaDataRecovery**	0x0
1 bit	BYTE **- fOpenedViaSafeLoad**	0x0
3 bits	BYTE **- reserved**	0x0

Structure of BrtFileRecover

fDontAutoRecover: 0x00 specifies that the AutoRecover information has not been disabled for the workbook.

fSavedDuringRecovery: 0x00 specifies that the workbook was not saved during the AutoRecover process.

fCreatedViaMinimalSave: 0x00 specifies that the workbook was not created by a **minimal save** during **data recovery**.

fOpenedViaDataRecovery: 0x00 specifies that the workbook was not opened by a data recovery operation.

fOpenedViaSafeLoad: 0x00 specifies that the workbook was not opened in **safe load** mode.

3.7.15 Workbook: BrtEndBook

The next record in this example, **BrtEndBook** (section 2.4.362), specifies the end of a collection of records that specifies properties of the **workbook**, as specified in the following table.

Size	Structure
0000	BrtEndBook **- BrtEndBook**

Structure of BrtEndBook

3.7.16 Workbook: BrtBeginSst

The next record in this example, **BrtBeginSst** (section 2.4.228), specifies properties of a shared string table and the beginning of a collection of **BrtSSTItem** (section 2.4.781) records, as specified in the following table.

Size	Structure	Value
0008	BrtBeginSst **- BrtBeginSst**	
0004	DWORD **- cstTotal**	0x00000002

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Size	Structure	Value
0004	DWORD **- cstUnique**	0x00000002

Structure of BrtBeginSst

cstTotal: 0x00000002 specifies that the total number of references in the **workbook** to strings in the **BrtSSTItem** collection is 2.

cstUnique: 0x00000002 specifies that the number of unique strings in the **BrtSSTItem** collection is 2.

3.7.17 Workbook: BrtSSTItem 1

The next record in this example, **BrtSSTItem** (section 2.4.781), specifies an individual string in the shared string table, as specified in the following table.

Size	Structure	Value
0011	BrtSSTItem **- BrtSstItem**	
0011	RichStr **- richStr**	Number

Structure of BrtSstItem

richStr: "Number" specifies the type of the string.

3.7.18 Workbook: BrtSSTItem 2

The next record in this example, **BrtSSTItem** (section 2.4.781), specifies an individual string in the shared string table, as specified in the following table.

Size	Structure	Value
0013	BrtSSTItem **- BrtSstItem**	
0013	RichStr **- richStr**	Formula

Structure of BrtSstItem

richStr: "Formula" specifies the type of the string.

3.7.19 Workbook: BrtEndSst

The next record in this example, **BrtEndSst** (section 2.4.576), specifies the end of a collection of **BrtSSTItem** (section 2.4.781) records, as specified in the following table.

Size	Structure
0000	BrtEndSst **- BrtEndSst**

Structure of BrtEndSst

3.7.20 Workbook: BrtBeginSheet

The next record in this example, **BrtBeginSheet** (section 2.4.197), specifies the beginning of a collection of records that specifies **sheets**, as specified in the following table. Every sheet in the **workbook** starts with this record and ends with the **BrtEndSheet** (section 2.4.545) record.

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Size	Structure
0000	BrtBeginSheet **- BrtBeginSheet**

Structure of BrtBeginSheet

The records for the second and third sheets in the workbook are not included in this example.

3.7.21 Workbook: BrtWsProp

The next record in this example, **BrtWsProp** (section 2.4.844), specifies properties for the **worksheet**, as specified in the following table.

Size	Structure	Value
0017	BrtWsProp **- BrtWsProp**	
1 bit	USHORT **- fShowAutoBreaks**	0x1
2 bits	USHORT **- reserved1**	0x0
1 bit	USHORT **- fPublish**	0x1
1 bit	USHORT **- fDialog**	0x0
1 bit	USHORT **- fApplyStyles**	0x0
1 bit	USHORT **- fRowSumsBelow**	0x1
1 bit	USHORT **- fColSumsRight**	0x1
1 bit	USHORT **- fFitToPage**	0x0
1 bit	USHORT **- reserved2**	0x0
1 bit	USHORT **- fShowOutlineSymbols**	0x1
1 bit	USHORT **- reserved3**	0x0
1 bit	USHORT **- fSyncHoriz**	0x0
1 bit	USHORT **- fSyncVert**	0x0
1 bit	USHORT **- fAltExprEval**	0x0
1 bit	USHORT **- fAltFormulaEntry**	0x0
1 bit	BYTE **- fFilterMode**	0x0
1 bit	BYTE **- fCondFmtCalc**	0x1
6 bits	BYTE **- reserved4**	0x00
0008	BrtColor **- brtcolorTab**	
1 bit	BYTE **- fValidRGB**	0x0
7 bits	XColorType **- xColorType**	0x00
0001	BYTE **- index**	0x40
0002	SHORT **- nTintAndShade**	0x0000

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Size	Structure	Value
0001	BYTE **- bRed**	0x00
0001	BYTE **- bGreen**	0x00
0001	BYTE **- bBlue**	0x00
0001	BYTE **- bAlpha**	0x00
0004	Rw **- rwSync**	
0004	RwNullable **- rw**	0xFFFFFFFF
0004	Col **- colSync**	
0004	ColNullable **- col**	0xFFFFFFFF
0004	CodeName **- strName**	empty string

Structure of BrtWsProp

fShowAutoBreaks: 0x1 specifies that each automatic **page break** is **visible** on this **sheet**.

fPublish: 0x1 specifies that the **publish to server** feature is enabled for this sheet.

fDialog: 0x0 specifies that the sheet is not a **dialog sheet**.

fApplyStyles: 0x0 specifies not to apply the built-in cell style (section 2.2.6.1.2) when an **outline** is applied.

fRowSumsBelow: 0x1 specifies that a summary **row** appears below the detailed data rows.

fColSumsRight: 0x1 specifies that the summary **columns (1)** appear to the right in a sheet that is displayed left-to-right.

fFitToPage: 0x0 specifies not to fit the printable contents in a single page when printing this sheet.

fShowOutlineSymbols: 0x1 specifies that the sheet outline symbols are visible for the sheet.

fSyncHoriz: 0x0 specifies that horizontal scrolling is not synchronized across multiple windows that display this sheet.

fSyncVert: 0x0 specifies vertical scrolling is not synchronized across multiple windows that display this sheet.

fAltExprEval: 0x0 specifies that the sheet does not use **transition formula evaluation**.

fAltFormulaEntry: 0x0 specifies that the sheet does not use **transition formula entry**.

fFilterMode: 0x0 specifies that there are no **AutoFilters** on the sheet.

fCondFmtCalc: 0x1 specifies that **conditional formatting** is evaluated normally and all the existing conditional formatting will be updated as the **cells** associated with the conditional formatting change.

brtcolorTab: Specifies the **background color** of the **sheet tab**.

brtcolorTab.fValidRGB: 0x00 specifies that the color specified by the **index** field does not match the color specified by the **bRed**, **bGreen**, **bBlue**, and **bAlpha** fields.

brtcolorTab.xColorType: 0x00 specifies that color information is automatically determined by the application.

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brtcolorTab.index: 0x40 specifies this value is undefined and ignored.

brtcolorTab.nTintAndShade: 0x0000 specifies the amount of tint or **shade** applied to the color specified by the **index** field or the **bRed**, **bGreen**, **bBlue**, and **bAlpha** fields.

brtcolorTab.bRed: 0x00 specifies the intensity of the color red in this color.

brtcolorTab.bGreen: 0x00 specifies the intensity of the color green in this color.

brtcolorTab.bBlue: 0x00 specifies the intensity of the color blue in this color.

brtcolorTab.bAlpha: 0x00 specifies the transparency of this color.

rwSync: Specifies the anchor row for synchronous vertical scrolling.

rwSync.rw: 0xFFFFFFFF specifies that this value is ignored.

colSync: Specifies the anchor column (1) for synchronous horizontal scrolling.

colSync.col: 0xFFFFFFFF specifies that this value is ignored.

strName: The empty string specifies that there is no **module** associated with the sheet.

3.7.22 Workbook: BrtWsDim

The next record in this example, **BrtWsDim** (section 2.4.841), specifies the **row** and **column (1)** bounds of used **cells** in the **sheet**, as specified in the following table. Used cells include all cells with data, formulas (section 2.2.2), or formatting applied directly to the cell.

Size	Structure	Value
0010	BrtWsDim **- BrtWsDim**	
0010	UncheckedRfX **- rfx**	
0004	LONG **- rwFirst**	0x00000003
0004	LONG **- rwLast**	0x00000006
0004	LONG **- colFirst**	0x00000001
0004	LONG **- colLast**	0x00000001

Structure of BrtWsDim

rfx: Specifies the row and column (1) bounds of all the non-empty cells in this sheet, which is B4:B7.

rfx.rwFirst: 0x00000003 specifies the first row of the **range**, which is row 4.

rfx.rwLast: 0x00000006 specifies the last row of the range, which is row 7.

rfx.colFirst: 0x00000001 specifies the first column (1) of the range, which is column (1) B.

rfx.colLast: 0x00000001 specifies the last column (1) of the range, which is column (1) B.

3.7.23 Workbook: BrtBeginWsViews

The next record in this example, **BrtBeginWsViews** (section 2.4.303), specifies the beginning of a collection of **sheet views**, as specified in the following table.

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Size	Structure
0000	BrtBeginWsViews **- BrtBeginWsViews**

Structure of BrtBeginWsViews

3.7.24 Workbook: BrtBeginWsView

The next record in this example, **BrtBeginWsView** (section 2.4.302), specifies **sheet** view properties, as specified in the following table.

Size	Structure	Value
001E	BrtBeginWsView **- BrtBeginWsView**	
1 bit	USHORT **- fWnProt**	0x0
1 bit	USHORT **- fDspFmla**	0x0
1 bit	USHORT **- fDspGrid**	0x1
1 bit	USHORT **- fDspRwCol**	0x1
1 bit	USHORT **- fDspZeros**	0x1
1 bit	USHORT **- fRightToLeft**	0x0
1 bit	USHORT **- fSelected**	0x0
1 bit	USHORT **- fDspRuler**	0x1
1 bit	USHORT **- fDspGuts**	0x1
1 bit	USHORT **- fDefaultHdr**	0x1
1 bit	USHORT **- fWhitespaceHidden**	0x0
5 bits	USHORT **- reserved1**	0x00
0004	XLView **- xlView**	0x00000000
0004	LONG **- rwTop**	0x00000000
0004	LONG **- colLeft**	0x00000000
0001	BYTE **- icvHdr**	0x40
0001	BYTE **- reserved2**	0x00
0002	WORD **- reserved3**	0x0000
0002	USHORT **- wScale**	0x0064
0002	USHORT **- wScaleNormal**	0x0000
0002	USHORT **- wScaleSLV**	0x0000
0002	USHORT **- wScalePLV**	0x0000
0004	DWORD **- iWbkView**	0x00000000

Structure of BrtBeginWsView

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fWnProt: 0x0 specifies that the window that displays the sheet view is not **locked** because of **window protection**.

fDspFmla: 0x0 specifies that formulas (section 2.2.2) are not displayed in **cells** in the sheet view.

fDspGrid: 0x1 specifies that **gridlines** are displayed in the sheet view.

fDspRwCol: 0x1 specifies that **row** and **column (1)** headings are displayed in the sheet view.

fDspZeros: 0x1 specifies that cells with a value of 0 are displayed as numbers.

fRightToLeft: 0x0 specifies that the sheet view is displayed left-to-right.

fSelected: 0x0 specifies that the sheet is not selected in the sheet view.

fDspRuler: 0x1 specifies that this value is ignored because **xlView** is not in **Page Layout view**.

fDspGuts: 0x1 specifies that **outline** symbols are displayed in sheet view.

fDefaultHdr: 0x1 specifies that the default color is used for the gridlines.

fWhitespaceHidden: 0x0 specifies that **page margins**, **headers** and footers are not **hidden**.

xlView: 0x00000000 specifies that the type of sheet view is XLVNORMAL, which indicates that information is displayed in **Normal view**.

rwTop: 0x00000000 specifies that the first row that is displayed in the sheet view is row 1.

colLeft: 0x00000000 specifies that the first column (1) that is displayed in the sheet view is column (1) A.

icvHdr: 0x40 specifies that the color of the gridlines displayed in the **sheet view** is the system color for text in the window.

wScale: 0x0064 specifies that the **zoom level** percentage of the sheet displayed in the sheet view is 100%.

wScaleNormal: 0x0000 specifies that the zoom level percentage of the sheet when displayed in Normal view is 100.

wScaleSLV: 0x0000 specifies that the zoom level percentage of the sheet when displayed in **Page Break Preview view** is 100.

wScalePLV: 0x0000 specifies that the zoom level percentage of the sheet when displayed in Page Layout view is 100.

iWbkView: 0x00000000 specifies the **workbook view** that this sheet view is associated with.

3.7.25 Workbook: BrtSel

The next record in this example, **BrtSel** (section 2.4.766), specifies the **cell selection** for a **sheet**, as specified in the following table.

Size	Structure	Value
0024	BrtSel **- BrtSel**	
0004	Pnn **- pnn**	0x00000003
0004	LONG **- rwAct**	0x00000000

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Size	Structure	Value
0004	LONG **- colAct**	0x00000000
0004	DWORD **- dwRfxAct**	0x00000000
0014	UncheckedSqRfX **- sqrfx**	
0004	LONG **- crfx**	0x00000001
0010	UncheckedRfX **- rgrfx**	
0010	UncheckedRfX **- rfx[0]**	
0004	LONG **- rwFirst**	0x00000000
0004	LONG **- rwLast**	0x00000000
0004	LONG **- colFirst**	0x00000000
0004	LONG **- colLast**	0x00000000

Structure of BrtSel

pnn: 0x00000003 specifies that the selection belongs to the top-left **pane**.

rwAct: 0x00000000 specifies the **row** of the **active cell**.

colAct: 0x00000000 specifies the **column (1)** of the active cell.

dwRfxAct: 0x00000000 specifies the zero-based index of the **RfX** (section 2.5.117) structure in the **sqrfx** array.

sqrfx: Specifies a collection of all non-contiguous **ranges** within the selection.

sqrfx.crfx: 0x00000001 specifies the count of the **UncheckedRfX** (section 2.5.153) structures in **rgrfx**.

sqrfx.rgrfx: Specifies the set of ranges that are **selected**.

sqrfx.rgrfx.rfx[0]: Specifies the first range.

sqrfx.rgrfx.rfx[0].rwFirst: 0x00000000 specifies that the first row in the range is row 1.

sqrfx.rgrfx.rfx[0].rwLast: 0x00000000 specifies that the last row in the range is row 1.

sqrfx.rgrfx.rfx[0].colFirst: 0x00000000 specifies that the first column (1) in the range is column (1) A.

sqrfx.rgrfx.rfx[0].colLast: 0x00000000 specifies that the last column (1) in the range is column (1) A.

3.7.26 Workbook: BrtEndWsView

The next record in this example, **BrtEndWsView** (section 2.4.649), specifies the end of a collection of **BrtBeginWsView** (section 2.4.302) records, as specified in the following table.

Size	Structure
0000	BrtEndWsView **- BrtEndWsView**

Structure of BrtEndWsView

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3.7.27 Workbook: BrtEndWsViews

The next record in this example, **BrtEndWsViews** (section 2.4.650), specifies the end of a collection of **BrtBeginWsViews** (section 2.4.303) record, as specified in the following table.

Size	Structure
0000	BrtEndWsViews **- BrtEndWsViews**

Structure of BrtEndWsViews

3.7.28 Workbook: BrtWsFmtInfo

The next record in this example, **BrtWsFmtInfo** (section 2.4.842), specifies **sheet** formatting properties, as specified in the following table.

Size	Structure	Value
000C	BrtWsFmtInfo **- BrtWsFmtInfo**	
0004	DWORD **- dxGCol**	0xFFFFFFFF
0002	WORD **- cchDefColWidth**	0x0008
0002	WORD **- miyDefRwHeight**	0x012C
1 bit	DWORD **- fUnsynced**	0x0
1 bit	DWORD **- fDyZero**	0x0
1 bit	DWORD **- fExAsc**	0x0
1 bit	DWORD **- fExDesc**	0x0
12 bits	DWORD **- reserved**	0x000
8 bits	DWORD **- iOutLevelRw**	0x00
8 bits	DWORD **- iOutLevelCol**	0x00

Structure of BrtWsFmtInfo

dxGCol: 0xFFFFFFFF specifies that this value is ignored.

cchDefColWidth: 0x0008 specifies that the default **column (1)** width is 8.

miyDefRwHeight: 0x012C specifies that this field is ignored when **fUnsynced** is 0.

fUnsynced: 0x0 specifies that **miyDefRwHeight** has been determined by the application.

fDyZero: 0x0 specifies that **rows** are not **hidden** by default.

fExAsc: 0x0 specifies that rows do not have a thick top **border** by default.

fExDesc: 0x0 specifies that rows do not have a thick bottom border by default.

iOutLevelRw: 0x00 specifies the highest number of **outline levels** for rows in this sheet.

iOutLevelCol: 0x00 specifies the highest number of outline levels for columns (1) in this sheet.

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3.7.29 Workbook: BrtBeginSheetData

The next record in this example, **BrtBeginSheetData** (section 2.4.198), specifies the beginning of the cell table (section 2.2.1) on this **sheet**, as specified in the following table.

Size	Structure
0000	BrtBeginSheetData **- BrtBeginSheetData**

Structure of BrtBeginSheetData

3.7.30 Workbook: BrtRowHdr 1

The next record in this example, **BrtRowHdr** (section 2.4.746), specifies **row** information, as specified in the following table.

Size	Structure	Value
0019	BrtRowHdr **- BrtRowHdr**	
0004	LONG **- rw**	0x00000003
0004	DWORD **- ixfe**	0x00000000
0002	WORD **- miyRw**	0x012C
1 bit	BYTE **- fExtraAsc**	0x0
1 bit	BYTE **- fExtraDsc**	0x0
6 bits	BYTE **- reserved1**	0x00
3 bits	BYTE **- iOutLevel**	0x0
1 bit	BYTE **- fCollapsed**	0x0
1 bit	BYTE **- fDyZero**	0x0
1 bit	BYTE **- fUnsynced**	0x0
1 bit	BYTE **- fGhostDirty**	0x0
1 bit	BYTE **- fReserved**	0x0
1 bit	BYTE **- fPhShow**	0x0
7 bits	BYTE **- reserved2**	0x00
0004	DWORD **- ccolspan**	0x00000001
0008	BrtColSpan **- rgBrtColspan**	
0008	BrtColSpan **- brtcolspan[0]**	
0004	LONG **- colMic**	0x00000001
0004	LONG **- colLast**	0x00000001

Structure of BrtRowHdr

rw: 0x00000003 specifies that the index of the row is the fourth row.

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ixfe: 0x00000000 specifies a zero-based index of a **BrtXF** (section 2.4.845) record that specifies the format to apply as the default format for the row. The indexed **BrtXF** is not included in this example.

miyRw: 0x012C specifies that this value is ignored because the **fUnsynced** field is 0x0.

fExtraAsc: 0x0 specifies that padding will not be allocated for the top of this row for a thick upper **cell border**.

fExtraDsc: 0x0 specifies that padding will not be allocated for the bottom of this row for a medium or thick bottom cell border.

iOutLevel: 0x0 specifies the **outline level** for this row.

fCollapsed: 0x0 specifies that preceding rows are not in the collapsed **outline state**.

fDyZero: 0x0 specifies that the row is not **hidden**.

fUnsynced: 0x0 specifies the row height has not been manually specified.

fGhostDirty: 0x0 specifies the row style as specified by the **ixfe** field is not applied.

fPhShow: 0x0 specifies the cells in this row do not have the **phonetic guide** enabled.

ccolspan: 0x00000001 specifies the number of **BrtColSpan** (section 2.5.8) elements in **rgBrtColspan** is 1.

rgBrtColspan: Specifies the permissible locations for cells within this row.

rgBrtColspan.brtcolspan[0]: An array of **BrtColSpan** structures that specify the permissible locations for cells within this row.

rgBrtColspan.brtcolspan[0].colMic: 0x00000001 specifies that the first **column (1)** with data in this span is column (1) B.

rgBrtColspan.brtcolspan[0].colLast: 0x00000001 specifies that the last column (1) with data in this span is column (1) B.

3.7.31 Workbook: BrtCellIsst 1

The next record in this example, **BrtCellIsst** (section 2.4.319), specifies a **cell** that contains a string, as specified in the following table.

Size	Structure	Value
000C	BrtCellIsst **- BrtCellIsst**	
0008	Cell **- cell**	
0004	LONG **- column**	0x00000001
24 bits	DWORD **- iStyleRef**	0x000000
1 bit	DWORD **- fPhShow**	0x0
7 bits	DWORD **- reserved**	0x00
0004	DWORD **- isst**	0x00000000

Structure of BrtCellIsst

cell: Specifies cell information.

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cell.column: 0x00000001 specifies that **column (1)** B contains the cell.

cell.iStyleRef: 0x000000 specifies a zero-based index of a **BrtXF** (section 2.4.845) record that specifies the cell formatting for this cell. The indexed **BrtXF** is not included in this example.

cell.fPhShow: 0x0 specifies the **sheet** does not show **phonetic information** for this cell.

isst: 0x00000000 specifies a zero-based index of a **BrtSSTItem** (section 2.4.781) that specifies the string "Number" that this cell contains.

3.7.32 Workbook: BrtRowHdr 2

The next record in this example, **BrtRowHdr** (section 2.4.746), specifies **row** information, as specified in the following table.

Size	Structure	Value
0019	BrtRowHdr **- BrtRowHdr**	
0004	LONG **- rw**	0x00000004
0004	DWORD **- ixfe**	0x00000000
0002	WORD **- miyRw**	0x012C
1 bit	BYTE **- fExtraAsc**	0x0
1 bit	BYTE **- fExtraDsc**	0x0
6 bits	BYTE **- reserved1**	0x00
3 bits	BYTE **- iOutLevel**	0x0
1 bit	BYTE **- fCollapsed**	0x0
1 bit	BYTE **- fDyZero**	0x0
1 bit	BYTE **- fUnsynced**	0x0
1 bit	BYTE **- fGhostDirty**	0x0
1 bit	BYTE **- fReserved**	0x0
1 bit	BYTE **- fPhShow**	0x0
7 bits	BYTE **- reserved2**	0x00
0004	DWORD **- ccolspan**	0x00000001
0008	BrtColSpan **- rgBrtColspan**	
0008	BrtColSpan **- brtcolspan[0]**	
0004	LONG **- colMic**	0x00000001
0004	LONG **- colLast**	0x00000001

Structure of BrtRowHdr

Fields in this record are explained in a previous **BrtRowHdr** (section 2.4.746) record in this example and are omitted for brevity.

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3.7.33 Workbook: BrtCellRk

The next record in this example, **BrtCellRk** (section 2.4.322), specifies a **cell** that contains a number, as specified in the following table.

Size	Structure	Value
000C	BrtCellRk **- BrtCellRk**	
0008	Cell **- cell**	
0004	LONG **- column**	0x00000001
24 bits	DWORD **- iStyleRef**	0x000000
1 bit	DWORD **- fPhShow**	0x0
7 bits	DWORD **- unused**	0x00
0004	RkNumber **- value**	
1 bit	ULONG **- FX100**	0x0
1 bit	ULONG **- FInt**	0x0
30 bits	ULONG **- num**	0x0FFC0000

Structure of BrtCellRk

cell: Specifies cell information.

cell.column: 0x00000001 specifies that **column (1)** B contains the cell.

cell.iStyleRef: 0x000000 specifies a zero-based index of a **BrtXF** (section 2.4.845) record that specifies the cell formatting for this cell. The indexed **BrtXF** is not included in this example.

cell.fPhShow: 0x0 specifies that the **sheet** does not show **phonetic information** for this cell.

value: The **RkNumber** (section 2.5.122) which specifies the value in the cell.

value.FX100: 0x0 specifies that the value in the **value.num** field was not multiplied by 100 when it was saved.

value.FInt: 0x0 specifies that the value in the **value.num** field is the 30 most significant bits of a 64-bit binary floating point number.

value.num: 0x0FFC0000 specifies the 30 most significant bits of a 64-bit binary floating-point number whose remaining bits are 0. That number is 1.

3.7.34 Workbook: BrtRowHdr 3

The next record in this example, **BrtRowHdr** (section 2.4.746), specifies **row** information, as specified in the following table.

Size	Structure	Value
0019	BrtRowHdr **- BrtRowHdr**	
0004	LONG **- rw**	0x00000005
0004	DWORD **- ixfe**	0x00000000

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Size	Structure	Value
0002	WORD **- miyRw**	0x012C
1 bit	BYTE **- fExtraAsc**	0x0
1 bit	BYTE **- fExtraDsc**	0x0
6 bits	BYTE **- reserved1**	0x00
3 bits	BYTE **- iOutLevel**	0x0
1 bit	BYTE **- fCollapsed**	0x0
1 bit	BYTE **- fDyZero**	0x0
1 bit	BYTE **- fUnsynced**	0x0
1 bit	BYTE **- fGhostDirty**	0x0
1 bit	BYTE **- fReserved**	0x0
1 bit	BYTE **- fPhShow**	0x0
7 bits	BYTE **- reserved2**	0x00
0004	DWORD **- ccolspan**	0x00000001
0008	BrtColSpan **- rgBrtColspan**	
0008	BrtColSpan **- brtcolspan[0]**	
0004	LONG **- colMic**	0x00000001
0004	LONG **- colLast**	0x00000001

Structure of BrtRowHdr

Fields in this record are explained in a previous **BrtRowHdr** (section 2.4.746) record in this example and are omitted for brevity.

3.7.35 Workbook: BrtCellIsst 2

The next record in this example, **BrtCellIsst** (section 2.4.319), specifies a **cell** that contains a string, as specified in the following table.

Size	Structure	Value
000C	BrtCellIsst **- BrtCellIsst**	
0008	Cell **- cell**	
0004	LONG **- column**	0x00000001
24 bits	DWORD **- iStyleRef**	0x000000
1 bit	DWORD **- fPhShow**	0x0
7 bits	DWORD **- reserved**	0x00
0004	DWORD **- isst**	0x00000001

Structure of BrtCellIsst

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cell: Specifies cell information.

cell.column: 0x00000001 specifies that **column (1)** B contains the cell.

cell.iStyleRef: 0x000000 specifies the formatting for a cell. The **BrtXF** (section 2.4.845) record is not included in the example.

cell.fPhShow: 0x0 specifies that the **sheet** does not show **phonetic information** for this cell.

isst: 0x00000001 specifies the zero-based index of a **BrtSSTItem** (section 2.4.781) that specifies the string "Formula" that this cell contains.

3.7.36 Workbook: BrtRowHdr 4

The next record in this example, **BrtRowHdr** (section 2.4.746), specifies **row** information, as specified in the following table.

Size	Structure	Value
0019	BrtRowHdr **- BrtRowHdr**	
0004	LONG **- rw**	0x00000006
0004	DWORD **- ixfe**	0x00000000
0002	WORD **- miyRw**	0x012C
1 bit	BYTE **- fExtraAsc**	0x0
1 bit	BYTE **- fExtraDsc**	0x0
6 bits	BYTE **- reserved1**	0x00
3 bits	BYTE **- iOutLevel**	0x0
1 bit	BYTE **- fCollapsed**	0x0
1 bit	BYTE **- fDyZero**	0x0
1 bit	BYTE **- fUnsynced**	0x0
1 bit	BYTE **- fGhostDirty**	0x0
1 bit	BYTE **- fReserved**	0x0
1 bit	BYTE **- fPhShow**	0x0
7 bits	BYTE **- reserved2**	0x00
0004	DWORD **- ccolspan**	0x00000001
0008	BrtColSpan **- rgBrtColspan**	
0008	BrtColSpan **- brtcolspan[0]**	
0004	LONG **- colMic**	0x00000001
0004	LONG **- colLast**	0x00000001

Structure of BrtRowHdr

Fields in this record are explained in a previous **BrtRowHdr** (section 2.4.746) record in this example and are omitted for brevity.

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3.7.37 Workbook: BrtFmlaNum

The next record in this example, **BrtFmlaNum** (section 2.4.673), specifies a **cell** that contains a formula (section 2.2.2) where the most recent evaluation resulted in a numeric value, as specified in the following table.

Size	Structure	Value
0028	BrtFmlaNum **- BrtFmlaNum**	
0008	Cell **- cell**	
0004	LONG **- column**	0x00000001
24 bits	DWORD **- iStyleRef**	0x000000
1 bit	DWORD **- fPhShow**	0x0
7 bits	DWORD **- reserved**	0x00
0008	Xnum **- xnum**	0x3FF6A09E667F3BCD
0002	GrbitFmla **- grbitFlags**	
1 bit	WORD **- fReserved**	0x0
1 bit	WORD **- fAlwaysCalc**	0x0
14 bits	WORD **- unused**	0x0000
0016	CellParsedFormula **- formula**	
0004	DWORD **- cce**	0x0000000E
000E	Rgce **- rgce**	
0007	Ptg **- Ptg[0]**	
0007	PtgRef **- PtgRef**	
5 bits	BYTE **- ptg**	0x04
2 bits	PtgDataType **- type**	0x2
1 bit	BYTE **- reserved**	0x0
0006	RgceLoc **- loc**	
0004	UncheckedRw **- row**	0x00000004
0002	ColRelShort **- column**	
14 bits	USHORT **- col**	0x0001
1 bit	USHORT **- fColRel**	0x1
1 bit	USHORT **- fRwRel**	0x1
0003	Ptg **- Ptg[1]**	
0003	PtgInt **- PtgInt**	
7 bits	BYTE **- ptg**	0x1E

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Size	Structure	Value
1 bit	BYTE **- reserved0**	0x0
0002	WORD **- integer**	0x0002
0001	Ptg **- Ptg[2]**	
0001	PtgMul **- PtgMul**	
7 bits	BYTE **- ptg**	0x05
1 bit	BYTE **- reserved0**	0x0
0003	Ptg **- Ptg[3]**	
0003	PtgFunc **- PtgFunc**	
5 bits	BYTE **- ptg**	0x01
2 bits	PtgDataType **- type**	0x2
1 bit	BYTE **- reserved**	0x0
0002	Ftab **- iftab**	
0002	WORD **- iftab**	0x0014
0004	DWORD **- cb**	0x00000000

Structure of BrtFmlaNum

cell: Specifies the cell that contains the formula (section 2.2.2).

cell.column: 0x00000001 specifies that **column (1)** B contains this cell.

cell.iStyleRef: 0x000000 specifies the zero-based index to a **BrtXF** (section 2.4.845) record that the formatting **style**. The **BrtXF** record is not included in the example.

cell.fPhShow: 0x0 specifies that the cell does not show **phonetic information**.

xnum: 0x3FF6A09E667F3BCD specifies an **Xnum** (section 2.5.171) value of 1.4142135623730951 that specifies the value to which this formula is evaluated.

grbitFlags.fAlwaysCalc: 0x0 specifies that the formula does not need to be reevaluated when the document is loaded.

formula: Specifies a formula stored in a cell.

formula.cce: 0x0000000E specifies that the length of **rgce** in bytes is 14.

formula.rgce: Specifies the sequence of **Ptg** (section 2.5.97.16) structures for the formula.

formula.rgce.Ptg[0]: Specifies a single element of a formula (section 2.2.2).

formula.rgce.Ptg[0].PtgRef: Specifies a reference to a single cell.

formula.rgce.Ptg[0].PtgRef.ptg: 0x04 is required in this field.

formula.rgce.Ptg[0].PtgRef.type: 0x2 specifies a single value of a simple type.

formula.rgce.Ptg[0].PtgRef.loc: Specifies that a reference to single cell **relative references** is stored as coordinates.

