**[MS-ESREST]:**

**Excel Services REST Protocol**

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**Revision Summary**

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| 3/31/2010 | 1.01 | Editorial | Revised and edited the technical content |
| 4/30/2010 | 1.02 | Editorial | Revised and edited the technical content |
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# Introduction

The Excel Services REST Protocol extensions to the Atom Publishing Protocol (AtomPub) [[RFC5023]](https://go.microsoft.com/fwlink/?LinkId=140880) and its extensions specified in the Open Data Protocol (ODATA) Specification [[MS-ODATA]](%5BMS-ODATA%5D.pdf#Section_2b686a1a9e1f456f80ff072a010fc278) enable applications to expose spreadsheet data, using common Web technologies, as a data service that can be consumed by clients within corporate networks and across the Internet.

Sections 1.5, 1.8, 1.9, 2, and 3 of this specification are normative. All other sections and examples in this specification are informative.

## Glossary

This document uses the following terms:

**atom feed**: An [**XML**](#gt_982b7f8e-d516-4fd5-8d5e-1a836081ed85) structure that contains metadata about content, such as the language version and the date when the content was last modified, and is sent to subscribers by using the Atom Publishing Protocol (AtomPub), as described in [[RFC4287]](https://go.microsoft.com/fwlink/?LinkId=140877).

**cell**: A box that is formed by the intersection of a [**row**](#gt_a87817fc-9b18-49a1-925e-9be9e1d92665) and a column in a worksheet or a table. A cell can contain numbers, strings, and formulas, and various formats can be applied to that data.

**cell error value**: Any of a number of special values that are returned as a result of an unsuccessful formula calculation.

**data culture**: The language that is used to specify number formatting for data.

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

**HTML fragment**: Lines of text that adhere to HTML tag rules, as described in [[HTML]](https://go.microsoft.com/fwlink/?LinkId=89880), but do not have processing instructions or any other type of header information.

**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].

**JavaScript Object Notation (JSON)**: A text-based, data interchange format that is used to transmit structured data, typically in Asynchronous JavaScript + XML (AJAX) web applications, as described in [[RFC7159]](https://go.microsoft.com/fwlink/?linkid=842522). The JSON format is based on the structure of ECMAScript (Jscript, JavaScript) objects.

**list**: An organization of a region of cells into a tabular structure in a workbook.

**named range**: See defined name.

**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.

**published item**: A specific named object that is in a published workbook.

**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.

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

**slicer**: A mechanism that is used to filter data in one or more PivotTable reports or cube functions.

**table**: A [**list**](#gt_04ce231e-214c-44fd-b7ba-7cc19eee79bf) that is defined in a workbook.

**UI culture**: The language that is used to display strings and graphical elements in a user interface.

**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]](https://go.microsoft.com/fwlink/?LinkId=90287).

**Web Services Description Language (WSDL)**: An XML format for describing network services as a set of endpoints that operate on messages that contain either document-oriented or procedure-oriented information. The operations and messages are described abstractly and are bound to a concrete network protocol and message format in order to define an endpoint. Related concrete endpoints are combined into abstract endpoints, which describe a network service. WSDL is extensible, which allows the description of endpoints and their messages regardless of the message formats or network protocols that are used.

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

**workbook file**: A file that contains a byte stream representation of a workbook.

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

**XML**: The Extensible Markup Language, as described in [[XML1.0]](https://go.microsoft.com/fwlink/?LinkId=90599).

**XML namespace**: A collection of names that is used to identify elements, types, and attributes in XML documents identified in a URI reference [[RFC3986]](https://go.microsoft.com/fwlink/?LinkId=90453). 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]](https://go.microsoft.com/fwlink/?LinkId=90602).

**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**](#gt_982b7f8e-d516-4fd5-8d5e-1a836081ed85) itself. An XML schema provides a view of a document type at a relatively high level of abstraction.

**MAY, SHOULD, MUST, SHOULD NOT, MUST NOT:** These terms (in all caps) are used as defined in [[RFC2119]](https://go.microsoft.com/fwlink/?LinkId=90317). All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

## 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](https://go.microsoft.com/fwlink/?linkid=850906).

### 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.

[MC-CSDL] Microsoft Corporation, "[Conceptual Schema Definition File Format](%5BMC-CSDL%5D.pdf#Section_c03ad8c3e8b74306af96a9e52bb3df12)".

[MS-ODATA] Microsoft Corporation, "[Open Data Protocol (OData)](%5BMS-ODATA%5D.pdf#Section_2b686a1a9e1f456f80ff072a010fc278)".

[MS-RDL] Microsoft Corporation, "[Report Definition Language File Format](%5BMS-RDL%5D.pdf#Section_532872047cd04bc9a5cdd42a5925dca1)".

[RFC1766] Alvestrand, H., "Tags for the Identification of Languages", RFC 1766, March 1995, [http://www.ietf.org/rfc/rfc1766.txt](https://go.microsoft.com/fwlink/?LinkId=120475)

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, [http://www.rfc-editor.org/rfc/rfc2119.txt](https://go.microsoft.com/fwlink/?LinkId=90317)

[RFC2616] Fielding, R., Gettys, J., Mogul, J., et al., "Hypertext Transfer Protocol -- HTTP/1.1", RFC 2616, June 1999, [http://www.rfc-editor.org/rfc/rfc2616.txt](https://go.microsoft.com/fwlink/?LinkId=90372)

[RFC4287] Nottingham, M., and Sayre, R., Eds., "The Atom Syndication Format", RFC 4287, December 2005, [http://www.rfc-editor.org/rfc/rfc4287.txt](https://go.microsoft.com/fwlink/?LinkId=140877)

[WSDL] Christensen, E., Curbera, F., Meredith, G., and Weerawarana, S., "Web Services Description Language (WSDL) 1.1", W3C Note, March 2001, [http://www.w3.org/TR/2001/NOTE-wsdl-20010315](https://go.microsoft.com/fwlink/?LinkId=90577)

[XMLNS] Bray, T., Hollander, D., Layman, A., et al., Eds., "Namespaces in XML 1.0 (Third Edition)", W3C Recommendation, December 2009, [http://www.w3.org/TR/2009/REC-xml-names-20091208/](https://go.microsoft.com/fwlink/?LinkId=191840)

[XMLSCHEMA1/2] Thompson, H., Beech, D., Maloney, M., and Mendelsohn, N., Eds., "XML Schema Part 1: Structures Second Edition", W3C Recommendation, October 2004, [http://www.w3.org/TR/2004/REC-xmlschema-1-20041028/](https://go.microsoft.com/fwlink/?LinkId=90607)

[XMLSCHEMA1] Thompson, H., Beech, D., Maloney, M., and Mendelsohn, N., Eds., "XML Schema Part 1: Structures", W3C Recommendation, May 2001, [http://www.w3.org/TR/2001/REC-xmlschema-1-20010502/](https://go.microsoft.com/fwlink/?LinkId=90608)

[XMLSCHEMA2/2] Biron, P., and Malhotra, A., Eds., "XML Schema Part 2: Datatypes Second Edition", W3C Recommendation, October 2004, [http://www.w3.org/TR/2004/REC-xmlschema-2-20041028/](https://go.microsoft.com/fwlink/?LinkId=90609)

[XMLSCHEMA2] Biron, P.V., Ed. and Malhotra, A., Ed., "XML Schema Part 2: Datatypes", W3C Recommendation, May 2001, [http://www.w3.org/TR/2001/REC-xmlschema-2-20010502/](https://go.microsoft.com/fwlink/?LinkId=90610)

### Informative References

[MS-DPRDL] Microsoft Corporation, "[Report Definition Language Data Portability Overview](%5BMS-DPRDL%5D.pdf#Section_f6d2f8c097d34fdd91d520caa829b413)".

[RFC2818] Rescorla, E., "HTTP Over TLS", RFC 2818, May 2000, [http://www.rfc-editor.org/rfc/rfc2818.txt](https://go.microsoft.com/fwlink/?LinkId=90383)

[RFC5023] Gregorio, J., and de hOra, B., Eds., "The Atom Publishing Protocol", RFC 5023, October 2007, [http://www.rfc-editor.org/rfc/rfc5023.txt](https://go.microsoft.com/fwlink/?LinkId=140880)

## Overview

This protocol enables protocol clients to access information stored in [**workbooks**](#gt_343c4660-90e1-4d86-b9cc-5007075d9dfe) maintained by a protocol server using common Web technologies. Various types of resources within spreadsheets can be retrieved, such as [**ranges**](#gt_c2c93fec-8d3e-45de-8010-c738cc1cea99), [**tables**](#gt_d3a7da8d-a597-4838-9756-25e30b640ba7), charts, [**slicers**](#gt_dc86a1af-fcc9-4b5e-bef4-898c1cfe8cae), timelines, interactive reports and [**PivotTable**](#gt_38963165-73bc-400a-a809-aff03693a316) reports. The information returned by the protocol can be in one of several formats, such as [**HTML**](#gt_549c4960-e8be-4c24-bc2b-b86530f1c1bf), image, [**JavaScript Object Notation (JSON)**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26), and as an [**Atom feed**](#gt_418513b2-266d-4d59-8403-277bd630d14c). This protocol client also allows for values to be inserted into [**cells**](#gt_43d1e51e-4f26-493b-b7c9-e84e920d7461) of the workbook.

A typical scenario for using this protocol is a custom application where workbook data is used as a data source that is connected to other processes that act on that data, such as displaying it in a novel way or taking specific action based on the contents of that data. Another typical scenario for this protocol is in embedding of workbook data into applications that support common Web standards.

## Relationship to Other Protocols

This protocol uses the AtomPub messaging protocol for formatting requests and responses as described in [[RFC5023]](https://go.microsoft.com/fwlink/?LinkId=140880) and URI and Payload extensions to the AtomPub protocol as described in [[MS-ODATA]](%5BMS-ODATA%5D.pdf#Section_2b686a1a9e1f456f80ff072a010fc278). It transmits these messages using the HTTP protocol as described in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372) or the HTTPS protocol as described in [[RFC2818]](https://go.microsoft.com/fwlink/?LinkId=90383).

The following diagram shows the underlying messaging and transport stack that the protocol uses:



Figure 1 This protocol in relation to other protocols

## Prerequisites/Preconditions

This protocol operates against a resource in a workbook that is identified by a [**URL**](#gt_433a4fb7-ef84-46b0-ab65-905f5e3a80b1) that is known by protocol clients. The URL is formed by appending the workbook relative path and the resource location to "http://<ServerName>/\_vti\_bin/ExcelRest.aspx", for example: http://www.example.com/\_vti\_bin/ExcelRest.aspx/Docs/Documents/sampleWorkbook.xlsx/model/Charts('SampleChart'). It is a prerequisite that the client obtain a URL to the server before these extensions can be used.

## Applicability Statement

AtomPub, as described in [[RFC5023]](https://go.microsoft.com/fwlink/?LinkId=140880), in combination with the extensions defined in this document, is appropriate for use in Web services that need a uniform, flexible, general purpose interface for exposing retrieve operations on a data model to clients.

## Versioning and Capability Negotiation

This document covers versioning issues in the following areas:

* **Supported transports:** This document can be implemented on top of the Atom Publishing Protocol as described in section [2.1](#Section_b80ea155b3284eb1a0edffd17c3c8ce5).
* **Protocol versions:** Servers specify the protocol version by using the **X-XLSVersion** response header.

The **X-XLSVersion** response header is present on any response message.

The syntax of the **X-XLSVersion** header is defined as follows:

X-XLSVersion = "X-XLSVersion:" VersionNum

VersionNum = DIGIT \*DIGIT "." DIGIT \*DIGIT "." DIGIT \*DIGIT

The **VersionNum** section of the header value states the version of the protocol server.

* **Localization:** This document does not specify any localization-dependent behavior.
* **Capability negotiation:** The protocol that is defined in this document enables limited capability negotiation using the **X-XLSVersion** response header.

On a response from the server to the client, the **X-XLSVersion** header needs to be specified. The value states the version of the protocol the server used to generate the response.

## Vendor-Extensible Fields

None.

## Standards Assignments

None.

# Messages

## Transport

No new transports are required except for those specified in [[MS-ODATA]](%5BMS-ODATA%5D.pdf#Section_2b686a1a9e1f456f80ff072a010fc278) section [2.1](http://msdn.microsoft.com/en-us/library/7313eecb-22cb-435b-94d2-88dad7267508/).

## Common Message Syntax

This section contains common definitions that are used by this protocol. The syntax of the definitions uses [**XML schema**](#gt_bd0ce6f9-c350-4900-827e-951265294067), as specified in [[XMLSCHEMA1/2]](https://go.microsoft.com/fwlink/?LinkId=90607) and [[XMLSCHEMA2/2]](https://go.microsoft.com/fwlink/?LinkId=90609), and [**WSDL**](#gt_5a824664-0858-4b09-b852-83baf4584efa), as specified in [[WSDL]](https://go.microsoft.com/fwlink/?LinkId=90577).

### Namespaces

This specification defines and references various [**XML namespaces**](#gt_485f05b3-df3b-45ac-b8bf-d05f5d185a24) by using the mechanisms specified in [[XMLNS]](https://go.microsoft.com/fwlink/?LinkId=191840). Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

| Prefix | Namespace URI | Reference |
| --- | --- | --- |
| tns | http://schemas.microsoft.com/office/excel/server/webservices |  |
| xs | http://www.w3.org/2001/XMLSchema | [[XMLSCHEMA1]](https://go.microsoft.com/fwlink/?LinkId=90608)[[XMLSCHEMA2]](https://go.microsoft.com/fwlink/?LinkId=90610) |
| atom | http://www.w3.org/2005/Atom | [[RFC4287]](https://go.microsoft.com/fwlink/?LinkId=140877) |

### Messages

This specification does not define any common [**WSDL**](#gt_5a824664-0858-4b09-b852-83baf4584efa) message definitions.

### Elements

This specification does not define any common [**XML schema**](#gt_bd0ce6f9-c350-4900-827e-951265294067) element definitions.

### Complex Types

The following table summarizes the set of common [**XML schema**](#gt_bd0ce6f9-c350-4900-827e-951265294067) complex type definitions defined by this specification. XML schema complex type definitions that are specific to a particular operation are described with the operation.

| Complex type | Description |
| --- | --- |
| **Range** | A range of [**cells**](#gt_43d1e51e-4f26-493b-b7c9-e84e920d7461) in a worksheet. |
| **Row** | Represents a [**row**](#gt_a87817fc-9b18-49a1-925e-9be9e1d92665) in a [**worksheet**](#gt_2fdc6291-fa6a-48a6-afbb-04f910d68615). |
| **Cell** | Represents a cell in a worksheet. |
| **JSONReference** | Represents a reference to an Entity Set. |
| **JSONCollection** | Represents a collection of Entities. |

#### Range

Represents a range of [**cells**](#gt_43d1e51e-4f26-493b-b7c9-e84e920d7461) in a [**worksheet**](#gt_2fdc6291-fa6a-48a6-afbb-04f910d68615).

