[MS-ESREST]:
Excel Services REST Protocol

Intellectual Property Rights Notice for Open Specifications Documentation

Revision Summary

Date	Revision History	Revision Class	Comments
02/19/2010	1.0	Major	Initial Availability.
03/31/2010	1.01	Editorial	Revised and edited the technical content
04/30/2010	1.02	Editorial	Revised and edited the technical content
06/07/2010	1.03	Editorial	Revised and edited the technical content
06/29/2010	1.04	Editorial	Changed language and formatting in the technical content.
07/23/2010	1.04	No change	No changes to the meaning, language, or formatting of the technical content.
09/27/2010	1.04	No change	No changes to the meaning, language, or formatting of the technical content.
11/15/2010	1.04	No change	No changes to the meaning, language, or formatting of the technical content.
12/17/2010	1.04	No change	No changes to the meaning, language, or formatting of the technical content.
03/18/2011	1.04	No change	No changes to the meaning, language, or formatting of the technical content.
06/10/2011	1.04	No change	No changes to the meaning, language, or formatting of the technical content.
01/20/2012	2.0	Major	Significantly changed the technical content.
04/11/2012	2.0	No change	No changes to the meaning, language, or formatting of the technical content.
07/16/2012	2.0	No change	No changes to the meaning, language, or formatting of the technical content.
09/12/2012	2.0	No change	No changes to the meaning, language, or formatting of the technical content.
10/08/2012	2.0.1	Editorial	Changed language and formatting in the technical content.
02/11/2013	3.0	Major	Significantly changed the technical content.
07/30/2013	4.0	Major	Significantly changed the technical content.
11/18/2013	4.1	Minor	Clarified the meaning of the technical content.
02/10/2014	4.1	No change	No changes to the meaning, language, or formatting of the technical content.
04/30/2014	4.2	Minor	Clarified the meaning of the technical content.

Release: October 30, 2014

Date	Revision History	Revision Class	Comments
07/31/2014	4.2	No change	No changes to the meaning, language, or formatting of the technical content.
10/30/2014	4.3	Minor	Clarified the meaning of the technical content.

Table of Contents

1   Introduction

The Excel Services REST Protocol extensions to the Atom Publishing Protocol (AtomPub) [RFC5023] and its extensions specified in the Open Data Protocol (ODATA) Specification [MS-ODATA] 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 1.8, 2, and 3 of this specification are normative and can contain the terms MAY, SHOULD, MUST, MUST NOT, and SHOULD NOT as defined in [RFC2119]. Sections 1.5 and 1.9 are also normative but do not contain those terms. All other sections and examples in this specification are informative.

1.1   Glossary

The following terms are defined in [MS-OFCGLOS]:

atom feed
cell
cell error value
data culture
formula
HTML fragment
Hypertext Markup Language (HTML)
JavaScript Object Notation (JSON)
list
named range
PivotTable
published item
range
row
slicer
table
UI culture
Uniform Resource Locator (URL)
Web Services Description Language (WSDL)
workbook
workbook file
worksheet
XML
XML namespace
XML schema

The following terms are specific to this document:

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

1.2   References

References to Microsoft Open Specification documents do not include a publishing year because links are to the latest version of the documents, which are updated frequently. References to other documents include a publishing year when one is available.

1.2.1 Normative References

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

[MC-CSDL] Microsoft Corporation, "Conceptual Schema Definition File Format".

[MS-DPRDL] Microsoft Corporation, "Report Definition Language Data Portability Overview".

[MS-ODATA] Microsoft Corporation, "Open Data Protocol (OData)".

[MS-RDL] Microsoft Corporation, "Report Definition Language File Format".

[RFC1766] Alvestrand, H., "Tags for the Identification of Languages", RFC 1766, March 1995, http://www.ietf.org/rfc/rfc1766.txt

[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

[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

[RFC4287] Nottingham, M., and Sayre, R., Eds., "The Atom Syndication Format", RFC 4287, December 2005, http://www.ietf.org/rfc/rfc4287.txt

[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

[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/

[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/

[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/

1.2.2 Informative References

[MS-OFCGLOS] Microsoft Corporation, "Microsoft Office Master Glossary".