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formula.rgce.Ptg[0].PtgRef.loc.row: 0x00000004 specifies that the **row** coordinate of the **cell reference** is 5.

formula.rgce.Ptg[0].PtgRef.loc.column: Specifies the column (1) coordinate of the cell reference.

formula.rgce.Ptg[0].PtgRef.loc.column.col: 0x0001 specifies column (1) B.

formula.rgce.Ptg[0].PtgRef.loc.column.fColRel: 0x1 specifies that the associated row and column (1) pair is a relative reference with respect to columns (1).

formula.rgce.Ptg[0].PtgRef.loc.column.fRwRel: 0x1 specifies that the associated row and column (1) pair is a relative reference with respect to rows.

formula.rgce.Ptg[1]: Specifies a single element of a formula (section 2.2.2).

formula.rgce.Ptg[1].PtgInt: Specifies a value.

formula.rgce.Ptg[1].PtgInt.ptg: 0x1E is required in this field.

formula.rgce.Ptg[1].PtgInt.integer: 0x0002 specifies that the value is 2.

formula.rgce.Ptg[2]: Specifies a single element of a formula (section 2.2.2).

formula.rgce.Ptg[2].PtgMul: Specifies a binary value operator that multiplies the first and second **expression** in a binary value expression.

formula.rgce.Ptg[2].PtgMul.ptg: 0x05 is required in this field.

formula.rgce.Ptg[3]: Specifies a single element of a formula.

formula.rgce.Ptg[3].PtgFunc: Specifies a call to a **function** with a fixed number of parameters.

formula.rgce.Ptg[3].PtgFunc.ptg: 0x01 is required in this field.

formula.rgce.Ptg[3].PtgFunc.type: 0x2 specifies the data type for the value of this **Ptg** is VALUE.

formula.rgce.Ptg[3].PtgFunc.iftab: Specifies the function to be called.

formula.rgce.Ptg[3].PtgFunc.iftab.iftab: 0x0014 specifies that the function being called is SQRT.

formula.cb: 0x00000000 specifies that the length of the **rgcb** field is 0.

3.7.38 Workbook: BrtEndSheetData

The next record in this example, **BrtEndSheetData** (section 2.4.546), specifies the end of the cell table (section 2.2.1) on the **sheet**, as specified in the following table.

Size	Structure
0000	BrtEndSheetData **- BrtEndSheetData**

Structure of BrtEndSheetData

3.7.39 Workbook: BrtSheetProtection

The next record in this example, **BrtSheetProtection** (section 2.4.768)**,** specifies **protection** options for a **sheet**, as specified in the following table.

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Size	Structure	Value
0042	BrtSheetProtection **- BrtSheetProtection**	
0002	WORD **- protpwd**	0x0000
0004	DWORD **- fLocked**	0x00000000
0004	DWORD **- fObjects**	0x00000001
0004	DWORD **- fScenarios**	0x00000001
0004	DWORD **- fFormatCells**	0x00000000
0004	DWORD **- fFormatColumns**	0x00000000
0004	DWORD **- fFormatRows**	0x00000000
0004	DWORD **- fInsertColumns**	0x00000000
0004	DWORD **- fInsertRows**	0x00000000
0004	DWORD **- fInsertHyperlinks**	0x00000000
0004	DWORD **- fDeleteColumns**	0x00000000
0004	DWORD **- fDeleteRows**	0x00000000
0004	DWORD **- fSelLockedCells**	0x00000001
0004	DWORD **- fSort**	0x00000000
0004	DWORD **- fAutoFilter**	0x00000000
0004	DWORD **- fPivotTables**	0x00000000
0004	DWORD **- fSelUnlockedCells**	0x00000001

Structure of BrtSheetProtection

protpwd: 0x0000 specifies that there is no password set.

fLocked: 0x00000000 specifies that the sheet and contents of **locked cells** are not **protected**.

fObjects: 0x00000001 specifies that this field is undefined and ignored because **fLocked** is 0.

fScenarios: 0x00000001 specifies that this field is undefined and ignored because **fLocked** is 0.

fFormatCells: 0x00000000 specifies that this field is undefined and ignored because **fLocked** is 0.

fFormatColumns: 0x00000000 specifies that this field is undefined and ignored because **fLocked** is 0.

fFormatRows: 0x00000000 specifies that this field is undefined and ignored because **fLocked** is 0.

fInsertColumns: 0x00000000 specifies that this field is undefined and ignored because **fLocked** is 0.

fInsertRows: 0x00000000 specifies that this field is undefined and ignored because **fLocked** is 0.

fInsertHyperlinks: 0x00000000 specifies that this field is undefined and ignored because **fLocked** is 0.

fDeleteColumns: 0x00000000 specifies that this field is undefined and ignored because **fLocked** is 0.

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fDeleteRows: 0x00000000 specifies that this field is undefined and ignored because **fLocked** is 0.

fSelLockedCells: 0x00000001 specifies that this field is undefined and ignored because **fLocked** is 0.

fSort: 0x00000000 specifies that this field is undefined and ignored because **fLocked** is 0.

fAutoFilter: 0x00000000 specifies that this field is undefined and ignored because **fLocked** is 0.

fPivotTables: 0x00000000 specifies that this field is undefined and ignored because **fLocked** is 0.

fSelUnlockedCells: 0x00000001 specifies that this field is undefined and ignored because **fLocked** is 0.

3.7.40 Workbook: BrtPrintOptions

The next record in this example, **BrtPrintOptions** (section 2.4.736), specifies the options for printing the **sheet**, as specified in the following table.

Size	Structure	Value
0002	BrtPrintOptions **- BrtPrintOptions**	
1 bit	WORD **- fHCenter**	0x0
1 bit	WORD **- fVCenter**	0x0
1 bit	WORD **- fPrintHeaders**	0x0
1 bit	WORD **- fPrintGrid**	0x0
1 bit	WORD **- unused**	0x1
11 bits	WORD **- reserved**	0x000

Structure of BrtPrintOptions

fHCenter: 0x0 specifies not to center the printed content horizontally on the page.

fVCenter: 0x0 specifies not to center the printed content vertically on the page.

fPrintHeaders: 0x0 specifies that the **header rows** and **column (1)** heading will not be printed.

fPrintGrid: 0x0 specifies that **gridlines** will not be printed.

3.7.41 Workbook: BrtMargins

The next record in this example, **BrtMargins**, specifies the **page margins** for the **sheet**, as specified in the following table.

Size	Structure	Value
0030	BrtMargins **- BrtMargins**	
0008	Margin **- xnumLeft**	
0008	Xnum **- margin**	0x3FE6666666666666
0008	Margin **- xnumRight**	
0008	Xnum **- margin**	0x3FE6666666666666

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Size	Structure	Value
0008	Margin **- xnumTop**	
0008	Xnum **- margin**	0x3FE8000000000000
0008	Margin **- xnumBottom**	
0008	Xnum **- margin**	0x3FE8000000000000
0008	Margin **- xnumHeader**	
0008	Xnum **- margin**	0x3FD3333333333333
0008	Margin **- xnumFooter**	
0008	Xnum **- margin**	0x3FD3333333333333

Structure of BrtMargins

xnumLeft: Specifies the left page margin.

xnumLeft.margin: 0x3FE6666666666666 specifies an **Xnum** (section 2.5.171) value of 0.7 that specifies the left page margin size in inches.

xnumRight: Specifies the right page margin.

xnumRight.margin: 0x3FE6666666666666 specifies an **Xnum** value of 0.7 that specifies the right page margin size in inches.

xnumTop: Specifies the top page margin.

xnumTop.margin: 0x3FE8000000000000 specifies an **Xnum** value of 0.75 that specifies the top page margin size in inches.

xnumBottom: Specifies the bottom page margin.

xnumBottom.margin: 0x3FE8000000000000 specifies an **Xnum** value of 0.75 that specifies the bottom page margin size in inches.

xnumHeader: Specifies the header page margin.

xnumHeader.margin: 0x3FD3333333333333 specifies an **Xnum** (section 2.5.171) value of 0.3 that specifies the header page margin size in inches.

xnumFooter: Specifies the footer page margin.

xnumFooter.margin: 0x3FD3333333333333 specifies an **Xnum** value of 0.3 that specifies the footer page margin size in inches.

3.7.42 Workbook: BrtEndSheet

The last record in this example, **BrtEndSheet** (section 2.4.545), specifies the end of a collection of records that specifies properties of the **sheet**.

Size	Structure
0000	BrtEndSheet **- BrtEndSheet**

Structure of BrtEndSheet

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3.8 PivotTable

This example shows a **PivotTable** (section 2.1.7.40) and its associated **PivotCache** (section 2.2.5.2). The **PivotTable** uses a **range** of **cells** (A1:E45) in the "Source Data" **sheet** as its source data (section 2.2.5.2.1). The "CustomerName" and "ProductName" fields have been added to the **row** area, "Quantity" to the data area (section 2.2.5.3.8.1.4), and "OrderDate" to the page area (section 2.2.5.3.8.1.3) of this PivotTable view (section 2.2.5.3). The "OrderDate" field has two dates selected in the filter (12/23/1997 and 12/26/1997) and the rest have been filtered out.

The following figure illustrates the **PivotTable** (section 2.1.7.40) discussed in this example.

	A	B	C
1			
2			
3		OrderDate	(Multiple Items)
4			
5		Row Labels	Sum of Quantity
6		⊟Island Trading	55
7		Ipoh Coffee	55
8		⊟Königlich Essen	71
9		Geitost	23
10		Perth Pasties	48
11		⊞Richter Supermarkt	31
12		Grand Total	157

Figure 27: PivotTable example

This example covers **PivotTable** records that are members of the **Workbook** (section 2.1.7.61), **PivotCache** Definition (section 2.1.7.38), **PivotCache** Records (section 2.1.7.39), and **PivotTable** (section 2.1.7.40) parts **ABNF**. The first set of records between **BrtBeginPivotCacheIDs** (section 2.4.169) and **BrtEndPivotCacheIDs** (section 2.4.517) are contained in the **Workbook** part ABNF. The records between **BrtBeginPivotCacheDef** (section 2.4.167) and **BrtEndPivotCacheDef** (section 2.4.515) are contained in the **PivotCache** Definition part ABNF. The records between **BrtBeginPivotCacheRecords** (section 2.4.170) and **BrtEndPivotCacheRecords** (section 2.4.518) are contained in the **PivotCache** Records part ABNF. The records between **BrtBeginSXView** (section 2.4.273) and **BrtEndSXView** (section 2.4.621) are contained in the **PivotTable** (section 2.1.7.40) part ABNF.

3.8.1 PivotTable: BrtBeginPivotCacheIDs

The first record in this example, **BrtBeginPivotCacheIDs** (section 2.4.169)**,** represents the beginning of the collection of **BrtBeginPivotCacheID** (section 2.4.168) records in the **Workbook** (section 2.1.7.61) part **ABNF**, as specified in the following table.

Size	Structure
0000	BrtBeginPivotCacheIDs **- BrtBeginPivotCacheIDs**

Structure of BrtBeginPivotCacheIDs

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3.8.2 PivotTable: BrtBeginPivotCacheID

The **BrtBeginPivotCacheID** (section 2.4.168) record specifies the relationship between the **PivotCache** (section 2.2.5.2) identifier and its associated **PivotCache** Definition (section 2.1.7.38), as specified in the following table.

Size	Structure	Value
0010	BrtBeginPivotCacheID **- BrtBeginPivotCacheID**	
0004	DWORD **- idSx**	0x00000041
000C	RelID **- irstcacheRelID**	rId3

Structure of BrtBeginPivotCacheID

idSx: 0x00000041 specifies the identifier of the **PivotCache** Definition (section 2.1.7.38). This identifier corresponds to the **idCache** field of the PivotTable view (section 2.2.5.3) as specified in **BrtBeginSXView** (section 2.4.273).

irstcacheRelID: rId3 specifies the relationship identifier of the **workbook** part containing the **PivotTable** (section 2.1.7.40).

3.8.3 PivotTable: BrtBeginPivotCacheDef

Next, the **BrtBeginPivotCacheDef** (section 2.4.167) record specifies the properties of the **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
0039	BrtBeginPivotCacheDef **- BrtBeginPivotCacheDef**	
0001	AppVersion **- bVerCacheLastRefresh**	0x03
0001	AppVersion **- bVerCacheRefreshableMin**	0x03
0001	AppVersion **- bVerCacheCreated**	0x03
1 bit	BYTE **- fSaveData**	0x1
1 bit	BYTE **- fInvalid**	0x0
1 bit	BYTE **- fRefreshOnLoad**	0x0
1 bit	BYTE **- fOptimizeCache**	0x0
1 bit	BYTE **- fEnableRefresh**	0x1
1 bit	BYTE **- fBackgroundQuery**	0x0
1 bit	BYTE **- fUpgradeOnRefresh**	0x0
1 bit	BYTE **- fSheetData**	0x0
0004	LONG **- citmGhostMax**	0xFFFFFFFF
0008	DateAsXnum **- xnumRefreshedDate**	
0008	Xnum **- dateNum**	0x40E355758E27E5E8
1 bit	BYTE **- fLoadRefreshedWho**	0x1

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Size	Structure	Value
1 bit	BYTE **- fLoadRelIDRecords**	0x1
1 bit	BYTE **- fSupportSubquery**	0x0
1 bit	BYTE **- fSupportAttribDrill**	0x0
4 bits	BYTE **- reserved**	0x0
0004	DWORD **- crecords**	0x0000002C
0018	XLWideString **- stRefreshedWho**	John Smith
000C	RelID **- stRelIDRecords**	rId1

Structure of BrtBeginPivotCacheDef

Fields in this record that are ignored because they apply only to **OLAP** or **ODBC data sources** are omitted for brevity.

bVerCacheLastRefresh: 0x03 specifies the data functionality level (section 2.2.5.1) of the application that last refreshed the **PivotCache** (section 2.2.5.2).

bVerCacheRefreshableMin: 0x03 specifies the lowest data functionality level (section 2.2.5.1) of the application that is required to refresh the **PivotCache**.

bVerCacheCreated: 0x03 specifies the data functionality level (section 2.2.5.1) of the application that created the **PivotCache**.

fSaveData: 0x1 specifies that the cache records (section 2.2.5.2.10) exist.

fInvalid: 0x0 specifies that the **PivotCache** (section 2.2.5.2) is valid and does not need a **refresh** before the next recalculation.

fRefreshOnLoad: 0x0 specifies that the **PivotCache** is not refreshed when the **workbook** is opened.

fOptimizeCache: 0x0 specifies that optimizations to reduce memory are not applied to the **PivotCache** (section 2.2.5.2).

fEnableRefresh: 0x1 specifies that the user can refresh the **PivotCache**.

fBackgroundQuery: 0x0 specifies that the **PivotCache** is not refreshed asynchronously.

fUpgradeOnRefresh: 0x0 specifies that the **PivotCache** is not scheduled for a version upgrade at the next refresh.

citmGhostMax: 0xFFFFFFFF specifies the number of unused cache items (section 2.2.5.2.3) to allow before they are discarded, which is 4294967295.

xnumRefreshedDate: 0x40E355758E27E5E8 represents 5/27/2008 4:09:59PM, which is when the **PivotCache** (section 2.2.5.2) was last refreshed.

fLoadRefreshedWho: 0x1 specifies that the **stRefreshedWho** field exists.

fLoadRelIDRecords: 0x1 specifies that the **stRelIDRecords** field exists.

crecords: 0x0000002C specifies that the number of cache records (section 2.2.5.2.10) in the **PivotCache** (section 2.2.5.2) is 44.

stRefreshedWho: "John Smith" specifies the name of the user who last refreshed the **PivotCache**.

stRelIDRecords: "rId1" specifies the unique identifier that corresponds to the related cache records.

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3.8.4 PivotTable: BrtBeginPCDSource

The **BrtBeginPCDSource** (section 2.4.165) record specifies the type of the **PivotCache** (section 2.2.5.2) source data (section 2.2.5.2.1), as specified in the following table.

Size	Structure	Value
0008	BrtBeginPCDSource **- BrtBeginPCDSource**	
0004	LONG **- iSrcType**	0x00000000
0004	DWORD **- dwConnID**	0x00000000

Structure of BrtBeginPCDSource

iSrcType: 0x00000000 specifies that the **PivotCache** (section 2.2.5.2) source data (section 2.2.5.2.1) is a **range**.

dwConnID: 0x00000000 specifies the unique identifier of the external connection (section 2.2.8). This value is ignored, because the value of **iSrcType** is 0x00000000.

3.8.5 PivotTable: BrtBeginPCDSRange

The **BrtBeginPCDSRange** (section 2.4.166) record specifies the properties of the **range**-based source data (section 2.2.5.2.1) for this **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
002D	BrtBeginPCDSRange **- BrtBeginPCDSRange**	
1 bit	BYTE **- fName**	0x0
7 bits	BYTE **- reserved1**	0x00
1 bit	BYTE **- fBuiltIn**	0x0
7 bits	BYTE **- reserved2**	0x00
1 bit	BYTE **- fLoadRelId**	0x0
1 bit	BYTE **- fLoadSheet**	0x1
6 bits	BYTE **- reserved3**	0x00
001A	XLWideString **- sheetName**	Source Data
0010	RfX **- range**	
0004	LONG **- rwFirst**	0x00000000
0004	LONG **- rwLast**	0x0000002C
0004	LONG **- colFirst**	0x00000000
0004	LONG **- colLast**	0x00000004

Structure of BrtBeginPCDSRange

fName: 0x0 specifies that the source data (section 2.2.5.2.1) is not a **defined name**.

fBuiltIn: 0x0 specifies that the defined name is not a **built-in name.** This field is ignored, because the source data is not a defined name.

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fLoadRelId: 0x0 specifies that the source data is not in an external workbook (section 2.1.10).

fLoadSheet: 0x1 specifies that the source data is scoped to a single **sheet**.

sheetName: Source Data specifies the name of the sheet to which the source data is scoped.

range: Specifies the source data range.

range.rwFirst: 0x00000000 specifies that the first **row** of the source data (section 2.2.5.2.1) range is row 1.

range.rwLast: 0x0000002C specifies that the last row of the source data range is row 45.

range.colFirst: 0x00000000 specifies that the first **column (1)** of the source data range is column (1) A.

range.colLast: 0x00000004 specifies that the last column (1) of the source data range is column (1) E.

3.8.6 PivotTable: BrtBeginPCDFields

Next, **BrtBeginPCDFields** (section 2.4.136) specifies the beginning of the collection of cache fields (section 2.2.5.2.2) in the **PivotCache** (section 2.2.5.2) and the count of the cache fields, as specified in the following table.

Size	Structure	Value
0004	BrtBeginPCDFields **- BrtBeginPCDFields**	
0004	DWORD **- cfields**	0x00000005

Structure of BrtBeginPCDFields

cfields: 0x00000005 specifies that there are five cache fields (section 2.2.5.2.2) in the **PivotCache** (section 2.2.5.2).

3.8.7 PivotTable: BrtBeginPCDField 1

The first **BrtBeginPCDField** (section 2.4.135) record specifies the properties of the "CustomerName" cache field (section 2.2.5.2.2) in the **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
0030	BrtBeginPCDField **- BrtBeginPCDField**	
1 bit	BYTE **- fServerBased**	0x0
1 bit	BYTE **- fCantGetUniqueItems**	0x0
1 bit	BYTE **- fSrcField**	0x1
1 bit	BYTE **- fCaption**	0x0
1 bit	BYTE **- fOlapMemPropField**	0x0
3 bits	BYTE **- reserved1**	0x0
1 bit	BYTE **- fLoadFmla**	0x0
1 bit	BYTE **- fLoadPropName**	0x0

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Size	Structure	Value
6 bits	BYTE **- reserved2**	0x00
0004	PivotNumFmt **- ifmt**	
0002	Ifmt **- ifmt**	
0002	WORD **- ifmt**	0x0000
0002	WORD **- reserved**	0x0000
0002	SHORT **- wTypeSql**	0x0000
0004	DWORD **- ihdb**	0x00000000
0004	DWORD **- isxtl**	0x00000000
0004	DWORD **- cIsxtmps**	0x00000000
001C	XLWideString **- stFldName**	CustomerName

Structure of BrtBeginPCDField

Fields in this record that are ignored because they apply only to **OLAP** or **ODBC data sources** are omitted for brevity.

fSrcField: 0x1 specifies that this cache field (section 2.2.5.2.2) was created based on a **column (1)** in the source data (section 2.2.5.2.1).

fCaption: 0x0 specifies that the **stFldCaption** field, which specifies the caption of this cache field, does not exist after the fixed size portion of the record.

fLoadFmla: 0x0 specifies that the **fldFmla** field, which specifies the formula (section 2.2.2) for a calculated field (section 2.2.5.2.5), does not exist after the fixed-size portion of the record.

ifmt: Specifies the **number format** applied to all items in this cache field (section 2.2.5.2.2).

ifmt.ifmt.ifmt: 0x0000 specifies that all the items in the cache field are in the General number format as specified in [ISO/IEC29500-1:2016], section 18.8.30.

stFldName: CustomerName specifies the name of the cache field.

3.8.8 PivotTable: BrtBeginPCDFAtbl

The **BrtBeginPCDFAtbl** (section 2.4.130) record specifies properties of the "CustomerName" cache field (section 2.2.5.2.2) and begins the collection of cache item (section 2.2.5.2.3) records shared by the cache field in the **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
0006	BrtBeginPCDFAtbl **- BrtBeginPCDFAtbl**	
1 bit	WORD **- fTextEtcField**	0x1
1 bit	WORD **- fNonDates**	0x1
1 bit	WORD **- fDateInField**	0x0
1 bit	WORD **- fHasTextItem**	0x1
1 bit	WORD **- fHasBlankItem**	0x0

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Size	Structure	Value
1 bit	WORD **- fMixedTypesIgnoringBlanks**	0x0
1 bit	WORD **- fNumField**	0x0
1 bit	WORD **- fIntField**	0x0
1 bit	WORD **- fNumMinMaxValid**	0x0
1 bit	WORD **- fHasLongTextItem**	0x0
6 bits	WORD **- reserved**	0x00
0004	DWORD **- citems**	0x00000005

Structure of BrtBeginPCDFAtbl

fTextEtcField: 0x1 specifies that this cache field (section 2.2.5.2.2) contains at least one cache item (section 2.2.5.2.3) that is a text, blank, Boolean, or error value.

fNonDates: 0x1 specifies that this cache field contains at least one cache item that is not a date.

fDateInField: 0x0 specifies that this cache field does not contain a cache item that is a date.

fHasTextItem: 0x1 specifies that this cache field contains a cache item that is a text value.

fHasBlankItem: 0x0 specifies that this cache field does not contain a cache item that is a blank value.

fMixedTypesIgnoringBlanks: 0x0 specifies that this cache field does not contain cache items that are more than one of the following types of values: text, numeric, or date.

fNumField: 0x0 specifies that this cache field does not contain a cache item that is a numeric value.

fIntField: 0x0 specifies that this cache field does not contain a cache item (section 2.2.5.2.3) that is an integer.

fNumMinMaxValid: 0x0 specifies that **xnumMin** and **xnumMax** do not follow the fixed portion of this record.

fHasLongTextItem: 0x0 specifies that this cache field does not contain a cache item that is a string over 255 characters.

citems: 0x00000005 specifies that there are five cache items in this collection.

3.8.9 PivotTable: BrtPCDIString 1

The next record, **BrtPCDIString** (section 2.4.727), specifies the value of the "Great Lakes Food Market" cache item (section 2.2.5.2.3) in the **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
0032	BrtPCDIString **- BrtPCDIString**	
0032	XLWideString **- st**	Great Lakes Food Market

Structure of BrtPCDIString

st: Great Lakes Food Market specifies the string type value of this record.

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3.8.10 PivotTable: BrtPCDIString 2

This **BrtPCDIString** (section 2.4.727) record specifies the value of the "Island Trading" cache item (section 2.2.5.2.3) in the **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
0020	BrtPCDIString **- BrtPCDIString**	
0020	XLWideString **- st**	Island Trading

Structure of BrtPCDIString

st: Island Trading specifies the string type value of this record.

The remaining **BrtPCDIString** (section 2.4.727) records are omitted for brevity.

3.8.11 PivotTable: BrtBeginPCDField 2

The next **BrtBeginPCDField** (section 2.4.135) record specifies the "OrderDate" cache field (section 2.2.5.2.2) that corresponds to the pivot field (section 2.2.5.3.2) displayed on the page axis (section 2.2.5.3.7.1) in this example, as specified in the following table.

Size	Structure	Value
002A	BrtBeginPCDField **- BrtBeginPCDField**	
1 bit	BYTE **- fServerBased**	0x0
1 bit	BYTE **- fCantGetUniqueItems**	0x0
1 bit	BYTE **- fSrcField**	0x1
1 bit	BYTE **- fCaption**	0x0
1 bit	BYTE **- fOlapMemPropField**	0x0
3 bits	BYTE **- reserved1**	0x0
1 bit	BYTE **- fLoadFmla**	0x0
1 bit	BYTE **- fLoadPropName**	0x0
6 bits	BYTE **- reserved2**	0x00
0004	PivotNumFmt **- ifmt**	
0002	Ifmt **- ifmt**	
0002	WORD **- ifmt**	0x000E
0002	WORD **- reserved**	0x0000
0002	SHORT **- wTypeSql**	0x0000
0004	DWORD **- ihdb**	0x00000000
0004	DWORD **- isxtl**	0x00000000
0004	DWORD **- cIsxtmps**	0x00000000
0016	XLWideString **- stFldName**	OrderDate

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Structure of BrtBeginPCDField

Fields in this record that are explained in previous records in this example are omitted for brevity.

ifmt.ifmt.ifmt: 0x000E specifies all the items in the cache field are in **mm-dd-yy** format as specified in [ISO/IEC29500-1:2016], section 18.8.30.

stFldName: OrderDate specifies the name of the cache field (section 2.2.5.2.2).

3.8.12 PivotTable: BrtBeginPCDFAtbl 1

The next **BrtBeginPCDFAtbl** (section 2.4.130) record specifies properties of the "OrderDate" cache field (section 2.2.5.2.2) and begins the collection of cache item (section 2.2.5.2.3) records shared by the cache field in the **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
0016	BrtBeginPCDFAtbl **- BrtBeginPCDFAtbl**	
1 bit	WORD **- fTextEtcField**	0x0
1 bit	WORD **- fNonDates**	0x0
1 bit	WORD **- fDateInField**	0x1
1 bit	WORD **- fHasTextItem**	0x0
1 bit	WORD **- fHasBlankItem**	0x0
1 bit	WORD **- fMixedTypesIgnoringBlanks**	0x0
1 bit	WORD **- fNumField**	0x0
1 bit	WORD **- fIntField**	0x0
1 bit	WORD **- fNumMinMaxValid**	0x1
1 bit	WORD **- fHasLongTextItem**	0x0
6 bits	WORD **- reserved**	0x00
0004	DWORD **- citems**	0x00000014
0008	Xnum **- xnumMin**	0x40E15C8000000000
0008	Xnum **- xnumMax**	0x40E17D6000000000

Structure of BrtBeginPCDFAtbl

Fields in this record that are explained in previous records in this example are omitted for brevity.

fTextEtcField: 0x0 specifies that this cache field (section 2.2.5.2.2) does not contain at least one cache item (section 2.2.5.2.3) that is a text, blank, Boolean, or error value.

fNonDates: 0x0 specifies that this cache field does not contain a cache item that is a non-date value.

fDateInField: 0x1 specifies that this cache field contains at least one cache item that is a date.

fHasTextItem: 0x0 specifies that this cache field does not contain a cache item that is a text value.

fNumMinMaxValid: 0x1 specifies that **xnumMin** and **xnumMax** exist in the record.

citems: 0x00000014 specifies that there are 20 cache items in this collection.

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xnumMin: 0x40E15C8000000000 specifies that the earliest date specified among all the **BrtPCDIDatetime** (section 2.4.722) records in this collection is May 6, 1997.

xnumMax: 0x40E17D6000000000 specifies that the latest date specified among all the **BrtPCDIDatetime** records in this collection is January 24, 1998.

3.8.13 PivotTable: BrtBeginPCDIRun

The **BrtBeginPCDIRun** (section 2.4.146) record specifies the sequence of **PCDIDateTime** (section 2.5.100) cache items (section 2.2.5.2.3), as specified in the following table.

Size	Structure	Value
00A6	BrtBeginPCDIRun **- BrtBeginPCDIRun**	
0002	SHORT **- mdSxoper**	0x0020
0004	DWORD **- cItems**	0x00000014
00A0	PCDIDateTime **- rgPCDIDatetime**	
0008	PCDIDateTime **- PCDIDatetime[0]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x0005
0001	BYTE **- dom**	0x06
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[1]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x0005
0001	BYTE **- dom**	0x0F
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[2]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x0006
0001	BYTE **- dom**	0x13
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00

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Size	Structure	Value
0008	PCDIDateTime **- PCDIDatetime[3]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x0006
0001	BYTE **- dom**	0x18
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[4]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x0007
0001	BYTE **- dom**	0x0F
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[5]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x0007
0001	BYTE **- dom**	0x1F
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[6]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x0008
0001	BYTE **- dom**	0x05
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[7]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x0008

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Size	Structure	Value
0001	BYTE **- dom**	0x0E
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[8]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x0009
0001	BYTE **- dom**	0x04
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[9]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x0009
0001	BYTE **- dom**	0x0F
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[10]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x0009
0001	BYTE **- dom**	0x16
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[11]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x000A
0001	BYTE **- dom**	0x10
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00

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Size	Structure	Value
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[12]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x000A
0001	BYTE **- dom**	0x1B
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[13]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x000B
0001	BYTE **- dom**	0x14
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[14]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x000B
0001	BYTE **- dom**	0x18
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[15]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x000B
0001	BYTE **- dom**	0x1C
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[16]**	
0002	USHORT **- yr**	0x07CD

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Size	Structure	Value
0002	USHORT **- mon**	0x000C
0001	BYTE **- dom**	0x17
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[17]**	
0002	USHORT **- yr**	0x07CD
0002	USHORT **- mon**	0x000C
0001	BYTE **- dom**	0x1A
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[18]**	
0002	USHORT **- yr**	0x07CE
0002	USHORT **- mon**	0x0001
0001	BYTE **- dom**	0x06
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00
0008	PCDIDateTime **- PCDIDatetime[19]**	
0002	USHORT **- yr**	0x07CE
0002	USHORT **- mon**	0x0001
0001	BYTE **- dom**	0x17
0001	BYTE **- hr**	0x00
0001	BYTE **- min**	0x00
0001	BYTE **- sec**	0x00

Structure of BrtBeginPCDIRun

mdSxoper: 0x0020 specifies that the date-time type field is used to store cache items (section 2.2.5.2.3) and is defined by rgPCDIDateTime.

cItems: 0x00000014 specifies that the number of cache items in the array is 20.

rgPCDIDatetime: Specifies an array of 20 unique **PCDIDateTime** (section 2.5.100) fields, three of which are described following this sentence, that specify the date-time values of the cache items.