##### Range XML Value

If **Range** value is used in response [**XML**](#gt_982b7f8e-d516-4fd5-8d5e-1a836081ed85), it MUST conform to the following XML schema.

1. <xs:complexType name="Range">
2. <xs:element name="row" type="Row" minOccurs="0" maxOccurs="unbounded"/>
3. <xs:attribute name="name" type=" string" use="required"/>
4. </xs:complexType>

**row:** Represents a [**row**](#gt_a87817fc-9b18-49a1-925e-9be9e1d92665) from the spreadsheet.

**name:** Contains the name of the [**range**](#gt_c2c93fec-8d3e-45de-8010-c738cc1cea99)

##### Range JSON Value

If **Range** value is used in response XML, it is represented as a [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) object. It has the JSON members listed in the following table.

| Member Name | Member Value |
| --- | --- |
| name | A JSON string value representing the name of the range. This member MUST be present. |
| rows | A JSON array representing a collection of [**row**](#gt_a87817fc-9b18-49a1-925e-9be9e1d92665) in a [**worksheet**](#gt_2fdc6291-fa6a-48a6-afbb-04f910d68615). This member MUST be present. |

#### Row

Represents a [**row**](#gt_a87817fc-9b18-49a1-925e-9be9e1d92665) in a [**worksheet**](#gt_2fdc6291-fa6a-48a6-afbb-04f910d68615).

##### Row XML Value

If **Row** value is used in response XML, it MUST conform to the following XML schema.

1. <xs:complexType name="Row">
2. <xs:element name="c" type="Cell" minOccurs="0" maxOccurs="unbounded"/>
3. </xs:complexType>

**c:** Represents a cell in the [**worksheet**](#gt_2fdc6291-fa6a-48a6-afbb-04f910d68615). The number of **c** elements inside a **row** element MUST be the same for all **row** elements inside the same **range** element

##### Row JSON Value

If **Row** value is used in response JSON text, it MUST conform to JSON array representation format. The JSON array representing the **Row** SHOULD contain **Cell** objects.

#### Cell

Represents a [**cell**](#gt_43d1e51e-4f26-493b-b7c9-e84e920d7461) in a [**worksheet**](#gt_2fdc6291-fa6a-48a6-afbb-04f910d68615).

##### Cell XML Value

If **Cell** value is used in response XML, it MUST conform to the following XML schema.

<xs:complexType name="Cell">

 <xs:element name="fv" xsi:type="xs:string" minOccurs="0" maxOccurs="1"/>

 <xs:element name="v" xsi:type= "xs:anyType" minOccurs="0" maxOccurs="1"/>

</xs:complexType>

**fv:** Represents a cell formatted using a **number format** according to how the [**worksheet**](#gt_2fdc6291-fa6a-48a6-afbb-04f910d68615) cell is number formatted in the workbook value in a cell. If the **v** element is present and the **xsi:type**attribute on it is set to "string" then this element MUST NOT be present. MUST NOT be present if the cell is empty.

**v:** Represents the value of the cell. The **xsi:type** attribute MUST be set to either "double" (as the default), "Boolean", "String" or "Error". If the **xsi:type** attribute is set to "Error", the value of the cell MUST be one of values defined in Error type (section [2.2.5.1](#Section_f77533bd27fe4e5ea02361f53d116d7b)). MUST be present if the cell is not empty

##### Cell JSON Value

If **Cell** value is used in response JSON text, it MUST conform to JSON object value representation format. It has the JSON members listed in the following table.

| Member Name | Member Value |
| --- | --- |
| **v** | A [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) value representing the value of the cell. The type of the JSON value is one of the intrinsic JSON types – string, number or boolean. MUST NOT be present of the cell is empty or the cell is an error. |
| **fv** | A JSON string value representing a cell formatted using a number format according to how the [**worksheet**](#gt_2fdc6291-fa6a-48a6-afbb-04f910d68615) cell is number formatted in the workbook value in a cell. MUST NOT be present if the type of **v** member is JSON string. |
| **t** | A JSON string value representing the type of data in a cell. MUST be present and set to "error" if the cell is an error. MUST NOT be present if the cell is empty. |

#### JSONReference

Represents a reference to an Entity Set in a workbook.

If **JSONReference** value is used in response JSON text, it MUST conform to JSON object value representation format. It has the JSON member listed in the following table.

| Member Name | Member Value |
| --- | --- |
| **baseUri** | A [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) string value representing the URL that is used to access the Entity Set using the default Entity Set representation. The default representation is [**XML**](#gt_982b7f8e-d516-4fd5-8d5e-1a836081ed85) for **Entity Sets** accessed in the context of **Model Entity Set.** The default representation is JSON for **Entity Sets** accessed in the context of **Session Entity Set.** |
| **jsonUri** | A JSON string value representing the URL that is used to access the Entity Set using the JSON representation. |

#### JSONCollection

Represents a collection of Entities.

If **JSONCollection** value is used in response JSON text, it MUST conform to JSON object value representation format. It has the JSON member listed in the following table.

| Member Name | Member Value |
| --- | --- |
| **items** | A [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) array representing a collection of objects of the same type. |

### Simple Types

The following table summarizes the set of common [**XML schema**](#gt_bd0ce6f9-c350-4900-827e-951265294067) simple type definitions defined by this specification. XML schema simple type definitions that are specific to a particular operation are described with the operation.

| Simple type | Description |
| --- | --- |
| **Error** | An enumeration of the set of [**cell error values**](#gt_693c43e3-0b84-4343-b837-2689ce439ddd) that a [**worksheet**](#gt_2fdc6291-fa6a-48a6-afbb-04f910d68615) [**cell**](#gt_43d1e51e-4f26-493b-b7c9-e84e920d7461) can contain. |

#### Error

The **Error** type is an enumeration of the set of [**cell error values**](#gt_693c43e3-0b84-4343-b837-2689ce439ddd) that a [**worksheet**](#gt_2fdc6291-fa6a-48a6-afbb-04f910d68615) [**cell**](#gt_43d1e51e-4f26-493b-b7c9-e84e920d7461) can contain.

This simple type is defined as follows.

1. <xs:simpleType name="Error">
2. <xs:restriction base="xs:string">
3. <xs:enumeration value="Div0"/>
4. <xs:enumeration value="Name"/>
5. <xs:enumeration value="Num"/>
6. <xs:enumeration value="Value"/>
7. <xs:enumeration value="NotApplicable"/>
8. <xs:enumeration value="Null"/>
9. <xs:enumeration value="Ref"/>
10. </xs:restriction>
11. </xs:simpleType>

The following table specifies the allowable values for Error:

| Value | Meaning |
| --- | --- |
| Div0 | Worksheet cell contains a number that is divided by 0. |
| NotApplicable | Worksheet cell contains a value not available to a [**formula**](#gt_f9d85460-6133-492b-9b3d-730bf40e5169). |
| Name | Worksheet cell contains text not recognized by a formula. |
| Null | Worksheet cell contains an empty intersection of two areas. |
| Num | Worksheet cell contains invalid numeric values in a formula. |
| Ref | Worksheet cell contains a reference that is not valid. |
| Value | Worksheet cell contains a formula that includes worksheet cells that contain different data types. |

### Attributes

This specification does not define any common [**XML schema**](#gt_bd0ce6f9-c350-4900-827e-951265294067) attribute definitions.

### Groups

This specification does not define any common [**XML schema**](#gt_bd0ce6f9-c350-4900-827e-951265294067) group definitions.

### Attribute Groups

This specification does not define any common [**XML schema**](#gt_bd0ce6f9-c350-4900-827e-951265294067) attribute group definitions.

### Common Data Structures

This specification does not define any common [**XML schema**](#gt_bd0ce6f9-c350-4900-827e-951265294067) data structures.

# Protocol Details

## Server Details

### Abstract Data Model

This section describes a conceptual model of possible data organization that an implementation maintains to participate in this protocol. The described organization is provided to facilitate the explanation of how the protocol behaves. This document does not mandate that implementations adhere to this model as long as their external behavior is consistent with that described in this document.

The relationship between the Excel Services REST Protocol data model and the Entity Data Model defined in [[MC-CSDL]](%5BMC-CSDL%5D.pdf#Section_c03ad8c3e8b74306af96a9e52bb3df12) are described as follows. The mapping between Entity Data Model concepts and those of the AtomPub specification is described in [[MS-ODATA]](%5BMS-ODATA%5D.pdf#Section_2b686a1a9e1f456f80ff072a010fc278) section [2.2.1](http://msdn.microsoft.com/en-us/library/ee1ad6fa-f5f6-4ac0-83df-2898b6b5c04d/). The described relationship is provided to facilitate the explanation of how the protocol behaves. This document does not mandate that implementations adhere to this model, as long as their external behavior is consistent with the behavior described in [MS-ODATA] and [MC-CSDL].

| Spreadsheet data structure | Description | Entity Data Model term |
| --- | --- | --- |
| Model | Information about the spreadsheet.  | **EntitySet** |
| Session | Information about a view session to be created on the protocol server. | **EntitySet** |
| Ranges | The list of ranges that are exposed by the spreadsheet. | **EntitySet** |
| Charts | The list of charts that are exposed by the spreadsheet. | **EntitySet** |
| Tables | The list of tables that are exposed by the spreadsheet. | **EntitySet** |
| PivotTables | The list of pivot tables that are exposed by the spreadsheet. | **EntitySet** |
| Range | A range from the spreadsheet. | **Entity** |
| Table | A table from the spreadsheet. | **Entity** |
| PivotTable | A PivotTable from the spreadsheet. | **Entity** |
| Chart | A chart from the spreadsheet. | None. Returned as a binary response to the request. |
| OData | The OData service document, as specified in [MS-ODATA]. | None. This is the OData service document, as specified in [MS-ODATA]. |
| Sessions | The entry point for creating a view session on the protocol server. | **EntitySet** |
| Slicers | The list of slicers that are exposed by the spreadsheet. | **EntitySet** |
| Slicer | A slicer from the spreadsheet. | **Entity** |
| Timelines | The list of timelines that are exposed by the spreadsheet. | **EntitySet** |
| Timeline | A timeline from the spreadsheet. | **Entity** |
| \_unsupported\_InteractiveReports | The list of interactive reports that are exposed by the workbook. | **EntitySet** |
| Store | The Store data of interactive reports exposed by the workbook. | **Entity** |
| ConnectionInfo | The ConnectionInfo data of interactive reports exposed by the workbook. | **Entity** |
| State | The sort operations on PivotTables that are exposed by the workbook. | **Entity** |

When the **$format** (as specified in [MS-ODATA] section [2.2.3.6.1.5](http://msdn.microsoft.com/en-us/library/0ee0c8b9-3e52-40b6-9c3b-99eeef5bae93/)) [**Uniform Resource Locator (URL)**](#gt_433a4fb7-ef84-46b0-ab65-905f5e3a80b1) parameter is specified, it overrides the logic specified in [MS-ODATA] with relation to the ACCEPT HTTP header. When there are multiple response formats that satisfy the ACCEPT HTTP header, if one of the content types corresponds to the default format for the **EntityType** or **EntitySet**, that is the one that will be returned. If none of the content types specified in the ACCEPT HTTP header is the default one, the protocol server MUST return the supported format with the highest priority in the ACCEPT HTTP header.

Requests can contain a URL parameter where the key starts with "Ranges(‘" and ends with "’)" (case insensitive), between these two strings, the key will contain a string that refers to a [**range**](#gt_c2c93fec-8d3e-45de-8010-c738cc1cea99). When such a parameter is passed, the protocol server MUST place the value associated with the parameter in the spreadsheet range specified by the parameter and recalculate the spreadsheet before returning the result from the same spreadsheet. The range specified in the parameter MUST correspond to a single cell in the spreadsheet.

**Model** and **Session** Entities Sets are also used as contexts for other entities in the workbook. An entities is said to be "in the context" of **Model** or **Session** if the URL path used to access the entities is respectively using the /Model or /Session URL path part.

Unless specified otherwise, all access to the above entities MUST use HTTP GET verb. Whenever PUT or DELETE verbs are specified, calling these verbs needs to be implemented through the usage of HTTP tunneling technique. Such technique requires that HTTP POST verb is used with **X-HTTP-Method** request header with the value of "PUT" or "DELETE" respectively.

#### Model Entity Set

The Model entity set represents the spreadsheet as a whole.

The protocol server will return a value as follows:

* If a URL parameter with a key of "$format" and value of "workbook" is passed, or the ACCEPT HTTP header, as specified in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372), fits one of the following content types: "application/vnd.openxmlformats-officedocument.spreadsheetml.sheet", "application/vnd.ms-excel.sheet.binary.macroEnabled.12" or "application/vnd.ms-excel.sheet.macroEnabled.12", then the protocol server will return a [**workbook file**](#gt_16b279e8-e81c-444c-8080-8f3259a51851).
* If a URL parameter with a key of "$format" and value of "json" is passed, accessing **Model** Entity Set will result in [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) text returned. This JSON text represents the list of other Entity Sets supported by the spreadsheet. The following table lists the JSON members.

| Member Name | Member Value |
| --- | --- |
| Ranges | A **JSONReference** object representing ranges in the [**worksheet**](#gt_2fdc6291-fa6a-48a6-afbb-04f910d68615) and referencing the corresponding **Ranges Entity Set**. |
| Charts | A **JSONReference** object representing charts in the worksheet and referencing the corresponding **Charts Entity Set**. |
| Tables | A **JSONReference** object representing tables in the worksheet and referencing the corresponding **Tables Entity Set**. |
| pivotTables | A **JSONReference** object representing [**PivotTables**](#gt_38963165-73bc-400a-a809-aff03693a316) in the worksheet and referencing the corresponding **PivotTables Entity Set**. |

* Otherwise, accessing The Model Entity Set as an entity set as specified in [[MS-ODATA]](%5BMS-ODATA%5D.pdf#Section_2b686a1a9e1f456f80ff072a010fc278) will result in the list of other entity sets supported by the spreadsheet. The protocol server returns an **EntitySet** containing 4 entity sets, as follows:
	+ An entity set with the **category** element present, as specified in [MS-ODATA] section [2.2.6.2.1](http://msdn.microsoft.com/en-us/library/05cfc245-b863-41d2-ac84-f3c9f462c00a/), with the **term** attribute set to "ExcelServices.Ranges" which represents the ranges in the workbook.
	+ An entity set with the **category** element present, as specified in [MS-ODATA] section 2.2.6.2.1, with the **term** attribute set to "ExcelServices.Charts" which represents the charts in the workbook.
	+ An entity set with the **category** element present, as specified in [MS-ODATA] section 2.2.6.2.1, with the **term** attribute set to "ExcelServices.Tables" which represents the tables in the workbook.
	+ An entity set with the **category** element present, as specified in [MS-ODATA] section 2.2.6.2.1, with the **term** attribute set to "ExcelServices.PivotTables" which represents the PivotTables in the workbook.