[RFC2818] Rescorla, E., "HTTP Over TLS", RFC 2818, May 2000, http://www.rfc-editor.org/rfc/rfc2818.txt

[RFC5023] Gregorio, J., and de hOra, B., Eds., "The Atom Publishing Protocol", RFC 5023, October 2007, http://www.ietf.org/rfc/rfc5023.txt

1.3 Overview
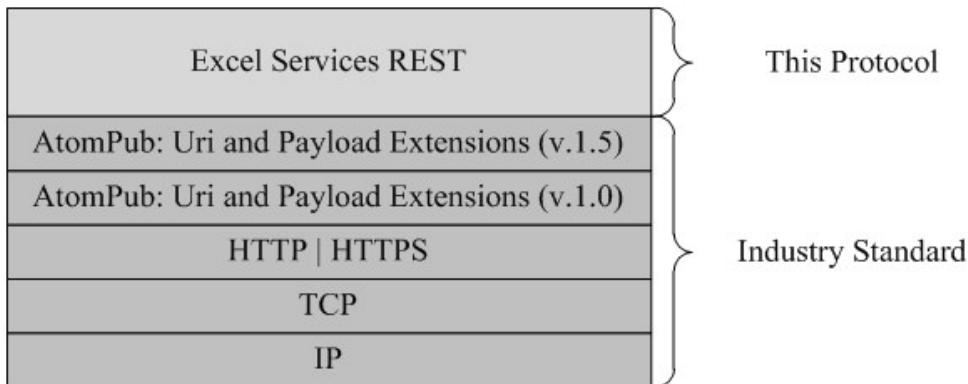
This protocol enables protocol clients to access information stored in **workbooks** maintained by a protocol server using common Web technologies. Various types of resources within spreadsheets can be retrieved, such as **ranges**, **tables**, charts, **slicers**, timelines, interactive reports and **PivotTable** reports. The information returned by the protocol can be in one of several formats, such as **HTML**, image, **JavaScript Object Notation (JSON)**, and as an **Atom feed**. This protocol client also allows for values to be inserted into **cells** 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.

1.4 Relationship to Other Protocols

This protocol uses the AtomPub messaging protocol for formatting requests and responses as described in [RFC5023] and URI and Payload extensions to the AtomPub protocol as described in [MS-ODATA]. It transmits these messages using the HTTP protocol as described in [RFC2616] or the HTTPS protocol as described in [RFC2818].

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

Figure 1: This protocol in relation to other protocols

1.5 Prerequisites/Preconditions

This protocol operates against a resource in a workbook that is identified by a **URL** 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.

1.6 Applicability Statement

AtomPub, as described in [RFC5023], 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.

1.7 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.

- **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.

1.8   Vendor-Extensible Fields

None.

1.9   Standards Assignments

None.

2 Messages

2.1 Transport

No new transports are required except for those specified in [MS-ODATA] section 2.1.

2.2 Common Message Syntax

This section contains common definitions that are used by this protocol. The syntax of the definitions uses **XML schema**, as specified in [XMLSCHEMA1] and [XMLSCHEMA2], and **WSDL**, as specified in [WSDL].

2.2.1 Namespaces

This specification defines and references various **XML namespaces** by using the mechanisms specified in [XMLNS]. 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] [XMLSCHEMA2]
atom	http://www.w3.org/2005/Atom	[RFC4287]

2.2.2 Messages

This specification does not define any common WSDL message definitions.

2.2.3 Elements

This specification does not define any common XML schema element definitions.

2.2.4 Complex Types

The following table summarizes the set of common XML schema 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 in a worksheet.
Row	Represents a **row** (2) in a **worksheet**.
Cell	Represents a cell in a worksheet.
JSONReference	Represents a reference to an Entity Set.
JSONCollection	Represents a collection of Entities.

2.2.4.1 Range

Represents a range of cells in a worksheet.

2.2.4.1.1 Range XML Value

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

```
<xs:complexType name="Range">
        <xs:element name="row" type="Row" minOccurs="0" maxOccurs="unbounded"/>
        <xs:attribute name="name" type=" string" use="required"/>
</xs:complexType>
```

row: Represents a row (2) from the spreadsheet.

name: Contains the name of the range

2.2.4.1.2 Range JSON Value

If **Range** value is used in response XML, it is represented as a JSON 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 (2) in a worksheet. This member MUST be present.

2.2.4.2 Row

Represents a row(2) in a worksheet.

2.2.4.2.1 Row XML Value

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

```
<xs:complexType name="Row">
        <xs:element name="c" type="Cell" minOccurs="0" maxOccurs="unbounded"/>
</xs:complexType>
```

c: Represents a cell in the worksheet. The number of **c** elements inside a **row** element MUST be the same for all **row** elements inside the same **range** element

2.2.4.2.2 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.

2.2.4.3 Cell

Represents a cell in a worksheet.