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rgPCDIDatetime.PCDIDatetime[0]: specifies the value of May 6, 1997 00:00:00.

rgPCDIDatetime.PCDIDatetime[0].yr: 0x07CD specifies the year to be 1997.

rgPCDIDatetime.PCDIDatetime[0].mon: 0x0005 specifies the month to be May.

rgPCDIDatetime.PCDIDatetime[0].dom: 0x06 specifies the day of the month to be the 6th.

rgPCDIDatetime.PCDIDatetime[0].hr: 0x00 specifies the hour to be 0.

rgPCDIDatetime.PCDIDatetime[0].min: 0x00 specifies the minute to be 0.

rgPCDIDatetime.PCDIDatetime[0].sec: 0x00 specifies the second to be 0.

rgPCDIDatetime.PCDIDatetime[16]: Specifies the date-time value of December 23, 1997 00:00:00.

rgPCDIDatetime.PCDIDatetime[16].yr: 0x07CD specifies the year to be 1997.

rgPCDIDatetime.PCDIDatetime[16].mon: 0x000C specifies the month to be December.

rgPCDIDatetime.PCDIDatetime[16].dom: 0x17 specifies the date to be the 23rd.

rgPCDIDatetime.PCDIDatetime[16].hr: 0x00 specifies the hour to be 0.

rgPCDIDatetime.PCDIDatetime[16].min: 0x00 specifies the minute to be 0.

rgPCDIDatetime.PCDIDatetime[16].sec: 0x00 specifies the second to be 0.

rgPCDIDatetime.PCDIDatetime[17]: Specifies the date-time value of December 26, 1997 00:00:00

rgPCDIDatetime.PCDIDatetime[17].yr: 0x07CD specifies the year is 1997 in the date.

rgPCDIDatetime.PCDIDatetime[17].mon: 0x000C specifies the month to be December.

rgPCDIDatetime.PCDIDatetime[17].dom: 0x1A specifies the date to be the 26th.

rgPCDIDatetime.PCDIDatetime[17].hr: 0x00 specifies the hour to be 0.

rgPCDIDatetime.PCDIDatetime[17].min: 0x00 specifies the minute to be 0.

rgPCDIDatetime.PCDIDatetime[17].sec: 0x00 specifies the second to be 0.

3.8.14 PivotTable: BrtBeginPCDField 3

The next **BrtBeginPCDField** (section 2.4.135) record specifies the "ProductName" cache field (section 2.2.5.2.2), as specified in the following table.

Size	Structure	Value
002E	BrtBeginPCDField **- BrtBeginPCDField**	
1 bit	BYTE **- fServerBased**	0x0
1 bit	BYTE **- fCantGetUniqueItems**	0x0
1 bit	BYTE **- fSrcField**	0x1
1 bit	BYTE **- fCaption**	0x0

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Size	Structure	Value
1 bit	BYTE **- fOlapMemPropField**	0x0
3 bits	BYTE **- reserved1**	0x0
1 bit	BYTE **- fLoadFmla**	0x0
1 bit	BYTE **- fLoadPropName**	0x0
6 bits	BYTE **- reserved2**	0x00
0004	PivotNumFmt **- ifmt**	
0002	Ifmt **- ifmt**	
0002	WORD **- ifmt**	0x0000
0002	WORD **- reserved**	0x0000
0002	SHORT **- wTypeSql**	0x0000
0004	DWORD **- ihdb**	0x00000000
0004	DWORD **- isxtl**	0x00000000
0004	DWORD **- cIsxtmps**	0x00000000
001A	XLWideString **- stFldName**	ProductName

Structure of BrtBeginPCDField

Fields in this record that are explained in previous records in this example are omitted for brevity.

stFldName: ProductName specifies the name of this cache field (section 2.2.5.2.2).

The **BrtBeginPCDFAtbl** (section 2.4.130) and **BrtBeginPCDIRun** (section 2.4.146) records following this record are omitted for brevity.

3.8.15 PivotTable: BrtBeginPCDField 4

The next **BrtBeginPCDField** (section 2.4.135) record specifies the "UnitPrice" cache field (section 2.2.5.2.2), as specified in the following table.

Size	Structure	Value
002A	BrtBeginPCDField **- BrtBeginPCDField**	
1 bit	BYTE **- fServerBased**	0x0
1 bit	BYTE **- fCantGetUniqueItems**	0x0
1 bit	BYTE **- fSrcField**	0x1
1 bit	BYTE **- fCaption**	0x0
1 bit	BYTE **- fOlapMemPropField**	0x0
3 bits	BYTE **- reserved1**	0x0
1 bit	BYTE **- fLoadFmla**	0x0
1 bit	BYTE **- fLoadPropName**	0x0

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Size	Structure	Value
6 bits	BYTE **- reserved2**	0x00
0004	PivotNumFmt **- ifmt**	
0002	Ifmt **- ifmt**	
0002	WORD **- ifmt**	0x002C
0002	WORD **- reserved**	0x0000
0002	SHORT **- wTypeSql**	0x0000
0004	DWORD **- ihdb**	0x00000000
0004	DWORD **- isxtl**	0x00000000
0004	DWORD **- cIsxtmps**	0x00000000
0016	XLWideString **- stFldName**	UnitPrice

Structure of BrtBeginPCDField

Fields in this record that are explained in previous records in this example are omitted for brevity.

ifmt.ifmt.ifmt: 0x002C specifies that the number formatting style applied is style 44 from the built-in number formats as specified in [ISO/IEC29500-1:2016], section 18.8.30.

stFldName: UnitPrice specifies the name of this cache field (section 2.2.5.2.2).

The **BrtBeginPCDFAtbl** (section 2.4.130) record following this record is omitted for brevity.

3.8.16 PivotTable: BrtBeginPCDField 5

The next **BrtBeginPCDField** (section 2.4.135) record describes the "Quantity" cache field (section 2.2.5.2.2), as specified in the following table.

Size	Structure	Value
0028	BrtBeginPCDField **- BrtBeginPCDField**	
1 bit	BYTE **- fServerBased**	0x0
1 bit	BYTE **- fCantGetUniqueItems**	0x0
1 bit	BYTE **- fSrcField**	0x1
1 bit	BYTE **- fCaption**	0x0
1 bit	BYTE **- fOlapMemPropField**	0x0
3 bits	BYTE **- reserved1**	0x0
1 bit	BYTE **- fLoadFmla**	0x0
1 bit	BYTE **- fLoadPropName**	0x0
6 bits	BYTE **- reserved2**	0x00
0004	PivotNumFmt **- ifmt**	

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Size	Structure	Value
0002	Ifmt **- ifmt**	
0002	WORD **- ifmt**	0x0000
0002	WORD **- reserved**	0x0000
0002	SHORT **- wTypeSql**	0x0000
0004	DWORD **- ihdb**	0x00000000
0004	DWORD **- isxtl**	0x00000000
0004	DWORD **- cIsxtmps**	0x00000000
0014	XLWideString **- stFldName**	Quantity

Structure of BrtBeginPCDField

Fields in this record that are explained in previous records in this example are omitted for brevity.

stFldName: Quantity specifies the name of this cache field (section 2.2.5.2.2).

3.8.17 PivotTable: BrtBeginPCDFAtbl 2

The next **BrtBeginPCDFAtbl** (section 2.4.130) record specifies properties of the "Quantity" cache field (section 2.2.5.2.2) and begins the collection of cache item (section 2.2.5.2.3) records shared by the cache field in the **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
0016	BrtBeginPCDFAtbl **- BrtBeginPCDFAtbl**	
1 bit	WORD **- fTextEtcField**	0x0
1 bit	WORD **- fNonDates**	0x1
1 bit	WORD **- fDateInField**	0x0
1 bit	WORD **- fHasTextItem**	0x0
1 bit	WORD **- fHasBlankItem**	0x0
1 bit	WORD **- fMixedTypesIgnoringBlanks**	0x0
1 bit	WORD **- fNumField**	0x1
1 bit	WORD **- fIntField**	0x1
1 bit	WORD **- fNumMinMaxValid**	0x1
1 bit	WORD **- fHasLongTextItem**	0x0
6 bits	WORD **- reserved**	0x00
0004	DWORD **- citems**	0x00000000
0008	Xnum **- xnumMin**	0x4008000000000000
0008	Xnum **- xnumMax**	0x404C000000000000

Structure of BrtBeginPCDFAtbl

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Fields in this record that are explained in previous records in this example are omitted for brevity.

fNumField: 0x1 specifies that this cache field (section 2.2.5.2.2) contains a cache item (section 2.2.5.2.3) that is a numeric value.

fIntField: 0x1 specifies that this cache field contains a cache item that is an integer value.

citems: 0x00000000 specifies that the number of cache items in this collection is 0.

xnumMin: 0x4008000000000000 specifies that the minimum value in this cache field is 3.

xnumMax: 0x404C000000000000 specifies that the maximum value in this cache field is 56.

3.8.18 PivotTable: BrtBeginPivotCacheRecords

The next record in this example, **BrtBeginPivotCacheRecords** (section 2.4.170), specifies the beginning of the collection of cache records (section 2.2.5.2.10) in the **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
0004	BrtBeginPivotCacheRecords **- BrtBeginPivotCacheRecords**	
0004	DWORD **- crecords**	0x0000002C

Structure of BrtBeginPivotCacheRecords

crecords: 0x0000002C specifies that there are 44 cache records in the **PivotCache**.

3.8.19 PivotTable: BrtPCRRecord 1

The next record in this example, **BrtPCRRecord** (section 2.4.729), specifies the first cache record (section 2.2.5.2.10) in the **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
001C	BrtPCRRecord **- BrtPCRRecord**	
001C	rgb **- rgb**	
0004	ULONG **- rgb[0]**	0x00000000
0004	ULONG **- rgb[1]**	0x00000000
0004	ULONG **- rgb[2]**	0x00000000
0008	Xnum **- rgb[3]**	0x4004000000000000
0008	Xnum **- rgb[4]**	0x4020000000000000

Structure of BrtPCRRecord

rgb: Specifies a cache record (section 2.2.5.2.10) that consists of cache item (section 2.2.5.2.3) from the "CustomerName", "OrderDate", "ProductName", "UnitPrice", and "Quantity" cache field (section 2.2.5.2.2).

These records consist of five sequential parts:

1. A 4-byte, zero-based cache item (section 2.2.5.2.3) index into the "CustomerName" cache field.
2. A 4-byte, zero-based cache item index into the "OrderDate" cache field.

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3. A 4-byte, zero-based cache item index into the "ProductName" cache field.
4. An 8-byte, 64-bit floating point number specifying the value of the "UnitPrice" cache field.
5. An 8-byte, 64-bit floating point number specifying the value of the "Quantity" cache field.

This particular record would evaluate as follows:

rgb.rgb[0]: 0x00000000 specifies the index of the first cache item (section 2.2.5.2.3) in the "CustomerName" cache field (section 2.2.5.2.2), which is "Great Lakes Food Market".

rgb.rgb[1]: 0x00000000 specifies the index of the first cache item in the "OrderDate" cache field, which is 5/6/1997.

rgb.rgb[2]: 0x00000000 specifies the index of the first cache item in the "ProductName" cache field, which is "Geitost".

rgb.rgb[3]: 0x4004000000000000 specifies the 64-bit floating point value 2.50 in the "UnitPrice" cache field.

rgb.rgb[4]: 0x4020000000000000 specifies the 64-bit floating point value 8 in the "Quantity" cache field.

3.8.20 PivotTable: BrtPCRRecord 2

This **BrtPCRRecord** (section 2.4.729) specifies the next cache record (section 2.2.5.2.10) in the **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
001C	BrtPCRRecord **- BrtPCRRecord**	
001C	rgb **- rgb**	
0004	ULONG **- rgb[0]**	0x00000002
0004	ULONG **- rgb[1]**	0x00000010
0004	ULONG **- rgb[2]**	0x00000004
0008	Xnum **- rgb[3]**	0x4043000000000000
0008	Xnum **- rgb[4]**	0x4026000000000000

Structure of BrtPCRRecord

rgb: Specifies a cache record (section 2.2.5.2.10) that consists of cache items (section 2.2.5.2.3) from the "CustomerName", "OrderDate", "ProductName", "UnitPrice", and "Quantity" cache fields (section 2.2.5.2.2).

rgb.rgb[0]: 0x00000002 specifies the index of the third cache item (section 2.2.5.2.3) in the "CustomerName" cache field (section 2.2.5.2.2), which is "Richter Supermarkt".

rgb.rgb[1]: 0x00000010 specifies the index of the 17th cache item in the "OrderDate" cache field, which is 12/23/1997.

rgb.rgb[2]: 0x00000004 specifies the index of the fifth cache item in the "ProductName" cache field, which is "Gnocchi di nonna Alice".

rgb.rgb[3]: 0x4043000000000000 specifies the 64-bit floating point value 38.00 in the "UnitPrice" cache field.

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rgb.rgb[4]: 0x4026000000000000 specifies the 64-bit floating point value 11 in the "Quantity" cache field.

3.8.21 PivotTable: BrtPCRRecord 3

This **BrtPCRRecord** (section 2.4.729) specifies the next cache record (section 2.2.5.2.10) in the **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
001C	BrtPCRRecord **- BrtPCRRecord**	
001C	rgb **- rgb**	
0004	ULONG **- rgb[0]**	0x00000002
0004	ULONG **- rgb[1]**	0x00000010
0004	ULONG **- rgb[2]**	0x00000003
0008	Xnum **- rgb[3]**	0x4047000000000000
0008	Xnum **- rgb[4]**	0x4010000000000000

Structure of BrtPCRRecord

rgb: Specifies a cache record (section 2.2.5.2.10) that consists of cache item (section 2.2.5.2.3) from the "CustomerName", "OrderDate", "ProductName", "UnitPrice", and "Quantity" cache field (section 2.2.5.2.2).

rgb.rgb[0]: 0x00000002 specifies the index of the third cache item (section 2.2.5.2.3) in the "CustomerName" cache field (section 2.2.5.2.2), which is "Richter Supermarkt".

rgb.rgb[1]: 0x00000010 specifies the index of the 17th cache item in the "OrderDate" cache field, which is 12/23/1997.

rgb.rgb[2]: 0x00000003 specifies the index of the fourth cache item in the "ProductName" cache field, which is "Ipoh Coffee".

rgb.rgb[3]: 0x4047000000000000 specifies the 64-bit floating point value 46.00 in the "UnitPrice" cache field.

rgb.rgb[4]: 0x4010000000000000 specifies the 64-bit floating point value 4 in the "Quantity" cache field.

3.8.22 PivotTable: BrtPCRRecord 4

This **BrtPCRRecord** (section 2.4.729) specifies the next cache record (section 2.2.5.2.10) in the **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
001C	BrtPCRRecord **- BrtPCRRecord**	
001C	rgb **- rgb**	
0004	ULONG **- rgb[0]**	0x00000002
0004	ULONG **- rgb[1]**	0x00000010

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Size	Structure	Value
0004	ULONG **- rgb[2]**	0x00000005
0008	Xnum **- rgb[3]**	0x4022666666666666
0008	Xnum **- rgb[4]**	0x4030000000000000

Structure of BrtPCRRecord

rgb: Specifies a cache record (section 2.2.5.2.10) that consists of cache items (section 2.2.5.2.3) from the "CustomerName", "OrderDate", "ProductName", "UnitPrice", and "Quantity" cache fields (section 2.2.5.2.2).

rgb.rgb[0]: 0x00000002 specifies the index of the third cache item (section 2.2.5.2.3) in the "CustomerName" cache field (section 2.2.5.2.2), which is "Richter Supermarkt".

rgb.rgb[1]: 0x00000010 specifies the index of the 17th cache item in the "OrderDate" cache field, which is 12/23/1997.

rgb.rgb[2]: 0x00000005 specifies the index of the sixth cache item in the "ProductName" cache field, which is "Teatime Chocolate Biscuits".

rgb.rgb[3]: 0x4022666666666666 specifies the 64-bit floating point value 9.20 in the "UnitPrice" cache field.

rgb.rgb[4]: 0x4030000000000000 specifies the 64-bit floating point value 16 in the "Quantity" cache field.

3.8.23 PivotTable: BrtPCRRecord 5

This **BrtPCRRecord** (section 2.4.729) specifies the next cache record (section 2.2.5.2.10) in the **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
001C	BrtPCRRecord **- BrtPCRRecord**	
001C	rgb **- rgb**	
0004	ULONG **- rgb[0]**	0x00000004
0004	ULONG **- rgb[1]**	0x00000011
0004	ULONG **- rgb[2]**	0x00000000
0008	Xnum **- rgb[3]**	0x4004000000000000
0008	Xnum **- rgb[4]**	0x4037000000000000

Structure of BrtPCRRecord

rgb: Specifies a cache record that consists of cache items (section 2.2.5.2.3) from the "CustomerName", "OrderDate", "ProductName", "UnitPrice", and "Quantity" cache fields (section 2.2.5.2.2).

rgb.rgb[0]: 0x00000004 specifies the index of the fifth cache item in the "CustomerName" cache field, which is "Königlich Essen".

rgb.rgb[1]: 0x00000011 specifies the index of the 18th cache item in the "OrderDate" cache field, which is 12/26/1997.

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rgb.rgb[2]: 0x00000000 specifies the index of the first cache item in the "ProductName" cache field, which is "Geitost".

rgb.rgb[3]: 0x4004000000000000 specifies the 64-bit floating point value 2.50 in the "UnitPrice" cache field.

rgb.rgb[4]: 0x4037000000000000 specifies the 64-bit floating point value 23 in the "Quantity" cache field.

3.8.24 PivotTable: BrtPCRRecord 6

This **BrtPCRRecord** (section 2.4.729) specifies the next cache record (section 2.2.5.2.10) in the **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
001C	BrtPCRRecord **- BrtPCRRecord**	
001C	rgb **- rgb**	
0004	ULONG **- rgb[0]**	0x00000003
0004	ULONG **- rgb[1]**	0x00000011
0004	ULONG **- rgb[2]**	0x00000003
0008	Xnum **- rgb[3]**	0x4047000000000000
0008	Xnum **- rgb[4]**	0x404B800000000000

Structure of BrtPCRRecord

rgb: Specifies a cache record that consists of cache items (section 2.2.5.2.3) from the "CustomerName", "OrderDate", "ProductName", "UnitPrice", and "Quantity" cache fields (section 2.2.5.2.2).

rgb.rgb[0]: 0x00000003 specifies the index of the fourth cache item in the "CustomerName" cache field, which is "Island Trading".

rgb.rgb[1]: 0x00000011 specifies the index of the 18th cache item in the "OrderDate" cache field, which is 12/26/1997.

rgb.rgb[2]: 0x00000003 specifies the index of the fourth cache item in the "ProductName" cache field, which is "Ipoh Coffee".

rgb.rgb[3]: 0x4047000000000000 specifies the 64-bit floating point value 46 in the "UnitPrice" cache field.

rgb.rgb[4]: 0x404B800000000000 specifies the 64-bit floating point value 55 in the "Quantity" cache field.

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This **BrtPCRRecord** (section 2.4.729) specifies the next cache record (section 2.2.5.2.10) in the **PivotCache** (section 2.2.5.2), as specified in the following table.

Size	Structure	Value
001C	BrtPCRRecord **- BrtPCRRecord**	

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Size	Structure	Value
001C	rgb **- rgb**	
0004	ULONG **- rgb[0]**	0x00000004
0004	ULONG **- rgb[1]**	0x00000011
0004	ULONG **- rgb[2]**	0x00000002
0008	Xnum **- rgb[3]**	0x404B800000000000
0008	Xnum **- rgb[4]**	0x4048000000000000

Structure of BrtPCRRecord

rgb: Specifies a cache record that consists of cache items (section 2.2.5.2.3) from the "CustomerName", "OrderDate", "ProductName", "UnitPrice", and "Quantity" cache fields (section 2.2.5.2.2).

rgb.rgb[0]: 0x00000004 specifies the index of the fifth cache item (section 2.2.5.2.3) in the "CustomerName" cache field, which is "Königlich Essen".

rgb.rgb[1]: 0x00000011 specifies the index of the 18th cache item in the "OrderDate" cache field, which is 12/26/1997.

rgb.rgb[2]: 0x00000002 specifies the index of the third cache item in the "ProductName" cache field, which is "Perth Pasties".

rgb.rgb[3]: 0x404B800000000000 specifies the 64-bit floating point value 55.00 in the "UnitPrice" cache field.

rgb.rgb[4]: 0x4048000000000000 specifies the 64-bit floating point value 48 in the "Quantity" cache field.

The remaining 37 **BrtPCRRecord** records have been omitted for brevity.

3.8.26 PivotTable: BrtBeginSXView

The **BrtBeginSXView** (section 2.4.273) record begins a collection of records that specify the PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0054	BrtBeginSXView **- BrtBeginSXView**	
0001	AppVersion **- bVerSxMacro**	0x03
1 bit	BYTE **- fDisplayImmediateItems**	0x1
1 bit	BYTE **- fEnableDataEd**	0x0
1 bit	BYTE **- fDisableFList**	0x0
1 bit	BYTE **- fReenterOnLoadOnce**	0x0
1 bit	BYTE **- fNotViewCalculatedMembers**	0x1
1 bit	BYTE **- fNotVisualTotals**	0x0
1 bit	BYTE **- fPageMultipleItemLabel**	0x1

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Size	Structure	Value
1 bit	BYTE **- reserved1**	0x0
1 bit	WORD **- fHideDDData**	0x0
3 bits	WORD **- reserved2**	0x0
1 bit	WORD **- fHideDrillIndicators**	0x0
1 bit	WORD **- fPrintDrillIndicators**	0x0
1 bit	WORD **- fMemPropsInTips**	0x1
1 bit	WORD **- fNoPivotTips**	0x0
7 bits	WORD **- cIndentInc**	0x00
1 bit	WORD **- fNoHeaders**	0x0
1 bit	DWORD **- fNoStencil**	0x0
1 bit	DWORD **- fHideTotAnnotation**	0x0
1 bit	DWORD **- fIncludeEmptyRw**	0x0
1 bit	DWORD **- fIncludeEmptyCol**	0x0
1 bit	DWORD **- fEnableWizard**	0x1
1 bit	DWORD **- fEnableDrilldown**	0x1
1 bit	DWORD **- fEnableFieldDialog**	0x1
1 bit	DWORD **- fPreserveFormatting**	0x1
1 bit	DWORD **- fAutoFormat**	0x1
1 bit	DWORD **- fDisplayErrorString**	0x0
1 bit	DWORD **- fDisplayNullString**	0x1
1 bit	DWORD **- fAcrossPageLay**	0x0
1 bit	DWORD **- fSubtotalHiddenPageItems**	0x0
1 bit	DWORD **- fRwGrand**	0x1
1 bit	DWORD **- fColGrand**	0x1
1 bit	DWORD **- fPrintTitles**	0x0
1 bit	DWORD **- unused**	0x1
1 bit	DWORD **- fRepeatItemsOnEachPrintedPage**	0x1
1 bit	DWORD **- fMergeLabels**	0x0
1 bit	DWORD **- fDisplayData**	0x1
1 bit	DWORD **- fDisplayGrand**	0x0
1 bit	DWORD **- fDisplayPageFieldStyle**	0x0

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Size	Structure	Value
1 bit	DWORD **- fDisplayTableStyle**	0x0
1 bit	DWORD **- fDisplayVacateStyle**	0x0
1 bit	DWORD **- ibitAtrNum**	0x0
1 bit	DWORD **- ibitAtrFnt**	0x0
1 bit	DWORD **- ibitAtrAlc**	0x0
1 bit	DWORD **- ibitAtrBdr**	0x0
1 bit	DWORD **- ibitAtrPat**	0x0
1 bit	DWORD **- ibitAtrProt**	0x1
1 bit	DWORD **- fDisplayTag**	0x0
1 bit	DWORD **- reserved3**	0x0
1 bit	DWORD **- fDefaultCompact**	0x1
1 bit	DWORD **- fDefaultOutline**	0x1
1 bit	DWORD **- fOutlineData**	0x1
1 bit	DWORD **- fCompactData**	0x1
1 bit	DWORD **- fNewDropZones**	0x1
1 bit	DWORD **- fPublished**	0x0
1 bit	DWORD **- fEmptyDisplayErrorString**	0x1
1 bit	DWORD **- fEmptyDisplayNullString**	0x1
1 bit	DWORD **- fTurnOffImmersive**	0x0
1 bit	DWORD **- fSingleFilterPerField**	0x1
1 bit	DWORD **- fUseRwHdrName**	0x0
1 bit	DWORD **- fUseColHdrName**	0x0
1 bit	DWORD **- fNonDefaultSortInFlist**	0x0
1 bit	DWORD **- reserved4**	0x0
1 bit	DWORD **- fDontUseCustomLists**	0x0
17 bits	DWORD **- reserved5**	0x00000
0001	DWORD **- sxaxis4Data**	0x02
0001	BYTE **- cWrapPage**	0x00
0001	AppVersion **- bVerSxLastUpdated**	0x03
0001	AppVersion **- bVerSxUpdateableMin**	0x03
0004	LONG **- ipos4Data**	0xFFFFFFFF

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Size	Structure	Value
0002	USHORT **- itblAutoFmt**	0x0001
0002	WORD **- reserved6**	0x0000
0004	DWORD **- dwCrtFmtId**	0x00000000
0004	DWORD **- idCache**	0x00000041
0024	XLWideString **- irstName**	OrdersPivotTable
0010	XLWideString **- irstData**	Values

Structure of BrtBeginSXView

Fields in this record that are ignored because they apply to **OLAP** source data (section 2.2.5.2.1) or are not applicable in **compact axis** mode are omitted for brevity.

bVerSxMacro: 0x03 specifies the application version that created this **PivotTable** (section 2.1.7.40) is Microsoft Office Excel 2007.

fDisplayImmediateItems: 0x1 specifies that pivot item (section 2.2.5.3.3) labels displayed on the **row** axis and the **column (1)** axis when there are no data items (section 2.2.5.3.7.5.1) in this PivotTable view.

fEnableDataEd: 0x0 specifies that **cells** displaying values for data items cannot be edited.

fDisableFList: 0x0 specifies that the **PivotTable field list** is displayed.

fReenterOnLoadOnce: 0x0 specifies that the PivotTable view is not automatically updated on load.

fPageMultipleItemLabel: 0x1 specifies that a pivot fields (section 2.2.5.3.2) on the page axis (section 2.2.5.3.7.1) with multiple pivot items **selected** displays "(multiple items)".

fHideDDData: 0x0 specifies that a drop-down button for the data field (section 2.2.5.3.7.5.2) in the PivotTable view is not **hidden**.

fHideDrillIndicators: 0x0 specifies that **expand/collapse buttons** are displayed.

fPrintDrillIndicators: 0x0 specifies that expand/collapse buttons are not displayed when printed.

fMemPropsInTips: 0x1 specifies that **member** property information is shown in PivotTable view **ToolTips**.

fNoPivotTips: 0x0 specifies that ToolTips are displayed for PivotTable view cells.

cIndentInc: 0x00 specifies that the indentation increment that will be used for pivot fields in compact axis mode will be 1.

fNoStencil: 0x0 specifies that the PivotTable view displays large drop zones when there are no data items (section 2.2.5.3.7.5.1) in the PivotTable view.

fEnableWizard: 0x1 specifies that the user is able to use a wizard UI to work with the **PivotTable** (section 2.1.7.40).

fEnableDrilldown: 0x1 specifies that the user is able to show details for a cell displaying the value for a data item.

fEnableFieldDialog: 0x1 specifies that the user is allowed to display pivot fields properties.

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fPreserveFormatting: 0x1 specifies that formatting applied by the user to PivotTable view cells is preserved on **refresh**.

fAutoFormat: 0x1 specifies that an **AutoFormat** has been applied to the PivotTable view.

fDisplayErrorString: 0x0 specifies that if there are errors, the error strings to display in the cells are determined by the application.

fDisplayNullString: 0x1 specifies that if a cell is empty, the string as specified by the **irstNullString** field is displayed in the cell.

fAcrossPageLay: 0x0 specifies that if the page area (section 2.2.5.3.8.1.3) has another field added, pivot fields are displayed down, then over.

fSubtotalHiddenPageItems: 0x0 specifies page-filtering behavior that is not applicable for this example because the application version that created this **PivotTable** (section 2.1.7.40) is Microsoft Office Excel 2007.

fRwGrand: 0x1 specifies that **grand totals** are displayed for the row axis.

fColGrand: 0x1 specifies that grand totals are displayed for the column (1) axis.

fPrintTitles: 0x0 specifies that pivot field captions and pivot item (section 2.2.5.3.3) captions on the row axis and the column (1) axis from this PivotTable view do not appear on every page when printed.

fRepeatItemsOnEachPrintedPage: 0x1 specifies that pivot item captions on the row axis are repeated at the top of each printed page for pivot fields in tabular form.

fMergeLabels: 0x0 specifies that pivot item captions on the row area and column (1) area that span multiple cells are not merged into a single cell.

fDisplayData: 0x1 specifies that there is an **irstData** field after the fixed part of this record, that specifies the caption for the data field (section 2.2.5.3.7.5.2) in the PivotTable view.

fDisplayGrand: 0x0 specifies that there is not an **irstGrand** field after the fixed part of this record, that specifies a user-defined caption to display for grand totals when the **PivotTable** (section 2.1.7.40) is recalculated.

fDisplayPageFieldStyle: 0x0 specifies that there is not an **irstPageFieldStyle** field after the fixed part of this record, that specifies the cell style (section 2.2.6.1.2) to apply to each cell that contains data for pivot fields on the page axis (section 2.2.5.3.7.1) of the PivotTable view.

fDisplayTableStyle: 0x0 specifies that there is not an **irstTableStyle** field after the fixed part of this record, that specifies the cell style (section 2.2.6.1.2) to apply to this PivotTable view.

fDisplayVacateStyle: 0x0 specifies that there is not an **irstVacateStyle** field after the fixed part of this record, that specifies the cell style (section 2.2.6.1.2) to apply to the cells left blank when a PivotTable view shrinks during a refresh operation.

ibitAtrNum: 0x0 specifies that AutoFormat **number format** properties are not applied.

ibitAtrFnt: 0x0 specifies that AutoFormat **font** format properties are not applied.

ibitAtrAlc: 0x0 specifies that AutoFormat alignment format properties are not applied.

ibitAtrBdr: 0x0 specifies that AutoFormat **border** format properties are not applied.

ibitAtrPat: 0x0 specifies that AutoFormat pattern format properties are not applied.

ibitAtrProt: 0x1 specifies that the AutoFormat style is **protected**.