#### Session Entity Set

The Session entity set represents a view session that was created as described in section [3.1.1.10](#Section_2664b42edbbe46438cbfe63d1eed3bfa). All requests to a Session entity set, or other entities accessed in the context of Session, MUST specify a URL parameter "$sid" with the value set to the session identifier returned by the protocol server for a Sessions request.

When accessing the entity using HTTP GET verb, the protocol server will return a value as follows:

* If a URL parameter with a key of "$format" and value of "json" is passed, accessing **Session** Entity Set will result in [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) text returned. This JSON text represents the list of other Entity Sets supported by the spreadsheet. It has the JSON members listed in the following table.

| Member Name | Member Value |
| --- | --- |
| Ranges | A **JSONReference** object representing ranges in the [**worksheet**](#gt_2fdc6291-fa6a-48a6-afbb-04f910d68615) and referencing the corresponding **Ranges Entity Set**. |
| Charts | A **JSONReference** object representing charts in the worksheet and referencing the corresponding **Charts Entity Set**. |
| Tables | A **JSONReference** object representing tables in the worksheet and referencing the corresponding **Tables Entity Set**. |
| pivotTables | A **JSONReference** object representing [**PivotTables**](#gt_38963165-73bc-400a-a809-aff03693a316) in the worksheet and referencing the corresponding **PivotTables Entity Set**. |
| Slicers | A **JSONReference** object representing slicers in the worksheet and referencing the corresponding **Slicers Entity Set**. |
| Timelines | A **JSONReference** object representing timelines in the worksheet and referencing the corresponding **Timelines Entity Set**. |
| \_unsupported\_InteractiveReports | A **JSONReference** object representing interactive reports in the workbook and referencing the corresponding **\_unsupported\_InteractiveReports Entity Set**. |

* Otherwise, accessing The Session Entity Set as an entity set as specified in [[MS-ODATA]](%5BMS-ODATA%5D.pdf#Section_2b686a1a9e1f456f80ff072a010fc278) will result in the list of other entity sets supported by the spreadsheet. The protocol server returns an **EntitySet** containing 4 entity sets, as follows:
	+ An entity set with the **category** element present, as specified in [MS-ODATA] section [2.2.6.2.1](http://msdn.microsoft.com/en-us/library/05cfc245-b863-41d2-ac84-f3c9f462c00a/), with the **term** attribute set to "ExcelServices.Ranges" which represents the ranges in the workbook.
	+ An entity set with the **category** element present, as specified in [MS-ODATA] section 2.2.6.2.1, with the **term** attribute set to "ExcelServices.Charts" which represents the charts in the workbook.
	+ An entity set with the **category** element present, as specified in [MS-ODATA] section 2.2.6.2.1, with the **term** attribute set to "ExcelServices.Tables" which represents the tables in the workbook.
	+ An entity set with the **category** element present, as specified in [MS-ODATA] section 2.2.6.2.1, with the **term** attribute set to "ExcelServices.PivotTables" which represents the PivotTables in the workbook
	+ An entity set with the **category** element present, as specified in [MS-ODATA] section 2.2.6.2.1, with the **term** attribute set to "ExcelServices.Slicers" which represents the slicers in the workbook.
	+ An entity set with the **category** element present, as specified in [MS-ODATA] section 2.2.6.2.1, with the **term** attribute set to "ExcelServices.Timelines" which represents the timelines in the workbook.

When accessing the entity using HTTP DELETE verb, the protocol server will close the view session and all subsequent attempts to access the same session will fail.

#### Ranges Entity Set

Ranges in the spreadsheet are represented as an **EntitySet**, which contains **Entities** of a single **EntityType** as specified in section [3.1.1.4](#Section_5725ae90b59b42ecaea635f5bb056bb5). The **Ranges** entity set represents the list of ranges exposed by the spreadsheet. The protocol server will return a value as follows:

* If a URL parameter with a key of "$format" and value of "atom" is passed, or is accessed in the context of **Model** Entity Set then the protocol server returns an entity with the category **element** present, as specified in [[MS-ODATA]](%5BMS-ODATA%5D.pdf#Section_2b686a1a9e1f456f80ff072a010fc278) section [2.2.6.2.1](http://msdn.microsoft.com/en-us/library/05cfc245-b863-41d2-ac84-f3c9f462c00a/), and the **term** attribute set to "ExcelServices.Range" for every [**published item**](#gt_14dfffe3-13a6-4c5f-b1d8-22e1e241634f) in the workbook that represents a [**named range**](#gt_042582ea-4050-4e5c-a2df-ae39706a19b6).
* If a URL parameter with a key of "$format" and value of "json" is passed, or is accessed in the context of **Session** Entity Set then the protocol server returns [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) text containing **JSONCollection** as defined in section [2.2.4.5](#Section_4d72893027dc489685766782c2987898). The **JSONCollection** represents a list of entities for every published item in the workbook that represents a named range. Each entry in the **JSONCollection** has members listed in the following table.

| Member Name | Member Value |
| --- | --- |
| name | A JSONstring value representing the name of a named range. |

#### Range Entity

The Range entity represents a range in the spreadsheet.

The protocol server will return a value as follows:

* If a URL parameter with a key of "$format" and value of "html" is passed, or the ACCEPT HTTP header, as specified in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372) fits the content type: "text/html" then the protocol server will return an [**HTML fragment**](#gt_e7f2929e-a312-4cfd-883f-2d9e9e4ba3ad) corresponding to the requested [**range**](#gt_c2c93fec-8d3e-45de-8010-c738cc1cea99).
* Accessing the Range Entity as an entity as specified in [[MS-ODATA]](%5BMS-ODATA%5D.pdf#Section_2b686a1a9e1f456f80ff072a010fc278) (or with a URL parameter with a key of "$format" and value of "atom") will result in a single Entity Type containing the complex type **Range** as defined in section [2.2.4.1.1](#Section_7b80ee4e0d954109addb426fa1d6c855) in a **content** element with a **type** attribute set to "application/xml", as specified in [MS-ODATA].
* Accessing the Range Entity with a URL parameter with a key of "$format" and value of "json" will result in a [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) text containing the complex type **Range** as defined in section [2.2.4.1.2](#Section_bd0399b3540e446e84385d6337e4d3d6).
* Accessing the Range Entity with a URL parameter with a key of "$format" and value of "image" will result in a PNG image of the requested range. Also, the protocol server supports cropping and scaling the resulting image when optional URL parameters are specified. These parameters are described in the following table:

| Parameter Name | Description |
| --- | --- |
| $cropw | An unsigned integer representing the width in pixels used to limit the number of columns of the range of the returned image. The cumulative pixel width of all visible columns in the requested range will be compared with **$cropw**. If the cumulative width of a column is equal or exceeds **$cropw**, then that column will be last one rendered into the returned image. |
| $croph | An unsigned integer representing the height in pixels used to limit the number of rows of the range of the returned image. The cumulative pixel height of all visible columns in the requested range will be compared with **$croph**. If the cumulative height of a column is equal or exceeds **$croph**, then that row will be last one rendered into the returned image. |
| $width | An unsigned integer representing the width in pixels the returned image needs to scale to. The protocol server only provides scaling down and preserves the aspect ratio of the original image and that can cause that the width of the resulting image is smaller than **$width**. |
| $height | An unsigned integer representing the height in pixels the returned image needs to scale to. The protocol server only provides scaling down and preserves the aspect ratio of the original image and that can cause that the height of the resulting image is smaller than **$height**. |

#### Tables Entity Set

Tables in the spreadsheet are represented as an **EntitySet**, which contains **Entities** of a single **EntityType** as specified in section [3.1.1.6](#Section_a42a29547d894f759f5b713699056bbb). The Tables entity set represents the list of tables exposed by the spreadsheet. The protocol server will return a value as follows:

* If a URL parameter with a key "$format’ and value of "atom" is passed, or is accessed in the context of Model Entity Set then the protocol server returns an entity with the category **element** present, as specified in [[MS-ODATA]](%5BMS-ODATA%5D.pdf#Section_2b686a1a9e1f456f80ff072a010fc278) section [2.2.6.2.1](http://msdn.microsoft.com/en-us/library/05cfc245-b863-41d2-ac84-f3c9f462c00a/), and the **term** attribute set to "ExcelServices.Table" for every [**published item**](#gt_14dfffe3-13a6-4c5f-b1d8-22e1e241634f) in the workbook that represents a [**list**](#gt_04ce231e-214c-44fd-b7ba-7cc19eee79bf).
* If a URL parameter with a key of "$format" and value of "json" is passed, or is accessed in the context of Session Entity Set then the protocol server returns [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) text containing a **JSONCollection** as defined in section [2.2.4.5](#Section_4d72893027dc489685766782c2987898). The **JSONCollection** represents a list of entities for every published item in the workbook that represents a list. Each entry in the **JSONCollection** has members listed in the following table.

| Member Name | Member Value |
| --- | --- |
| name | A **JSON** string value representing the name of a list. |

#### Table Entity

The Table entity represents a table in the spreadsheet.

The protocol server will return a value as follows:

* If a URL parameter with a key of "$format" and value of "html" is passed, or the ACCEPT HTTP header (as specified in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372)) fits the content type: "text/html", the protocol server will return an HTML fragment representing the requested table.
* Accessing the Table Entity as an entity as specified in [[MS-ODATA]](%5BMS-ODATA%5D.pdf#Section_2b686a1a9e1f456f80ff072a010fc278) (or with a URL parameter with a key of "$format" and value of "atom") will result in a single **Entity** containing the complex type **Range** as defined in section [2.2.4.1.1](#Section_7b80ee4e0d954109addb426fa1d6c855) in a **content** element with a **type** attribute set to "application/xml", as specified in [MS-ODATA].
* Accessing the Table Entity with a URL parameter with a key of "$format" and value of "json" will result in a [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) text containing the complex type **Range** as defined in section [2.2.4.1.2](#Section_bd0399b3540e446e84385d6337e4d3d6).

#### PivotTables Entity Set

PivotTables in the spreadsheet are represented as an **EntitySet**, which contains **Entities** of a single **EntityType** as specified in section [3.1.1.8](#Section_c23fb022d4aa4efbabcce0d6272b37d8). The **PivotTables** entity set represents the list of PivotTables exposed by the spreadsheet. The protocol server will return a value as follows:

* If a URL parameter with a key "$format’ and value of "atom" is passed, or is accessed in the context of Model Entity Set then the protocol server returns an entity with the category **element** present (as specified in [[MS-ODATA]](%5BMS-ODATA%5D.pdf#Section_2b686a1a9e1f456f80ff072a010fc278) section [2.2.6.2.1](http://msdn.microsoft.com/en-us/library/05cfc245-b863-41d2-ac84-f3c9f462c00a/)) and the **term** attribute set to "ExcelServices.PivotTable" for every [**published item**](#gt_14dfffe3-13a6-4c5f-b1d8-22e1e241634f) in the workbook that represents a [**PivotTable**](#gt_38963165-73bc-400a-a809-aff03693a316).
* If a URL parameter with a key of "$format" and value of "json" is passed, or is accessed in the context of Session Entity Set then the protocol server returns JSON text containing **JSONCollection** as defined in section [2.2.4.5](#Section_4d72893027dc489685766782c2987898). The **JSONCollection** represents a list of entities for every published item in the workbook that represents a PivotTable. Each entry in the **JSONCollection** has members listed in the following table.

| Member Name | Member Value |
| --- | --- |
| Name | A **JSON** string value representing the name of a PivotTable. |

#### PivotTable Entity

The **PivotTable** entity represents a PivotTable in the spreadsheet. The protocol server will return a value as follows:

* If a URL parameter with a key of "$format" and value of "html" is passed, or the ACCEPT HTTP header, as specified in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372) fits the content type: "text/html" then the protocol server will return an HTML fragment representing the requested PivotTable.
* Accessing the PivotTable Entity as an entity as specified in [[MS-ODATA]](%5BMS-ODATA%5D.pdf#Section_2b686a1a9e1f456f80ff072a010fc278) (or with a URL parameter with a key of "$format" and value of "atom") will result in a single Entity Type containing the complex type **Range** as defined in section [2.2.4.1.1](#Section_7b80ee4e0d954109addb426fa1d6c855) in a **content** element with a **type** attribute set to "application/xml", as specified in [MS-ODATA].
* Accessing the PivotTable Entity with a URL parameter with a key of "$format" and value of "json" will result in a [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) text containing the complex type **Range** as defined in section [2.2.4.1.2](#Section_bd0399b3540e446e84385d6337e4d3d6).