2.2.4.3.1 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 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). MUST be present if the cell is not empty

2.2.4.3.2 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 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 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.

2.2.4.4 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 string value representing the URL that is used to access the Entity Set using the default Entity Set representation. The default representation is XML 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

Member Name	Member Value
	JSON representation.

2.2.4.5 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 array representing a collection of objects of the same type.

2.2.5 Simple Types

The following table summarizes the set of common XML schema 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** that a worksheet cell can contain.

2.2.5.1 Error

The **Error** type is an enumeration of the set of cell error values that a worksheet cell can contain.

This simple type is defined as follows.

```
<xs:simpleType name="Error">
  <xs:restriction base="xs:string">
    <xs:enumeration value="Div0"/>
    <xs:enumeration value="Name"/>
    <xs:enumeration value="Num"/>
    <xs:enumeration value="Value"/>
    <xs:enumeration value="NotApplicable"/>
    <xs:enumeration value="Null"/>
    <xs:enumeration value="Ref"/>
  </xs:restriction>
</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**.
Name	Worksheet cell contains text not recognized by a formula.

Value	Meaning
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.

2.2.6 Attributes

This specification does not define any common XML schema attribute definitions.

2.2.7 Groups

This specification does not define any common XML schema group definitions.

2.2.8 Attribute Groups

This specification does not define any common XML schema attribute group definitions.

2.2.9 Common Data Structures

This specification does not define any common XML schema data structures.

3 Protocol Details

3.1 Server Details

3.1.1 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] are described as follows. The mapping between Entity Data Model concepts and those of the AtomPub specification is described in [MS-ODATA] section 2.2.1. 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**

Spreadsheet data structure	Description	Entity Data Model term
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) Uniform Resource Locator (URL) 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. 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.

3.1.1.1 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], 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**.

- If a URL parameter with a key of "$format" and value of "json" is passed, accessing **Model** Entity Set will result in JSON 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 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 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] 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, 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.

3.1.1.2   Session Entity Set

The Session entity set represents a view session that was created as described in section 3.1.1.10. 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 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 and referencing the corresponding **Ranges Entity Set**.

Member Name	Member Value
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 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] 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, 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.

3.1.1.3 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. 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] section 2.2.6.2.1, and the **term** attribute set to "ExcelServices.Range" for every **published item** in the workbook that represents a **named range**.

- 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. 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 JSON string value representing the name of a named range.

3.1.1.4 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] fits the content type: "text/html" then the protocol server will return an **HTML fragment** corresponding to the requested range.

- Accessing the Range Entity as an entity as specified in [MS-ODATA] (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 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 text containing the complex type **Range** as defined in section 2.2.4.1.2.

- 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**.

Parameter Name	Description
$height	An unsigned integer representing the height in pixels the returned image needs to scale to. The protocol server only provides scaling down and preserves the aspect ratio of the original image and that can cause that the height of the resulting image is smaller than **$height**.

3.1.1.5 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. 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] section 2.2.6.2.1, and the **term** attribute set to "ExcelServices.Table" for every published item in the workbook that represents a **list** (2).

- 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 a **JSONCollection** as defined in section 2.2.4.5. The **JSONCollection** represents a list of entities for every published item in the workbook that represents a list (2). 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 (2).

3.1.1.6 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]) 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] (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 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 text containing the complex type **Range** as defined in section 2.2.4.1.2.

3.1.1.7 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. 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] section 2.2.6.2.1) and the **term** attribute set to "ExcelServices.PivotTable" for every published item in the workbook that represents a PivotTable.

- 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. 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.