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fDisplayTag: 0x0 specifies that there is not an **irstTag** field after the fixed part of this record, that specifies a user-defined string that is associated with this PivotTable view.

fDefaultCompact: 0x1 specifies that new pivot fields (section 2.2.5.3.2) are created in compact axis mode.

fDefaultOutline: 0x1 specifies that new pivot fields are created in **outline** mode.

fOutlineData: 0x1 specifies that the data field in the PivotTable view is displayed in outline mode.

fCompactData: 0x1 specifies that the data field in the PivotTable view is displayed in compact axis mode.

fNewDropZones: 0x1 specifies that in-grid drop zones is disabled. Fields cannot be dragged and dropped within the PivotTable view.

fPublished: 0x0 specifies that this PivotTable view is not included in the version of the **workbook** that is published to or rendered on a web or application server.

fEmptyDisplayErrorString: 0x1 specifies that the **irstErrorString** field does not exist after the fixed part of this record, that specifies the string to display in cells that contain values for data items (section 2.2.5.3.7.5.1) when an error occurs.

fEmptyDisplayNullString: 0x1 specifies that the **irstNullString** field does not exist after the fixed part of this record, that specifies the string to display in cells that contain values for data items that are empty.

fTurnOffImmersive: 0x0 specifies that the **PivotTable** (section 2.2.5) contextual tab, a user interface for manipulating **PivotTable** options, is displayed.

fSingleFilterPerField: 0x1 specifies that the pivot fields in the PivotTable view can have only one **filter** each.

fUseRwHdrName: 0x0 specifies that there is not an **irstRwHdrName** field after the fixed part of this record, that specifies the user-defined string to display in the row header when one or more pivot fields in the PivotTable view are in compact axis mode.

fUseColHdrName: 0x0 specifies that there is not an **irstColHdrName** field after the fixed part of this record, that specifies the user-defined string to display in the column (1) header when one or more pivot fields in the PivotTable view are in compact axis mode.

fNonDefaultSortInFlist: 0x0 specifies that pivot fields (section 2.2.5.3.2) in the PivotTable field list are displayed in source data (section 2.2.5.2.1) order.

fDontUseCustomLists: 0x0 specifies that **custom lists** are used when sorting the pivot items (section 2.2.5.3.3) in the PivotTable view.

sxaxis4Data: 0x02 specifies that the data field is displayed on the column (1) axis.

cWrapPage: 0x00 specifies that no wrapping occurs when starting another row or column (1).

bVerSxLastUpdated: 0x03 specifies that the last application version to update this PivotTable view is Microsoft Office Excel 2007.

bVerSxUpdateableMin: 0x03 specifies that the earliest application version that can update this PivotTable view is Office Excel 2007.

ipos4Data: 0xFFFFFFFF specifies the position of the data field and specifies that the data field is displayed as the last field on the column (1) axis.

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itblAutoFmt: 0x0001 specifies an **AutoFormatID** (section 2.5.3) that specifies which AutoFormat is applied.

dwCrtFmtId: 0x00000000 specifies the next available chart identifier to use when creating a **PivotChart** (section 2.2.3.2) for this **PivotTable** (section 2.2.5).

idCache: 0x00000041 specifies the **PivotCache** (section 2.2.5.2) identifier of the **PivotCache** used by this PivotTable view. This value equals the **idSx** field of the **BrtBeginPivotCacheID** (section 2.4.168) record.

irstName: Specifies that the unique name for this PivotTable view is "OrdersPivotTable".

irstData: Specifies that the caption of the data field in the PivotTable view is "Values".

3.8.27 PivotTable: BrtBeginSxLocation

The **BrtBeginSXLocation** (section 2.4.252) record specifies the position of the PivotTable view (section 2.2.5.3) in the **sheet**, as specified in the following table.

Size	Structure	Value
0024	BrtBeginSXLocation **- BrtBeginSxlocation**	
0010	UncheckedRfX **- rfxGeom**	
0004	LONG **- rwFirst**	0x00000004
0004	LONG **- rwLast**	0x0000000B
0004	LONG **- colFirst**	0x00000001
0004	LONG **- colLast**	0x00000002
0004	LONG **- rwFirstHead**	0x00000005
0004	LONG **- rwFirstData**	0x00000005
0004	LONG **- colFirstData**	0x00000002
0004	LONG **- crwPage**	0x00000001
0004	LONG **- ccolPage**	0x00000001

Structure of BrtBeginSxlocation

rfxGeom: Specifies the location of the PivotTable view in the sheet as follows:

rfxGeom.rwFirst: 0x00000004 specifies that the first **row** of the **range** specified by the PivotTable view is row 5.

rfxGeom.rwLast: 0x0000000B specifies that the last row of the range specified by the PivotTable view is row 12.

rfxGeom.colFirst: 0x00000001 specifies that the first **column (1)** of the range specified by the PivotTable view is column (1) B.

rfxGeom.colLast: 0x00000002 specifies that the last column (1) of the range specified by the PivotTable view is column (1) C.

rwFirstHead: 0x00000005 specifies that the location of the topmost row in the PivotTable view body is row 6.

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rwFirstData: 0x00000005 specifies that the location of the topmost row of the PivotTable view body where **cells** containing values of data items (section 2.2.5.3.7.5.1) are displayed is row 6.

colFirstData: 0x00000002 specifies that the location of the first column (1) of the PivotTable view body where cells containing values of data items (section 2.2.5.3.7.5.1) are displayed is column (1) C.

crwPage: 0x00000001 specifies that there is one row with cells containing data for pivot fields (section 2.2.5.3.2) on the page axis (section 2.2.5.3.7.1) of the PivotTable view.

ccolPage: 0x00000001 specifies that there is one column (1) with cells containing data for pivot fields (section 2.2.5.3.2) on the page axis (section 2.2.5.3.7.1) of the PivotTable view.

3.8.28 PivotTable: BrtBeginSXVDs

The next record in this example, **BrtBeginSXVDs** (section 2.4.271), begins a collection of records that specify the pivot field (section 2.2.5.3.2) of the **PivotTable** view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0004	BrtBeginSXVDs **- BrtBeginSXVDs**	
0004	DWORD **- csxvds**	0x00000005

Structure of BrtBeginSXVDs

csxvds: 0x00000005 specifies that there are five pivot fields in the PivotTable view.

3.8.29 PivotTable: BrtBeginSXVD 1

The first **BrtBeginSXVD** (section 2.4.270) record specifies the "CustomerName" pivot field (section 2.2.5.3.2) in the **PivotTable** view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0014	BrtBeginSXVD **- BrtBeginSXVD**	
0001	SXAxis **- sxaxis**	
1 bit	BYTE **- sxaxisRw**	0x1
1 bit	BYTE **- sxaxisCol**	0x0
1 bit	BYTE **- sxaxisPage**	0x0
1 bit	BYTE **- sxaxisData**	0x0
4 bits	BYTE **- reserved**	0x0
1 bit	WORD **- fDefault**	0x1
1 bit	WORD **- fSum**	0x0
1 bit	WORD **- fCounta**	0x0
1 bit	WORD **- fAverage**	0x0
1 bit	WORD **- fMax**	0x0
1 bit	WORD **- fMin**	0x0

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Size	Structure	Value
1 bit	WORD **- fProduct**	0x0
1 bit	WORD **- fCount**	0x0
1 bit	WORD **- fStdev**	0x0
1 bit	WORD **- fStdevp**	0x0
1 bit	WORD **- fVar**	0x0
1 bit	WORD **- fVarp**	0x0
4 bits	WORD **- reserved1**	0x0
1 bit	BYTE **- fDrilledLevel**	0x0
1 bit	BYTE **- fHideDD**	0x0
1 bit	BYTE **- fHiddenLvl**	0x0
1 bit	BYTE **- fUseMemPropCaption**	0x0
1 bit	BYTE **- fCompact**	0x1
1 bit	BYTE **- fDisplayName**	0x0
1 bit	BYTE **- fDisplaySub**	0x0
1 bit	BYTE **- fTensorSort**	0x0
0004	PivotNumFmt **- ifmt**	
0002	Ifmt **- ifmt**	
0002	WORD **- ifmt**	0x0000
0002	WORD **- reserved**	0x0000
1 bit	DWORD **- fDragToRow**	0x1
1 bit	DWORD **- fDragToColumn**	0x1
1 bit	DWORD **- fDragToPage**	0x1
1 bit	DWORD **- fDragToHide**	0x1
1 bit	DWORD **- fDragToData**	0x1
1 bit	DWORD **- fShowAllItems**	0x0
1 bit	DWORD **- fOutline**	0x1
1 bit	DWORD **- fInsertBlankRow**	0x0
1 bit	DWORD **- fSubtotalAtTop**	0x1
1 bit	DWORD **- fServerBased**	0x0
1 bit	DWORD **- reserved2**	0x0
1 bit	DWORD **- fPageBreaksBetweenItems**	0x0

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Size	Structure	Value
1 bit	DWORD **- fAutoSort**	0x0
1 bit	DWORD **- fAscendSort**	0x1
1 bit	DWORD **- fAutoShow**	0x0
1 bit	DWORD **- fTopAutoShow**	0x1
1 bit	DWORD **- fHideNewItems**	0x0
1 bit	DWORD **- fHasAdvFilter**	0x0
1 bit	DWORD **- fFilterInclusive**	0x1
1 bit	DWORD **- fEnableMultiplePageItems**	0x0
1 bit	DWORD **- fNotAutoSortDft**	0x0
1 bit	DWORD **- fMemPropDisplayInReport**	0x0
1 bit	DWORD **- fMemPropDisplayInTip**	0x0
1 bit	DWORD **- fMemPropDisplayInCaption**	0x0
1 bit	DWORD **- fItemsDrilledByDefault**	0x0
7 bits	DWORD **- unused2**	0x00
0004	DWORD **- citmAutoShow**	0x0000000A
0004	ISXDI **- isxdiAutoShow**	0xFFFFFFFF

Structure of BrtBeginSXVD

Fields in this record that are ignored because they apply only to **OLAP** or **ODBC data sources** are omitted for brevity.

sxaxis: Specifies the axis or axes this pivot field (section 2.2.5.3.2) is placed on as follows:

sxaxis.sxaxisRw: 0x01 specifies that this pivot field is on the **row** axis.

sxaxis.sxaxisCol: 0x00 specifies that this pivot field is not on the **column (1)** axis.

sxaxis.sxaxisPage: 0x00 specifies that this pivot field is not on the page axis (section 2.2.5.3.7.1).

sxaxis.sxaxisData: 0x00 specifies that this pivot field is not on the data axis (section 2.2.5.3.7.5).

fDefault: 0x1 specifies that the default subtotal (section 2.2.5.3.7.4.2) is displayed for this pivot field.

fSum: 0x0 specifies that subtotals using the sum aggregate function are not displayed for this pivot field.

fCounta: 0x0 specifies that subtotals using the count aggregate function are not displayed for this pivot field (section 2.2.5.3.2).

fAverage: 0x0 specifies that subtotals using the average aggregate function are not displayed for this pivot field.

fMax: 0x0 specifies that subtotals using the maximum aggregate function are not displayed for this pivot field.

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fMin: 0x0 specifies that subtotals (section 2.2.5.3.7.4.2) using the minimum aggregate function are not displayed for this pivot field.

fProduct: 0x0 specifies that subtotals using the product aggregate function are not displayed for this pivot field.

fCount: 0x0 specifies that subtotals using the count number aggregate function are not displayed for this pivot field.

fStdev: 0x0 specifies that subtotals using the standard deviation aggregate function are not displayed for this pivot field.

fStdevp: 0x0 specifies that subtotals using the standard deviation population aggregate function are not displayed for this pivot field (section 2.2.5.3.2).

fVar: 0x0 specifies that subtotals using the variance aggregate function are not displayed for this pivot field.

fVarp: 0x0 specifies that subtotal (section 2.2.5.3.7.4.2) using the variance population aggregate function are not displayed for this pivot field.

fHideDD: 0x0 specifies that drop-down buttons are not shown in **cells** where pivot field labels are displayed.

fCompact: 0x1 specifies that this pivot field is in **compact axis** mode.

fDisplayName: 0x0 specifies that the **irstName** field, which specifies the name of the pivot field, does not exist after the fixed-size portion of the record.

fDisplaySub: 0x0 specifies that the **irstSub** field, which specifies custom text displayed for a subtotals label, does not exist after the fixed-size portion of the record.

fDragToRow: 0x1 specifies that this pivot field can be placed on the row axis.

fDragToColumn: 0x1 specifies that this pivot field can be placed on the column (1) axis.

fDragToPage: 0x1 specifies that this pivot field (section 2.2.5.3.2) can be placed on the page axis (section 2.2.5.3.7.1).

fDragToHide: 0x1 specifies that this pivot field can be removed from the PivotTable view (section 2.2.5.3).

fDragToData: 0x1 specifies that this pivot field can be placed on the data axis (section 2.2.5.3.7.5).

fShowAllItems: 0x0 specifies that all pivot items (section 2.2.5.3.3) for this pivot field are not displayed.

fOutline: 0x1 specifies that this pivot field is in **outline** mode.

fInsertBlankRow: 0x0 specifies that a blank row is not inserted after each pivot item (section 2.2.5.3.3).

fSubtotalAtTop: 0x1 specifies that subtotals (section 2.2.5.3.7.4.2) are displayed at the top.

fPageBreaksBetweenItems: 0x0 specifies that a **page break** will not be inserted after each pivot item when the **PivotTable** (section 2.2.5) is printed.

fAutoSort: 0x0 specifies that autosort (see section 2.2.5.3.2.1) is not applied to this pivot field.

fAscendSort: 0x1 specifies that any autosort (see section 2.2.5.3.2.1) applied to this pivot field will **sort** in **ascending order**.

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fAutoShow: 0x0 specifies that an **AutoShow filter** is not applied to this pivot field (section 2.2.5.3.2).

fTopAutoShow: 0x1 specifies that any AutoShow filter applied to this pivot field shows the top ranked values.

fHideNewItems: 0x0 specifies that new pivot items (section 2.2.5.3.3) that are added after a **refresh** are shown by default.

fHasAdvFilter: 0x0 specifies that this pivot field does not have a value filter (section 2.2.5.3.6.1.3) applied to it.

fFilterInclusive: 0x1 specifies that new pivot items of this pivot field are excluded in manual filtering (section 2.2.5.3.5) by default.

fEnableMultiplePageItems: 0x0 specifies that this pivot field cannot have multiple pivot items selected when it is on the page axis (section 2.2.5.3.7.1).

fNotAutoSortDft: 0x0 specifies that any sort operation applied to this pivot field (section 2.2.5.3.2) is an autosort (see section 2.2.5.3.2.1).

citmAutoShow: 0x0000000A specifies the number of pivot items (section 2.2.5.3.3) to show when AutoShow is applied.

isxdiAutoShow: 0xFFFFFFFF specifies that no data item (section 2.2.5.3.7.5.1) is set for the AutoShow.

3.8.30 PivotTable: BrtBeginSXVIs 1

The next record in this example, **BrtBeginSXVIs** (section 2.4.276), begins the collection of records that specify the pivot items (section 2.2.5.3.3) of the "CustomerName" pivot field (section 2.2.5.3.2) in this PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0004	BrtBeginSXVIs **- BrtBeginSXVIs**	
0004	DWORD **- csxvis**	0x00000006

Structure of BrtBeginSXVIs

csxvis: 0x00000006 specifies that the count of pivot items in this collection is 6.

3.8.31 PivotTable: BrtBeginSXVI 1

This **BrtBeginSXVI** (section 2.4.272) record specifies the "Antonio Moreno Taquería" pivot item (section 2.2.5.3.3) in the **BrtBeginSXVIs** (section 2.4.276) collection. This pivot item (section 2.2.5.3.3) is filtered out of the PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0007	BrtBeginSXVI **- BrtBeginSXVI**	
0001	PivotItemType **- itmtype**	0x00
1 bit	WORD **- fHidden**	0x0
1 bit	WORD **- fHideDetail**	0x0
1 bit	WORD **- fFormula**	0x0

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Size	Structure	Value
1 bit	WORD **- fMissing**	0x0
1 bit	WORD **- fDisplayName**	0x0
1 bit	WORD **- fDrilledMember**	0x0
1 bit	WORD **- fHasChildrenEst**	0x0
1 bit	WORD **- fCollapsedMember**	0x0
1 bit	WORD **- fOlapFilterSelected**	0x0
7 bits	WORD **- reserved**	0x00
0004	LONG **- iCache**	0x00000001

Structure of BrtBeginSXVI

Fields in this record that are ignored because they apply only to **OLAP data sources** are omitted for brevity.

itmtype: 0x00 specifies that this pivot item (section 2.2.5.3.3) is not a subtotal (section 2.2.5.3.7.4.2), **grand total**, or blank line.

fHidden: 0x0 specifies that this pivot item is not **hidden** by a manual filter (section 2.2.5.3.5).

fHideDetail: 0x0 specifies that this pivot item is not collapsed (section 2.2.5.3.7.4.1).

fFormula: 0x0 specifies that this pivot item is not a calculated item (section 2.2.5.2.6).

fMissing: 0x0 specifies that this pivot item is not missing from the **source data**.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0x00000001 specifies the index to the cache item (section 2.2.5.2.3) in the cache field (section 2.2.5.2.2) for the "CustomerName" pivot field (section 2.2.5.3.2).

The next record in this collection, the **BrtBeginSXVI** (section 2.4.272) for "Great Lakes Food Market", is omitted for brevity.

3.8.32 PivotTable: BrtBeginSXVI 2

The next **BrtBeginSXVI** (section 2.4.272) record is the "Island Trading" pivot item (section 2.2.5.3.3) in the **BrtBeginSXVIs** (section 2.4.276) collection and in the PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0007	BrtBeginSXVI **- BrtBeginSXVI**	
0001	PivotItemType **- itmtype**	0x00
1 bit	WORD **- fHidden**	0x0
1 bit	WORD **- fHideDetail**	0x0
1 bit	WORD **- fFormula**	0x0
1 bit	WORD **- fMissing**	0x0

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Size	Structure	Value
1 bit	WORD **- fDisplayName**	0x0
1 bit	WORD **- fDrilledMember**	0x0
1 bit	WORD **- fHasChildrenEst**	0x0
1 bit	WORD **- fCollapsedMember**	0x0
1 bit	WORD **- fOlapFilterSelected**	0x0
7 bits	WORD **- reserved**	0x00
0004	LONG **- iCache**	0x00000003

Structure of BrtBeginSXVI

Fields in this record that are ignored because they apply only to **OLAP data sources** are omitted for brevity.

itmtype: 0x00 specifies that this pivot item (section 2.2.5.3.3) is not a subtotal (section 2.2.5.3.7.4.2), **grand total**, or blank line.

fHidden: 0x0 specifies that this pivot item is not **hidden** by a manual filter (section 2.2.5.3.5).

fHideDetail: 0x0 specifies that this pivot item is not collapsed (section 2.2.5.3.7.4.1).

fFormula: 0x0 specifies that this pivot item is not a calculated item (section 2.2.5.2.6).

fMissing: 0x0 specifies that this pivot item is not missing from the **source data**.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0x00000003 specifies the index to the cache item (section 2.2.5.2.3) in the cache field (section 2.2.5.2.2) for the "CustomerName" pivot field (section 2.2.5.3.2).

3.8.33 PivotTable: BrtBeginSXVI 3

The next **BrtBeginSXVI** (section 2.4.272) record is the "Königlich Essen" pivot item (section 2.2.5.3.3) in the **BrtBeginSXVIs** (section 2.4.276) collection and in the PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0007	BrtBeginSXVI **- BrtBeginSXVI**	
0001	PivotItemType **- itmtype**	0x00
1 bit	WORD **- fHidden**	0x0
1 bit	WORD **- fHideDetail**	0x0
1 bit	WORD **- fFormula**	0x0
1 bit	WORD **- fMissing**	0x0
1 bit	WORD **- fDisplayName**	0x0
1 bit	WORD **- fDrilledMember**	0x0
1 bit	WORD **- fHasChildrenEst**	0x0

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Size	Structure	Value
1 bit	WORD **- fCollapsedMember**	0x0
1 bit	WORD **- fOlapFilterSelected**	0x0
7 bits	WORD **- reserved**	0x00
0004	LONG **- iCache**	0x00000004

Structure of BrtBeginSXVI

Fields in this record that are ignored because they apply only to **OLAP data sources** are omitted for brevity.

itmtype: 0x00 specifies that this pivot item (section 2.2.5.3.3) is not a subtotal (section 2.2.5.3.7.4.2), **grand total**, or blank line.

fHidden: 0x0 specifies that this pivot item is not **hidden** by a manual filter (section 2.2.5.3.5).

fHideDetail: 0x0 specifies that this pivot item is not collapsed (section 2.2.5.3.7.4.1).

fFormula: 0x0 specifies that this pivot item is not a calculated item (section 2.2.5.2.6).

fMissing: 0x0 specifies that this pivot item is not missing from the **source data**.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0x00000004 specifies the index to the cache item (section 2.2.5.2.3) in the cache field (section 2.2.5.2.2) for the "CustomerName" pivot field (section 2.2.5.3.2).

3.8.34 PivotTable: BrtBeginSXVI 4

The next **BrtBeginSXVI** (section 2.4.272) record in this example is the "Richter Supermarkt" pivot item (section 2.2.5.3.3) in the **BrtBeginSXVIs** (section 2.4.276) collection and in the PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0007	BrtBeginSXVI **- BrtBeginSXVI**	
0001	PivotItemType **- itmtype**	0x00
1 bit	WORD **- fHidden**	0x0
1 bit	WORD **- fHideDetail**	0x1
1 bit	WORD **- fFormula**	0x0
1 bit	WORD **- fMissing**	0x0
1 bit	WORD **- fDisplayName**	0x0
1 bit	WORD **- fDrilledMember**	0x0
1 bit	WORD **- fHasChildrenEst**	0x0
1 bit	WORD **- fCollapsedMember**	0x0
1 bit	WORD **- fOlapFilterSelected**	0x0
7 bits	WORD **- reserved**	0x00

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Size	Structure	Value
0004	LONG **- iCache**	0x00000002

Structure of BrtBeginSXVI

Fields in this record that are ignored because they apply only to **OLAP data sources** are omitted for brevity.

itmtype: 0x00 specifies that this pivot item (section 2.2.5.3.3) is not a subtotal (section 2.2.5.3.7.4.2), **grand total**, or blank line.

fHidden: 0x0 specifies that this pivot item is not **hidden** by a manual filter (section 2.2.5.3.5).

fHideDetail: 0x1 specifies that this pivot item is collapsed (section 2.2.5.3.7.4.1).

fFormula: 0x0 specifies that this pivot item is not a calculated item (section 2.2.5.2.6).

fMissing: 0x0 specifies that this pivot item is not missing from the **source data**.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0x00000002 specifies the index to the cache item (section 2.2.5.2.3) in the cache field (section 2.2.5.2.2) for the "CustomerName" pivot field (section 2.2.5.3.2).

3.8.35 PivotTable: BrtBeginSXVI 5

The next **BrtBeginSXVI** (section 2.4.272) record in this example specifies the **grand total** pivot item (section 2.2.5.3.3) in the **BrtBeginSXVIs** (section 2.4.276) collection and in the PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0007	BrtBeginSXVI **- BrtBeginSXVI**	
0001	PivotItemType **- itmtype**	0x01
1 bit	WORD **- fHidden**	0x0
1 bit	WORD **- fHideDetail**	0x0
1 bit	WORD **- fFormula**	0x0
1 bit	WORD **- fMissing**	0x0
1 bit	WORD **- fDisplayName**	0x0
1 bit	WORD **- fDrilledMember**	0x0
1 bit	WORD **- fHasChildrenEst**	0x0
1 bit	WORD **- fCollapsedMember**	0x0
1 bit	WORD **- fOlapFilterSelected**	0x0
7 bits	WORD **- reserved**	0x00
0004	LONG **- iCache**	0xFFFFFFFF

Structure of BrtBeginSXVI

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Fields in this record that are ignored because they apply only to **OLAP data sources** are omitted for brevity.

itmtype: 0x01 specifies that this pivot item (section 2.2.5.3.3) is a subtotal (section 2.2.5.3.7.4.2) that uses the **aggregation function** specified by the data items (section 2.2.5.3.7.5.1) included in this subtotal.

fHidden: 0x0 specifies that this pivot item (section 2.2.5.3.3) is not **hidden** by a manual filter (section 2.2.5.3.5).

fHideDetail: 0x0 specifies that this pivot item is not collapsed (section 2.2.5.3.7.4.1).

fFormula: 0x0 specifies that this pivot item is not a calculated item (section 2.2.5.2.6).

fMissing: 0x0 specifies that this pivot item is not missing from the **source data**.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0xFFFFFFFF specifies that an index to a cache item (section 2.2.5.2.3) is not specified.

3.8.36 PivotTable: BrtBeginSXVD 2

The next record in this example, **BrtBeginSXVD** (section 2.4.270), specifies the "OrderDate" pivot field (section 2.2.5.3.2) displayed on the page axis (section 2.2.5.3.7.1) in the example, as specified in the following table.

Size	Structure	Value
0014	BrtBeginSXVD **- BrtBeginSXVD**	
0001	SXAxis **- sxaxis**	
1 bit	BYTE **- sxaxisRw**	0x0
1 bit	BYTE **- sxaxisCol**	0x0
1 bit	BYTE **- sxaxisPage**	0x1
1 bit	BYTE **- sxaxisData**	0x0
4 bits	BYTE **- reserved**	0x0
1 bit	WORD **- fDefault**	0x1
1 bit	WORD **- fSum**	0x0
1 bit	WORD **- fCounta**	0x0
1 bit	WORD **- fAverage**	0x0
1 bit	WORD **- fMax**	0x0
1 bit	WORD **- fMin**	0x0
1 bit	WORD **- fProduct**	0x0
1 bit	WORD **- fCount**	0x0
1 bit	WORD **- fStdev**	0x0
1 bit	WORD **- fStdevp**	0x0

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Size	Structure	Value
1 bit	WORD **- fVar**	0x0
1 bit	WORD **- fVarp**	0x0
4 bits	WORD **- reserved1**	0x0
1 bit	BYTE **- fDrilledLevel**	0x0
1 bit	BYTE **- fHideDD**	0x0
1 bit	BYTE **- fHiddenLvl**	0x0
1 bit	BYTE **- fUseMemPropCaption**	0x0
1 bit	BYTE **- fCompact**	0x1
1 bit	BYTE **- fDisplayName**	0x0
1 bit	BYTE **- fDisplaySub**	0x0
1 bit	BYTE **- fTensorSort**	0x0
0004	PivotNumFmt **- ifmt**	
0002	Ifmt **- ifmt**	
0002	WORD **- ifmt**	0x000E
0002	WORD **- reserved**	0x0000
1 bit	DWORD **- fDragToRow**	0x1
1 bit	DWORD **- fDragToColumn**	0x1
1 bit	DWORD **- fDragToPage**	0x1
1 bit	DWORD **- fDragToHide**	0x1
1 bit	DWORD **- fDragToData**	0x1
1 bit	DWORD **- fShowAllItems**	0x0
1 bit	DWORD **- fOutline**	0x1
1 bit	DWORD **- fInsertBlankRow**	0x0
1 bit	DWORD **- fSubtotalAtTop**	0x1
1 bit	DWORD **- fServerBased**	0x0
1 bit	DWORD **- reserved2**	0x0
1 bit	DWORD **- fPageBreaksBetweenItems**	0x0
1 bit	DWORD **- fAutoSort**	0x0
1 bit	DWORD **- fAscendSort**	0x1
1 bit	DWORD **- fAutoShow**	0x0
1 bit	DWORD **- fTopAutoShow**	0x1

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Size	Structure	Value
1 bit	DWORD **- fHideNewItems**	0x0
1 bit	DWORD **- fHasAdvFilter**	0x0
1 bit	DWORD **- fFilterInclusive**	0x1
1 bit	DWORD **- fEnableMultiplePageItems**	0x1
1 bit	DWORD **- fNotAutoSortDft**	0x0
1 bit	DWORD **- fMemPropDisplayInReport**	0x0
1 bit	DWORD **- fMemPropDisplayInTip**	0x0
1 bit	DWORD **- fMemPropDisplayInCaption**	0x0
1 bit	DWORD **- fItemsDrilledByDefault**	0x0
7 bits	DWORD **- unused**	0x00
0004	DWORD **- citmAutoShow**	0x0000000A
0004	ISXDI **- isxdiAutoShow**	0xFFFFFFFF

Structure of BrtBeginSXVD

Fields in this record that are explained in previous records in this example are omitted for brevity.

sxaxis: Specifies the axis or axes this pivot field (section 2.2.5.3.2) is placed on as follows:

sxaxis.sxaxisRw: 0x00 specifies that this pivot field is not on the **row** axis.

sxaxis.sxaxisCol: 0x00 specifies that this pivot field is not on the **column (1)** axis.

sxaxis.sxaxisPage: 0x01 specifies that this pivot field is on the page axis (section 2.2.5.3.7.1).

sxaxis.sxaxisData: 0x00 specifies that this pivot field is not on the data axis (section 2.2.5.3.7.5).

ifmt: Specifies the **number format** used in PivotTables (section 2.2.5) and PivotCaches (section 2.2.5.2) as follows:

ifmt.ifmt: Specifies the identifier of a number format.

ifmt.ifmt.ifmt: 0x000E specifies that the number format used to display this value is "mm-dd-yy".

fEnableMultiplePageItems: 0x1 specifies that this pivot field can have multiple pivot items (section 2.2.5.3.3) selected when it is on the page axis.

3.8.37 PivotTable: BrtBeginSXVIs 2

The next record in this example, **BrtBeginSXVIs** (section 2.4.276), begins the collection of pivot item (section 2.2.5.3.3) records for the "OrderDate" pivot field (section 2.2.5.3.2), as specified in the following table.

Size	Structure	Value
0004	BrtBeginSXVIs **- BrtBeginSXVIs**	
0004	DWORD **- csxvis**	0x00000015

Structure of BrtBeginSXVIs

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csxvis: 0x00000015 specifies that the count of pivot items in this collection is 21.

3.8.38 PivotTable: BrtBeginSXVI 6

The first **BrtBeginSXVI** (section 2.4.272) record specifies the 5/6/1997 pivot item (section 2.2.5.3.3) of the "OrderDate" pivot field (section 2.2.5.3.2), which is filtered out of the PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0007	BrtBeginSXVI **- BrtBeginSXVI**	
0001	PivotItemType **- itmtype**	0x00
1 bit	WORD **- fHidden**	0x1
1 bit	WORD **- fHideDetail**	0x0
1 bit	WORD **- fFormula**	0x0
1 bit	WORD **- fMissing**	0x0
1 bit	WORD **- fDisplayName**	0x0
1 bit	WORD **- fDrilledMember**	0x0
1 bit	WORD **- fHasChildrenEst**	0x0
1 bit	WORD **- fCollapsedMember**	0x0
1 bit	WORD **- fOlapFilterSelected**	0x0
7 bits	WORD **- reserved**	0x00
0004	LONG **- iCache**	0x00000000

Structure of BrtBeginSXVI

Fields in this record that are ignored because they apply only to **OLAP data sources** are omitted for brevity.

itmtype: 0x00 specifies that this pivot item (section 2.2.5.3.3) is not a subtotal (section 2.2.5.3.7.4.2), **grand total**, or blank line.

fHidden: 0x1 specifies that this pivot item is **hidden** by a manual filter (section 2.2.5.3.5).

fHideDetail: 0x0 specifies that this pivot item is not collapsed (section 2.2.5.3.7.4.1).

fFormula: 0x0 specifies that this pivot item is not a calculated item (section 2.2.5.2.6).

fMissing: 0x0 specifies that this pivot item is not missing from the **source data**.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0x00000000 specifies the index to the cache item (section 2.2.5.2.3) in the cache field (section 2.2.5.2.2) for the "OrderDate" pivot field (section 2.2.5.3.2).

The second through the 16th **BrtBeginSXVI** (section 2.4.272) records are omitted for brevity.