#### Charts Entity Set

Charts in the spreadsheet are represented as an **EntitySet**. The protocol server will return a value as follows:

* If a URL parameter with a key "$format" and value of "json" is passed, or is accessed in the context of Model Entity Set then the protocol server returns an **entry** element with the **category** element present, as specified in [[MS-ODATA]](%5BMS-ODATA%5D.pdf#Section_2b686a1a9e1f456f80ff072a010fc278) section [2.2.6.2.1](http://msdn.microsoft.com/en-us/library/05cfc245-b863-41d2-ac84-f3c9f462c00a/), and the **term** attribute set to "ExcelServices.Chart" for every [**published item**](#gt_14dfffe3-13a6-4c5f-b1d8-22e1e241634f) in the workbook that represents a chart. Each **entry** element has a **content** element with the **type** attribute set to "image/png" and the **src** attribute set to a URL that will return the image representing the requested chart.
* If a URL parameter with a key of "$format" and value of "json" is passed, or is accessed in the context of Session Entity Set then the protocol server returns [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) text containing **JSONCollection** as defined in section [2.2.4.5](#Section_4d72893027dc489685766782c2987898). The **JSONCollection** represents a list of entities for every published item in the workbook that represents a Chart. Each entry in the **JSONCollection** has members listed in the following table.

| Member Name | Member Value |
| --- | --- |
| name | A JSONstring value representing the name of a Chart. |

When requesting an individual Chart a PNG image is returned. This image can be scaled from its original size by optionally specifying width or height or both. The scaling maintains the original aspect ratio, except when both width and height is specified. In case when both width and height is specified, the protocol server MUST fit the image into the rectangular area defined by those constraints. The protocol server recognizes URL parameters listed in the following table.

| Parameter Name | Description |
| --- | --- |
| $width | An unsigned integer representing, in pixels, the desired width of the returned image.  |
| $height | An unsigned integer representing, in pixels, the desired height of the returned image. |

#### Sessions Entity Set

A view session is opened on the protocol server when a request is made to the Sessions Entity Set using a POST. The protocol server recognizes URL parameters listed in the following table.

| Parameter Name | Description |
| --- | --- |
| $uc | A language tag, as specified in in [[RFC1766]](https://go.microsoft.com/fwlink/?LinkId=120475), Section 2. Specifies the [**UI culture**](#gt_863429e2-da47-4f86-8ce3-923f4fe764d9). |
| $dc | A language tag, as specified in in [RFC1766], Section 2. Specifies the [**data culture**](#gt_3d07019b-9127-488a-8d57-ac3525891401). |

* If a URL parameter with a key of "$format" and value of "atom" is passed the content of the Entity Set result is single entity that represents the session. Making a request to the entity URL will return a result as described in section [3.1.1.1](#Section_783916efd83f49a082c944f76c8d15b1).
* If a URL parameter with a key of "$format" and value of "json" is passed, or the ACCEPT HTTP header , as specified in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372) fits the content type: "application/json" then the protocol server will return a [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) text. It has the JSON members listed in the following table.

| Member Name | Member Value |
| --- | --- |
| sessionId | A JSON string value representing the session id of the view session created by protocol server. |
| baseUri | A URL representing the Session Entity. |
| itemViewerUri | A URL representing an interactive item view for the view session created by the protocol server. |

#### Slicers

Slicers in the spreadsheet are represented as an **EntitySet**, which contains **Entities** of a single **EntityType** as specified in section [3.1.1.12](#Section_cfb546d9d50c4616bb3c5658146fca05). The Slicers entity set represents the list of Slicers exposed by the spreadsheet. Slicers can only be accessed in the context of Session Entity Set. If a URL parameter with a key of "$format" and value of "json" is passed, or the ACCEPT HTTP header, as specified in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372) fits the content type: "application/json" the protocol server returns [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) text containing a **JSONCollection** as defined in section [2.2.4.5](#Section_4d72893027dc489685766782c2987898). The **JSONCollection** represents a list of entities for every [**published item**](#gt_14dfffe3-13a6-4c5f-b1d8-22e1e241634f) in the workbook that represents a Slicer. Each entry in the **JSONCollection** has members listed in the following table.

| Member Name | Member Value |
| --- | --- |
| name | A **JSON** string value representing the name of a Slicer. |
| caption | A **JSON** string value representing the caption of a Slicer. |
| updatesAllowed | A **JSON** boolean value representing whether the protocol server allows modifying the state of the Slicer as defined in section 3.1.1.12. |
| connectedPublishedObjects[] | A **JSON** array containing JSON string values representing the names of published items whose state would be affected if the selection state of the Slicer is modified. |

#### Slicer

The **Slicer** entity represents a Slicer in the spreadsheet. The protocol server supports retrieving the Slicer through HTTP GET verb as well as applying changes to the current state of the slicer through HTTP POST and PUT verbs.

When a request is made using a GET:

* If a URL parameter with a key of "$format" and value of "json" is passed, or the ACCEPT HTTP header, as specified in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372) fits the content type: "application/json" then the protocol server will return a [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) text representing the items in the requested Slicer. The protocol server recognizes URL parameters listed in the following table.

| Parameter Name | Description |
| --- | --- |
| $skip | An unsigned integer representing the index of the first slicer item that is to be returned by the protocol server. If not specified, the default value is 0. |
| $top | An unsigned integer representing the maximum number of slicer items that are to be returned by the protocol server. If not specified, the default value is 100. The maximum number of slicer items returned is 100. |

The JSON object returned by protocol server has members listed in the following table.

| Member Name | Member Value |
| --- | --- |
| totalItemCount | A JSONnumber value representing the total number of items in a Slicer. MUST be present. |
| ItemOffset | A JSONnumber value representing the 0-based index of the first item returned in the **items** array. MUST be present |
| hasEffectiveSelection | A JSON boolean value representing some of the slicer items are in unselected state. MUST be present. |
| NextOffset | A JSONnumber. |
| Items[] | A JSONarray containing data about slicer items. |
| Items[].displayName | The JSON string value representing the display name of the slicer item. |
| Items[].uniqueName | The JSONstring value representing the unique name of the slicer item. This name MUST be used when programmatic referencing the slicer item in the slicer update operation. |
| items[].unselected | The JSONboolean value representing that this item has been unselected. Present only when true. |
| items[].noData | The JSONboolean value representing that this item has no data. Present only when true. |

When a request is made using PUT or POST:

If a URL parameter with a key of "$format" and value of "json" is passed, or the ACCEPT HTTP header, as specified in [RFC2616] fits the content type: "application/json" then the protocol server interprets the body of the HTTP request as a JSON text. The JSON object expected by protocol server has members listed in the following table.

| Member Name | Member Value |
| --- | --- |
| parameters | A JSONnested object representing the operation parameters passed to the protocol server. MUST be present. |
| parameters.selectionMode | A JSONstring value representing the way the slicer state needs to be modified. Supports the following string values:* **cumulative**
* **clearFilter**
* **selectedOnly** (this is the default)
 |
| parameters.selected[] | A JSONarray of JSON string values representing unique names of slicer items that are to be selected. MUST be ignored if the value of **selectionMode** is set to **clearFilter**. |
| parameters.unselected[] | A JSONarray of JSON string values representing unique names of slicer items that are not to be selected. MUST be ignored if the value of **selectionMode** is set to **clearFilter** or **selectedOnly**. |

#### Timelines

Timelines in the spreadsheet are represented as an **EntitySet**, which contains **Entities** of a single **EntityType** as specified in section [3.1.1.14](#Section_9f07c1c60c1b4cd4a5bfa495c13ef15f). The Timelines entity set represents the list of timelines exposed by the spreadsheet. The content of the Entity Set result is a JSON formatted array of **Entities**for every published item in the workbook that represents a Timeline. Timelines can only be accessed in the context of Session Entity Set. If a URL parameter with a key of "$format" and value of "json" is passed, or the ACCEPT HTTP header, as specified in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372) fits the content type: "application/json" the protocol server returns [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) text containing a **JSONCollection** as defined in section [2.2.4.5](#Section_4d72893027dc489685766782c2987898). The **JSONCollection** represents a list of entities for every [**published item**](#gt_14dfffe3-13a6-4c5f-b1d8-22e1e241634f) in the workbook that represents a Timeline. Each entry in the JSONCollection has members listed in the following table.

| Member Name | Member Value |
| --- | --- |
| name | A JSONstring value representing the name of a Timeline. |
| caption | A JSONstring value representing the caption of a Timeline. |
| connectedPublishedObjects[] | A JSONarray containing JSON string values representing the names of published items whose state would be affected if the state of the Timeline is modified. |

#### Timeline

The **Timeline** entity represents a timeline in the spreadsheet.

The protocol server supports retrieving the timeline through HTTP GET verb as well as applying changes to the current state of the timeline through HTTP POST and PUT verbs.

When a request is made using a GET:

* If a URL parameter with a key of "$format" and value of "json" is passed, or the ACCEPT HTTP header, as specified in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372) fits the content type: "application/json" then the protocol server will return a [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) text representing the items in the requested Timeline. The JSON object returned by protocol server has members listed in the following table.

| Member Name | Member Value |
| --- | --- |
| minDate | JSON string value representing the minimum date the timeline is defined on (YYYY-MM-DD format). MUST be present. |
| maxDate |  JSON string value representing the maximum date the timeline is defined on (YYYY-MM-DD format). MUST be present. |
| selectionBeginDate | JSON string value representing the begin date of timeline selected range (YYYY-MM-DD format).MUST NOT be present if selectionState value is equal to "clearFilter". |
| selectionEndDate | JSON string value representing the end date of timeline selected range (YYYY-MM-DD format).MUST NOT be present if selectionState value is equal to "clearFilter". |
| displayLevel | A JSONstring value representing timeline’s display level. MUST be present and be set to one of the following string values:* years
* quarters
* months
* days
 |
| selectionState | A JSONstring value representing timeline’s selection state. MUST be present and be set to one of the following string values:* between
* clearFilter
* unsupported
 |
| displayLabel | The JSONstring value representing the descriptive label of the timeline. |

When a request is made using PUT or POST:

If a URL parameter with a key of "$format" and value of "json" is passed, or the ACCEPT HTTP header, as specified in [RFC2616] fits the content type: "application/json" then the protocol server interprets the body of the HTTP request as a JSON text. The JSON object expected by protocol server has members listed in the following table.

| Member Name | Member Value |
| --- | --- |
| Parameters | A JSONnested object representing the operation parameters passed to the protocol server. MUST be present. |
| parameters.selectionType | A JSONstring value representing the requested selection Type. MUST be present and be set to one of the following string values:* **between**
* **clearFilter**
 |
| parameters.selectionBeginDate | A JSONstring value representing the selection begin date. Ignored if the value of **selectionType** is set to **clearFilter**. |
| parameters.selectionEndDate | A JSONstring value representing the selection end date. Ignored if the value of **selectionType** is set to **clearFilter**. |

.

#### \_unsupported\_InteractiveReports

\_unsupported\_InteractiveReports in the workbook are represented as an **EntitySet**, which contains items representing each interactive report exposed in the workbook. The content of the Entity Set result is a [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) formatted array of items for every published interactive report in the workbook. \_unsupported\_InteractiveReports can only be accessed in the context of a Session Entity Set. If a URL parameter with a key of "$format" and value of "json" is passed, or the ACCEPT HTTP header, as specified in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372), fits the content type: "application/json", then the protocol server returns JSON text containing a **JSONCollection** as defined in section [2.2.4.5](#Section_4d72893027dc489685766782c2987898). The **JSONCollection** represents a list of interactive reports for every [**published item**](#gt_14dfffe3-13a6-4c5f-b1d8-22e1e241634f) in the workbook that represents an interactive report. Each entry in the **JSONCollection** has members listed in the following table.

| Member Name | Member Value |
| --- | --- |
| sheetName | A JSON string value representing the name (spreadsheet name) of an interactive report. |
| slideId | A JSON string value representing the identifier of an interactive report slide. |

#### Store

Store contains data for interactive reports exposed in the workbook. The content result is a [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) formatted object consisting of properties for every published interactive report in the workbook. Store can only be accessed in the context of \_unsupported\_InteractiveReports as a sub-resource. If a URL parameter with a key of "$format" and value of "json" is passed, or the ACCEPT HTTP header, as specified in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372), fits the content type: "application/json", then the protocol server returns a JSON object. The JSON object contains properties for interactive reports in the workbook. The JSON object has properties listed in the following table.

| Member Name | Member Value |
| --- | --- |
| correlationId | A GUID representing the correlation identifier. |
| dataConnectionsInfo | A JSON object containing information about data connections in the workbook. |
| dataConnectionsInfo.dataConnectionInfo[] | A JSON array of data connection information. |
| dataConnectionsInfo.dataConnectionInfo[].connectionName | A JSON string value representing the data connection’s connection name. |
| dataConnectionsInfo.dataConnectionInfo[].connectionString | A JSON string value representing the data connection’s connection string. |
| dataConnectionsInfo.dataConnectionInfo[].dataSourceName | A JSON string value representing the data connection’s data source name. |
| dataConnectionsInfo.dataConnectionInfo[].isEmbedded | A JSON boolean value representing whether the data connection is embedded. |
| dataConnectionsInfo.dataConnectionInfo[].refreshTimestamp | A JSON string timestamp in ISO 8601 format representing the data connection’s last refresh date and time. |
| dataConnectionsInfo.dataConnectionInfo[].securityToken | A JSON string value representing the data connection’s security token. |
| dataConnectionsInfo.dataConnectionInfo[].slidesIds[] | A JSON array of slide identifiers associated with this data connection. |
| dataConnectionsInfo.dataConnectionInfo[].sourceIndex | A JSON string value representing the data connection’s source index. |
| dataConnectionsInfo.dataConnectionInfo[].state | A JSON string value representing the data connection state. MUST be set to one of the following string values:* Failed
* Streaming
* Succeeded
 |
| dataConnectionsInfo.dataSources | A JSON string value representing the data sources in the workbook. |
| reportData | A JSON string value representing the report data as described in [[MS-DPRDL]](%5BMS-DPRDL%5D.pdf#Section_f6d2f8c097d34fdd91d520caa829b413) and as specified in [[MS-RDL]](%5BMS-RDL%5D.pdf#Section_532872047cd04bc9a5cdd42a5925dca1). |

#### ConnectionInfo

ConnectionInfo contains data for interactive reports exposed in the workbook. The difference between ConnectionInfo and Store is that ConnectionInfo does not contain reportData for optimization purposes. The content result is a JSON formatted object consisting of properties for every published interactive report in the workbook. ConnectionInfo can only be accessed in the context of \_unsupported\_InteractiveReports as a sub-resource. If a URL parameter with a key of "$format" and value of "json" is passed, or the ACCEPT HTTP header, as specified in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372), fits the content type: "application/json", then the protocol server returns a [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) object. The JSON object contains properties for interactive reports in the workbook. The JSON object has properties listed in the following table.

| Member Name | Member Value |
| --- | --- |
| correlationId | A GUID representing the correlation identifier. |
| dataConnectionsInfo | A JSON object containing information about data connections in the workbook. |
| dataConnectionsInfo.dataConnectionInfo[] | A JSON array of data connection information. |
| dataConnectionsInfo.dataConnectionInfo[].connectionName | A JSON string value representing the data connection’s connection name. |
| dataConnectionsInfo.dataConnectionInfo[].connectionString | A JSON string value representing the data connection’s connection string. |
| dataConnectionsInfo.dataConnectionInfo[].dataSourceName | A JSON string value representing the data connection’s data source name. |
| dataConnectionsInfo.dataConnectionInfo[].isEmbedded | A JSON boolean value representing whether the data connection is embedded. |
| dataConnectionsInfo.dataConnectionInfo[].refreshTimestamp | A JSON string timestamp in ISO 8601 format representing the data connection’s last refresh date and time. |
| dataConnectionsInfo.dataConnectionInfo[].securityToken | A JSON string value representing the data connection’s security token. |
| dataConnectionsInfo.dataConnectionInfo[].slidesIds[] | A JSON array of slide Ids associated with this data connection. |
| dataConnectionsInfo.dataConnectionInfo[].sourceIndex | A JSON string value representing the data connection’s source index. |
| dataConnectionsInfo.dataConnectionInfo[].state | A JSON string value representing the data connection state. MUST be set to one of the following string values:* Failed
* Streaming
* Succeeded
 |
| dataConnectionsInfo.dataSources | A JSON string value representing the data sources in the workbook. |

#### State

State contains data for [**PivotTables**](#gt_38963165-73bc-400a-a809-aff03693a316) stored in the workbook. The content result is a [**JSON**](#gt_7c4f81c3-2e19-4c95-ab8d-45721da01d26) formatted object representing a PivotTable in the workbook. If a URL parameter with a key of "$format" and value of "json" is passed, or the ACCEPT HTTP header, as specified in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372), fits the content type "application/json", then the protocol server returns a JSON object. The JSON object represents a PivotTable in the workbook. The JSON object has properties listed in the following table.

| Member Name | Member Value |
| --- | --- |
| Name | A JSON string value representing the current rest resource. |
| Parent | A JSON string value representing parent level rest resource. |
| Index | A JSON string value representing rest resource index |
| ValidatedParameters | A JSON string value representing the name collection of validated parameters. |
| VerifyMethodsCalled | A JSON boolean value representing whether verified methods are invoked. |

### Timers

None.