3.1.1.8   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] 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] (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 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 text containing the complex type **Range** as defined in section 2.2.4.1.2.

3.1.1.9   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] section 2.2.6.2.1, and the **term** attribute set to "ExcelServices.Chart" for every published item 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 text containing **JSONCollection** as defined in section 2.2.4.5. 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 JSON string 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.

3.1.1.10   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], Section 2. Specifies the **UI culture**.
$dc	A language tag, as specified in in [RFC1766], Section 2. Specifies the **data culture**.

- ▪ 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.

- ▪ 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 will return a JSON 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.

3.1.1.11   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. 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] fits the content type: "application/json" the protocol server returns JSON text containing a **JSONCollection** as defined in section 2.2.4.5. The **JSONCollection** represents a list of entities for every published item 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.

Member Name	Member Value
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.

3.1.1.12   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] fits the content type: "application/json" then the protocol server will return a JSON 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 JSON number value representing the total number of items in a Slicer. MUST be present.
ItemOffset	A JSON number 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 JSON number.
Items[]	A JSON array containing data about slicer items.
Items[].displayName	The JSON string value representing the display name of the slicer item.
Items[].uniqueName	The JSON string 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 JSON boolean value representing that this item has been unselected. Present only when true.

Member Name	Member Value
items[].noData	The JSON boolean 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 JSON nested object representing the operation parameters passed to the protocol server. MUST be present.
parameters.selectionMode	A JSON string 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 JSON array 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 JSON array 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**.

3.1.1.13   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. 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] fits the content type: "application/json" the protocol server returns JSON text containing a **JSONCollection** as defined in section 2.2.4.5. The **JSONCollection** represents a list of entities for every published item 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 JSON string value representing the name of a Timeline.
caption	A JSON string value representing the caption of a Timeline.
connectedPublishedObjects[]	A JSON array containing JSON string values representing the names of published items whose state would be affected if the state of the Timeline is modified.

3.1.1.14 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] fits the content type: "application/json" then the protocol server will return a JSON 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 JSON string 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 JSON string value representing timeline's selection state. MUST be present and be set to one of the following string values: ▪ between ▪ clearFilter ▪ unsupported
displayLabel	The JSON string 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 JSON nested object representing the operation parameters passed to the protocol server. MUST be present.
parameters.selectionType	A JSON string value representing the requested selection Type. MUST be present and be set to one of the following string values: ▪ **between** ▪ **clearFilter**
parameters.selectionBeginDate	A JSON string value representing the selection begin date. Ignored if the value of **selectionType** is set to **clearFilter**.
parameters.selectionEndDate	A JSON string value representing the selection end date. Ignored if the value of **selectionType** is set to **clearFilter**.

.

3.1.1.15   _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 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], fits the content type: "application/json", then the protocol server returns JSON text containing a **JSONCollection** as defined in section 2.2.4.5. The **JSONCollection** represents a list of interactive reports for every published item 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.

3.1.1.16   Store

Store contains data for interactive reports exposed in the workbook. The content result is a JSON 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], 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.

Member Name	Member Value
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 specified in [MS-DPRDL] and [MS-RDL].

3.1.1.17   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], 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 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.

3.1.1.18 State

State contains data for PivotTables stored in the workbook. The content result is a JSON 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], 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.

Member Name	Member Value
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.

3.1.2 Timers

None.

3.1.3 Initialization

None.

3.1.4 Message Processing Events and Sequencing Rules

None.

3.1.5 Timer Events

None.

3.1.6 Other Local Events

None.

4   Protocol Examples

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

- A site at http://www.contoso.com exists.

- A workbook with the title Sales.xlsx exists on the site. The workbook contains the following resources:

  - A table named "SalesProjections".

  - A chart named "CommissionChart".

  - A range named "CommissionRate_Bikes".

4.1   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.

Request