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3.8.39 PivotTable: BrtBeginSXVI 7

The 17th **BrtBeginSXVI** (section 2.4.272) record specifies the 12/23/1997 pivot item (section 2.2.5.3.3) of the "OrderDate" pivot field (section 2.2.5.3.2), which is included in the PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0007	BrtBeginSXVI **- BrtBeginSXVI**	
0001	PivotItemType **- itmtype**	0x00
1 bit	WORD **- fHidden**	0x0
1 bit	WORD **- fHideDetail**	0x0
1 bit	WORD **- fFormula**	0x0
1 bit	WORD **- fMissing**	0x0
1 bit	WORD **- fDisplayName**	0x0
1 bit	WORD **- fDrilledMember**	0x0
1 bit	WORD **- fHasChildrenEst**	0x0
1 bit	WORD **- fCollapsedMember**	0x0
1 bit	WORD **- fOlapFilterSelected**	0x0
7 bits	WORD **- reserved**	0x00
0004	LONG **- iCache**	0x00000010

Structure of BrtBeginSXVI

Fields in this record that are ignored because they apply only to **OLAP data sources** are omitted for brevity.

itmtype: 0x00 specifies that this pivot item (section 2.2.5.3.3) is not a subtotal (section 2.2.5.3.7.4.2), **grand total**, or blank line.

fHidden: 0x0 specifies that this pivot item is not **hidden** by a manual filter (section 2.2.5.3.5).

fHideDetail: 0x0 specifies that this pivot item is not collapsed (section 2.2.5.3.7.4.1).

fFormula: 0x0 specifies that this pivot item is not a calculated item (section 2.2.5.2.6).

fMissing: 0x0 specifies that this pivot item is not missing from the **source data**.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0x00000010 specifies the index to the cache item (section 2.2.5.2.3) in the cache field (section 2.2.5.2.2) for the "OrderDate" pivot field (section 2.2.5.3.2).

3.8.40 PivotTable: BrtBeginSXVI 8

The 18th **BrtBeginSXVI** (section 2.4.272) record specifies the 12/26/1997 pivot item (section 2.2.5.3.3) of the "OrderDate" pivot field (section 2.2.5.3.2), which is included in the PivotTable view (section 2.2.5.3), as specified in the following table.

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Size	Structure	Value
0007	BrtBeginSXVI **- BrtBeginSXVI**	
0001	PivotItemType **- itmtype**	0x00
1 bit	WORD **- fHidden**	0x0
1 bit	WORD **- fHideDetail**	0x0
1 bit	WORD **- fFormula**	0x0
1 bit	WORD **- fMissing**	0x0
1 bit	WORD **- fDisplayName**	0x0
1 bit	WORD **- fDrilledMember**	0x0
1 bit	WORD **- fHasChildrenEst**	0x0
1 bit	WORD **- fCollapsedMember**	0x0
1 bit	WORD **- fOlapFilterSelected**	0x0
7 bits	WORD **- reserved**	0x00
0004	LONG **- iCache**	0x00000011

Structure of BrtBeginSXVI

Fields in this record that are ignored because they apply only to **OLAP data sources** are omitted for brevity.

itmtype: 0x00 specifies that this pivot item (section 2.2.5.3.3) is not a subtotal (section 2.2.5.3.7.4.2), **grand total**, or blank line.

fHidden: 0x0 specifies that this pivot item is not **hidden** by a manual filter (section 2.2.5.3.5).

fHideDetail: 0x0 specifies that this pivot item is not collapsed (section 2.2.5.3.7.4.1).

fFormula: 0x0 specifies that this pivot item is not a calculated item (section 2.2.5.2.6).

fMissing: 0x0 specifies that this pivot item is not missing from the **source data**.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0x00000011 specifies the index to the cache item (section 2.2.5.2.3) in the cache field (section 2.2.5.2.2) for the "OrderDate" pivot field (section 2.2.5.3.2).

The remaining **BrtBeginSXVI** (section 2.4.272) records are omitted for brevity.

3.8.41 PivotTable: BrtBeginSXVD 3

The next **BrtBeginSXVD** (section 2.4.270) record specifies the "ProductName" pivot field (section 2.2.5.3.2) in the **row** area, as specified in the following table.

Size	Structure	Value
0014	BrtBeginSXVD **- BrtBeginSXVD**	
0001	SXAxis **- sxaxis**	

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Size	Structure	Value
1 bit	BYTE **- sxaxisRw**	0x1
1 bit	BYTE **- sxaxisCol**	0x0
1 bit	BYTE **- sxaxisPage**	0x0
1 bit	BYTE **- sxaxisData**	0x0
4 bits	BYTE **- reserved**	0x0
1 bit	WORD **- fDefault**	0x1
1 bit	WORD **- fSum**	0x0
1 bit	WORD **- fCounta**	0x0
1 bit	WORD **- fAverage**	0x0
1 bit	WORD **- fMax**	0x0
1 bit	WORD **- fMin**	0x0
1 bit	WORD **- fProduct**	0x0
1 bit	WORD **- fCount**	0x0
1 bit	WORD **- fStdev**	0x0
1 bit	WORD **- fStdevp**	0x0
1 bit	WORD **- fVar**	0x0
1 bit	WORD **- fVarp**	0x0
4 bits	WORD **- reserved1**	0x0
1 bit	BYTE **- fDrilledLevel**	0x0
1 bit	BYTE **- fHideDD**	0x0
1 bit	BYTE **- fHiddenLvl**	0x0
1 bit	BYTE **- fUseMemPropCaption**	0x0
1 bit	BYTE **- fCompact**	0x1
1 bit	BYTE **- fDisplayName**	0x0
1 bit	BYTE **- fDisplaySub**	0x0
1 bit	BYTE **- fTensorSort**	0x0
0004	PivotNumFmt **- ifmt**	
0002	Ifmt **- ifmt**	
0002	WORD **- ifmt**	0x0000
0002	WORD **- reserved**	0x0000
1 bit	DWORD **- fDragToRow**	0x1

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Size	Structure	Value
1 bit	DWORD **- fDragToColumn**	0x1
1 bit	DWORD **- fDragToPage**	0x1
1 bit	DWORD **- fDragToHide**	0x1
1 bit	DWORD **- fDragToData**	0x1
1 bit	DWORD **- fShowAllItems**	0x0
1 bit	DWORD **- fOutline**	0x1
1 bit	DWORD **- fInsertBlankRow**	0x0
1 bit	DWORD **- fSubtotalAtTop**	0x1
1 bit	DWORD **- fServerBased**	0x0
1 bit	DWORD **- reserved2**	0x0
1 bit	DWORD **- fPageBreaksBetweenItems**	0x0
1 bit	DWORD **- fAutoSort**	0x0
1 bit	DWORD **- fAscendSort**	0x1
1 bit	DWORD **- fAutoShow**	0x0
1 bit	DWORD **- fTopAutoShow**	0x1
1 bit	DWORD **- fHideNewItems**	0x0
1 bit	DWORD **- fHasAdvFilter**	0x0
1 bit	DWORD **- fFilterInclusive**	0x1
1 bit	DWORD **- fEnableMultiplePageItems**	0x0
1 bit	DWORD **- fNotAutoSortDft**	0x0
1 bit	DWORD **- fMemPropDisplayInReport**	0x0
1 bit	DWORD **- fMemPropDisplayInTip**	0x0
1 bit	DWORD **- fMemPropDisplayInCaption**	0x0
1 bit	DWORD **- fItemsDrilledByDefault**	0x0
7 bits	DWORD **- unused**	0x00
0004	DWORD **- citmAutoShow**	0x0000000A
0004	LONG **- isxdiAutoShow**	0xFFFFFFFF

Structure of BrtBeginSXVD

Fields in this record that are explained in previous records in this example are omitted for brevity.

sxaxis: Specifies the axis or axes this pivot field (section 2.2.5.3.2) is placed on.

sxaxis.sxaxisRw: 0x01 specifies that this pivot field is on the row axis.

sxaxis.sxaxisCol: 0x00 specifies that this pivot field is not on the **column (1)** axis.

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sxaxis.sxaxisPage: 0x00 specifies that this pivot field is not on the page axis (section 2.2.5.3.7.1).

sxaxis.sxaxisData: 0x00 specifies that this pivot field is not on the data axis (section 2.2.5.3.7.5).

The seven **BrtBeginSXVI** (section 2.4.272) records in this collection are omitted for brevity.

3.8.42 PivotTable: BrtBeginSXVD 4

The next **BrtBeginSXVD** (section 2.4.270) record specifies the "UnitPrice" pivot field (section 2.2.5.3.2), which is not in the **PivotTable** view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0014	BrtBeginSXVD **- BrtBeginSXVD**	
0001	SXAxis **- sxaxis**	
1 bit	BYTE **- sxaxisRw**	0x0
1 bit	BYTE **- sxaxisCol**	0x0
1 bit	BYTE **- sxaxisPage**	0x0
1 bit	BYTE **- sxaxisData**	0x0
4 bits	BYTE **- reserved**	0x0
1 bit	WORD **- fDefault**	0x1
1 bit	WORD **- fSum**	0x0
1 bit	WORD **- fCounta**	0x0
1 bit	WORD **- fAverage**	0x0
1 bit	WORD **- fMax**	0x0
1 bit	WORD **- fMin**	0x0
1 bit	WORD **- fProduct**	0x0
1 bit	WORD **- fCount**	0x0
1 bit	WORD **- fStdev**	0x0
1 bit	WORD **- fStdevp**	0x0
1 bit	WORD **- fVar**	0x0
1 bit	WORD **- fVarp**	0x0
4 bits	WORD **- reserved1**	0x0
1 bit	BYTE **- fDrilledLevel**	0x0
1 bit	BYTE **- fHideDD**	0x0
1 bit	BYTE **- fHiddenLvl**	0x0
1 bit	BYTE **- fUseMemPropCaption**	0x0
1 bit	BYTE **- fCompact**	0x1

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Size	Structure	Value
1 bit	BYTE **- fDisplayName**	0x0
1 bit	BYTE **- fDisplaySub**	0x0
1 bit	BYTE **- fTensorSort**	0x0
0004	PivotNumFmt **- ifmt**	
0002	Ifmt **- ifmt**	
0002	WORD **- ifmt**	0x002C
0002	WORD **- reserved**	0x0000
1 bit	DWORD **- fDragToRow**	0x1
1 bit	DWORD **- fDragToColumn**	0x1
1 bit	DWORD **- fDragToPage**	0x1
1 bit	DWORD **- fDragToHide**	0x1
1 bit	DWORD **- fDragToData**	0x1
1 bit	DWORD **- fShowAllItems**	0x0
1 bit	DWORD **- fOutline**	0x1
1 bit	DWORD **- fInsertBlankRow**	0x0
1 bit	DWORD **- fSubtotalAtTop**	0x1
1 bit	DWORD **- fServerBased**	0x0
1 bit	DWORD **- reserved2**	0x0
1 bit	DWORD **- fPageBreaksBetweenItems**	0x0
1 bit	DWORD **- fAutoSort**	0x0
1 bit	DWORD **- fAscendSort**	0x1
1 bit	DWORD **- fAutoShow**	0x0
1 bit	DWORD **- fTopAutoShow**	0x1
1 bit	DWORD **- fHideNewItems**	0x0
1 bit	DWORD **- fHasAdvFilter**	0x0
1 bit	DWORD **- fFilterInclusive**	0x1
1 bit	DWORD **- fEnableMultiplePageItems**	0x0
1 bit	DWORD **- fNotAutoSortDft**	0x0
1 bit	DWORD **- fMemPropDisplayInReport**	0x0
1 bit	DWORD **- fMemPropDisplayInTip**	0x0
1 bit	DWORD **- fMemPropDisplayInCaption**	0x0

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Size	Structure	Value
1 bit	DWORD **- fItemsDrilledByDefault**	0x0
7 bits	DWORD **- unused**	0x00
0004	DWORD **- citmAutoShow**	0x0000000A
0004	LONG **- isxdiAutoShow**	0xFFFFFFFF

Structure of BrtBeginSXVD

Fields in this record that are explained in previous records in this example are omitted for brevity.

sxaxis: Specifies the axis or axes this pivot field (section 2.2.5.3.2) is placed on.

sxaxis.sxaxisRw: 0x00 specifies that this pivot field is not on the **row** axis.

sxaxis.sxaxisCol: 0x00 specifies that this pivot field is not on the **column (1)** axis.

sxaxis.sxaxisPage: 0x00 specifies that this pivot field is not on the page axis (section 2.2.5.3.7.1).

sxaxis.sxaxisData: 0x00 specifies that this pivot field is not on the data axis (section 2.2.5.3.7.5).

ifmt: Specifies the **number format** used in **PivotTables** (section 2.2.5) and **PivotCaches** (section 2.2.5.2) as follows.

ifmt.ifmt: Specifies the identifier of a number format.

ifmt.ifmt.ifmt: 0x002C specifies that the number format used to display this value is the following currency format "_($* #,##0.00_);_($* (#,##0.00);_($* "-"??_);_(@_)".

3.8.43 PivotTable: BrtBeginSXVD 5

The next **BrtBeginSXVD** (section 2.4.270) record specifies the "Quantity" pivot field (section 2.2.5.3.2) on the data axis (section 2.2.5.3.7.5) in the PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0014	BrtBeginSXVD **- BrtBeginSXVD**	
0001	SXAxis **- sxaxis**	
1 bit	BYTE **- sxaxisRw**	0x0
1 bit	BYTE **- sxaxisCol**	0x0
1 bit	BYTE **- sxaxisPage**	0x0
1 bit	BYTE **- sxaxisData**	0x1
4 bits	BYTE **- reserved**	0x0
1 bit	WORD **- fDefault**	0x1
1 bit	WORD **- fSum**	0x0
1 bit	WORD **- fCounta**	0x0
1 bit	WORD **- fAverage**	0x0

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Size	Structure	Value
1 bit	WORD **- fMax**	0x0
1 bit	WORD **- fMin**	0x0
1 bit	WORD **- fProduct**	0x0
1 bit	WORD **- fCount**	0x0
1 bit	WORD **- fStdev**	0x0
1 bit	WORD **- fStdevp**	0x0
1 bit	WORD **- fVar**	0x0
1 bit	WORD **- fVarp**	0x0
4 bits	WORD **- reserved1**	0x0
1 bit	BYTE **- fDrilledLevel**	0x0
1 bit	BYTE **- fHideDD**	0x0
1 bit	BYTE **- fHiddenLvl**	0x0
1 bit	BYTE **- fUseMemPropCaption**	0x0
1 bit	BYTE **- fCompact**	0x1
1 bit	BYTE **- fDisplayName**	0x0
1 bit	BYTE **- fDisplaySub**	0x0
1 bit	BYTE **- fTensorSort**	0x0
0004	PivotNumFmt **- ifmt**	
0002	Ifmt **- ifmt**	
0002	WORD **- ifmt**	0x0000
0002	WORD **- reserved**	0x0000
1 bit	DWORD **- fDragToRow**	0x1
1 bit	DWORD **- fDragToColumn**	0x1
1 bit	DWORD **- fDragToPage**	0x1
1 bit	DWORD **- fDragToHide**	0x1
1 bit	DWORD **- fDragToData**	0x1
1 bit	DWORD **- fShowAllItems**	0x0
1 bit	DWORD **- fOutline**	0x1
1 bit	DWORD **- fInsertBlankRow**	0x0
1 bit	DWORD **- fSubtotalAtTop**	0x1
1 bit	DWORD **- fServerBased**	0x0

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Size	Structure	Value
1 bit	DWORD **- reserved2**	0x0
1 bit	DWORD **- fPageBreaksBetweenItems**	0x0
1 bit	DWORD **- fAutoSort**	0x0
1 bit	DWORD **- fAscendSort**	0x1
1 bit	DWORD **- fAutoShow**	0x0
1 bit	DWORD **- fTopAutoShow**	0x1
1 bit	DWORD **- fHideNewItems**	0x0
1 bit	DWORD **- fHasAdvFilter**	0x0
1 bit	DWORD **- fFilterInclusive**	0x1
1 bit	DWORD **- fEnableMultiplePageItems**	0x0
1 bit	DWORD **- fNotAutoSortDft**	0x0
1 bit	DWORD **- fMemPropDisplayInReport**	0x0
1 bit	DWORD **- fMemPropDisplayInTip**	0x0
1 bit	DWORD **- fMemPropDisplayInCaption**	0x0
1 bit	DWORD **- fItemsDrilledByDefault**	0x0
7 bits	DWORD **- unused**	0x00
0004	DWORD **- citmAutoShow**	0x0000000A
0004	LONG **- isxdiAutoShow**	0xFFFFFFFF

Structure of BrtBeginSXVD

Fields in this record that are explained in previous records in this example are omitted for brevity.

sxaxis: Specifies the axis or axes this pivot field (section 2.2.5.3.2) is placed on.

sxaxis.sxaxisRw: 0x00 specifies that this pivot field is not on the **row** axis.

sxaxis.sxaxisCol: 0x00 specifies that this pivot field is not on the **column (1)** axis.

sxaxis.sxaxisPage: 0x00 specifies this pivot field does not refer to the page axis (section 2.2.5.3.7.1).

sxaxis.sxaxisData: 0x01 specifies that this pivot field is on the data axis (section 2.2.5.3.7.5).

ifmt: Specifies the **number format** used in **PivotTables** (section 2.2.5) and **PivotCaches** (section 2.2.5.2) as follows:

ifmt.ifmt: Specifies the identifier of a number format.

ifmt.ifmt.ifmt: 0x0000 specifies that the general number format is used to display this value.

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3.8.44 PivotTable: BrtBeginISXVDRws

The next record in this example, **BrtBeginISXVDRws** (section 2.4.96), specifies the pivot fields (section 2.2.5.3.2) that are displayed on the **row** axis of this PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
000C	BrtBeginISXVDRws **- BrtBeginIsxvdRws**	
0004	DWORD **- cisxvd**	0x00000002
0008	ISXVD **- rgisxvdrws**	
0004	LONG **- isxvd[0]**	0x00000000
0004	LONG **- isxvd[1]**	0x00000002

Structure of BrtBeginIsxvdRws

cisxvd: 0x00000002 specifies that the count of pivot fields (section 2.2.5.3.2) in the row axis is 2.

rgisxvdrws: An array of **ISXVD** (section 2.5.83) that specifies the pivot fields that are displayed on the row axis of this PivotTable view.

rgisxvdrws.isxvd[0]: 0x00000000 specifies the pivot field index within the collection of **BrtBeginSXVDs** (section 2.4.271) records as referenced by this field. This index specifies the corresponding **BrtBeginPCDField** (section 2.4.135) "CustomerName" in the **PivotCache Definition** (section 2.1.7.38) part.

rgisxvdrws.isxvd[1]: 0x00000002 specifies the pivot field index within the collection of **BrtBeginSXVDs** records as referenced by this field. This index specifies the corresponding **BrtBeginPCDField** "ProductName" in the **PivotCache Definition** part.

3.8.45 PivotTable: BrtBeginSXLIRws

The next record in this example, **BrtBeginSXLIRws** (section 2.4.251), begins a collection of records that specify the pivot lines (section 2.2.5.3.8.3) that are displayed on the **row** area of the PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0004	BrtBeginSXLIRws **- BrtBeginSXLIRws**	
0004	DWORD **- csxlis**	0x00000007

Structure of BrtBeginSXLIRws

csxlis: 0x00000007 specifies that the number of pivot lines that are displayed on the row area of the PivotTable view is 7.

3.8.46 PivotTable: BrtBeginSXLI 1

The first **BrtBeginSXLI** (section 2.4.249) record is the "Island Trading" pivot line (section 2.2.5.3.8.3) in the **row** axis of this PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
000C	BrtBeginSXLI **- BrtBeginSXLI**	

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Size	Structure	Value
0002	WORD **- cSic**	0x0000
0001	PivotItemType **- itmtype**	0x00
0001	BYTE **- reserved**	0x00
0004	DWORD **- cisxvis**	0x00000001
0004	ISXDI **- iData**	0x00000000

Structure of BrtBeginSXLI

cSic: 0x0000 specifies that zero pivot line entries (section 2.2.5.3.8.4) are reused from the previous pivot line (section 2.2.5.3.8.3).

itmtype: 0x00 specifies that the type of this pivot line item is not a subtotal (section 2.2.5.3.7.4.2) or **grand total**.

cisxvis: 0x00000001 specifies that the count of pivot line entries in this pivot line is 1.

3.8.47 PivotTable: BrtBeginISXVIs 1

The next record, **BrtBeginISXVIs** (section 2.4.97), specifies the pivot line entries (section 2.2.5.3.8.4) that occur on pivot line (section 2.2.5.3.8.3), as specified in the following table.

Size	Structure	Value
0004	BrtBeginISXVIs **- BrtBeginIsxvis**	
0004	LONG **- rgisxvis**	
0004	LONG **- isxvi[0]**	0x00000002

Structure of BrtBeginIsxvis

rgisxvis: An array of pivot line entry (section 2.2.5.3.8.4) indexes.

rgisxvis.isxvi[0]: 0x00000002 specifies the index of a pivot item (section 2.2.5.3.3) within the 1st **row** field "CustomerName". The index 0x02 refers to the 3rd item in the pivot items collection **BrtBeginSXVIs** (section 2.4.276) of **BrtBeginSXVD** (section 2.4.270) pivot field (section 2.2.5.3.2) "CustomerName". This 3rd pivot item (section 2.2.5.3.3) **BrtBeginSXVI** (section 2.4.272) contains an index that refers to the 4th item in the **BrtBeginPCDIRun** (section 2.4.146) "Island Trading" of the corresponding **BrtBeginPCDField** (section 2.4.135) in the **PivotCache Definition** (section 2.1.7.38).

3.8.48 PivotTable: BrtBeginSXLI 2

The next **BrtBeginSXLI** (section 2.4.249) record is the "Ipoh Coffee" pivot line (section 2.2.5.3.8.3) in the **row** axis of this PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
000C	BrtBeginSXLI **- BrtBeginSXLI**	
0002	WORD **- cSic**	0x0001
0001	PivotItemType **- itmtype**	0x00

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Size	Structure	Value
0001	BYTE **- reserved**	0x00
0004	DWORD **- cisxvis**	0x00000001
0004	ISXDI **- iData**	0x00000000

Structure of BrtBeginSXLI

cSic: 0x0001 specifies that the number of pivot line entries (section 2.2.5.3.8.4) to reuse from the previous pivot line (section 2.2.5.3.8.3) is 1.

itmtype: 0x00 specifies that the type of this pivot line item is not a subtotal (section 2.2.5.3.7.4.2) or **grand total**.

cisxvis: 0x00000001 specifies that the count of pivot line entries in this pivot line is 1.

3.8.49 PivotTable: BrtBeginISXVIs 2

The next **BrtBeginISXVIs** (section 2.4.97) record specifies the pivot line entries (section 2.2.5.3.8.4) that occur on the second pivot line (section 2.2.5.3.8.3), as specified in the following table.

Size	Structure	Value
0004	BrtBeginISXVIs **- BrtBeginIsxvis**	
0004	LONG **- rgisxvis**	
0004	LONG **- isxvi[0]**	0x00000002

Structure of BrtBeginIsxvis

rgisxvis: An array of pivot line entry indexes.

rgisxvis.isxvi[0]: 0x00000002 specifies the index of the pivot item (section 2.2.5.3.3) within the 2nd **row** field "ProductName". The index 0x02 refers to the 3rd item in the pivot items collection **BrtBeginSXVIs** (section 2.4.276) of **BrtBeginSXVD** (section 2.4.270) pivot field (section 2.2.5.3.2) "ProductName". This 3rd pivot item **BrtBeginSXVI** (section 2.4.272) contains an index that refers to the 4th item in the **BrtBeginPCDIRun** (section 2.4.146) "Ipoh Coffee" of the corresponding **BrtBeginPCDField** (section 2.4.135) in the **PivotCache Definition** (section 2.1.7.38).

Records following this record, until the next **BrtBeginSXLI** (section 2.4.249) record, are omitted for brevity.

3.8.50 PivotTable: BrtBeginSXLI 3

The next **BrtBeginSXLI** (section 2.4.249) record is the **grand total** pivot line (section 2.2.5.3.8.3) in the **row** axis of this PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
000C	BrtBeginSXLI **- BrtBeginSXLI**	
0002	WORD **- cSic**	0x0000
0001	PivotItemType **- itmtype**	0x0D
0001	BYTE **- reserved**	0x00

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Size	Structure	Value
0004	DWORD **- cisxvis**	0x00000001
0004	ISXDI **- iData**	0x00000000

Structure of BrtBeginSXLI

cSic: 0x0000 specifies that the number of pivot line entries (section 2.2.5.3.8.4) to reuse from the previous pivot line (section 2.2.5.3.8.3) is 0.

itmtype: 0x0D specifies that the type of this pivot line item is grand total.

cisxvis: 0x00000001 specifies that the count of pivot line entries (section 2.2.5.3.8.4) in this pivot line is 1.

3.8.51 PivotTable: BrtBeginISXVIs 3

The next **BrtBeginISXVIs** (section 2.4.97) record specifies the pivot line entries (section 2.2.5.3.8.4) for the **grand total** pivot line (section 2.2.5.3.8.3), as specified in the following table.

Size	Structure	Value
0004	BrtBeginISXVIs **- BrtBeginIsxvis**	
0004	LONG **- rgisxvis**	
0004	LONG **- isxvi[0]**	0x00000000

Structure of BrtBeginIsxvis

rgisxvis: An array of pivot line entry indexes.

rgisxvis.isxvi[0]: 0x00000000 specifies the index of the pivot item (section 2.2.5.3.3) within the last **row** field "Grand Total".

3.8.52 PivotTable: BrtBeginSXLICols

The next record in this example, **BrtBeginSXLICols** (section 2.4.250), specifies the pivot line (section 2.2.5.3.8.3) that are displayed on the **column (1)** axis of the PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0004	BrtBeginSXLICols **- BrtBeginSXLICols**	
0004	DWORD **- csxlis**	0x00000001

Structure of BrtBeginSXLICols

csxlis: 0x00000001 specifies that the number of pivot lines that are displayed on the column (1) area of the PivotTable view is 1.

3.8.53 PivotTable: BrtBeginSXLI 4

The next record in this example, **BrtBeginSXLI** (section 2.4.249), is the "Sum of Quantity" pivot line (section 2.2.5.3.8.3) in the **column (1)** axis of this PivotTable view (section 2.2.5.3), as specified in the following table.

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Size	Structure	Value
000C	BrtBeginSXLI **- BrtBeginSXLI**	
0002	WORD **- cSic**	0x0000
0001	PivotItemType **- itmtype**	0x00
0001	BYTE **- reserved**	0x00
0004	DWORD **- cisxvis**	0x00000000
0004	ISXDI **- iData**	0x00000000

Structure of BrtBeginSXLI

cSic: 0x0000 specifies the number of pivot line entries (section 2.2.5.3.8.4) to reuse from the previous pivot line (section 2.2.5.3.8.3).

itmtype: 0x00 specifies that the type of this pivot line item is not a subtotal (section 2.2.5.3.7.4.2) or **grand total**.

cisxvis: 0x00000000 specifies that the count of pivot line entries in this pivot line is 0.

3.8.54 PivotTable: BrtBeginSXPIs

The next record in this example, **BrtBeginSXPIs** (section 2.4.254), begins the collection of records that specify the pivot fields (section 2.2.5.3.2) on the page axis (section 2.2.5.3.7.1) of the PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0004	BrtBeginSXPIs **- BrtBeginSXPIs**	
0004	DWORD **- csxpis**	0x00000001

Structure of BrtBeginSXPIs

csxpis: 0x00000001 specifies that the count of pivot fields on the page axis is 1.

3.8.55 PivotTable: BrtBeginSXPI

The next record in this example, **BrtBeginSXPI** (section 2.4.253), specifies the properties of a pivot field (section 2.2.5.3.2) on the page axis (section 2.2.5.3.7.1) of the PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
000D	BrtBeginSXPI **- BrtBeginSXPI**	
0004	ISXVD **- isxvd**	0x00000001
0004	DWORD **- isxvi**	0x001000FE
0004	LONG **- isxth**	0xFFFFFFFF
1 bit	BYTE **- fUnique**	0x0
1 bit	BYTE **- fDisplay**	0x0
6 bits	BYTE **- reserved**	0x00

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Structure of BrtBeginSXPI

isxvd: 0x00000001 specifies a pivot field (section 2.2.5.3.2) index that refers to a pivot field in the **BrtBeginSXVDs** (section 2.4.271) collection.

isxvi: 0x001000FE specifies that this field is ignored, as specified in section 2.2.5.3.7.1.1.

isxth: 0xFFFFFFFF specifies a value that is ignored because this **PivotTable** (section 2.2.5) is not an **OLAP PivotTable**.

fUnique: 0x0 specifies that the **irstUnique** field, which applies only to OLAP **PivotTables**, is not present after the fixed-size portion of this record.

fDisplay: 0x0 specifies that the **irstDisplay** field, which applies only to OLAP **PivotTables**, is not present after the fixed-size portion of this record.

3.8.56 PivotTable: BrtBeginSXDIs

The next record, **BrtBeginSXDIs** (section 2.4.242), begins the collection of records that specify the data items (section 2.2.5.3.7.5.1) on the data axis (section 2.2.5.3.7.5) of the PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
0004	BrtBeginSXDIs **- BrtBeginSXDIs**	
0004	DWORD **- csxdis**	0x00000001

Structure of BrtBeginSXDIs

csxdis: 0x00000001 specifies that the number of data items on the data axis in this PivotTable view is 1.

3.8.57 PivotTable: BrtBeginSXDI

The next record, **BrtBeginSXDI** (section 2.4.241), specifies the "Sum of Quantity" data item (section 2.2.5.3.7.5.1) that summarizes data in this PivotTable view (section 2.2.5.3), as specified in the following table.

Size	Structure	Value
003B	BrtBeginSXDI **- BrtBeginSXDI**	
0004	ISXVD **- isxvdData**	0x00000004
0004	DataConsolidationFunction **- iiftab**	0x00000000
0004	ShowDataAs **- df**	0x00000000
0004	ISXVD **- isxvd**	0x00000000
0004	DWORD **- isxvi**	0x00000000
0004	PivotNumFmt **- ifmt**	
0002	Ifmt **- ifmt**	
0002	WORD **- ifmt**	0x0000
0002	WORD **- reserved**	0x0000

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Size	Structure	Value
0001	BYTE **- fLoadDisplayName**	0x01
0022	XLWideString **- stDisplayName**	Sum of Quantity

Structure of BrtBeginSXDI

The **isxvd** and **isxvi** fields are not described here because they are ignored in this example.

isxvdData: 0x00000004 specifies the index of the pivot field (section 2.2.5.3.2) in the **BrtBeginSXVDs** (section 2.4.271) collection that the pivot field that this data item (section 2.2.5.3.7.5.1) summarizes.

iiftab: 0x00000000 specifies the SUM aggregation **data consolidation function** that applies to this data item (section 2.2.5.3.7.5.1).

df: 0x00000000 specifies that the data format for this data item is normal.

ifmt: Specifies the format applied to this data item.

ifmt.ifmt.ifmt: 0x0000 specifies this data item has the General **number format**.

fLoadDisplayName: 0x01 specifies that the name of the data item is present.

stDisplayName: Specifies that the name of the data item is "Sum of Quantity".