### Initialization

None.

### Message Processing Events and Sequencing Rules

None.

### Timer Events

None.

### Other Local Events

None.

# Protocol Examples

The examples in this section use the following sample data and configuration:

* A site at http://www.contoso.com exists.
* A [**workbook**](#gt_343c4660-90e1-4d86-b9cc-5007075d9dfe) with the title Sales.xlsx exists on the site. The workbook contains the following resources:
	+ A [**table**](#gt_d3a7da8d-a597-4838-9756-25e30b640ba7) named "SalesProjections".
	+ A chart named "CommissionChart".
	+ A [**range**](#gt_c2c93fec-8d3e-45de-8010-c738cc1cea99) named "CommissionRate\_Bikes".

## Retrieve the Entity Container for the Content of a Workbook

The following example illustrates the exchange of messages required for a client to retrieve the entity container for the content of the Sales.xlsx [**workbook**](#gt_343c4660-90e1-4d86-b9cc-5007075d9dfe).

**Request**

1. GET /\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/ HTTP/1.1
2. Accept: application/atom+xml
3. Host: www.contoso.com

**Response**

1. HTTP/1.1 200 OK
2. Cache-Control: private
3. Content-Type: application/atom+xml;charset=utf-8
4. Server: Microsoft-IIS/7.5
5. SPRequestGuid: 63c0d5ca-8b6e-43bf-92a5-d6ed45210f5b
6. X-SharePointHealthScore: 4
7. X-AspNet-Version: 2.0.50727
8. X-Powered-By: ASP.NET
9. MicrosoftSharePointTeamServices: 14.0.0.4732
10. Date: Wed, 20 Jan 2010 19:48:13 GMT
11. Content-Length: 3158
12. <?xml version="1.0" encoding="utf-8" standalone="yes"?>
13. <feed xmlns="http://www.w3.org/2005/Atom" xmlns:x="http://schemas.microsoft.com/office/2008/07/excelservices/rest" xmlns:d="http://schemas.microsoft.com/ado/2007/08/dataservice" xmlns:m="http://schemas.microsoft.com/ado/2007/08/dataservices/metadata">
14. <title type="text">Model</title>
15. <id>http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/</id>
16. <updated>2010-01-20T19:48:13Z</updated>
17. <author>
18. <name />
19. </author>
20. <link rel="self" href="http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/" title="Model" />
21. <entry>
22. <category term="ExcelServices.Ranges" scheme="http://schemas.microsoft.com/ado/2007/08/dataservices/scheme" />
23. <title>Ranges</title>
24. <id>http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Ranges</id>
25. <updated>2010-01-20T19:48:13Z</updated>
26. <author>
27. <name />
28. </author>
29. <link rel="alternate" href="http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Ranges?$format=atom" title="Ranges" />
30. <content type="application/atom+xml;charset=utf-8" src="http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Ranges?$format=atom" />
31. </entry>
32. <entry>
33. <category term="ExcelServices.Charts" scheme="http://schemas.microsoft.com/ado/2007/08/dataservices/scheme" />
34. <title>Charts</title>
35. <id>http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Charts</id>
36. <updated>2010-01-20T19:48:13Z</updated>
37. <author>
38. <name />
39. </author>
40. <link rel="alternate" href="http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Charts?$format=atom" title="Charts" />
41. <content type="application/atom+xml;charset=utf-8" src="http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Charts?$format=atom" />
42. </entry>
43. <entry>
44. <category term="ExcelServices.Tables" scheme="http://schemas.microsoft.com/ado/2007/08/dataservices/scheme" />
45. <title>Tables</title>
46. <id>http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Tables</id>
47. <updated>2010-01-20T19:48:13Z</updated>
48. <author>
49. <name />
50. </author>
51. <link rel="alternate" href="http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Tables?$format=atom" title="Tables" />
52. <content type="application/atom+xml;charset=utf-8" src="http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Tables?$format=atom" />
53. </entry>
54. <entry>
55. <category term="ExcelServices.PivotTables" scheme="http://schemas.microsoft.com/ado/2007/08/dataservices/scheme" />
56. <title>PivotTables</title>
57. <id>http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/PivotTables</id>
58. <updated>2010-01-20T19:48:13Z</updated>
59. <author>
60. <name />
61. </author>
62. <link rel="alternate" href="http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/PivotTables?$format=atom" title="PivotTables" />
63. <content type="application/atom+xml;charset=utf-8" src="http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/PivotTables?$format=atom" />
64. </entry>
65. </feed>

## Retrieve a Table from a Workbook as HTML

The following example illustrates the exchange of messages required for a client to retrieve the HTML representation of a table called SalesProjections within the Sales.xlsx [**workbook**](#gt_343c4660-90e1-4d86-b9cc-5007075d9dfe).

**Request**

1. GET /\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Tables('SalesProjections')?$format=html HTTP/1.1
2. Accept: text/html
3. Host: www.contoso.com

**Response**

1. HTTP/1.1 200 OK
2. Cache-Control: private
3. Content-Type: text/html; charset=utf-8
4. Last-Modified: Wed, 20 Jan 2010 11:49:08 GMT
5. Vary: Accept-Encoding
6. Server: Microsoft-IIS/7.5
7. SPRequestGuid: eae1c496-30f7-4263-92aa-3a31fb2d8c89
8. X-SharePointHealthScore: 4
9. X-AspNet-Version: 2.0.50727
10. X-Powered-By: ASP.NET
11. MicrosoftSharePointTeamServices: 14.0.0.4732
12. Date: Wed, 20 Jan 2010 19:49:08 GMT
13. Content-Length: 18625
14. <div style="overflow:hidden"><table cellpadding="0" cellspacing="0" class="ewr-sheettable tnov rnov bnov lnov" style="border-collapse:collapse;margin-left:-2px;margin-top:-2px;"><tr><td style="border-bottom:1px solid transparent;width:1px;font-size:1px;height:1px;line-height:1px;"><div class="clp">&nbsp;</div></td><td style="font-size:1px;height:1px;line-height:1px;width:97px;"><div class="clp" style="width:97px;">&nbsp;</div></td><td style="font-size:1px;height:1px;line-height:1px;width:78px;"><div class="clp" style="width:78px;">&nbsp;</div></td><td style="font-size:1px;height:1px;line-height:1px;width:62px;"><div class="clp" style="width:62px;">&nbsp;</div></td><td style="font-size:1px;height:1px;line-height:1px;width:62px;"><div class="clp" style="width:62px;">&nbsp;</div></td><td style="font-size:1px;height:1px;line-height:1px;width:69px;"><div class="clp" style="width:69px;">&nbsp;</div></td><td style="font-size:1px;height:1px;line-height:1px;width:83px;"><div class="clp" style="width:83px;">&nbsp;</div></td></tr><tr><td style="border-bottom:1px solid transparent;width:1px;"><div class="clp" style="height:19px;">&nbsp;</div></td><td data-range="B9" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:95px;max-height:18px;">Salesperson</div></td><td data-range="C9" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:76px;max-height:18px;">Accessories</div></td><td data-range="D9" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:18px;">Bikes</div></td><td data-range="E9" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:18px;">Clothing</div></td><td data-range="F9" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:67px;max-height:18px;">Total</div></td><td data-range="G9" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;border-right:solid 1px #F79646;"><div class="cv-nwl" style="width:81px;max-height:18px;">Commission</div></td></tr><tr><td style="border-bottom:1px solid transparent;width:1px;"><div class="clp" style="height:19px;">&nbsp;</div></td><td data-range="B10" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 2px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:95px;max-height:19px;">Pierre</div></td><td data-range="C10" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 2px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:76px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp; 2,420 </div></td><td data-range="D10" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 2px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:19px;">&nbsp;$ &nbsp; &nbsp;1,858 </div></td><td data-range="E10" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 2px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:19px;">&nbsp;$ &nbsp; &nbsp;1,618 </div></td><td data-range="F10" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 2px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:67px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp;5,896 </div></td><td data-range="G10" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 2px #F79646;border-left:solid 1px #F79646;border-right:solid 1px #F79646;"><div class="cv-nwl" style="width:81px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; 94 </div></td></tr><tr><td style="border-bottom:1px solid transparent;width:1px;"><div class="clp" style="height:19px;">&nbsp;</div></td><td data-range="B11" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:95px;max-height:19px;">Henri</div></td><td data-range="C11" style="text-align:left;vertical-align:bottom;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:76px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp; 1,674 </div></td><td data-range="D11" style="text-align:left;vertical-align:bottom;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:19px;">&nbsp;$ &nbsp; &nbsp;1,665 </div></td><td data-range="E11" style="text-align:left;vertical-align:bottom;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:19px;">&nbsp;$ &nbsp; &nbsp;2,846 </div></td><td data-range="F11" style="text-align:left;vertical-align:bottom;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:67px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp;6,185 </div></td><td data-range="G11" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;border-right:solid 1px #F79646;"><div class="cv-nwl" style="width:81px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; 107 </div></td></tr><tr><td style="border-bottom:1px solid transparent;width:1px;"><div class="clp" style="height:19px;">&nbsp;</div></td><td data-range="B12" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:95px;max-height:19px;">Joe</div></td><td data-range="C12" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:76px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp; 2,041 </div></td><td data-range="D12" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:19px;">&nbsp;$ &nbsp; &nbsp;2,834 </div></td><td data-range="E12" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:19px;">&nbsp;$ &nbsp; &nbsp;2,146 </div></td><td data-range="F12" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:67px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp;7,021 </div></td><td data-range="G12" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;border-right:solid 1px #F79646;"><div class="cv-nwl" style="width:81px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; 120 </div></td></tr><tr><td style="border-bottom:1px solid transparent;width:1px;"><div class="clp" style="height:19px;">&nbsp;</div></td><td data-range="B13" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:95px;max-height:19px;">Samantha</div></td><td data-range="C13" style="text-align:left;vertical-align:bottom;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:76px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp; 3,195 </div></td><td data-range="D13" style="text-align:left;vertical-align:bottom;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:19px;">&nbsp;$ &nbsp; &nbsp;1,682 </div></td><td data-range="E13" style="text-align:left;vertical-align:bottom;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp;630 </div></td><td data-range="F13" style="text-align:left;vertical-align:bottom;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:67px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp;5,507 </div></td><td data-range="G13" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;border-right:solid 1px #F79646;"><div class="cv-nwl" style="width:81px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; 78 </div></td></tr><tr><td style="border-bottom:1px solid transparent;width:1px;"><div class="clp" style="height:19px;">&nbsp;</div></td><td data-range="B14" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:95px;max-height:19px;">Dieter</div></td><td data-range="C14" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:76px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp; 2,996 </div></td><td data-range="D14" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:19px;">&nbsp;$ &nbsp; &nbsp;3,455 </div></td><td data-range="E14" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:19px;">&nbsp;$ &nbsp; &nbsp;1,436 </div></td><td data-range="F14" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:67px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp;7,887 </div></td><td data-range="G14" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;border-right:solid 1px #F79646;"><div class="cv-nwl" style="width:81px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; 128 </div></td></tr><tr><td style="border-bottom:1px solid transparent;width:1px;"><div class="clp" style="height:19px;">&nbsp;</div></td><td data-range="B15" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:95px;max-height:19px;">Albert</div></td><td data-range="C15" style="text-align:left;vertical-align:bottom;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:76px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp; 2,387 </div></td><td data-range="D15" style="text-align:left;vertical-align:bottom;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:19px;">&nbsp;$ &nbsp; &nbsp;1,287 </div></td><td data-range="E15" style="text-align:left;vertical-align:bottom;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:19px;">&nbsp;$ &nbsp; &nbsp;3,243 </div></td><td data-range="F15" style="text-align:left;vertical-align:bottom;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:67px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp;6,917 </div></td><td data-range="G15" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;border-right:solid 1px #F79646;"><div class="cv-nwl" style="width:81px;max-height:19px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; 114 </div></td></tr><tr><td style="border-bottom:1px solid transparent;width:1px;"><div class="clp" style="height:19px;">&nbsp;</div></td><td data-range="B16" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:95px;max-height:18px;">Elizabeth</div></td><td data-range="C16" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:76px;max-height:18px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp; 3,454 </div></td><td data-range="D16" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:18px;">&nbsp;$ &nbsp; &nbsp;1,719 </div></td><td data-range="E16" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:18px;">&nbsp;$ &nbsp; &nbsp;3,489 </div></td><td data-range="F16" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:normal 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;"><div class="cv-nwl" style="width:67px;max-height:18px;">&nbsp;$ &nbsp; &nbsp; &nbsp;8,662 </div></td><td data-range="G16" style="text-align:left;vertical-align:bottom;background-color:#FDE9D9;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px #F79646;border-left:solid 1px #F79646;border-right:solid 1px #F79646;"><div class="cv-nwl" style="width:81px;max-height:18px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; 139 </div></td></tr><tr><td style="border-bottom:1px solid transparent;width:1px;"><div class="clp" style="height:19px;">&nbsp;</div></td><td data-range="B17" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:double 3px #F79646;border-left:solid 1px #F79646;border-bottom:solid 1px #F79646;"><div class="cv-nwl" style="width:95px;max-height:18px;">Total</div></td><td data-range="C17" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:double 3px #F79646;border-left:solid 1px #F79646;border-bottom:solid 1px #F79646;"><div class="cv-nwl" style="width:76px;max-height:18px;">&nbsp;$ &nbsp; &nbsp; &nbsp; 18,167 </div></td><td data-range="D17" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:double 3px #F79646;border-left:solid 1px #F79646;border-bottom:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:18px;">&nbsp;$ &nbsp;14,500 </div></td><td data-range="E17" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:double 3px #F79646;border-left:solid 1px #F79646;border-bottom:solid 1px #F79646;"><div class="cv-nwl" style="width:60px;max-height:18px;">&nbsp;$ &nbsp;15,408 </div></td><td data-range="F17" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:double 3px #F79646;border-left:solid 1px #F79646;border-bottom:solid 1px #F79646;"><div class="cv-nwl" style="width:67px;max-height:18px;">&nbsp;$ &nbsp; &nbsp;48,075 </div></td><td data-range="G17" style="text-align:left;vertical-align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:double 3px #F79646;border-left:solid 1px #F79646;border-right:solid 1px #F79646;border-bottom:solid 1px #F79646;"><div class="cv-nwl" style="width:81px;max-height:18px;">&nbsp;$ &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; 780 </div></td></tr></table></div>

## Retrieve a Range from a Workbook as an Atom Feed

The following example illustrates the exchange of messages required for a client to retrieve a [**range**](#gt_c2c93fec-8d3e-45de-8010-c738cc1cea99) from the Sales.xlsx [**workbook**](#gt_343c4660-90e1-4d86-b9cc-5007075d9dfe) as an Atom feed.

**Request**

1. GET /\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Ranges('C17%7CE17')?$format=atom HTTP/1.1
2. Accept: application/atom+xml
3. Host: www.contoso.com

**Response**

1. HTTP/1.1 200 OK
2. Cache-Control: private
3. Content-Type: application/atom+xml;charset=utf-8
4. Server: Microsoft-IIS/7.5
5. SPRequestGuid: a8fecc3b-a7ef-48e5-a988-b6152207fad1
6. X-SharePointHealthScore: 4
7. X-AspNet-Version: 2.0.50727
8. X-Powered-By: ASP.NET
9. MicrosoftSharePointTeamServices: 14.0.0.4732
10. Date: Wed, 20 Jan 2010 19:50:23 GMT
11. Content-Length: 1183
12. <?xml version="1.0" encoding="utf-8"?>
13. <entry xmlns:x="http://schemas.microsoft.com/office/2008/07/excelservices/rest" xmlns:d="http://schemas.microsoft.com/ado/2007/08/dataservice" xmlns:m="http://schemas.microsoft.com/ado/2007/08/dataservices/metadata" xmlns="http://www.w3.org/2005/Atom">
14. <title type="text">C17:E17</title>
15. <id>http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Ranges('C17%7CE17')</id>
16. <updated>2010-01-20T19:50:23Z</updated>
17. <author>
18. <name />
19. </author>
20. <link rel="self" href="http://www.contoso.com/\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Ranges('C17%7CE17')?$format=atom" title="C17:E17" />
21. <category term="ExcelServices.Range" scheme="http://schemas.microsoft.com/ado/2007/08/dataservices/scheme" />
22. <content type="application/xml">
23. <x:range name="C17:E17">
24. <x:row>
25. <x:c>
26. <x:v>18167</x:v>
27. <x:fv> $18,167 </x:fv>
28. </x:c>
29. <x:c>
30. <x:v>14500</x:v>
31. <x:fv> $14,500 </x:fv>
32. </x:c>
33. <x:c>
34. <x:v>15408</x:v>
35. <x:fv> $15,408 </x:fv>
36. </x:c>
37. </x:row>
38. </x:range>
39. </content>
40. </entry>

## Retrieve a Chart from a Workbook After Setting a Value in the Workbook

The following example illustrates the exchange of messages required for a client to change the value of a [**range**](#gt_c2c93fec-8d3e-45de-8010-c738cc1cea99) named CommissionRate\_Bikes in the Sales.xlsx [**workbook**](#gt_343c4660-90e1-4d86-b9cc-5007075d9dfe) while also retrieving a chart named CommissionChart from the same workbook. Note the chart is returned as an image. The binary image data is represented here in hexadecimal.

**Request**

1. GET /\_vti\_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Charts('CommissionChart')?$format=image&ranges('CommissionRate\_Bikes')=0.03 HTTP/1.1
2. Accept: image/png
3. Host: www.contoso.com