3.9 Metadata

This example shows metadata (section 2.2.4) for **cube functions** and the external connection (section 2.2.8) used with them.

This example uses a sample workbook with **cell values** as specified in the following table.

Cell	Formula	Result
B2	=CUBESET("Sales", "[Product].[All Products].Children", "Products")	Products
C2	=CUBEMEMBER("Sales", "[Measures].[Profit]")	Profit
B3	=CUBERANKEDMEMBER("Sales", B2, 1)	Drink
C3	=CUBEVALUE("Sales", $B3, C$2)	29358.9754
B4	=CUBERANKEDMEMBER("Sales", B2, 2)	Food
C4	=CUBEVALUE("Sales", $B4, C$2)	245764.8665
B5	=CUBERANKEDMEMBER("Sales", B2, 3)	Non-Consumable
C5	=CUBEVALUE("Sales", $B5, C$2)	64487.0545
B6	Grand Total	Grand Total
C6	=CUBEVALUE("Sales", B2,C$2)	339610.8964

This example's sample workbook is illustrated by the following figure.

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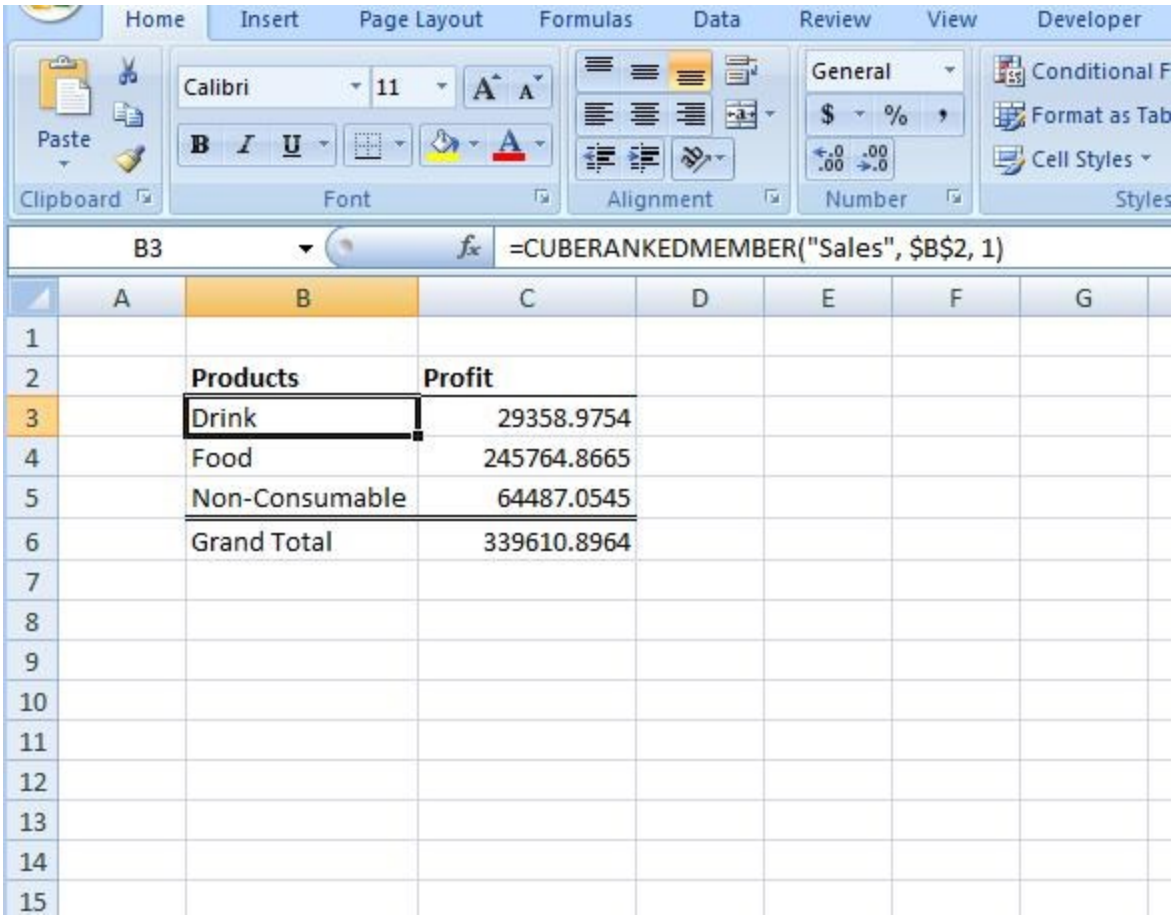

Figure 28: Metadata example workbook

This example includes all of the records in the external data connections part (section 2.1.7.24) and in the metadata (section 2.1.7.34) part except for **BrtEnd*** records, which have been omitted for brevity. Additionally, certain records which occur multiple times in the file are documented a fewer number of times in this example, again for brevity.

The records in the external data connections (section 2.1.7.24) part are **BrtBeginExtConnections** (section 2.4.80), **BrtBeginExtConnection** (section 2.4.79), **BrtBeginECDbProps** (section 2.4.60), and **BrtBeginECOlapProps** (section 2.4.61). Together, these records specify a connection to an **OLAP data source**.

The rest of the records in this example are in the metadata part.

BrtBeginMetadata (section 2.4.111), **BrtBeginEsmdtinfo** (section 2.4.74), **BrtBeginEsstr** (section 2.4.76), and **BrtBeginEsmdx** (section 2.4.75) specify the beginning of collections as specified in their respective section 2 specifications.

BrtMdtinfo (section 2.4.698) specifies the name and properties of the value metadata type for MDX Metadata (section 2.2.4.8) which is the metadata type (section 2.2.4.1) used in this example.

Four of the six **BrtStr** (section 2.4.782) records in the file are shown in this example. These records specify shared text strings used by other records in this example.

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Next, four of the nine sequences of records that conform to the **MDX** rule (defined in section 2.1.7.34) are shown in this example. In each, the **BrtBeginMdx** (section 2.4.105) record specifies the data connection name and the type of cube function that generated the metadata (section 2.2.4).

- The first example of a sequence of records that conforms to the **MDX** rule specifies the metadata associated with cell B2 in the example and includes one **BrtBeginMdx** (section 2.4.105) record and one **BrtBeginMdxSet** (section 2.4.108) record.
- The second example of a sequence of records that conforms to the **MDX** rule specifies the metadata associated with cell B3 in the example and includes one **BrtBeginMdx** record, one **BrtBeginMdxTuple** (section 2.4.109) record and one **BrtMdxMbrIstr** (section 2.4.699) record.
- The third example of a sequence of records that conforms to the **MDX** rule specifies the metadata associated with cell C2 in the example and includes one **BrtBeginMdx** record, one **BrtBeginMdxTuple** record and one **BrtMdxMbrIstr** record.
- The fourth example of a sequence of records that conforms to the **MDX** rule specifies the metadata associated with cell C6 in the example and includes one **BrtBeginMdx** record, one **BrtBeginMdxTuple** record and two **BrtMdxMbrIstr** records.

Finally, the **BrtBeginEsmdb** (section 2.4.73) and **BrtMdb** (section 2.4.697) records specify the association between the **BrtBeginMdx** records and the **BrtMdtinfo** (section 2.4.698) record which specifies the metadata type (section 2.2.4.1).

3.9.1 MetaData: BrtBeginExtConnections

The first record in this example is **BrtBeginExtConnections** (section 2.4.80) from the external data connections (section 2.1.7.24) part, which specifies the beginning of the collection of external connections (section 2.2.8), as specified in the following table. In this example, there is only one external connection in this collection, specified by **BrtBeginExtConnection** (section 2.4.80).

Size	Structure
0000	BrtBeginExtConnections **- BrtBeginExtConnections**

Structure of BrtBeginExtConnections

3.9.2 MetaData: BrtBeginExtConnection

The **BrtBeginExtConnection** (section 2.4.79) record specifies the external connection (section 2.2.8) used with the **cube functions** in this workbook, as specified in the following table.

Size	Structure	Value
00DF	BrtBeginExtConnection **- BrtBeginExtConnection**	
0001	DataFunctionalityLevel **- bVerRefreshed**	0x03
0001	DataFunctionalityLevel **- bVerRefreshableMin**	0x00
8 bits	WORD **- pc**	0x02
8 bits	WORD **- reserved1**	0x00
16 bits	DWORD **- wInterval**	0x0000
1 bit	DWORD **- fMaintain**	0x1
1 bit	DWORD **- fNewQuery**	0x0

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Size	Structure	Value
1 bit	DWORD **- fDeleted**	0x0
1 bit	DWORD **- fAlwaysUseConnectionFile**	0x0
1 bit	DWORD **- fBackgroundQuery**	0x1
1 bit	DWORD **- fRefreshOnLoad**	0x0
1 bit	DWORD **- fSaveData**	0x1
9 bits	DWORD **- reserved2**	0x000
1 bit	WORD **- fLoadSourceDataFile**	0x0
1 bit	WORD **- fLoadSourceConnectionFile**	0x1
1 bit	WORD **- fLoadConnectionDesc**	0x1
1 bit	WORD **- reserved3**	0x1
1 bit	WORD **- fLoadSSOApplicationID**	0x0
11 bits	WORD **- reserved4**	0x000
0004	DBType **- idbtype**	0x00000005
0004	DWORD **- irecontype**	0x00000001
0004	DWORD **- dwConnID**	0x00000001
0001	BYTE **- iCredMethod**	0x00
0098	XLWideString **- stConnectionFile**	C:\Documents and Settings\joh...
0022	XLWideString **- stConnDesc**	Sales Reporting
000E	XLWideString **- stConnName**	Sales

Structure of BrtBeginExtConnection

bVerRefreshed: 0x03 specifies that the application that last refreshed this external connection had a data functionality level (section 2.2.5.1) of greater than or equal to 3.

bVerRefreshableMin: 0x00 specifies that the minimum data functionality level that the application is required to support to correctly **refresh** the external connection is less than 3.

pc: 0x02 specifies that the password is not saved as part of the **connection string**. Note that this field is not relevant in this example because the connection string specifies integrated security as the authentication method.

wInterval: 0x0000 specifies that this external connection is not refreshed automatically.

fMaintain: 0x1 specifies that the application keeps this external connection open after a refresh.

fNewQuery: 0x0 specifies that this external connection has been refreshed.

fDeleted: 0x0 specifies that this external connection has not been deleted.

fAlwaysUseConnectionFile: 0x0 specifies that the application follows the procedure specified by the **irecontype** field when refreshing this external connection.

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fBackgroundQuery: 0x1 specifies that the preferred usage of this external connection is to refresh asynchronously in the background.

fRefreshOnLoad: 0x0 specifies that this external connection is not refreshed when the workbook is opened.

fSaveData: 0x1 specifies that the data retrieved from this external connection is saved within the **workbook**.

fLoadSourceDataFile: 0x0 specifies that **stDataFile** does not exist after the fixed-size portion of this record.

fLoadSourceConnectionFile: 0x1 specifies that **stConnectionFile** exists after the fixed-size portion of this record.

fLoadConnectionDesc: 0x1 specifies that **stConnDesc** exists after the fixed-size portion of this record.

fLoadSSOApplicationID: 0x0 specifies that **stSso** does not exist after the fixed-size portion of this record.

idbtype: 0x00000005 specifies that the **data source** type of this external connection is **OLE DB**.

irecontype: 0x00000001 specifies that this external connection is refreshed using the existing external connection information first. If the refresh fails, then updated connection information is retrieved, if available, from the external connection file associated with this external connection.

dwConnID: 0x00000001 specifies that the unique identifier of this external connection is 1.

iCredMethod: 0x00 specifies that integrated authentication is the authentication method used when establishing or re-establishing this external connection.

stConnectionFile: "C:\Documents and Settings\johnsmith\My Documents\My Data Sources\Sales.odc" specifies the path to the external connection file (section 2.2.8.2) from which this external connection was created.

stConnDesc: "Sales Reporting" specifies the user description for this external connection.

stConnName: "Sales" specifies the name of this external connection.

3.9.3 MetaData: BrtBeginECDbProps

The **BrtBeginECDbProps** (section 2.4.60) record specifies properties associated with this external connection (section 2.2.8), as specified in the following table.

Size	Structure	Value
0191	BrtBeginECDbProps **- BrtBeginECDbProps**	
0004	CmdType **- icmdtype**	0x00000001
1 bit	BYTE **- fLoadCmdSvr**	0x0
1 bit	BYTE **- fLoadCmd**	0x1
6 bits	BYTE **- reserved**	0x00
017E	XLWideString **- stConn**	Provider=MSOLAP.3;Integrated Security=SSPI;...
000E	XLWideString **- stCmd**	Sales

Structure of BrtBeginECDbProps

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icmdtype: 0x00000001 specifies that the command type for this connection is CMDCUBE. This means that **stCmd** specifies the name of a cube within an OLAP database.

fLoadCmdSvr: 0x0 specifies that **stCmdSvr** does not exist after the fixed-size portion of this record.

fLoadCmd: 0x1 specifies that **stCmd** exists after the fixed-size portion of this record.

stConn: "Provider=MSOLAP.3;Integrated Security=SSPI;Persist Security Info=True;Initial Catalog=FoodMart 2000;Data Source=olapserver;MDX Compatibility=1;Safety Options=2;MDX Missing Member Mode=Error" specifies the connection string used to connect to the **data source**.

stCmd: "Sales" specifies the name of the cube within the OLAP database (FoodMart 2000) specified in the connection string.

3.9.4 MetaData: BrtBeginECOlapProps

The **BrtBeginECOlapProps** (section 2.4.61) record specifies properties specific to **OLAP** external connections (section 2.2.8), as specified in the following table.

Size	Structure	Value
0006	BrtBeginECOlapProps **- BrtBeginECOlapProps**	
1 bit	BYTE **- fLocalConn**	0x0
1 bit	BYTE **- fNoRefreshCube**	0x0
1 bit	BYTE **- fSrvFmtBack**	0x1
1 bit	BYTE **- fSrvFmtFore**	0x1
1 bit	BYTE **- fSrvFmtFlags**	0x1
1 bit	BYTE **- fSrvFmtNum**	0x1
1 bit	BYTE **- fUseOfficeLcid**	0x1
1 bit	BYTE **- reserved1**	0x0
0004	DRw **- nDrillthroughRows**	0x000003E8
1 bit	BYTE **- bLoadConnLocal**	0x0
7 bits	BYTE **- reserved2**	0x00

Structure of BrtBeginECOlapProps

fLocalConn: 0x0 specifies that data is retrieved using the connection string specified by the **stConn** field of the **BrtBeginECDbProps** (section 2.4.60) record preceding this record.

fNoRefreshCube: 0x0 specifies that the local **cube** file is rebuilt from the original OLAP **data source** on refresh.

fSrvFmtBack: 0x1 specifies that the **fill colors** retrieved from the OLAP source are used for cell formatting.

fSrvFmtFore: 0x1 specifies that the **font face color** retrieved from the OLAP source is used for cell formatting.

fSrvFmtFlags: 0x1 specifies that the **font family** name retrieved from the OLAP source is used for cell formatting.

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fSrvFmtNum: 0x1 specifies that the format string retrieved from the OLAP source is used for cell formatting.

fUseOfficeLcid: 0x1 specifies that the application sends a **language code identifier (LCID)** to the OLAP provider to retrieve localized data.

nDrillthroughRows: 0x000003E8 specifies that a maximum of 1000 **rows** are returned when the user drills through an aggregate value in a **PivotTable** (section 2.2.5).

bLoadConnLocal: 0x0 specifies that **stConnLocal** does not exist after the fixed-size portion of this record and therefore, no local cube is associated with this external connection.

3.9.5 MetaData: BrtBeginMetadata

The **BrtBeginMetadata** (section 2.4.111) record specifies the beginning of a collection of records as defined by the **Metadata** (section 2.1.7.34) part **ABNF**. The collection of records specifies the metadata section 2.2.4) associated with the book, as specified in the following table.

Size	Structure
0000	BrtBeginMetadata **- BrtBeginMetadata**

Structure of BrtBeginMetadata

3.9.6 MetaData: BrtBeginEsmdtinfo

The **BrtBeginEsmdtinfo** (section 2.4.74) record specifies the beginning of the collection of **BrtMdtinfo** (section 2.4.698) records as defined by the **Metadata** (section 2.1.7.34) part **ABNF**, as specified in the following table. The collection of records specifies the list of metadata types (section 2.2.4.1).

Size	Structure	Value
0004	BrtBeginEsmdtinfo **- BrtBeginEsmdtinfo**	
0004	LONG **- cMdtinfo**	0x00000001

Structure of BrtBeginEsmdtinfo

cMdtinfo: 0x00000001 specifies that there is one record in this collection.

3.9.7 MetaData: BrtMdtinfo

The **BrtMdtinfo** (section 2.4.698) record specifies the name and properties of the value metadata type for MDX metadata, as specified in the following table. The values for the fields in this record are fixed for **cube functions**, and are specified in section 2.2.4.8. Refer to the **BrtMdtinfo** definition for the descriptions of these fields.

Size	Structure	Value
0016	BrtMdtinfo **- BrtMdtinfo**	
0004	MdtFlags **- grbit**	
1 bit	DWORD **- fGhostRw**	0x0
1 bit	DWORD **- fGhostCol**	0x0

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Size	Structure	Value
1 bit	DWORD **- fEdit**	0x0
1 bit	DWORD **- fDelete**	0x0
1 bit	DWORD **- fCopy**	0x1
1 bit	DWORD **- fPasteAll**	0x1
1 bit	DWORD **- fPasteFmlas**	0x0
1 bit	DWORD **- fPasteValues**	0x1
1 bit	DWORD **- fPasteFmts**	0x0
1 bit	DWORD **- fPasteComments**	0x0
1 bit	DWORD **- fPasteDv**	0x0
1 bit	DWORD **- fPasteBorders**	0x0
1 bit	DWORD **- fPasteColWidths**	0x0
1 bit	DWORD **- fPasteNumFmts**	0x0
1 bit	DWORD **- fMerge**	0x1
1 bit	DWORD **- fSplitFirst**	0x1
1 bit	DWORD **- fSplitAll**	0x0
1 bit	DWORD **- fRwColShift**	0x1
1 bit	DWORD **- fClearAll**	0x0
1 bit	DWORD **- fClearFmts**	0x1
1 bit	DWORD **- fClearContents**	0x0
1 bit	DWORD **- fClearComments**	0x1
1 bit	DWORD **- fAssign**	0x1
4 bits	DWORD **- reserved1**	0x0
1 bit	DWORD **- reserved2**	0x1
1 bit	DWORD **- fCanCoerce**	0x1
1 bit	DWORD **- fAdjust**	0x0
1 bit	DWORD **- fCellMeta**	0x0
1 bit	DWORD **- reserved3**	0x1
0004	DWORD **- metadataID**	0x0001D4C0
000E	XLWideString **- stName**	XLMDX

Structure of BrtMdtinfo

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3.9.8 MetaData: BrtBeginEsstr

The **BrtBeginEsstr** (section 2.4.76) record specifies the beginning of a collection of **BrtStr** (section 2.4.782) records, as specified in the following table.

Size	Structure	Value
0004	BrtBeginEsstr **- BrtBeginEsstr**	
0004	LONG **- cStr**	0x00000006

Structure of BrtBeginEsstr

cStr: 0x00000006 specifies that there are 6 **BrtStr** records in this collection.

3.9.9 MetaData: BrtStr 1

This **BrtStr** (section 2.4.782) record specifies the first shared text string in the collection, as specified in the following table.

Size	Structure	Value
0046	BrtStr **- BrtStr**	
0046	XLWideString **- stText**	[Product].[All Products].Children

Structure of BrtStr

stText: "[Product].[All Products].Children" specifies the MDX expression that defines an **OLAP named set**.

3.9.10 MetaData: BrtStr 2

This **BrtStr** (section 2.4.782) record specifies the second shared text string in the collection, as specified in the following table.

Size	Structure	Value
0044	BrtStr **- BrtStr**	
0044	XLWideString **- stText**	[Product].[All Products].[Drink]

Structure of BrtStr

stText: "[Product].[All Products].[Drink]" specifies the MDX expression that represents one of the **members** of the **OLAP named set** used in this example.

The next two **BrtStr** records that have been omitted specify the MDX expression of the other two members of the OLAP named set used in this example.

3.9.11 MetaData: BrtStr 3

This **BrtStr** (section 2.4.782) record specifies the fifth shared text string in the collection, as specified in the following table.

Size	Structure	Value
002A	BrtStr **- BrtStr**	

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Size	Structure	Value
002A	XLWideString **- stText**	[Measures].[Profit]

Structure of BrtStr

stText: "[Measures].[Profit]" specifies an MDX expression that represents an **OLAP** measure.

3.9.12 MetaData: BrtStr 4

This **BrtStr** (section 2.4.782) record specifies the sixth shared text string in the collection, as specified in the following table.

Size	Structure	Value
000E	BrtStr **- BrtStr**	
000E	XLWideString **- stText**	Sales

Structure of BrtStr

stText: "Sales" specifies the name of the external connection (section 2.2.8) used by the **cube functions** in this **workbook**. It matches the **stConnName** field of the **BrtBeginExtConnections** (section 2.4.80) record in this example.

3.9.13 MetaData: BrtBeginEsmdx

The **BrtBeginEsmdx** (section 2.4.75) record specifies the beginning of the collection of records that specify the **MDX** metadata store (section 2.2.4.4), as specified in the following table.

Size	Structure	Value
0004	BrtBeginEsmdx **- BrtBeginEsmdx**	
0004	LONG **- cMdx**	0x00000009

Structure of BrtBeginEsmdx

cMdx: 0x00000009 specifies that there are 9 MDX metadata (section 2.2.4.8) records in this collection.

Note that only the first, second, fifth, and ninth **BrtBeginMdx** (section 2.4.105) records are described following this record because they reference the shared strings specified earlier in this example and are used by different **cube functions**. The others are omitted for brevity.

3.9.14 MetaData: BrtBeginMdx 1

This is the first **BrtBeginMdx** (section 2.4.105) record in this example, as specified in the following table. This record specifies properties of the MDX metadata (section 2.2.4.8) used in cell B2.

Size	Structure	Value
0008	BrtBeginMdx **- BrtBeginMdx**	
0004	Istr **- istrConnName**	0x00000005
0004	TagFnMdx **- tfnSrc**	0x00000003

Structure of BrtBeginMdx

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istrConnName: 0x00000005 specifies the sixth shared text string, "Sales", which represents the name of the external connection (section 2.2.8) used by the function that generated this metadata.

tfnSrc: 0x00000003 specifies that this metadata was generated by a CUBESET **cube function**.

3.9.15 MetaData: BrtBeginMdxSet

The **BrtBeginMdxSet** (section 2.4.108) record specifies properties of the MDX set metadata (section 2.2.4.8.2) associated with the preceding **BrtBeginMdx** (section 2.4.105) record, as specified in the following table.

Size	Structure	Value
000C	BrtBeginMdxSet **- BrtBeginMdxSet**	
0004	Istr **- istrSetDef**	0x00000000
0004	SdSetSortOrder **- sso**	0x00000000
0004	LONG **- cMbrsSortBy**	0x00000000

Structure of BrtBeginMdxSet

istrSetDef: 0x00000000 specifies the first shared text string, "[Product].[All Products].Children", which specifies the MDX expression that defines this set.

sso: 0x00000000 specifies that this set is not sorted.

cMbrsSortBy: 0x00000000 specifies that the number of coordinates in the **OLAP cube** to sort the set on is 0.

3.9.16 MetaData: BrtBeginMdx 2

This is the second **BrtBeginMdx** (section 2.4.105) record in this example, as specified in the following table. This record specifies properties of the MDX metadata (section 2.2.4.8) used in cell B3.

Size	Structure	Value
0008	BrtBeginMdx **- BrtBeginMdx**	
0004	Istr **- istrConnName**	0x00000005
0004	TagFnMdx **- tfnSrc**	0x00000005

Structure of BrtBeginMdx

istrConnName: 0x00000005 specifies the sixth shared text string, "Sales", which represents the name of the external connection (section 2.2.8) used by the function that generated this metadata.

tfnSrc: 0x00000005 specifies that this metadata was generated by a CUBERANKEDMEMBER **cube function**.

3.9.17 MetaData: BrtBeginMdxTuple 1

The **BrtBeginMdxTuple** (section 2.4.109) record specifies formatting properties for MDX tuple metadata (section 2.2.4.8.1) associated with the preceding MDX metadata record and specifies the beginning of a collection of **BrtMdxMbrIstr** (section 2.4.699) records that specify **MDX unique names**, as specified in the following table.

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Size	Structure	Value
000E	BrtBeginMdxTuple **- BrtBeginMdxTuple**	
0004	LONG **- cMbrs**	0x00000001
0004	SrvFmtCV **- dwSrvFmtBack**	
0001	BYTE **- ciRed**	0x00
0001	BYTE **- ciGreen**	0x00
0001	BYTE **- ciBlue**	0x00
0001	BYTE **- unused**	0x00
0004	SrvFmtCV **- dwSrvFmtFore**	
0001	BYTE **- ciRed**	0x00
0001	BYTE **- ciGreen**	0x00
0001	BYTE **- ciBlue**	0x00
0001	BYTE **- unused**	0x00
0002	SrvFmtFlags **- sff**	
1 bit	WORD **- fSrvFmtNum**	0x0
1 bit	WORD **- fSrvFmtNumCurrency**	0x0
1 bit	WORD **- fSrvFmtNumStr**	0x0
1 bit	WORD **- fSrvFmtBack**	0x0
1 bit	WORD **- fSrvFmtFore**	0x0
1 bit	WORD **- fSrvFmtItalic**	0x0
1 bit	WORD **- fSrvFmtUnderline**	0x0
1 bit	WORD **- fSrvFmtBold**	0x0
1 bit	WORD **- fSrvFmtStrikethrough**	0x0
7 bits	WORD **- unused**	0x00

Structure of BrtBeginMdxTuple

[Optional: replace with more notes on the example]

The descriptions for the fields related to formatting have been omitted as they are not relevant to this example.

cMbrs: 0x00000001 specifies that there is one **member** expression in the tuple.

3.9.18 MetaData: BrtMdxMbrIstr

The **BrtMdxMbrIstr** (section 2.4.699) record specifies an **MDX unique name** and its properties, as specified in the following table.

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Size	Structure	Value
0005	BrtMdxMbrIstr **- BrtMdxMbrIstr**	
0004	Istr **- istr**	0x00000001
0001	MdxMbrIstrFlags **- grbit**	
1 bit	BYTE **- fCubeSet**	0x0
7 bits	BYTE **- unused**	0x00

Structure of BrtMdxMbrIstr

istr: 0x00000001 specifies the second shared text string, "[Product].[All Products].[Drink]", which specifies the MDX unique name.

grbit.fCubeSet: 0x00 specifies that **istr** does not specify an **OLAP named set**.

3.9.19 MetaData: BrtBeginMdx 3

This is the fifth **BrtBeginMdx** (section 2.4.105) record in this example, as specified in the following table. This record specifies properties of the MDX metadata (section 2.2.4.8) used in cell C2.

Size	Structure	Value
0008	BrtBeginMdx **- BrtBeginMdx**	
0004	Istr **- istrConnName**	0x00000005
0004	TagFnMdx **- tfnSrc**	0x00000001

Structure of BrtBeginMdx

istrConnName: 0x00000005 specifies the sixth shared text string, "Sales", which represents the name of the external connection (section 2.2.8) used by the function that generated this metadata.

tfnSrc: 0x00000001 specifies that this metadata was generated by a CUBEMEMBER **cube function**.

3.9.20 MetaData: BrtBeginMdxTuple 2

This **BrtBeginMdxTuple** (section 2.4.109) record specifies formatting properties for MDX tuple metadata (section 2.2.4.8.1) associated with the preceding MDX metadata record and specifies the beginning of a collection of **BrtMdxMbrIstr** (section 2.4.699) records that specify **MDX unique names**, as specified in the following table.

Size	Structure	Value
000E	BrtBeginMdxTuple **- BrtBeginMdxTuple**	
0004	LONG **- cMbrs**	0x00000001
0004	SrvFmtCV **- dwSrvFmtBack**	
0001	BYTE **- ciRed**	0x00
0001	BYTE **- ciGreen**	0x00

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Size	Structure	Value
0001	BYTE **- ciBlue**	0x00
0001	BYTE **- unused**	0x00
0004	SrvFmtCV **- dwSrvFmtFore**	
0001	BYTE **- ciRed**	0x00
0001	BYTE **- ciGreen**	0x00
0001	BYTE **- ciBlue**	0x00
0001	BYTE **- unused**	0x00
0002	SrvFmtFlags **- sff**	
1 bit	WORD **- fSrvFmtNum**	0x0
1 bit	WORD **- fSrvFmtNumCurrency**	0x0
1 bit	WORD **- fSrvFmtNumStr**	0x0
1 bit	WORD **- fSrvFmtBack**	0x0
1 bit	WORD **- fSrvFmtFore**	0x0
1 bit	WORD **- fSrvFmtItalic**	0x0
1 bit	WORD **- fSrvFmtUnderline**	0x0
1 bit	WORD **- fSrvFmtBold**	0x0
1 bit	WORD **- fSrvFmtStrikethrough**	0x0
7 bits	WORD **- unused**	0x00

Structure of BrtBeginMdxTuple

[Optional: replace with more notes on the example]

The descriptions for the fields related to formatting have been omitted as they are not relevant to this example.

cMbrs: 0x00000001 specifies that there is one **member** expression in the tuple.

3.9.21 MetaData: BrtMdxMbrIStr 1

The **BrtMdxMbrIstr** (section 2.4.699) record specifies an **MDX unique name** and its properties, as specified in the following table.

Size	Structure	Value
0005	BrtMdxMbrIstr **- BrtMdxMbrIstr**	
0004	Istr **- istr**	0x00000004
0001	MdxMbrIstrFlags **- grbit**	
1 bit	BYTE **- fCubeSet**	0x0
7 bits	BYTE **- unused**	0x00

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Structure of BrtMdxMbrIstr

istr: 0x00000004 specifies the fifth shared text string, "[Measures].[Profit]", which specifies the MDX unique name.

grbit.fCubeSet: 0x00 specifies that **istr** does not specify an **OLAP named set**.

3.9.22 MetaData: BrtBeginMdx 4

This is the ninth **BrtBeginMdx** (section 2.4.105) record in this example, as specified in the following table. This record specifies properties of the MDX metadata (section 2.2.4.8) used in cell C6.

Size	Structure	Value
0008	BrtBeginMdx **- BrtBeginMdx**	
0004	Istr **- istrConnName**	0x00000005
0004	TagFnMdx **- tfnSrc**	0x00000002

Structure of BrtBeginMdx

istrConnName: 0x00000005 specifies the sixth shared text string, "Sales", which represents the name of the external connection (section 2.2.8) used by the function that generated this metadata.

tfnSrc: 0x00000002 specifies that this metadata was generated by a CUBEVALUE **cube function**.

3.9.23 MetaData: BrtBeginMdxTuple 3

The **BrtBeginMdxTuple** (section 2.4.109) record specifies formatting properties for MDX tuple metadata (section 2.2.4.8.1) associated with the preceding MDX metadata record and specifies the beginning of a collection of **BrtMdxMbrIstr** (section 2.4.699) records that specify **MDX unique names**, as specified in the following table.