**Response**

1. HTTP/1.1 200 OK
2. Cache-Control: private
3. Content-Type: image/png
4. Server: Microsoft-IIS/7.5
5. SPRequestGuid: 976f5ad3-5748-4049-9471-eb2ad4035047
6. X-SharePointHealthScore: 4
7. X-AspNet-Version: 2.0.50727
8. X-Powered-By: ASP.NET
9. MicrosoftSharePointTeamServices: 14.0.0.4732
10. Date: Wed, 20 Jan 2010 19:51:32 GMT
11. Content-Length: 9325
12. 89504e47 0d0a1a0a 0000000d 49484452
13. 000001b5 00000120 08060000 003301ed
14. 2d000000 01735247 4200aece 1ce90000
15. 00046741 4d410000 b18f0bfc 61050000
16. 00097048 59730000 0ec30000 0ec301c7
17. 6fa86400 00240249 44415478 5eed9ddd
18. 91f320b2 8627a08d 600238a1 f862a3f1
19. d58964d7 496c0813 c8a9da1b 1f21091b
20. 6124a3e6 bff54cd5 d4379f2d 24f5db0d
21. 8f1a10fc 3cf94101 14400114 4001250a
22. fc28b103 33500005 50000550 e009d408
23. 02144001 14400135 0a003535 aec41014
24. 40011440 01a0460c a0000aa0 000aa851
25. 00a8a971 2586a000 0aa0000a 00356200
26. 05500005 50408d02 404d8d2b 31040550
27. 00055000 a8110328 80022880 026a1410
28. 42edef79 ffbd3d1f 6a64c010 14400114
29. 40010d0a 9c86dadf fdf7f9f3 f3b3fefe
30. 3eef7f9e 0c8fdbfc ddcd27de fab92dfb
31. eb163cfa 4e83cad8 80022880 02285045
32. 817350fb bb3f7f7f 9c0c6d82 910ba7c7
33. 6d82dd44 33f3ef16 6a8fe7ed c701e0e6
34. 3ca1ef02 b0ac2207 17410114 40011418
35. 598134a8 ed587e0a 6a264bf3 d23a537e
36. 93c98dac 30f78e02 28800228 504d8173
37. 509b6e6b cec64cf7 e3effde9 f73cdabb
38. fe84daf4 cd9c9dd9 6ecb77b6 3777677a
39. 50339f01 b56a31c0 85500005 50408d02
40. a7a1662d b7636b21 f884a0b6 1c3fc1cc
41. c26d0559 0ea8bdc7 f82c34f9 174d8801
42. 62801818 3906feef 7fff4704 5a31d4e6
43. ab99aec3 40c6f601 b58fe3cc ecc965dc
44. 2d04b5d4 ee47e348 2308bf68 400c1003
45. c4c0b831 20a1da39 a8791343 662089a0
46. 662687ac 9349e6cc cd9f4492 365104a8
47. 8d1bc434 40f88e18 20066c0c 9487daf4
48. 669a81d1 3ba5ddbe abf61a6f 0b4cf9f7
49. bf3b9ad2 fff13ac0 49cb801a 95828691
50. 182006c6 8f81934d ff7cf8b9 4c6dbdc2
51. e3969649 496ef44c 19a0367e 30d320e1
52. 43628018 38d3eedb 630550eb 7f3511a0
53. 4665a041 24068881 f163a012 d42497a9
54. 5b06a88d 1fcc3448 f8901820 0624e410
55. 646a92cb d42d03d4 a80c3488 c4003130
56. 7e0c48c8 01d498fa cfab0fc4 0031400c
57. 74190340 6d55804c 6dfc2734 9eb2f121
58. 31400c00 35a0d6e5 d3168d13 8d133140
59. 0c486200 a80135a0 46371231 400ca889
60. 01a006d4 d404b3e4 a98e3264 03c480ae
61. 18006a40 0da8f194 4e0c1003 6a6200a8
62. 013535c1 cc13b7ae 276efc89 3f253150
63. 116a7daf 2ac2ec47 2a90a402 5186b821
64. 06fa8a81 2a50b3fb a82d8b1a 07d68034
65. dbccd815 f8bd3bda 2e6aec2c 86bc96b1
66. 0b25a76e 100ad4fa 0a4c1a0a fc410c10
67. 03921828 0fb5799b 982d8c5c 00cdd09a
68. 96d80f6d 126abffb bc49b3f2 3f5bcf48
69. 1c4e191a 0a628018 d01c03f5 a1b673c5
70. 4fa81970 6db7a979 1535599a b7d70c9b
71. 84525135 57d42bd9 f6ef7ffe e359e2f7
72. 4a1a5ed9 d6f2509b aef0ea42 0c6c0e6a
73. 6fe0036a 26c3fbfd 9db23c67 2fb61564
74. a19dafcd 67295d90 743f02c5 2b37043d
75. d96e80f6 dffffc2b ebaf3967 4f36722f
76. e5da9b2a 50b317b1 636b21f8 04a1b6c9
77. d4de3b5f e780da7b d3527703 53fe4617
78. 62a0750c 94825a6b bbb87ef9 ba651e16
79. 243f690b 1a9baec3 40c6f61d 6a4bc667
80. 92b510d4 e87e2cf7 e4c35325 dad68c81
81. 5250ab69 03d76a57 67ca436d 82989b99
82. cd408a81 dad3bc02 b0406cfe 99279cac
83. 9343dcbf fdef2416 4d65e87e 6c178434
84. 0068efc6 0050231e 52da0409 024e666a
85. 4bb7e13b f5de4efe d84ed9f7 a6fccff0
86. 7a97ddcc 0df1a6f4 7bf3464e db05d4a8
87. 48291589 b2f9e207 a8e5d3f2 8a7179ba
88. f137498d a4d0e316 783f4d72 a2426580
89. 1a15e98a 0d408f36 03b531ea 628919aa
90. 3926f448 1021805a dfab8918 1180da18
91. 15a9c746 987bca1b 3b402daf 9ea5e2b3
92. 573f5582 9ae43275 cb00b531 2a52a90a
93. ca79fbf1 7faf8d25 31b28d91 5efd2421
94. 87205393 5ca66e19 a0d64fa3 46e3716d
95. 5ff4da58 129740ad 2e9512af 06d4aedd
96. 90d260f5 e37fa0d6 8f2f8eea 45af7e92
97. a0804c8d bd97589d 81182816 03bd3696
98. 3cf890a9 4980d9ac 0c99da18 4f87342c
99. fafd04d4 c6f071af 7e924084 4c8da7f4
100. 624fe9a5 a1d5eb34 e4d2768f 74fe5e1b
101. cb9134ac 71afbdfa 09a8ad0a 90a98df1
102. 74985a59 7bad88a9 76692a8f 8fc6a88b
103. bdfa09a8 01b561b3 2e4943de 6b4594d8
104. a2b50c3e 026a29b1 0dd4801a 504bdce6
105. 24c72a08 2995585b 59a006d4 5262ba22
106. d4fa5e55 84eec731 2a524ab0 9bb23498
107. fdfb191f f5efa39e eb5215a8 d97dd496
108. 458d036b 40ae8b13 ef2d4a6c cb1f2d68
109. 9cb24128 cb648d51 895281d6 7345cc61
110. 9b967300 b531ea63 af7e2a0f b579a57d
111. 67657e6f 2b9a7995 fe89561f fba9d93b
112. 9b77c0be 3fefeb5e 6acbc766 e57f078e
113. fe563402 abc8d4c6 a848a90d 77af1531
114. d52e4de5 f1d11875 b1573f09 9aff93ab
115. f4fb50db b962186a a6cb7281 d7e67b93
116. d979691d 9b848e51 115a37be bd56c4d6
117. baf4747d 7c34465d eed54fe5 a166f22a
118. 938d99ae c7c0e6a0 f6064250 33dd8eb6
119. 5bd1fd3e b4f3b57b acc8a8e9 fe7aaad8
120. dc4b998a dd6b45c4 df6f7fe3 a332b19f
121. 3bc67af5 93a8fd97 143265ec d85868fc
122. eb036a5e 86971b6a ef4d4bdd 0d4cf95b
123. bb2ea52a a276dd6a da878fc6 68877af4
124. 9301b7e4 276d4511 d37518c8 d83ea0e6
125. ed6c6d2b 95016228 53a3fb71 8ca7bbdc
126. 4f8b67cf 57aa229e bd0f8edf 8f577c34
127. 465deed5 4fe5a1e6 4d0c9981 140335ef
128. ce36d0f3 27863051 84aed3c8 a5cb7aad
129. 88408eee c7d162a0 d7ba541e 6af34c45
130. 379d7666 42bae36d af630253 fed7e38e
131. a6f4efbd 0e106b20 b31fc778 3a4cadf8
132. bd56c454 bb3495c7 4763d4c5 5efd14db
133. e6bbc789 ba1f1fb7 30ac2437 50a20c50
134. 1ba322a5 36debd56 c454bb34 95c74763
135. d4c55efd 24e18300 6a7daf26 c2cbd763
136. 54a21c0d 77af1531 876d5ace 818fc6a8
137. 8fbdfaa9 12d42497 a95b864c 6d8c8a94
138. da70f75a 1153edd2 541e1f8d 51177bf5
139. 93841c82 4c4d7299 ba6580da 181529b5
140. f1eeb522 a6daa5a9 3c3e1aa3 2ef6ea27
141. 0939805a e44c3b4d 0d8d165b 7aad885a
142. f4cd6107 3e026a29 7104d456 05c8d4c6
143. a84829c1 6ecad260 f6ef677c d4bf8f7a
144. ae4b400d a85dea1d 371accfe 1b4c7cd4
145. bf8f809a 049d95cb 90a98d51 91c8d4f4
146. fb09a88d e1e35efd 24410763 6a8ca90d
147. 9bddf55a 115361ad a9bc461f 199b4afc
148. b6f47baf 7e026a74 3f0e0b28 4985eeb5
149. 224a6cd1 5a46a38f b0e95fcf fffee7fb
150. afd12935 ae811a50 4b0ea2d4 20ac595e
151. 63e35253 bf1ad7d2 e8236cfa 0e3403bd
152. c1a0d6f7 aa228ca9 8dd18f9f daa86a6c
153. 5c5235e9 adbc461f 619332a8 d97dd496
154. ed63026b 40aedbcc 7c2c4aec 6e3fe3af
155. ecef6d4d 13daa3ed 4c1a0ad4 3ea15662
156. 0c20c793 584a23ac b17149d1 a3c7b21a
157. 7d844d9a a0e66df6 396d83fd dacdda40
158. 67de157b a2d9e7ce d7d3eafe 2f90992c
159. efc72967 56fe77e0 c8d63345 ba10a988
160. f52a628f 7069754f c4dd1871 d7ab9fce
161. 2433f6d8 73b31f7d a8ed5cf1 136adb03
162. 4db6f7ca c64c96e6 a5756c12 9abffbb0
163. d7a04d69 6c35da94 a2478f65 35fa089b
164. ea81ba3c d46c3666 ba1e039b 83da1b38
165. 86da92a9 598e8576 bede404f 6015dd8f
166. e1eec798 194b678e a1fb31ff c3478f60
167. 4ab92700 500f001a fd2468fe 9fe73235
168. e70a766c 2d34fe75 04351f62 39a0b68c
169. eff17ba4 41a9c6a5 a5ee1a6d 6aa96789
170. 6b6bf411 36c5833a 25a60ca4 253f62a8
171. cd17335d 87818c6d 0f6a33c0 bce34350
172. a3fb317f 0650aa22 a63c1da6 96d56853
173. aa26bd95 d7e8236c 8a875a6a 3c96879a
174. 37312404 293b61c4 9ffd6827 917cdca4
175. 3f318489 224c1489 5ce54563 e392da08
176. f4565ea3 8fb04913 d49e66a6 a2dbcd77
177. 9b3e79ff cce0da7c bfce6a9c 41e57fe7
178. 94f5a6f4 7fbc0e70 12d78ca9 31a67666
179. 6cd03db6 f538616f 504abd1f 00500f00
180. 29beead5 4f279bfe f97051f7 e3e31678
181. 3f4d72f5 4265801a 50036af9 bbb0258d
182. 66af8da5 c4165b06 9bea815a 820801d4
183. fa5e4d64 26f59415 a604adc6 b254c47a
184. 155163fc 486d22ee c688bb5e fd54096a
185. 92cbd42d 03d4c8d4 c8d4c8d4 a420fe56
186. ae57007c bbefa3ef 7bb54942 0e41a626
187. b94cdd32 a950330e 2ef19b12 74a9657b
188. 0dda14bb 34da94a2 478f6535 fa089bea
189. 659f1272 00b5c04c 3b82b65e d0a634c4
190. 1afd94a2 478f6535 fa089bea b50f406d
191. 552047a6 26edbeda 2bd77a56 1d15b15e
192. 45ec112e adee89b8 1b23ee7a f5135003
193. 6abb1364 7a0dda94 c656a34d 297af458
194. 56a38fb0 a91ea881 1a50036a 113bf21e
195. 65e1ad33 ea1ec194 724f00a0 1e0034fa
196. 09a80135 a006d4ba 7a9d05a8 01b514d8
197. 0235a006 d4801a50 8b5c664d dad802ea
198. 7aa0066a 400da801 35a006d4 4ec740af
199. a0ae08b5 be571561 f6232f5f 4b67af32
200. a696f7a5 ed5e1b4b 699666ca 6193b24c
201. cdeea3b6 2c5c1c58 03725d9c f8635162
202. 6fd1e2cd 3e6c47df 09500dd4 801a50cb
203. 0b272904 00403d00 487dd433 a805cdff
204. c9058de7 d5f6b7ab ebbb70b2 dbcb7cee
205. a76656f7 7700b8d9 5ee6e83b 8949e96b
206. 3f5211a9 88290d04 65df40a5 2e519752
207. ea838400 e75614f1 a1b673c5 0fa8994c
208. cc4bdd5e 1b811e7d 27b128c3 82c65444
209. 2a624a45 a42c503b db53d0ba dbbbd736
210. 4f828073 509baef0 da332db0 e3b5bd01
211. 1f6aa1dd adcd6726 cb3bfa4e 62902943
212. f723dd8f 671b157b 7cebc645 1b107b6d
213. 2c5374c6 a67a0fbd 12069c86 9abd881d
214. 5bdb8c8d ad5fd686 da766352 7f33d2f3
215. ff2f15b4 b9eff3cc f9b029be 229ed195
216. 638feb17 713746dc f5e827f3 e021f911
217. 436dbe98 e93a0c64 6c3150b3 dd8fa14c
218. edd53529 b1884c2d 389db754 d0a63cf1
219. a696d568 53aa26bd 95d7e823 6c8a0775
220. 6a3c4a10 700e6a13 c4dccc6c 065204d4
221. a63ec669 82c9ce44 91a3ef24 160135a0
222. 96f0ae1a dd8f7967 4d02807a 00480148
223. af7e9220 e01cd49e 66a6a2db dde0cc84
224. 74c7db5e c73820f3 a6ed6fe6 8d1c7d27
225. b08a3135 c6d41853 cb0b2769 83d96b63
226. 29b5a7e7 e9ef1a6d 1234ff27 a7f4bfc6
227. cc02efa7 49ae5ea8 0c50036a 400da8a5
228. 34f24765 0175bdec 53828893 999ab944
229. dfab8930 fb31dc98 5111eb55 4469636a
230. 7c54ea57 7a4fa9e5 88bbfee3 aee7ecb3
231. 12d42497 a95b864c 8d4c6dc4 4cad0400
232. 8c0e2dc7 094bd8d4 d29e9e01 90f200d2
233. ab9f24e4 10646a92 cbd42d03 d4801a50
234. 7b67082d 21d06b63 a911001a 6d929003
235. a80556f4 a622d265 92d24048 cb96883b
236. 32b5fc63 8b25fcd4 f2c1a3e7 ec13a8ad
237. 0a90a991 a991a991 a9491f2e be95036a
238. f51e7a81 1a50633f b58477d4 3466351a
239. 6d22abb9 4ef609d4 801a5003 6a4f3f4b
240. 6d0901b2 9a7a59cd b70c73c4 d714801a
241. 50036a40 0da8b1f3 353b5f4b 68d87319
242. c6d41853 634c8d31 b594cc65 c4ac26c5
243. de5e336a 09670acc 7e6cff72 3650036a
244. 400da8a5 34f2402d aedbf4a8 9ee5e8f6
245. 6e0e35bb 1dcdb21d 87b79496 b7bee366
246. cb9aa3ef 04560135 a006d480 1a508b9f
247. 5042a616 028dbf2b f666457f b310b2bf
248. 4abf5d0c 39f45dda da92400d a80135a0
249. 06d4809a 2027728a f850db9c ed006a26
250. 4bdb2cd9 bfecae1d da7c34f6 06811a50
251. 036a400d a801b558 66ec1e67 6034773d
252. 06f6585b f654b3db d6bcb7ac 096d126a
253. 3e036af1 01195379 7bed5e88 b9f7bd63
254. b4d954c2 1ede53cb 5b8f7a5e 7d43635d
255. 9240a9c0 4491691d 7fb379e8 04b08f0d
256. 457f2698 59b8add9 590ea82d 6378f97e
257. 4b342ee6 9c39eff1 ecb9b029 6ee0bba5
258. 9f4af8c8 42ed6cbc e43abe84 4d2d7d64
259. 74c1a63a 75c9405a f253046a f38d986e
260. 459bb1b9 7fcf5f9a 19923f4f c3b510d4
261. e87ee4e9 32e6a9b3 54e31273 ed12c794
262. b0874c8d ba1413ab 25626ffc d98f9b89
263. 212bac76 a1b6eca0 3d276b73 e6e64f22
264. 61a2484c 209e39a6 d7a03d63 837fac36
265. 9b4ad803 d4805a4c 1d2b117b e343edb9
266. 80eadd6d f11e375b 12b76df7 e0d1947e
267. 6fdec8e9 0c948922 4c1461a2 08134562
268. 1a73c931 bd024062 8b2dd3ab 4da71bff
269. a940f6ee c7c72d2d cb9218e1 97016a40
270. 0da801b5 94469e97 afe3c6cd d4bf7cbd
271. 8c956d33 b41c903a 7b0ea006 d4801a50
272. 036af15d af646a67 2953f978 a006d480
273. 1a50036a 40ad327a ca5d0ea8 0135a006
274. d4801a50 2b4799ca 67066a40 0da80135
275. a006d42a a3a7dce5 801a5003 6a400da8
276. 01b57294 a97c66a0 06d4801a 50036a40
277. ad327aca 5d0ea801 35a006d4 801a502b
278. 4799ca67 066a400d a80135a0 06d42aa3
279. a7dce580 1a50036a 400da801 b57294a9
280. 7c66a006 d4801a50 036a402d 137adaaf
281. 2a02d480 1a50036a 400da825 43cdeea3
282. b62c6afc b906e476 51636739 2db3358d
283. b31872ca 06a1c608 a006d480 1a50036a
284. 402d0d6a f316325b 50b9709a 81165c7e
285. dfaceecf d633a52a 60efab70 a7d8ddeb
286. 7a75529b 4ad8c3d6 33f10d7b acdf4af8
287. 29c7362d b1f71f3a ae579b24 50cab74a
288. bf0fb5cd dd1870ed 2c746cb2 340f766c
289. 124a458c a9a0bd56 c4987baf d5b00035
290. ea524c3c f65a97da 426dbafa ab7bd16e
291. 0e6aefc8 00eff777 cae49c3d d5569085
292. 76be369f a57441d2 fd48f723 dd8f743f
293. c634e692 637a0580 c496de7b 729a43ed
294. cdb0df79 5ceb05a6 8f2ceebd f3750ea8
295. b9e37139 fe2e15b4 39ee4d7a 0e6c8adb
296. 1fcae824 d538b55c 091fd94c 2df5dea4
297. e54bd8d4 d2474607 6caa5397 0c70253f
298. f9ba1ffd ab9b6e45 9bb105ba 264d5667
299. 92b510d4 e87ea4cb 24e6a9b3 54e31273
300. ed12c794 b087ee47 ea524cac 9688bd1c
301. e3846da1 3641cced 329c61f5 ea8634d3
302. fc1788cd 3f33e4d6 c921eedf fe77128b
303. 98fdf8ac 355e9323 68632adc de31bd56
304. 44a94d25 ec016a40 2d261e4b c45e8ef6
305. 4182808c 99dad2a5 f8eea6f0 2686ccf0
306. 7a7fbf99 1be24de9 0f4e923c 611d636a
307. 8ca931a6 c6985a4c 632e39a6 5700486c
308. 614c2d02 2c8fdbe7 fb6911c5 b21e02d4
309. 801a5003 6a298dfc 5159a016 3fa696ea
310. 03091832 666a73df e1d4cdb8 33755f72
311. 77c23240 0da80135 a096daa0 5ea5dbdb
312. d8d92ba8 2508c80c 35c92de4 2f03d480
313. 1a50036a 402d7e3c 11a8e5e7 50d63302
314. 35a006d4 801a5003 6a59c1d2 f264400d
315. a80135a0 06d4805a 4b0e65bd 3650036a
316. 400da801 35a09615 2c2d4f06 d4801a50
317. 036a400d a8b5e450 d66b0335 a006d480
318. 1a50036a 59c1d2f2 64400da8 0135a006
319. d4805a4b 0e65bd36 50036a40 0da80135
320. a096152c 2d4f06d4 801a5003 6a400da8
321. 65e250fb 5545801a 50036a40 0da801b5
322. 64a8cd2b f3bf162d 0eaf0169 8f395ad0
323. 38658350 63045003 6a400da8 0135a096
324. 06357fcf 346f2b9a f9e4f30e d8f7e77d
325. dd4b6db9 a059dddf 01a0bf15 8de0ae80
326. 1a50036a 400da801 35013e9c 22818d40
327. b72734dd 920bbcec 06a10bd3 a6cd44bd
328. bd66d824 343e1863 2b6eaf6b bbc5deff
329. 15f6882b e123f653 a32ec5d4 b112b1a7
330. 603fb505 5673f7e3 6b73d037 d64cb7a3
331. ed5674a1 16daf9da 3d56425a 32353235
332. 323532b5 98c65c72 4caf0090 d8c27e6a
333. 9184b1e3 66afb131 2f8bcb0d b5f7389e
334. bb49a9fc ef52419b fb3ecf9c 0f9be2f7
335. 803aa36b ce634bf8 c8666a39 eff3ccb9
336. 4ad864ce 79e61e72 1f8b4d75 ea9201ae
337. e4a7dcd6 33a65bd1 666cdece d636c80c
338. f442991a dd8f7499 c43c7596 6a5c62ae
339. 5de29812 f6d0fd48 5d8a89d5 12b1377e
340. f7a33731 648655a0 1b721946 fb79be86
341. d1fc8921 4c1479c6 04e1d963 7a0ddab3
342. 76b8c76b b3a9843d 400da8c5 d4b112b1
343. 373ed4e6 598c6e97 dffe0ed8 1ba8d9c9
344. 224e596f dec8e90c 943135c6 d4185363
345. 4c2da631 971cd32b 0024b630 a6168197
346. c72dfc7e 5a44d16c 870035a0 06d4805a
347. 4a237f54 16a8c58f a9a5fa40 0285cc63
348. 6aed5713 e1e5eb70 770b15b1 5e459456
349. e4123ea2 fb91eec7 98782c11 7b0aba1f
350. 254c2d53 864c8d4c 8d4c8d4c 2da63197
351. 1cd32b00 24b6d0fd 588641d9 cf0ad480
352. 1a50036a 298d3cdd 8f713d1b 47f58c4c
353. 2d23da80 1a50036a 400da8c5 77bdf69a
354. 7d4ab090 794c4d72 0bf9cb00 35a006d4
355. 801a5003 6af9e9d2 e88c400d a80135a0
356. 06d4805a 2304e5bf 2c50036a 400da801
357. 35a0969f 2e8dce08 d4801a50 036a400d
358. a8354250 fecb0235 a006d480 1a50036a
359. f9e9d2e8 8c400da8 0135a006 d4805a26
360. 04b55f55 04a80135 a006d480 1a504b86
361. 9add476d d95ac65b 03d2dd7e c65fbddf
362. db9ae6b5 0f9bf08e 801a5003 6a400da8
363. 01352142 d662de46 a0d3fe32 af9daea7
364. cd669eb7 17c84c26 f7b3fdce 05205bcf
365. b0f5ccb4 39604c83 d4eb0ba3 31f71e3a
366. a6843dac fd18174b 677c56c2 4f3956df
367. 3863837f 6caf3649 a094efe5 6b1f6a07
368. 776332ba 573666b2 346faf19 3609a522
369. c654d05e 2b62ccbd 0335f932 4c00e03a
370. ed435ba8 4d573730 9abb1e77 36075d6e
371. 70c9d42c c7423b5f 6fa027b0 8aee47ba
372. 1fe97ea4 fb51fa70 f1ad9cb6 8729636f
373. af36099a ff67be4c cdb9ba1d 5b0b8d8d
374. f910cb01 b5650c2f df6f2907 e7bcc7b3
375. e7c2a6b8 ccc0e874 56db5cc7 97f091ed
376. 7ecc758f 67cf53c2 a6963e32 f663539d
377. ba64602b f92902b5 f9464cb7 a297b1cd
378. 000b7d46 f763d418 d2b72748 56168fab
379. 6ca55716 97faa944 63c998da 75baeaa4
380. 7147a6b6 87cecdc4 90a993d1 03d8dc35
381. e9c16be9 8dbc3f7f 992802d4 222787b8
382. 15b70404 5a8ed794 b007a801 b518d895
383. 88bd1c75 a971a636 cd70dc74 01dea639
384. 8feecc48 bf7bd0f9 de9bd21f 62df19e3
385. 1853634c 8d3135c6 d4621a73 c931bd02
386. 40628b2d d3ab4d67 da7d7b6c f6eec7c7
387. cd7b3f4d 72578965 801a5003 6a402da5
388. 91a72bbf 8fae7c09 0a3243ad fd6a2246
389. 04a006d4 801a5003 6af15daf 646a127c
390. 562c03d4 801a5003 6a400da8 55c44ed9
391. 4b0135a0 06d4801a 50036a65 4953f1ec
392. 400da801 35a006d4 805a45ec 94bd1450
393. 036a400d a80135a0 56963415 cf0ed480
394. 1a50036a 400da855 c44ed94b 0135a006
395. d4801a50 036a6549 53f1ec40 0da80135
396. a006d480 5a45ec94 bd145003 6a400da8
397. 0135a056 963415cf 0ed4801a 50036a40
398. 0da855c4 cebc92f1 b4af9ab3 fe63c6ab
399. 0335a006 d4801a50 036a19b1 727c2abb
400. dfdab237 53feb522 811a5003 6a400da8
401. 01b53a50 9bb79ad9 aed01fda 4c34e566
402. 801a5003 6a400da8 01b5148e c497f5a1
403. 165f32fa 48a006d4 801a5003 6a402d1a
404. 1aa907ce 1b869aae 476f17ec d4f3daf2
405. 400da801 35a006d4 805a2ea6 449fc78e
406. add9ee47 77aced4c 97e43236 c72f1a10
407. 03c40031 a02906a2 61e21c98 793f35c1
408. 2d985daf 33676cc6 a9da7eb0 690c8f6a
409. f393367b 4c146193 eeba54bf f59f20e6
410. 66617376 06d4be46 1915f1ab 445d1ca0
411. cd4fdaec 016a5d54 93a89b90 c65e7da8
412. 3d1fcfdb a6ab30ff bb6a5231 a2946e74
413. 10363512 fee465b5 f9499b3d 40ed6440
414. 373c5c1a 7b0da0b6 a8f4b8e5 7f3fada1
415. fe5c1a05 50000550 a003051a 41addc6a
416. 221d68ca 2da0000a a0000a34 52a011d4
417. 1a59cb65 51000550 0005542b 00d454bb
418. 17e35000 0550e05a 0a00b56b f91b6b51
419. 00055040 b502404d b57b310e 05500005
420. aea50050 bb96bfb1 16055000 05542b00
421. d454bb17 e3500005 50e05a0a 00b56bf9
422. 3b60edf2 32fced71 79211000 05504081
423. 02404d81 13f398f0 f7fcfbcb 7326ce82
424. 02f10a2c 0f556716 308f3f77 e523cdb6
425. 5af3d3a1 cef77047 593003a8 9d8a7b6f
426. 892f4de9 8d59585a 4dc6a6d1 4f8e4d99
427. d74a3d55 05721f3c 81e076d7 f2346560
428. b6ec1230 7cd330ef 7b69ed18 ab3e01b5
429. 1395d47d 5229b110 f3895bc9 78a8f3a4
430. bc09e48c 97a87c2a 7d7e328d e57b59b9
431. 793f420d 605b1fa4 7e862780 0df037d4
432. 54d864db 83bbfbe0 b1dad8b1 cf80da89
433. 06d73696 33d05e4e 7d3c1f23 8f47f94f
434. ca0ac0a6 ce4faf6e ad29580d 08a6d853
435. 033605f1 b634216e 376aff0d 7f74b3b7
436. fa67db3d bcdad7e9 8315508b f6eed453
437. 6e606676 18709e52 4ce3d2f1 43cbb175
438. 7b4fca83 3734eafc f4f2e2d4 70da8624
439. d8d89c08 e69e0e1d 3cde6629 3fba51df
440. 0dff7d6a 23861933 0c8d0b06 fdf3373d
441. ccf7d96d 0cd4a22a f7fb296c 7e42fe59
442. b6cb99ff 1e9668ab e11a1a94 b94df9dd
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446. 41e11841 7a3ac63e 703cd6ca e86c6934
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457. 36387ff8 b4efbcb7 35fa58a7 ce2ed463
458. 508f362e 08d442b5 51e9acc0 fdf1b37e
459. 6732ed3d 73b8605b 1aca652c 6dbcc93b
460. 072fec0e ffd4bf33 3e33b05d 1abb50b5
461. 811aa81d 646ae34e 9e304629 9d69e6f8
462. 6bf3aed6 b00de597 177687b5 cbad5823
463. 7673efe4 9e2aba50 b7b66903 355053da
464. f87f7dfa 52d158ae 9959a72f 81c64c9e
465. 781fa3a1 e13feac6 1af4bdad 9783defe
466. 19bd0b75 31e96d8f b6f73a2f 0f35ad8d
467. bfb6a7af 7d402c95 73ac7781 ded66cc7
468. ffc66ef8 bfd6a575 62cf10be da3cf42d
469. 7eb94d2f 1b2f6b3b 4e5ddd0f 776dc473
470. 8f2f4d8e fe62cfef 6c978ef7 6f2f06b5
471. cf6d5654 34fef318 a0f37e96 790e53d8
472. 4d7234be 364443b9 31603fab 196d60de
473. 9aa5a22e 6d7a4d57 706dd63e 9cc93ce6
474. 6b23c1d7 451c7b94 f4de5c0c 6a3662df
475. dbaca869 fc0360d3 d14d72fc 5cbb5d87
476. b3c933b0 eca29bd9 b523763d 7e3e20aa
477. a84b7ec3 1e5c8ecc 666e32d7 372da5cd
478. 9e8098d7 849ab7cd 8a9ac63f 0036b326
479. ddd8135e 9a360165 2eaee4d5 0a3b36e3
480. eec3a7a2 2eed80cd 7d1f72e8 7721036d
481. c2d0f678 b5f40250 736697b9 2b4d4404
482. 6e99162d c75903e3 48b33d53 17e4fdb3
483. 2b32c715 39476605 54bc8766 bbaebc45
484. bd353c48 edb40ff3 1265832e 53b689e0
485. d53e35f6 38c62987 dab69be0 63bb8ea1
486. 2b9fbfe2 8933a616 cad832b7 c99cee8c
487. 023b1b7c 0e157fee c3a1d7b0 0f6587ef
488. b7ed0a35 a186ff95 a1d907c7 3e17a73f
489. 08c8a3f8 db8ec59f 89ea5e8f 550cb5d0
490. ac38e35c 6f5dc0d1 2be4fce4 1808cc75
491. dfad5e03 ef3af7f5 6583cf21 e22f3486
492. e48d030e 614720ea ec420b73 3d0aac19
493. 3aaa5d2f 53956e30 7bd08028 869ab1da
494. ddb86ffa af095015 ef34b91e f56cbc0e
495. 2dc6b0d4 c49c7dd4 1f7283cf a35726bc
496. c9224302 c0d8b03e 14be00e7 3d240e69
497. d75a3d86 8fbff3d5 5c39d45c b04d5b92
498. 87329af3 9a755802 b075e814 ef9646de
499. e0733fbe 869d7dea 78c7b7e1 b5bd8fb3
500. 6665fff1 f5ed0e47 8ebf6fb6 6dbfbf00
501. d40219db 398d0639 1ab075ed 28a79760
502. e40d3e3f de0754d1 cdfdced6 36ef080e
503. d9b3b393 590f1f7f f1b5fb22 50bb0ad8
504. e21dcf91 2515780f ccbb1018 7983cf45
505. 2dffc169 3b5e5352 d1d2e7b6 efd88df7
506. 12bfabcc 3af639bd 2c1e1a66 193ffee2
507. a2e04250 036c7121 c151a90a bc33b111
508. 5faafe66 fd76a7f1 b121e0da ea8cad7d
509. 93a09bef b7639aef b80b4c88 ebe69ecb
510. dfc8c5a0 565e50ae 80028f9b 3b8b4e33
511. d8869bdb 7e189c06 0a6342fa bd42d262
512. a03fe371 e09de005 cd095013 88461114
513. f85460bb 966368d7 ea311bcc 0bf9da9d
514. 29d8bbd9 ee8c4c6f 85a4196b 2ba0475d
515. 4734457e a096a21e 6551c02a b059cb91
516. 493b0446 05055cb0 f9af1d04 9762ab70
517. 4f1d5c02 a875e004 6e617005 820d0860
518. 1bdcab9d ddfec1ac 46fbeac1 c8efd365
519. 541ba865 1493535d 58816083 3281cd5d
520. 05f7c2f2 607a8a02 5f760538 cad8522e
521. 3b6859a0 36a8e3b8 ed960a68 58cbb1a5
522. 7e5c3b5e 819de5fe fc8725b2 b497a440
523. 2d3eba38 12052605 34ace588 23c752c0
524. edca3e78 f500b0cd 6e056a63 4537775b
525. 5d01ef49 f9826be9 55979c0b 0614b0bd
526. 03fa56d5 cfed6ea0 965b51ce a74881a3
527. 1772afb3 969e2287 0e6ecae7 e4a37995
528. 10c66d37 7e056a83 8739b75f 50816956
529. e3eebb65 175a4baf a0c29cfa b4026fb0
530. 5df11db4 18b9805a 8c4a1c73 4d05e6a9
531. faeb6a0c 9b9d8297 2ea0abac a5774de7
532. f76c35af 8b1c7907 a8f51cbb dc5b7305
533. ec42b7ee 46acf367 eaf6e56b 2e353780
534. 02591400 6a5964e4 24975260 c82d492e
535. e5218cbd b00240ed c2cec774 99028c65
536. c874a314 0ad45000 a8d55099 6ba85080
537. 3134156e c408e50a 0035e50e c63c1440
538. 0114b892 0240ed4a dec65614 40011450
539. ae005053 ee60cc43 01144081 2b2900d4
540. aee46d6c 45011440 01e50a00 35e50ec6
541. 3c144001 14b89202 40ed4ade c6561440
542. 011450ae 005053ee 60cc4301 1440812b
543. 2900d4ae e46d6c45 01144001 e50a0035
544. e50ec63c 14400114 b8920240 ed4adec6
545. 56144001 1450ae00 5053ee60 cc430114
546. 40812b29 00d4aee4 6d6c4501 144001e5
547. 0a0035e5 0ec63c14 400114b8 920240ed
548. 4adec656 14400114 50ae0050 53ee60cc
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550. 4001e50a 0035e50e c63c1440 0114b892
551. 0240ed4a dec65614 40011450 ae005053
552. ee60cc43 01144081 2b2900d4 aee4ed0b
553. d9faef7f fee3b9f7 ebcbf0b8 fd3c7f7e
554. d6dfdffb f3af814e f33ddc1e e22ba796
555. 175f9882 28d09902 40ad3387 703b7914
556. 3040fbef 7ffef5f1 6b3e777f 3e60f0b8
557. 3d7fef2d b096c76e ce820257 5700a85d
558. 3d0294da 1f05b5bf fbf3f7e7 f6dccd8f
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563. 347a306b 640580da c8dee3de 77158882
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566. 2b449abd cf271536 508cb8f7 d7f967f8
567. 1d809d18 4381c114 006a8339 8cdb8d53
568. 20196a01 8018782d 2033b07a 83c000e5
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571. 00d4faf5 0d7796a0 4014d48e ba1f77a0
572. b62450b1 b08a3d2e d07d38db 1e0fb74d
573. a676e2de 815a4290 51b44b05 805a976e
574. e1a65215 889bfdb8 8e51b95d 7d0674e6
575. ff5fbbf0 4a666aae f5cb3d7e f6466e3f
576. 3fd7fde8 66805bf0 a6ea4e79 1468ad00
577. 506bed01 aedf5881 fdc917df 265bd809
578. 26b9bb1f e7f3d957 0cccbf2b d1f63e37
579. 026e279a 9824ef60 92cb660c 0da8350e
580. 402e9f59 01a09659 504e8702 28800228
581. d04e01a0 d64e7bae 8c022880 02289059
582. 01a09659 504e8702 28800228 d04e01a0
583. d64e7bae 8c022880 02289059 01a09659
584. 504e8702 28800228 d04e01a0 d64e7bae
585. 8c022880 02289059 01a09659 504e8702
586. 28800228 d04e01a0 d64e7bae 8c022880
587. 02289059 01a09659 504e8702 28800228
588. d04e01a0 d64e7bae 8c022880 02289059
589. 01a09659 504e8702 28800228 d04e01a0
590. d64e7bae 8c022880 02289059 01a09659
591. 504e8702 28800228 d04e01a0 d64e7bae
592. 8c022880 02289059 01a09659 504e8702
593. 28800228 d04e81ff 0789e388 1dbe1730
594. 00000000 0049454e 44ae4260 82

## Retrieve the OData service document for a workbook

The following example illustrates the exchange of messages required for a client to request the OData service document.

**Request**

1. GET http://office/15/teams/DBI/xlservices/\_vti\_bin/ExcelRest.aspx/Users/adean/DatesAndTimes.xlsx/OData HTTP/1.1
2. Accept: text/html, application/xhtml+xml, \*/\*
3. Accept-Language: en-US
4. User-Agent: Mozilla/5.0 (compatible; MSIE 9.0; Windows NT 6.1; WOW64; Trident/5.0)
5. Accept-Encoding: gzip, deflate
6. Connection: Keep-Alive
7. Host: office

**Response**

1. HTTP/1.1 200 OK
2. Cache-Control: private
3. Content-Type: application/xml;charset=utf-8
4. Server: Microsoft-IIS/7.5
5. X-SharePointHealthScore: 0
6. DataServiceVersion: 1.0;
7. X-AspNet-Version: 4.0.30319
8. SPRequestGuid: 7cab629b-4882-d026-23a5-2bd43a07d980
9. X-Powered-By: ASP.NET
10. MicrosoftSharePointTeamServices: 15.0.0.3407
11. X-Content-Type-Options: nosniff
12. Date: Tue, 18 Oct 2011 19:38:41 GMT
13. Content-Length: 461
14. <?xml version="1.0" encoding="utf-8" standalone="yes"?>
15. <service xml:base="http://office/\_vti\_bin/ExcelRest.aspx/Users/adean/DatesAndTimes.xlsx/OData/" xmlns:atom="http://www.w3.org/2005/Atom" xmlns:app="http://www.w3.org/2007/app" xmlns="http://www.w3.org/2007/app">
16. <workspace>
17. <atom:title>Default</atom:title>
18. <collection href="DatesTextFormated">
19. <atom:title>DatesTextFormated</atom:title>
20. </collection>
21. </workspace>
22. </service>

# Security

## Security Considerations for Implementers

None.

## Index of Security Parameters

None.

# Appendix A: Full WSDL

None.

# Appendix B: 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 SharePoint Server 2010
* Microsoft SharePoint Server 2013
* Microsoft SharePoint Server 2016
* Microsoft SharePoint Server 2019
* Microsoft SharePoint Server Subscription Edition

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.

# 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 |
| --- | --- | --- |
| [7](#Section_7c742743937543ddbccf4963325e75d9) Appendix B: Product Behavior | Updated list of supported products. | Major |

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