Size	Structure	Value
0016	BrtBeginMdxTuple **- BrtBeginMdxTuple**	
0004	LONG **- cMbrs**	0x00000002
0004	SrvFmtCV **- dwSrvFmtBack**	
0001	BYTE **- ciRed**	0x00
0001	BYTE **- ciGreen**	0x00
0001	BYTE **- ciBlue**	0x00
0001	BYTE **- unused**	0x00
0004	SrvFmtCV **- dwSrvFmtFore**	
0001	BYTE **- ciRed**	0x00
0001	BYTE **- ciGreen**	0x00
0001	BYTE **- ciBlue**	0x00

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Size	Structure	Value
0001	BYTE **- unused**	0x00
0002	SrvFmtFlags **- sff**	
1 bit	WORD **- fSrvFmtNum**	0x1
1 bit	WORD **- fSrvFmtNumCurrency**	0x0
1 bit	WORD **- fSrvFmtNumStr**	0x0
1 bit	WORD **- fSrvFmtBack**	0x0
1 bit	WORD **- fSrvFmtFore**	0x0
1 bit	WORD **- fSrvFmtItalic**	0x0
1 bit	WORD **- fSrvFmtUnderline**	0x0
1 bit	WORD **- fSrvFmtBold**	0x0
1 bit	WORD **- fSrvFmtStrikethrough**	0x0
7 bits	WORD **- unused**	0x00
0008	SrvFmtNum **- sfnum**	
0008	SrvFmtData **- data**	
0004	ULONG **- cb**	0x00000004
0004	DWORD **- dwSrvFmtNum**	0x00000000

Structure of BrtBeginMdxTuple

[Optional: replace with more notes on the example]

The descriptions for the fields related to formatting have been omitted as they are not relevant to this example.

cMbrs: 0x00000002 specifies that there are two **member** expressions in the **tuple**.

3.9.24 MetaData: BrtMdxMbrIStr 2

The **BrtMdxMbrIstr** (section 2.4.699) record specifies an **MDX unique name** and its properties, as specified in the following table.

Size	Structure	Value
0005	BrtMdxMbrIstr **- BrtMdxMbrIstr**	
0004	Istr **- istr**	0x00000000
0001	MdxMbrIstrFlags **- grbit**	
1 bit	BYTE **- fCubeSet**	0x1
7 bits	BYTE **- unused**	0x00

Structure of BrtMdxMbrIstr

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istr: 0x00000000 specifies the first shared text string, "[Product].[All Products].Children", which specifies the MDX unique name.

grbit.fCubeSet: 0x01 specifies that **istr** does not specify an **OLAP named set**.

3.9.25 MetaData: BrtMdxMbrIStr 3

The **BrtMdxMbrIstr** (section 2.4.699) record specifies an **MDX unique name** and its properties, as specified in the following table.

Size	Structure	Value
0005	BrtMdxMbrIstr **- BrtMdxMbrIstr**	
0004	Istr **- istr**	0x00000004
0001	MdxMbrIstrFlags **- grbit**	
1 bit	BYTE **- fCubeSet**	0x0
7 bits	BYTE **- unused**	0x00

Structure of BrtMdxMbrIstr

istr: 0x00000004 specifies the fifth shared text string, "[Measures].[Profit]", which specifies the MDX unique name.

grbit.fCubeSet: 0x00 specifies that **istr** does not specify an **OLAP named set**.

3.9.26 MetaData: BrtBeginEsmdb

The **BrtBeginEsmdb (**section 2.4.73) record specifies the type of metadata block (section 2.2.4.5) records and specifies the beginning of a collection of **BrtMdb** (section 2.4.697) records as defined by the **Metadata** (section 2.1.7.34) part **ABNF**, as specified in the following table

Size	Structure	Value
0008	BrtBeginEsmdb **- BrtBeginEsmdb**	
0004	LONG **- cMdb**	0x00000009
0004	DWORD **- fCellMeta**	0x00000000

Structure of BrtBeginEsmdb

cMdb: 0x00000009 specifies that there are nine metadata blocks in this collection.

fCellMeta: 0x00000000 specifies that this collection contains value metadata (section 2.2.4.3) records.

3.9.27 MetaData: BrtMdb

This **BrtMdb (**section 2.4.697) record specifies an array of **Mdir** (section 2.5.93) structures and is the first metadata block (section 2.2.4.5) in the collection, as specified in the following table.

Size	Structure	Value
000C	BrtMdb **- BrtMdb**	

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Size	Structure	Value
0004	LONG **- cMdir**	0x00000001
0008	RgMdir **- rgMdir**	
0008	Mdir **- Mdir[0]**	
0004	LONG **- iMdt**	0x00000001
0004	DWORD **- mdd**	0x00000000

Structure of BrtMdb

cMdir: 0x00000001 specifies that there is one **Mdir** in the following array of **Mdir** structures. An **Mdir** structure specifies a reference to a metadata type and a corresponding metadata record.

rgMdir: This is the array of **Mdir** structures.

rgMdir.Mdir[0]: This is the first and only **Mdir** structure in the array.

rgMdir.Mdir[0].iMdt: 0x00000001 specifies the first **BrtMdtinfo** (section 2.4.698) in **BrtBeginEsmdtinfo** (section 2.4.74).

rgMdir.Mdir[0].mdd: 0x00000000 specifies the first **BrtBeginMdx** (section 2.4.105) in **BrtBeginEsmdx** (section 2.4.75) because **BrtMdtinfo.stName** is "XLMDX".

The next eight **BrtMdb** records, which have been omitted, specify the mappings between the same **BrtMdtinfo** referenced in this record and the other eight **BrtBeginMdx** records.

3.10 Slicer

This example shows a slicer (section 2.2.14) attached to a native **PivotTable** (section 2.2.5) and its associated slicer cache (section 2.2.14.1). The **PivotTable** has the "State" and "City" fields added to the **row** area and the "Population" field added to the data area (section 2.2.5.3.8.1.4). The slicer is based on the "State" field, and is currently filtering on "Washington", as illustrated by the following figure.

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Figure 29: PivotTable and Slicer

The following figure illustrates the example source data for the **PivotTable** (section 2.2.5) that the slicer (section 2.2.14) is filtering.

	A	B	C
1	State	City	Population
2	Washington	Seattle	594210
3	Washington	Spokane	200975
4	Washington	Bellevue	121347
5	Oregon	Portland	550396
6	Oregon	Springfield	56666

Figure 30: Source data for the PivotTable

This example includes all the records in the **Slicer** (section 2.1.7.48) and **SlicerCache** (section 2.1.7.47) part that are used in the specification of a non-**OLAP** slicer.

The records in the **Slicer** (section 2.1.7.48) part are **BrtBeginSlicers** (section 2.4.215), **BrtBeginSlicer** (section 2.4.200), **BrtEndSlicer** (section 2.4.548), and **BrtEndSlicers** (section 2.4.563). Together these records specify a slicer (section 2.2.14) used to filter a native **PivotTable** (section 2.2.5) on the **worksheet**.

The rest of the records in the example are in the **SlicerCache** (section 2.1.7.47) part. Together these records specify the cached subset of slicer source data (section 2.2.14.1.1) used in the slicer view (section 2.2.14.2).

The **BrtBeginSlicers** (section 2.4.215), **BrtBeginSlicerCache** (section 2.4.201), **BrtBeginSlicerCacheDef** (section 2.4.202), and **BrtBeginSlicerCacheNative** (section 2.4.207) records specify the beginning of collections as specified by their respective definitions.

The **BrtBeginSlicer** (section 2.4.200) record specifies the slicer view used on this worksheet. In this example, the slicer (section 2.2.14) filters the native **PivotTable** (section 2.2.5) based on the "State" field.

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The **BrtSlicerCachePivotTables** (section 2.4.776) record specifies the **PivotTable** with which the slicer is associated.

In this **workbook** the **BrtSlicerCacheNativeItem** (section 2.4.774) record specifies the array of cached non-OLAP slicer items (section 2.2.14.1.4.1). "Washington" and "Oregon" are the cached non-OLAP slicer items in this example.

The **BrtEndSlicerCacheNative** (section 2.4.555), **BrtEndSlicerCacheDef** (section 2.4.550), **BrtEndSlicerCache** (section 2.4.549), **BrtEndSlicer** (section 2.4.548), and **BrtEndSlicers** (section 2.4.563) records specify the end of their respective collections.

3.10.1 Slicer: BrtBeginSlicerCache

The **BrtBeginSlicerCache** (section 2.4.201) record specifies the beginning of the slicer cache (section 2.2.14.1) in the **worksheet**, as specified in the following table.

Size	Structure
0000	BrtBeginSlicerCache **- BrtBeginSlicerCache**

Structure of BrtBeginSlicerCache

3.10.2 Slicer: BrtBeginSlicerCacheDef

The **BrtBeginSlicerCacheDef** (section 2.4.202) record specifies the beginning of a slicer cache (section 2.2.14.1) definition, as specified in the following table.

Size	Structure	Value
002A	BrtBeginSlicerCacheDef **- BrtBeginSlicerCacheDef**	
001C	XLNameWideString **- stName**	Slicer_State
000E	XLWideString **- stHierarchy**	State

Structure of BrtBeginSlicerCacheDef

stName: "Slicer_State" specifies the unique name of the slicer cache.

stHierarchy: "State" specifies the **PivotCache** (section 2.2.5.2) field name. Because this slicer (section 2.2.14) is connected to a native **PivotTable** (section 2.2.5), "State" refers to the **stFldName** field of the **BrtBeginPCDField** (section 2.4.135) record in the only **PivotCache** in this **workbook**.

3.10.3 Slicer: BrtSlicerCachePivotTables

The **BrtSlicerCachePivotTables** (section 2.4.776) record specifies which PivotTable views (section 2.2.5.3) are filtered by the slicer cache (section 2.2.14.1), as specified in the following table.

Size	Structure	Value
0022	BrtSlicerCachePivotTables **- BrtSlicerCachePivotTables**	
0004	DWORD **- cpivotTables**	0x00000001
001E	RGSLICERCACHEPIVOTTABLE **- pivotTables**	
001E	SlicerCachePivotTable **- slicerCachePivotTable**	

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Size	Structure	Value
0004	DWORD **- iTabId**	0x00000001
001A	XLWideString **- stPivotTable**	PivotTable1

Structure of BrtSlicerCachePivotTables

cpivotTables: 0x00000001 specifies that the count of PivotTable views associated with this slicer cache is one.

pivotTables: This specifies the array of PivotTable views associated with this slicer cache.

pivotTables.slicerCachePivotTable: This begins the one and only PivotTable view associated with this slicer cache.

pivotTables.slicerCachePivotTable.iTabId: 0x00000001 specifies that the PivotTable view resides on the first **worksheet** tab.

pivotTables.slicerCachePivotTable.stPivotTable: "PivotTable1" specifies the name of the PivotTable view associated with this slicer cache.

3.10.4 Slicer: BrtBeginSlicerCacheNative

The **BrtBeginSlicerCacheNative** (section 2.4.207) record specifies the start of a collection of records that specifies the non-OLAP slicer items (section 2.2.14.1.4.1) that are used by this slicer cache (section 2.2.14.1), as specified in the following table.

Size	Structure	Value
0005	BrtBeginSlicerCacheNative **- BrtBeginSlicerCacheNative**	
0004	DWORD **- dwcacheId**	0x00000005
2 bits	SLICERCACHESORTORDERNATIVE **- fSortOrder**	0x1
2 bits	SLICERCACHECROSSFILTER **- fCrossFilter**	0x1
1 bit	BYTE **- fSortUsingCustomLists**	0x1
1 bit	BYTE **- fShowAllItems**	0x1
2 bits	BYTE **- reserved**	0x0

Structure of BrtBeginSlicerCacheNative

dwcacheId: 0x00000005 specifies the native **PivotCache** (section 2.2.5.2) index from the **BrtBeginPCD2.4.117** (section 2.4.122) of the **PivotCache**.

fSortOrder: 0x01 specifies that the non-OLAP slicer items (section 2.2.14.1.4.1) are sorted in ascending order.

fCrossFilter: 0x01 specifies that the table style element (section 2.2.6.2.2) of the slicer style (section 2.2.6.3.1) for non-OLAP slicer items (section 2.2.14.1.4.1) without data is applied to non-OLAP slicer items without data, and non-OLAP slicer items without data are sorted at the bottom in the list of non-OLAP slicer items in the display.

fSortUsingCustomLists: 0x01 specifies that a **custom list** is used for sorting.

fShowAllItems: 0x01 specifies that unused non-**OLAP** Cache Items (section 2.2.5.2.3) in the associated **PivotCache** (section 2.2.5.2) are displayed.

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3.10.5 Slicer: BrtSlicerCacheNativeItem

The **BrtSlicerCacheNativeItem** (section 2.4.774) record specifies the array of non-OLAP slicer items (section 2.2.14.1.4.1) that are used by this slicer cache (section 2.2.14.1), as specified in the following table.

Size	Structure	Value
000E	BrtSlicerCacheNativeItem **- BrtSlicerCacheNativeItem**	
0004	DWORD **- cItems**	0x00000002
000A	RGSLICERCACHENATIVEITEM **- rgItems**	
0005	SlicerCacheNativeItem **- nativeItem[0]**	
0004	DWORD **- dwcacheId**	0x00000001
1 bit	BYTE **- fSelected**	0x0
1 bit	BYTE **- fNoData**	0x0
6 bits	BYTE **- reserved**	0x00
0005	SlicerCacheNativeItem **- nativeItem[1]**	
0004	DWORD **- dwcacheId**	0x00000000
1 bit	BYTE **- fSelected**	0x1
1 bit	BYTE **- fNoData**	0x0
6 bits	BYTE **- reserved**	0x00

Structure of BrtSlicerCacheNativeItem

cItems: 0x00000002 specifies that there are two non-OLAP slicer items (section 2.2.14.1.4.1) for this slicer cache (section 2.2.14.1).

rgItems: This specifies the array of **SlicerCacheNativeItem** (section 2.5.135) records, one per non-OLAP slicer item (section 2.2.14.1.4.1).

rgItems.nativeItem[0]: This is the first item displayed in the slicer view (section 2.2.14.2) (Oregon).

rgItems.nativeItem[0].dwcacheId: 0x00000001 specifies that this item points to the second cached record in the associated **PivotCache** (section 2.2.5.2).

rgItems.nativeItem[0].fSelected: 0x00 specifies that this item is not **selected** for filtering.

rgItems.nativeItem[0].fNoData: 0x00 specifies that data exists for this item, as defined in Slicer Cross Filtering (section 2.2.14.1.5).

rgItems.nativeItem[1]: This is the second item displayed in the slicer view (Washington).

rgItems.nativeItem[1].dwcacheId: 0x00000000 specifies that this item points to the first cached record in the associated **PivotCache** (section 2.2.5.2).

rgItems.nativeItem[1].fSelected: 0x01 specifies that this item is selected for filtering.

rgItems.nativeItem[1].fNoData: 0x00 specifies that data exists for this item, as defined in Slicer Cross Filtering (section 2.2.14.1.5).

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3.10.6 Slicer: BrtEndSlicerCacheNative

The **BrtEndSlicerCacheNative** (section 2.4.555) record specifies the end of a collection of records that specifies the non-OLAP slicer items (section 2.2.14.1.4.1) that are used by this slicer cache (section 2.2.14.1), as specified in the following table.

Size	Structure
0000	BrtEndSlicerCacheNative **- BrtEndSlicerCacheNative**

Structure of BrtEndSlicerCacheNative

3.10.7 Slicer: BrtEndSlicerCacheDef

The **BrtEndSlicerCacheDef** (section 2.4.550) record specifies the end of the slicer cache (section 2.2.14.1) definition, as specified in the following table.

Size	Structure
0000	BrtEndSlicerCacheDef **- BrtEndSlicerCacheDef**

Structure of BrtEndSlicerCacheDef

3.10.8 Slicer: BrtEndSlicerCache

The **BrtEndSlicerCache** (section 2.4.549) record specifies the end of the slicer cache (section 2.2.14.1) in the **worksheet**, as specified in the following table.

Size	Structure
0000	BrtEndSlicerCache **- BrtEndSlicerCache**

Structure of BrtEndSlicerCache

3.10.9 Slicer: BrtBeginSlicers

The **BrtBeginSlicers** (section 2.4.215) record specifies the beginning of the collection of slicer views (section 2.2.14.2) in the **worksheet**, as specified in the following table.

Size	Structure
0000	BrtBeginSlicers **- BrtBeginSlicers**

Structure of BrtBeginSlicers

3.10.10 Slicer: BrtBeginSlicer

The **BrtBeginSlicer** (section 2.4.200) record specifies the beginning of a slicer view (section 2.2.14.2) in the **worksheet**, as specified in the following table.

Size	Structure	Value
0049	BrtBeginSlicer **- BrtBeginSlicer**	
1 bit	BYTE **- fCaptionVisible**	0x1
1 bit	BYTE **- fHasCaption**	0x1
1 bit	BYTE **- fHasStyle**	0x0

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Size	Structure	Value
1 bit	BYTE **- fLockedPosition**	0x0
4 bits	BYTE **- unused**	0x0
0004	DWORD **- dwStartSlicerItem**	0x00000000
0004	DWORD **- dwColumnCount**	0x00000001
0004	DWORD **- dwLevel**	0x00000000
0004	DWORD **- dxRowHeight**	0x00037CF8
000E	XLWideString **- stName**	State
001C	XLWideString **- stSlicerCacheName**	Slicer_State
000E	XLWideString **- stCaption**	State

Structure of BrtBeginSlicer

fCaptionVisible: 0x01 specifies that the caption is displayed.

fHasCaption: 0x01 specifies that the slicer (section 2.2.14) has a caption.

fHasStyle: 0x00 specifies that there is no slicer style (section 2.2.6.3.1) applied.

fLockedPosition: 0x00 specifies that the position of the slicer view is not **locked**.

dwStartSlicerItem: 0x00000000 specifies that the first element in the slicer cache (section 2.2.14.1) is the first element **visible** in the slicer view.

dwColumnCount: 0x00000001 specifies that there is a single **column (1)** of slicer items (section 2.2.14.1.4) in the slicer view.

dwLevel: This property is set to 0x00000000 because this is a non-**OLAP** slicer (section 2.1.7.48).

dxRowHeight: 0x00037CF8 specifies that the height of each slicer item (section 2.2.14.1.4) is 228600 **EMU**s high or ¼ of an inch.

stName: "State" specifies the name of the slicer view.

stSlicerCacheName: "Slicer_State" specifies the name of the slicer cache (section 2.2.14.1).

stCaption: "State" specifies the caption displayed at the top of the slicer view.

3.10.11 Slicer: BrtEndSlicer

The **BrtEndSlicer** (section 2.4.548) record specifies the end of a slicer view (section 2.2.14.2) in the **worksheet**, as specified in the following table.

Size	Structure
0000	BrtEndSlicer **- BrtEndSlicer**

Structure of BrtEndSlicer

3.10.12 Slicer: BrtEndSlicers

The **BrtEndSlicers** (section 2.4.563) record specifies the end of the collection of slicer views (section 2.2.14.2) in the **worksheet**, as specified in the following table.

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Size	Structure
0000	BrtEndSlicers **- BrtEndSlicers**

Structure of BrtEndSlicers

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4 Security Considerations

The password verifier features available in the file format (see section 2.2.9 and section 2.2.10) are used to prevent accidental modification, rather than being used as security features. It is possible to remove the passwords by removing the records containing the verifier values.

The translation of passwords from a double-byte **Unicode** string to a new character string in the ANSI codepage of the current system converts any Unicode character that cannot be mapped to the ANSI codepage of the current system to the 0x3F character in that codepage ([ISO/IEC29500-1:2016], section 18.2.29). Replacing these characters with 0x3F when the **hash** is verified will generate positive hash value matches. In certain locales this can be a significant portion of the everyday **character set**.

Further security considerations regarding the file encryption algorithms (section 2.2.11) are described in [MS-OFFCRYPTO] section 4.1.3.

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5 Appendix A: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include updates to those products.

- Microsoft Office Excel 2007
- Microsoft Excel 2010
- Microsoft Excel 2013
- Microsoft Excel 2016
- Microsoft Excel 2019
- Microsoft Excel 2021

Exceptions, if any, are noted in this section. If an update version, service pack or Knowledge Base (KB) number appears with a product name, the behavior changed in that update. The new behavior also applies to subsequent updates unless otherwise specified. If a product edition appears with the product version, behavior is different in that product edition.

Unless otherwise specified, any statement of optional behavior in this specification that is prescribed using the terms "SHOULD" or "SHOULD NOT" implies product behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term "MAY" implies that the product does not follow the prescription.

<1> Section 2.1.7.4: Office Excel 2007, Excel 2010 and Excel 2013 write out this part on save.

<2> Section 2.1.7.47: Office Excel 2007 preserves but does not support this part.

<3> Section 2.2.7.4.3.1: Office Excel 2007 does not save cached values for OLE data items.

<4> Section 2.2.9: Office Excel 2007, Excel 2010 and Excel 2013 warn the user when they enter passwords that contain characters other than alphanumeric characters or punctuation symbols.

<5> Section 2.3: Excel 2010 added support for record types that have record type values greater than or equal to 1024.

<6> Section 2.4.17: Excel 2010 and Excel 2013 do not save this record.

<7> Section 2.4.18: Excel 2010 and Excel 2013 does not save this record.

<8> Section 2.4.23: Excel 2010 saves out a DXFId instead.

<9> Section 2.4.70: If this Web connection was created in Microsoft Excel 97 this field is 1. Otherwise, this field is 0.

<10> Section 2.4.70: If this Web connection was refreshed using Microsoft Excel 2000, Microsoft Excel 2002, Microsoft Office Excel 2003, Office Excel 2007, Excel 2010 or Excel 2013, this field is 1. Otherwise, this field is 0.

<11> Section 2.4.77: Office Excel 2007, Excel 2010, and Excel 2013 do not load a file in which this field contains a value that it does not recognize, or that is not recognized by the underlying operating system. Office Excel 2007 and Excel 2010 recognize the language tags in the following table.

Language	Locale	Language tag
Afrikaans	South Africa	af-ZA

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Language	Locale	Language tag
Albanian	Albanian	sq-AL
Alsatian	France	gsw-FR
Amharic	Ethiopia	am-ET
Arabic	Algeria	ar-DZ
Arabic	Bahrain	ar-BH
Arabic	Egypt	ar-EG
Arabic	Iraq	ar-IQ
Arabic	Jordan	ar-JO
Arabic	Kuwait	ar-KW
Arabic	Lebanon	ar-LB
Arabic	Libya	ar-LY
Arabic	Morocco	ar-MA
Arabic	Oman	ar-OM
Arabic	Qatar	ar-QA
Arabic	Saudi Arabia	ar-SA
Arabic	Syria	ar-SY
Arabic	Tunisia	ar-TN
Arabic	U.A.E.	ar-AE
Arabic	Yemen	ar-YE
Armenian	Armenia	hy-AM
Assamese	India	as-IN
Azerbaijani (Cyrillic)	Azerbaijan	az-AZ-Cyrl
Azerbaijani (Latin)	Azerbaijan	az-AZ-Latn
Bangla	Bangladesh	bn-BD
Bangla (Bangla Script)	India	bn-IN
Bashkir	Russia	ba-RU
Basque	Basque (Basque)	eu-ES
Belarusian	Belarus	be-BY

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Language	Locale	Language tag
Bhutanese	Bhutan	bo-BT
Bosnian (Cyrillic)	Bosnia and Herzegovina	bs-BA-Cyrl
Bosnian (Latin)	Bosnia and Herzegovina	bs-BA-Latn
Breton	France	br-FR
Bulgarian	Bulgaria	bg-BG
Catalan	Catalan	ca-ES
Chinese	Hong Kong SAR	zh-HK
Chinese	Macao SAR	zh-MO
Chinese	PRC	zh-CN
Chinese	Singapore	zh-SG
Chinese	Taiwan	zh-TW
Corsican	France	co-FR
Croatian	Croatia	hr-HR
Croatian (Latin)	Bosnia and Herzegovina	hr-BA-Latn
Czech	Czech Republic	cs-CZ
Danish	Denmark	da-DK
Dari	Afghanistan	prs-AF
Divehi	Maldives	div-MV
Dutch	Belgium	nl-BE
Dutch	Netherlands	nl-NL
English	Australia	en-AU
English	Belize	en-BZ
English	Canada	en-CA
English	Caribbean	en-CB
English	India	en-IN
English	Ireland	en-IE
English	Jamaica	en-JM
English	Malaysia	en-MY

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Language	Locale	Language tag
English	New Zealand	en-NZ
English	Philippines	en-PH
English	South Africa	en-ZA
English	Trinidad	en-TT
English	United Kingdom	en-GB
English	United States	en-US
English	Zimbabwe	en-ZW
Estonian	Estonia	et-EE
Faroese	Faroe Islands	fo-FO
Filipino	Philippines	fil-PH
Finnish	Finland	fi-FI
French	Belgium	fr-BE
French	Canada	fr-CA
French	France	fr-FR
French	Luxembourg	fr-LU
French	Monaco	fr-MC
French	Switzerland	fr-CH
Frisian	Netherlands	fy-NL
Galician	Galician	gl-ES
Georgian	Georgia	ka-GE
German	Austria	de-AT
German	Germany	de-DE
German	Liechtenstein	de-LI
German	Luxembourg	de-LU
German	Switzerland	de-CH
Greek	Greece	el-GR
Greenlandic	Greenland	kl-GL
Gujarati (Gujarati Script)	India	gu-IN

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Language	Locale	Language tag
Hausa (Latin)	Nigeria	ha-NG-Latn
Hebrew	Israel	he-IL
Hindi	India	hi-IN
Hungarian	Hungary	hu-HU
Icelandic	Iceland	is-IS
Igbo	Nigeria	ig-NG
Inari Sami	Finland	smn-FI
Indonesian	Indonesia	id-ID
Inuktitut (Latin)	Canada	iu-CA-Latn
Inuktitut (Syllabics)	Canada	iu-CA-Cans
Irish	Ireland	ga-IE
isiXhosa / Xhosa	South Africa	xh-ZA
isiZulu / Zulu	South Africa	zu-ZA
Italian	Italy	it-IT
Italian	Switzerland	it-CH
Japanese	Japan	ja-JP
Kannada (Kannada Script)	India	kn-IN
Kazakh	Kazakhstan	kk-KZ
Khmer	Cambodia	kh-KH
K'iche	Guatemala	qut-GT
Kinyarwanda	Rwanda	rw-RW
Konkani	India	kok-IN
Korean	Korea	ko-KR
Kyrgyz	Kyrgyzstan	ky-KG
Lao	Lao PDR	lo-LA
Latvian	Latvia	lv-LV
Lithuanian	Lithuania	lt-LT
Lower Sorbian	Germany	wee-DE

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Language	Locale	Language tag
Lule Sami	Norway	smj-NO
Lule Sami	Sweden	smj-SE
Luxembourgish	Luxembourg	lb-LU
Macedonian	Former Yugoslav Republic of Macedonia	mk-MK
Malay	Brunei	ms-BN
Malay	Malaysia	ms-MY
Malayalam (Malayalam Script)	India	ml-IN
Maltese	Malta	mt-MT
Maori	New Zealand	mi-NZ
Mapudungun	Chile	arn-CL
Marathi	India	mr-IN
Mohawk	Mohawk	moh-CA
Mongolian (Cyrillic)	Mongolia	mn-MN
Mongolian (Mongolian)	PRC	mn-CN-Mong
Nepali	Nepal	ne-NP
Northern Sami	Finland	se-FI
Northern Sami	Norway	se-NO
Northern Sami	Sweden	se-SE
Norwegian (Bokmål)	Norway	nb-NO
Norwegian (Nynorsk)	Norway	nn-NO
Occitan	France	oc-FR
Odia	India	or-IN
Pashto	Afghanistan	ps-AF
Persian	Iran	fa-IR
Polish	Poland	pl-PL
Portuguese	Brazil	pt-BR
Portuguese	Portugal	pt-PT
Punjabi (Gurumukhi Script)	India	pa-IN

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Language	Locale	Language tag
Quechua	Bolivia	quz-BO
Quechua	Ecuador	quz-EC
Quechua	Peru	quz-PE
Romanian	Romania	ro-RO
Romansh	Switzerland	rm-CH
Russian	Russia	ru-RU
Sakha	Russia	sah-RU
Sanskrit	India	sa-IN
Serbian (Cyrillic)	Bosnia and Herzegovina	sr-BA-Cyrl
Serbian (Cyrillic)	Serbia	sr-SP-Cyrl
Serbian (Latin)	Bosnia and Herzegovina	sr-BA-Latn
Serbian (Latin)	Serbia	sr-SP-Latn
Sesotho sa Leboa / Northern Sotho	South Africa	ns-ZA
Setswana / Tswana	South Africa	tn-ZA
Sinhala	Sri Lanka	si-LK
Skolt Sami	Finland	sms-FI
Slovak	Slovakia	sk-SK
Slovenian	Slovenia	sl-SI
Southern Sami	Norway	sma-NO
Southern Sami	Sweden	sma-SE
Spanish	Argentina	es-AR
Spanish	Bolivia	es-BO
Spanish	Chile	es-CL
Spanish	Columbia	es-CO
Spanish	Costa Rica	es-CR
Spanish	Dominican Republic	es-DO
Spanish	Ecuador	es-EC
Spanish	El Salvador	es-SV

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Language	Locale	Language tag
Spanish	Guatemala	es-GT
Spanish	Honduras	es-HN
Spanish	Mexico	es-MX
Spanish	Nicaragua	es-NI
Spanish	Panama	es-PA
Spanish	Paraguay	es-PY
Spanish	Peru	es-PE
Spanish	Puerto Rico	es-PR
Spanish	Spain	es-ES
Spanish	United States	es-US
Spanish	Uruguay	es-UY
Spanish	Venezuela	es-VE
Swahili	Kenya	sw-KE
Swedish	Finland	sv-FI
Swedish	Sweden	sv-SE
Syriac	Syria	syr-SY
Tajik (Cyrillic)	Tajikistan	tg-TJ-Cyrl
Tamazight (Latin)	Algeria	tmz-DZ-Latn
Tamil	India	ta-IN
Tatar	Russia	tt-RU
Telugu (Telugu Script)	India	te-IN
Thai	Thailand	th-TH
Tibetan	PRC	bo-CN
Turkish	Turkey	tr-TR
Turkmen	Turkmenistan	tk-TM
Uighur	PRC	ug-CN
Ukrainian	Ukraine	uk-UA
Upper Sorbian	Germany	wen-DE

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Language	Locale	Language tag
Urdu	Pakistan	ur-PK
Uzbek (Cyrillic)	Uzbekistan	uz-UZ-Cyrl
Uzbek (Latin)	Uzbekistan	uz-UZ-Latn
Vietnamese	Viet Nam	vi-VN
Welsh	Great Britain	cy-GB
Wolof	Senegal	wo-SN
Yi	PRC	ii-CN
Yoruba	Nigeria	yo-NG

<12> Section 2.4.86: In certain scenarios, Office Excel 2007, Excel 2010, and Excel 2013 write out more than 0x000000CE **BrtFmt** records.

<13> Section 2.4.100: When the file is saved, the value of the **stStyleAgg** becomes NULL and the old value is written to the **stStyleInsertRow**. When the file is re-opened, these new styles will be applied.

<14> Section 2.4.106: Office Excel 2007, Excel 2010, and Excel 2013 will not load a file if **kpiprop** is equal to 0x00000005 or 0x00000006.

<15> Section 2.4.133: If this value is greater than 0x00 and the **fMixedTypesIgnoringBlanks** field of the **BrtBeginPCDFAtbl** (section 2.4.130) record of the enclosing **BrtBeginPCDField** (section 2.4.135) record is 1, Office Excel 2007 will report a valid file as corrupt.

<16> Section 2.4.147: Office Excel 2007, Excel 2010, and Excel 2013 will only load a file if the MDX expression specified by **stWeight** corresponds to a measure (section 2.2.5.2.7.1) in the **OLAP cube**.

<17> Section 2.4.147: Office Excel 2007 will not load a file with this string specified.

<18> Section 2.4.166: The value of **fLoadSheet** can be 0 if **fName** is 0 and the specified external workbook has one **sheet** and that sheet has the same name as that external workbook, not including the **file extension**.

<19> Section 2.4.196: Office Excel 2007, Excel 2010, and Excel 2013 allow the **Comment** field of a **BrtBeginSct** record to be a NULL string after converting an Excel Binary File Format (.xls) document to an Excel 2007 Binary File Format (.xlsb) document.

<20> Section 2.4.220: Excel 2010 and Excel 2013 do not save this record.

<21> Section 2.4.221: Excel 2010 and Excel 2013 do not save this record.

<22> Section 2.4.258: Office Excel 2007, Excel 2010, and Excel 2013 save the **PNN** value of Top-left pane as Bottom-right pane and Bottom-right pane as Top-left pane.

<23> Section 2.4.258: Office Excel 2007 will not load a file if the pivot selection belongs to the page area.

<24> Section 2.4.273: Office Excel 2007, Excel 2010, and Excel 2013 do not always save a value of 1 for OLAP PivotTables.

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<25> Section 2.4.306: If the value of the **protpwdBook** field of the **BrtBookProtection** (section 2.4.306) record is not 0x0000, Office Excel 2007 encrypts the document as described in [MS-OFFCRYPTO], section 2.3.4, ECMA-376 Document Encryption. If an encryption password is not specified the document is encrypted with the default password of "\x56\x65\x6C\x76\x65\x74\x53\x77\x65\x61\x74\x73\x68\x6F\x70".

<26> Section 2.4.306: If the value of the **protpwdRev** field of the **BrtBookProtection** (section 2.4.306) record is not 0x0000, Office Excel 2007 encrypts the document as described in [MS-OFFCRYPTO], section 2.3.4, ECMA-376 Document Encryption. If an encryption password is not specified the document is encrypted with the default password of "\x56\x65\x6C\x76\x65\x74\x53\x77\x65\x61\x74\x73\x68\x6F\x70".

<27> Section 2.4.307: If the size of the **rgbHash** member of the **ipdBookPasswordData** field of the **BrtBookProtectionIso** (section 2.4.307) record is nonzero, Office Excel 2007 encrypts the document as described in [MS-OFFCRYPTO], section 2.3.4, ECMA-376 Document Encryption. If an encryption password is not specified the document is encrypted with the default password of "\x56\x65\x6C\x76\x65\x74\x53\x77\x65\x61\x74\x73\x68\x6F\x70".

<28> Section 2.4.307: If the size of the **rgbHash** member of the **ipdRevPasswordData** field of the **BrtBookProtectionIso** (section 2.4.307) record is nonzero, Office Excel 2007 encrypts the document as described in [MS-OFFCRYPTO], section 2.3.4, ECMA-376 Document Encryption. If an encryption password is not specified the document is encrypted with the default password of "\x56\x65\x6C\x76\x65\x74\x53\x77\x65\x61\x74\x73\x68\x6F\x70".

<29> Section 2.4.324: Excel 2010 and Excel 2013 do not save this record.

<30> Section 2.4.324: Office Excel 2007 will not correctly load files with a **val** greater than or equal to 256.

<31> Section 2.4.369: Excel 2010 and Excel 2013 do not save this record.

<32> Section 2.4.370: Excel 2010 and Excel 2013 do not save this record.

<33> Section 2.4.568: Excel 2010 and Excel 2013 do not save this record.

<34> Section 2.4.569: Excel 2010 and Excel 2013 do not save this record.

<35> Section 2.4.667: Office Excel 2007 , Excel 2010 and Excel 2013 use this GUID as described in [MS-DTYP] section 2.3.4 to determine whether the VBA project needs to be recompiled on load by comparing the GUID in the file to the GUID built into the application. If the value is 0x0, the VBA project needs to be recompiled on load.

<36> Section 2.4.667: Value "xl" for **stAppName** is used by Office Excel 2007, Excel 2010, and Excel 2013. When **stAppName** is equal to "xl", Office Excel 2007, Excel 2010, and Excel 2013 expect each of **stLastEdited**, **stLowestEdited**, and **stRupBuild** to be a text representation of an unsigned integer that is less than or equal to 32767. When **stAppName** is not equal to "xl", Office Excel 2007, Excel 2010, and Excel 2013 ignore values of **stLastEdited**, **stLowestEdited**, and **stRupBuild**.

<37> Section 2.4.675: This record is available only in Excel 2016.

<38> Section 2.4.712: Office Excel 2007 does not ignore the preceding **BrtBeginPCDField** (section 2.4.135) of this record.

<39> Section 2.4.713: Office Excel 2007 does not support multiple uses of the same **OLAP measure** in one cache hierarchy (section 2.2.5.2.7) as specified by the **PCDHIERARCHY** rule, and does not ignore the associated cache hierarchy when the **BrtPCDH14**.**fIgnorable** bit is 1.

<40> Section 2.4.728: Office Excel 2007, Excel 2010, and Excel 2013 do not load a file in which this field contains a value that it does not recognize, or that is not recognized by the underlying operating system. Office Excel 2007, Excel 2010, and Excel 2013 recognize the following language tags:

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Language	Locale	Language Tag
Afrikaans	South Africa	af-ZA
Albanian	Albanian	sq-AL
Alsatian	France	gsw-FR
Amharic	Ethiopia	am-ET
Arabic	Algeria	ar-DZ
Arabic	Bahrain	ar-BH
Arabic	Egypt	ar-EG
Arabic	Iraq	ar-IQ
Arabic	Jordan	ar-JO
Arabic	Kuwait	ar-KW
Arabic	Lebanon	ar-LB
Arabic	Libya	ar-LY
Arabic	Morocco	ar-MA
Arabic	Oman	ar-OM
Arabic	Qatar	ar-QA
Arabic	Saudi Arabia	ar-SA
Arabic	Syria	ar-SY
Arabic	Tunisia	ar-TN
Arabic	U.A.E.	ar-AE
Arabic	Yemen	ar-YE
Armenian	Armenia	hy-AM
Assamese	India	as-IN
Azerbaijani (Cyrillic)	Azerbaijan	az-AZ-Cyrl
Azerbaijani (Latin)	Azerbaijan	az-AZ-Latn
Bangla	Bangladesh	bn-BD
Bangla (Bangla Script)	India	bn-IN
Bashkir	Russia	ba-RU
Basque	Basque (Basque)	eu-ES
Belarusian	Belarus	be-BY
Bhutanese	Bhutan	bo-BT
Bosnian (Cyrillic)	Bosnia and Herzegovina	bs-BA-Cyrl
Bosnian (Latin)	Bosnia and Herzegovina	bs-BA-Latn
Breton	France	br-FR
Bulgarian	Bulgaria	bg-BG
Catalan	Catalan	ca-ES
Chinese	Hong Kong SAR	zh-HK
Chinese	Macao SAR	zh-MO
Chinese	PRC	zh-CN
Chinese	Singapore	zh-SG
Chinese	Taiwan	zh-TW
Corsican	France	co-FR
Croatian	Croatia	hr-HR
Croatian (Latin)	Bosnia and Herzegovina	hr-BA-Latn
Czech	Czech Republic	cs-CZ
Danish	Denmark	da-DK
Dari	Afghanistan	prs-AF
Divehi	Maldives	div-MV

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Language	Locale	Language Tag
Dutch	Belgium	nl-BE
Dutch	Netherlands	nl-NL
English	Australia	en-AU
English	Belize	en-BZ
English	Canada	en-CA
English	Caribbean	en-CB
English	India	en-IN
English	Ireland	en-IE
English	Jamaica	en-JM
English	Malaysia	en-MY
English	New Zealand	en-NZ
English	Philippines	en-PH
English	South Africa	en-ZA
English	Trinidad	en-TT
English	United Kingdom	en-GB
English	United States	en-US
English	Zimbabwe	en-ZW
Estonian	Estonia	et-EE
Faroese	Faroe Islands	fo-FO
Filipino	Philippines	fil-PH
Finnish	Finland	fi-FI
French	Belgium	fr-BE
French	Canada	fr-CA
French	France	fr-FR
French	Luxembourg	fr-LU
French	Monaco	fr-MC
French	Switzerland	fr-CH
Frisian	Netherlands	fy-NL
Galician	Galician	gl-ES
Georgian	Georgia	ka-GE
German	Austria	de-AT
German	Germany	de-DE
German	Liechtenstein	de-LI
German	Luxembourg	de-LU
German	Switzerland	de-CH
Greek	Greece	el-GR
Greenlandic	Greenland	kl-GL
Gujarati (Gujarati Script)	India	gu-IN
Hausa (Latin)	Nigeria	ha-NG-Latn
Hebrew	Israel	he-IL
Hindi	India	hi-IN
Hungarian	Hungary	hu-HU
Icelandic	Iceland	is-IS
Igbo	Nigeria	ig-NG
Inari Sami	Finland	smn-FI
Indonesian	Indonesia	id-ID
Inuktitut (Latin)	Canada	iu-CA-Latn

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Language	Locale	Language Tag
Inuktitut (Syllabics)	Canada	iu-CA-Cans
Irish	Ireland	ga-IE
isiXhosa / Xhosa	South Africa	xh-ZA
isiZulu / Zulu	South Africa	zu-ZA
Italian	Italy	it-IT
Italian	Switzerland	it-CH
Japanese	Japan	ja-JP
Kannada (Kannada Script)	India	kn-IN
Kazakh	Kazakhstan	kk-KZ
Khmer	Cambodia	kh-KH
K'iche	Guatemala	qut-GT
Kinyarwanda	Rwanda	rw-RW
Konkani	India	kok-IN
Korean	Korea	ko-KR
Kyrgyz	Kyrgyzstan	ky-KG
Lao	Lao PDR	lo-LA
Latvian	Latvia	lv-LV
Lithuanian	Lithuania	lt-LT
Lower Sorbian	Germany	wee-DE
Lule Sami	Norway	smj-NO
Lule Sami	Sweden	smj-SE
Luxembourgish	Luxembourg	lb-LU
Macedonian	Former Yugoslav Republic of Macedonia	mk-MK
Malay	Brunei	ms-BN
Malay	Malaysia	ms-MY
Malayalam (Malayalam Script)	India	ml-IN
Maltese	Malta	mt-MT
Maori	New Zealand	mi-NZ
Mapudungun	Chile	arn-CL
Marathi	India	mr-IN
Mohawk	Mohawk	moh-CA
Mongolian (Cyrillic)	Mongolia	mn-MN
Mongolian (Mongolian)	PRC	mn-CN-Mong
Nepali	Nepal	ne-NP
Northern Sami	Finland	se-FI
Northern Sami	Norway	se-NO
Northern Sami	Sweden	se-SE
Norwegian (Bokmål)	Norway	nb-NO
Norwegian (Nynorsk)	Norway	nn-NO
Occitan	France	oc-FR
Odia	India	or-IN
Pashto	Afghanistan	ps-AF
Persian	Iran	fa-IR
Polish	Poland	pl-PL
Portuguese	Brazil	pt-BR
Portuguese	Portugal	pt-PT
Punjabi (Gurumukhi Script)	India	pa-IN

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Language	Locale	Language Tag
Quechua	Bolivia	quz-BO
Quechua	Ecuador	quz-EC
Quechua	Peru	quz-PE
Romanian	Romania	ro-RO
Romansh	Switzerland	rm-CH
Russian	Russia	ru-RU
Sakha	Russia	sah-RU
Sanskrit	India	sa-IN
Serbian (Cyrillic)	Bosnia and Herzegovina	sr-BA-Cyrl
Serbian (Cyrillic)	Serbia	sr-SP-Cyrl
Serbian (Latin)	Bosnia and Herzegovina	sr-BA-Latn
Serbian (Latin)	Serbia	sr-SP-Latn
Sesotho sa Leboa / Northern Sotho	South Africa	ns-ZA
Setswana / Tswana	South Africa	tn-ZA
Sinhala	Sri Lanka	si-LK
Skolt Sami	Finland	sms-FI
Slovak	Slovakia	sk-SK
Slovenian	Slovenia	sl-SI
Southern Sami	Norway	sma-NO
Southern Sami	Sweden	sma-SE
Spanish	Argentina	es-AR
Spanish	Bolivia	es-BO
Spanish	Chile	es-CL
Spanish	Columbia	es-CO
Spanish	Costa Rica	es-CR
Spanish	Dominican Republic	es-DO
Spanish	Ecuador	es-EC
Spanish	El Salvador	es-SV
Spanish	Guatemala	es-GT
Spanish	Honduras	es-HN
Spanish	Mexico	es-MX
Spanish	Nicaragua	es-NI
Spanish	Panama	es-PA
Spanish	Paraguay	es-PY
Spanish	Peru	es-PE
Spanish	Puerto Rico	es-PR
Spanish	Spain	es-ES
Spanish	United States	es-US
Spanish	Uruguay	es-UY
Spanish	Venezuela	es-VE
Swahili	Kenya	sw-KE
Swedish	Finland	sv-FI
Swedish	Sweden	sv-SE
Syriac	Syria	syr-SY
Tajik (Cyrillic)	Tajikistan	tg-TJ-Cyrl
Tamazight (Latin)	Algeria	tmz-DZ-Latn
Tamil	India	ta-IN

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Language	Locale	Language Tag
Tatar	Russia	tt-RU
Telugu (Telugu Script)	India	te-IN
Thai	Thailand	th-TH
Tibetan	PRC	bo-CN
Turkish	Turkey	tr-TR
Turkmen	Turkmenistan	tk-TM
Uighur	PRC	ug-CN
Ukrainian	Ukraine	uk-UA
Upper Sorbian	Germany	wen-DE
Urdu	Pakistan	ur-PK
Uzbek (Cyrillic)	Uzbekistan	uz-UZ-Cyrl
Uzbek (Latin)	Uzbekistan	uz-UZ-Latn
Vietnamese	Viet Nam	vi-VN
Welsh	Great Britain	cy-GB
Wolof	Senegal	wo-SN
Yi	PRC	ii-CN
Yoruba	Nigeria	yo-NG

<41> Section 2.4.746: Office Excel 2007, Excel 2010, and Excel 2013 ignore this value on load and write out 0.

<42> Section 2.4.749: Office Excel 2007, Excel 2010, and Excel 2013 write the value of **fAccepted** as 0 when converting from an [ISO/IEC29500-1:2016] document to this persistence format and the other revision whose **rrd.revid** value matches the **rrd.revid** value of this revision is in a different revision log.

<43> Section 2.4.755: In Office Excel 2007, Excel 2010, and Excel 2013, the value **BrtRRFormat**.**ich** can also be 0 because the effect was not calculated. The **ich** value can be correctly determined from the **cch** value.

<44> Section 2.4.779: Excel 2010 and Excel 2013 do not save this record.

<45> Section 2.4.796: Office Excel 2007 does not save cached values for OLE Data Items (section 2.2.7.4.3.1).

<46> Section 2.4.800: Office Excel 2007 will not ignore the **isxvdData** field of the immediately preceding **BrtBeginSXDI** (section 2.4.241) record.

<47> Section 2.4.804: Office Excel 2007 will not ignore the BrtBeginSXTH record preceding this record.

<48> Section 2.4.814: Office Excel 2007 does not support multiple uses of the same OLAP measure in one PivotTable view as specified by the **PivotTable** rule (section 2.2.5.3.9), and does not ignore the associated pivot field when **BrtSXVD14** (section 2.4.814).**fIgnorable** is 0x01.

<49> Section 2.4.835: Excel 2010 and Excel 2013 do not save this record.

<50> Section 2.4.836: Office Excel 2007, Excel 2010, and Excel 2013 treat this as 0x0 for security considerations.

<51> Section 2.4.836: If the **workbook** doesn't contain a **VBA project**, Office Excel 2007, Excel 2010, and Excel 2013 will reset the **strName** to a default value when the project is created.

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<52> Section 2.4.837: The following table shows the different versions of function accuracy Microsoft Excel supports.

Value	Meaning
0	Functions are calculated using the current application's algorithms.
1	Functions are calculated using algorithms implemented in Office Excel 2007.
2	Functions are calculated using algorithms implemented in Excel 2010.

<53> Section 2.5.1: Excel 2010, and Excel 2013 writes out 0x0E02 for this field.

<54> Section 2.5.1: Excel 2010, and Excel 2013 writes out 0x0000 for this field.

<55> Section 2.5.3: In some cases, Office Excel 2007, Excel 2010, and Excel 2013 will save the formats associated with 0x0011 through 0x0014 as 0x0000 through 0x0003. In this case, the formats associated with 0x0000 through 0x0010 will be saved as 0x0004 through 0x0014.

<56> Section 2.5.5: Office Excel 2007, Excel 2010, and Excel 2013 can also write out 0.

<57> Section 2.5.28: The following table shows the maximum data functionality levels (section 2.2.5.1) that different versions of spreadsheet software support.

Value	Maximum data functionality level for
0	Excel 97 and Excel 2000
1	Excel 2002 and Office Excel 2003
3	Office Excel 2007
4	Excel 2010
5	Excel 2013

<58> Section 2.5.29: Office Excel 2007, Excel 2010, and Excel 2013 treat this value as the non-existent date February 29, 1900.

<59> Section 2.5.35: Office Excel 2007, Excel 2010, and Excel 2013 do not always write out the correct value in this field. Although the value of this field is validated on load, it is not used at run time.

<60> Section 2.5.35: Office Excel 2007, Excel 2010, and Excel 2013 do not always write out the correct value in this field. Although the value of this field is validated on load, it is not used at run time.

<61> Section 2.5.40: Office Excel 2007, Excel 2010, and Excel 2013 can write 0 for **fPromptForFile.**

<62> Section 2.5.50: Office Excel 2007, Excel 2010, and Excel 2013 can write out values 0x13 through 0x24.

<63> Section 2.5.61: Office Excel 2007 writes 0x0000 for this field. Excel 2010 writes 0x0E02 for this field.

<64> Section 2.5.61: Office Excel 2007, Excel 2010, and Excel 2013 write 0x0000 for this field.

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<65> Section 2.5.94: Office Excel 2007, Excel 2010, and Excel 2013 use fixed values for some of the **MdtFlags** (section 2.5.94) flags regardless of the values specified in the structure. The specified values are preserved when the file is saved. The following table specifies the affected flags and their respective fixed values.

MdtFlags properties	Value
fGhostRw	0
fGhostCol	0
fDelete	0
fPasteAll	1
fPasteFmlas	1
fPasteValues	1
fPasteFmts	0
fPasteComments	0
fPasteDv	0
fPasteBorders	1
fPasteColWidths	0
fPasteNumFmts	0
fMerge	1
fSplitFirst	1
fSplitAll	0
fRwColShift	1
fClearAll	0
fClearContents	0
fClearComments	1
fCanCoerce	1
fAdjust	0

<66> Section 2.5.94: In Office Excel 2007, Excel 2010, and Excel 2013, examples of such functions are: **IF**, **CHOOSE**, **VLOOKUP**, and **HLOOKUP**.

<67> Section 2.5.94: Office Excel 2007, Excel 2010, and Excel 2013 write the **reserved2** value as 1 for the MDX Metadata (section 2.2.4.8) metadata type (section 2.2.4.1).

<68> Section 2.5.97.14: Office Excel 2007, Excel 2010, and Excel 2013 can write out an **rgce** that contains **PtgArray** (section 2.5.97.23).

<69> Section 2.5.141: Office Excel 2007, Excel 2010, and Excel 2013 do not load a file in which this field contains a value that it does not recognize, or that is not recognized by the underlying operating system. Office Excel 2007, Excel 2010, and Excel 2013 recognize the following language tags:

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Language	Locale	Language Tag
Afrikaans	South Africa	af-ZA
Albanian	Albanian	sq-AL
Alsatian	France	gsw-FR
Amharic	Ethiopia	am-ET
Arabic	Algeria	ar-DZ
Arabic	Bahrain	ar-BH
Arabic	Egypt	ar-EG
Arabic	Iraq	ar-IQ
Arabic	Jordan	ar-JO
Arabic	Kuwait	ar-KW
Arabic	Lebanon	ar-LB
Arabic	Libya	ar-LY
Arabic	Morocco	ar-MA
Arabic	Oman	ar-OM
Arabic	Qatar	ar-QA
Arabic	Saudi Arabia	ar-SA
Arabic	Syria	ar-SY
Arabic	Tunisia	ar-TN
Arabic	U.A.E.	ar-AE
Arabic	Yemen	ar-YE
Armenian	Armenia	hy-AM
Assamese	India	as-IN
Azerbaijani (Cyrillic)	Azerbaijan	az-AZ-Cyrl
Azerbaijani (Latin)	Azerbaijan	az-AZ-Latn
Bangla	Bangladesh	bn-BD
Bangla (Bangla Script)	India	bn-IN
Bashkir	Russia	ba-RU
Basque	Basque (Basque)	eu-ES
Belarusian	Belarus	be-BY
Bhutanese	Bhutan	bo-BT
Bosnian (Cyrillic)	Bosnia and Herzegovina	bs-BA-Cyrl
Bosnian (Latin)	Bosnia and Herzegovina	bs-BA-Latn
Breton	France	br-FR
Bulgarian	Bulgaria	bg-BG
Catalan	Catalan	ca-ES
Chinese	Hong Kong SAR	zh-HK
Chinese	Macao SAR	zh-MO
Chinese	PRC	zh-CN
Chinese	Singapore	zh-SG
Chinese	Taiwan	zh-TW
Corsican	France	co-FR
Croatian	Croatia	hr-HR
Croatian (Latin)	Bosnia and Herzegovina	hr-BA-Latn
Czech	Czech Republic	cs-CZ
Danish	Denmark	da-DK
Dari	Afghanistan	prs-AF
Divehi	Maldives	div-MV

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Language	Locale	Language Tag
Dutch	Belgium	nl-BE
Dutch	Netherlands	nl-NL
English	Australia	en-AU
English	Belize	en-BZ
English	Canada	en-CA
English	Caribbean	en-CB
English	India	en-IN
English	Ireland	en-IE
English	Jamaica	en-JM
English	Malaysia	en-MY
English	New Zealand	en-NZ
English	Philippines	en-PH
English	South Africa	en-ZA
English	Trinidad	en-TT
English	United Kingdom	en-GB
English	United States	en-US
English	Zimbabwe	en-ZW
Estonian	Estonia	et-EE
Faroese	Faroe Islands	fo-FO
Filipino	Philippines	fil-PH
Finnish	Finland	fi-FI
French	Belgium	fr-BE
French	Canada	fr-CA
French	France	fr-FR
French	Luxembourg	fr-LU
French	Monaco	fr-MC
French	Switzerland	fr-CH
Frisian	Netherlands	fy-NL
Galician	Galician	gl-ES
Georgian	Georgia	ka-GE
German	Austria	de-AT
German	Germany	de-DE
German	Liechtenstein	de-LI
German	Luxembourg	de-LU
German	Switzerland	de-CH
Greek	Greece	el-GR
Greenlandic	Greenland	kl-GL
Gujarati (Gujarati Script)	India	gu-IN
Hausa (Latin)	Nigeria	ha-NG-Latn
Hebrew	Israel	he-IL
Hindi	India	hi-IN
Hungarian	Hungary	hu-HU
Icelandic	Iceland	is-IS
Igbo	Nigeria	ig-NG
Inari Sami	Finland	smn-FI
Indonesian	Indonesia	id-ID
Inuktitut (Latin)	Canada	iu-CA-Latn

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Language	Locale	Language Tag
Inuktitut (Syllabics)	Canada	iu-CA-Cans
Irish	Ireland	ga-IE
isiXhosa / Xhosa	South Africa	xh-ZA
isiZulu / Zulu	South Africa	zu-ZA
Italian	Italy	it-IT
Italian	Switzerland	it-CH
Japanese	Japan	ja-JP
Kannada (Kannada Script)	India	kn-IN
Kazakh	Kazakhstan	kk-KZ
Khmer	Cambodia	kh-KH
K'iche	Guatemala	qut-GT
Kinyarwanda	Rwanda	rw-RW
Konkani	India	kok-IN
Korean	Korea	ko-KR
Kyrgyz	Kyrgyzstan	ky-KG
Lao	Lao PDR	lo-LA
Latvian	Latvia	lv-LV
Lithuanian	Lithuania	lt-LT
Lower Sorbian	Germany	wee-DE
Lule Sami	Norway	smj-NO
Lule Sami	Sweden	smj-SE
Luxembourgish	Luxembourg	lb-LU
Macedonian	Former Yugoslav Republic of Macedonia	mk-MK
Malay	Brunei	ms-BN
Malay	Malaysia	ms-MY
Malayalam (Malayalam Script)	India	ml-IN
Maltese	Malta	mt-MT
Maori	New Zealand	mi-NZ
Mapudungun	Chile	arn-CL
Marathi	India	mr-IN
Mohawk	Mohawk	moh-CA
Mongolian (Cyrillic)	Mongolia	mn-MN
Mongolian (Mongolian)	PRC	mn-CN-Mong
Nepali	Nepal	ne-NP
Northern Sami	Finland	se-FI
Northern Sami	Norway	se-NO
Northern Sami	Sweden	se-SE
Norwegian (Bokmål)	Norway	nb-NO
Norwegian (Nynorsk)	Norway	nn-NO
Occitan	France	oc-FR
Odia	India	or-IN
Pashto	Afghanistan	ps-AF
Persian	Iran	fa-IR
Polish	Poland	pl-PL
Portuguese	Brazil	pt-BR
Portuguese	Portugal	pt-PT
Punjabi (Gurumukhi Script)	India	pa-IN

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Quechua	Bolivia	quz-BO
Quechua	Ecuador	quz-EC
Quechua	Peru	quz-PE
Romanian	Romania	ro-RO
Romansh	Switzerland	rm-CH
Russian	Russia	ru-RU
Sakha	Russia	sah-RU
Sanskrit	India	sa-IN
Serbian (Cyrillic)	Bosnia and Herzegovina	sr-BA-Cyrl
Serbian (Cyrillic)	Serbia	sr-SP-Cyrl
Serbian (Latin)	Bosnia and Herzegovina	sr-BA-Latn
Serbian (Latin)	Serbia	sr-SP-Latn
Sesotho sa Leboa / Northern Sotho	South Africa	ns-ZA
Setswana / Tswana	South Africa	tn-ZA
Sinhala	Sri Lanka	si-LK
Skolt Sami	Finland	sms-FI
Slovak	Slovakia	sk-SK
Slovenian	Slovenia	sl-SI
Southern Sami	Norway	sma-NO
Southern Sami	Sweden	sma-SE
Spanish	Argentina	es-AR
Spanish	Bolivia	es-BO
Spanish	Chile	es-CL
Spanish	Columbia	es-CO
Spanish	Costa Rica	es-CR
Spanish	Dominican Republic	es-DO
Spanish	Ecuador	es-EC
Spanish	El Salvador	es-SV
Spanish	Guatemala	es-GT
Spanish	Honduras	es-HN
Spanish	Mexico	es-MX
Spanish	Nicaragua	es-NI
Spanish	Panama	es-PA
Spanish	Paraguay	es-PY
Spanish	Peru	es-PE
Spanish	Puerto Rico	es-PR
Spanish	Spain	es-ES
Spanish	United States	es-US
Spanish	Uruguay	es-UY
Spanish	Venezuela	es-VE
Swahili	Kenya	sw-KE
Swedish	Finland	sv-FI
Swedish	Sweden	sv-SE
Syriac	Syria	syr-SY
Tajik (Cyrillic)	Tajikistan	tg-TJ-Cyrl
Tamazight (Latin)	Algeria	tmz-DZ-Latn
Tamil	India	ta-IN

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Language	Locale	Language Tag
Tatar	Russia	tt-RU
Telugu (Telugu Script)	India	te-IN
Thai	Thailand	th-TH
Tibetan	PRC	bo-CN
Turkish	Turkey	tr-TR
Turkmen	Turkmenistan	tk-TM
Uighur	PRC	ug-CN
Ukrainian	Ukraine	uk-UA
Upper Sorbian	Germany	wen-DE
Urdu	Pakistan	ur-PK
Uzbek (Cyrillic)	Uzbekistan	uz-UZ-Cyrl
Uzbek (Latin)	Uzbekistan	uz-UZ-Latn
Vietnamese	Viet Nam	vi-VN
Welsh	United Kingdom	cy-GB
Wolof	Senegal	wo-SN
Yi	PRC	ii-CN
Yoruba	Nigeria	yo-NG

<70> Section 2.5.171: Under certain circumstances, Office Excel 2007, Excel 2010, and Excel 2013 persist these values.

<71> Section 2.5.172: Office Excel 2007, Excel 2010, and Excel 2013 save a value of -1 on the **lastSheet** field for either a top-level or a sheet-level reference to an external book if an **Information Rights Management (IRM)** authorization failure occurred during a refresh of that book's data.

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6 Change Tracking

This section identifies changes that were made to this document since the last release. Changes are classified as Major, Minor, or None.

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

- A document revision that incorporates changes to interoperability requirements.
- A document revision that captures changes to protocol functionality.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

The revision class **None** means that no new technical changes were introduced. Minor editorial and formatting changes may have been made, but the relevant technical content is identical to the last released version.

The changes made to this document are listed in the following table. For more information, please contact dochelp@microsoft.com.

Section	Description	Revision class
2.2.5.3.5.2 OLAP Manual Filters	Changed SXHItem to SXTHItem.	Minor
2.2.5.3.7.3 Column Axis	Changed rgixsvdcols to rgisxvdcols.	Minor
2.2.9 Password Verifier Algorithm	Moved password related endnote from section 4 here.	Minor
2.4.318 BrtCellIgnoreEC14	Changed FRTHeader.rqSqrefs to FRTHeader.rgSqrefs.	Minor
2.4.741 BrtRangeProtectionIso	Changed sqRFX to sqRfX.	Minor
2.4.750 BrtRRDefName	Changed frgp to fgrp.	Minor
2.4.845 BrtXF	Changed ixfParent to ixfeParent.	Minor
2.5.97.10 Ftab	Added _xlfn.FIELDVALUE, _xlfn.RANDARRAY, _xlfn.SEQUENCE, _xlfn.SORTBY, _xlfn.UNIQUE, and _xlfn.XLOOKUP to Future Function table. Added fieldvalue-params, let-params, randarray-params, sequence-params, sortby-params, unique-params, and xlookup-params to future-function-params.	Major
2.5.110 PRuleHeaderData	Removed redundant blank spaces.	Minor
3.8.26 PivotTable: BrtBeginSXView	Moved endnote content to text.	Minor
4 Security Considerations	Removed password related endnote.	Minor
5 Appendix A: Product Behavior	Updated list of supported products.	major

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