```
GET /_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/ HTTP/1.1
Accept: application/atom+xml
Host: www.contoso.com
```

Response

```
HTTP/1.1 200 OK
Cache-Control: private
Content-Type: application/atom+xml;charset=utf-8
Server: Microsoft-IIS/7.5
SPRequestGuid: 63c0d5ca-8b6e-43bf-92a5-d6ed45210f5b
X-SharePointHealthScore: 4
X-AspNet-Version: 2.0.50727
X-Powered-By: ASP.NET
MicrosoftSharePointTeamServices: 14.0.0.4732
Date: Wed, 20 Jan 2010 19:48:13 GMT
Content-Length: 3158

<?xml version="1.0" encoding="utf-8" standalone="yes"?>
<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">
  <title type="text">Model</title>
  <id>http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/</id>
  <updated>2010-01-20T19:48:13Z</updated>
  <author>
    <name />
  </author>
  <link rel="self"
href="http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/" title="Model"
/>
  <entry>
    <category term="ExcelServices.Ranges"
scheme="http://schemas.microsoft.com/ado/2007/08/dataservices/scheme" />
```

```
      <title>Ranges</title>
      <id>http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Ranges</id>
      <updated>2010-01-20T19:48:13Z</updated>
      <author>
        <name />
      </author>
      <link rel="alternate"
href="http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Ranges?$format=a
tom" title="Ranges" />
      <content type="application/atom+xml;charset=utf-8"
src="http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Ranges?$format=at
om" />
    </entry>
    <entry>
      <category term="ExcelServices.Charts"
scheme="http://schemas.microsoft.com/ado/2007/08/dataservices/scheme" />
      <title>Charts</title>
      <id>http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Charts</id>
      <updated>2010-01-20T19:48:13Z</updated>
      <author>
        <name />
      </author>
      <link rel="alternate"
href="http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Charts?$format=a
tom" title="Charts" />
      <content type="application/atom+xml;charset=utf-8"
src="http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Charts?$format=at
om" />
    </entry>
    <entry>
      <category term="ExcelServices.Tables"
scheme="http://schemas.microsoft.com/ado/2007/08/dataservices/scheme" />
      <title>Tables</title>
      <id>http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Tables</id>
      <updated>2010-01-20T19:48:13Z</updated>
      <author>
        <name />
      </author>
      <link rel="alternate"
href="http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Tables?$format=a
tom" title="Tables" />
      <content type="application/atom+xml;charset=utf-8"
src="http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Tables?$format=at
om" />
    </entry>
    <entry>
      <category term="ExcelServices.PivotTables"
scheme="http://schemas.microsoft.com/ado/2007/08/dataservices/scheme" />
      <title>PivotTables</title>

<id>http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/PivotTables</id>
      <updated>2010-01-20T19:48:13Z</updated>
      <author>
        <name />
      </author>
      <link rel="alternate"
href="http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/PivotTables?$for
mat=atom" title="PivotTables" />
      <content type="application/atom+xml;charset=utf-8"
src="http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/PivotTables?$form
at=atom" />
```

```
    </entry>
  </feed>
```

4.2   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.

Request

```
GET /_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Tables('SalesProjections')?$format=html
HTTP/1.1
Accept: text/html
Host: www.contoso.com
```

Response

```
HTTP/1.1 200 OK
Cache-Control: private
Content-Type: text/html; charset=utf-8
Last-Modified: Wed, 20 Jan 2010 11:49:08 GMT
Vary: Accept-Encoding
Server: Microsoft-IIS/7.5
SPRequestGuid: eae1c496-30f7-4263-92aa-3a31fb2d8c89
X-SharePointHealthScore: 4
X-AspNet-Version: 2.0.50727
X-Powered-By: ASP.NET
MicrosoftSharePointTeamServices: 14.0.0.4732
Date: Wed, 20 Jan 2010 19:49:08 GMT
Content-Length: 18625

<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"> </div></td><td style="font-
size:1px;height:1px;line-height:1px;width:97px;"><div class="clp"
style="width:97px;"> </div></td><td style="font-size:1px;height:1px;line-
height:1px;width:78px;"><div class="clp" style="width:78px;"> </div></td><td
style="font-size:1px;height:1px;line-height:1px;width:62px;"><div class="clp"
style="width:62px;"> </div></td><td style="font-size:1px;height:1px;line-
height:1px;width:62px;"><div class="clp" style="width:62px;"> </div></td><td
style="font-size:1px;height:1px;line-height:1px;width:69px;"><div class="clp"
style="width:69px;"> </div></td><td style="font-size:1px;height:1px;line-
height:1px;width:83px;"><div class="clp" style="width:83px;"> </div></td></tr><tr><td
style="border-bottom:1px solid transparent;width:1px;"><div class="clp"
style="height:19px;"> </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;"> </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;"> $
    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;"> $ 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;"> $
   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;"> $ 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;"> $
    94 </div></td></tr><tr><td style="border-bottom:1px solid
transparent;width:1px;"><div class="clp" style="height:19px;"> </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;"> $
    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;"> $ 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;"> $ 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;"> $
 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;"> $
107 </div></td></tr><tr><td style="border-bottom:1px solid transparent;width:1px;"><div
class="clp" style="height:19px;"> </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;"> $
        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;"> $
 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;"> $    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;"> $
     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;"> $    
          120 </div></td></tr><tr><td style="border-bottom:1px solid
transparent;width:1px;"><div class="clp" style="height:19px;"> </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;"> $    
    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;"> $    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;"> $        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;"> $    
 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;"> $              
  78 </div></td></tr><tr><td style="border-bottom:1px solid transparent;width:1px;"><div
class="clp" style="height:19px;"> </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;"> $         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;"> $  
 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;"> $    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;"> $
     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;"> $    
      128 </div></td></tr><tr><td style="border-bottom:1px solid
transparent;width:1px;"><div class="clp" style="height:19px;"> </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;"> $    
    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;"> $    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;"> $    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;"> $    
 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;">             
114 </div></td></tr><tr><td style="border-bottom:1px solid transparent;width:1px;"><div
class="clp" style="height:19px;"> </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;"> $         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;"> $  
 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;"> $    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;"> $
     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;"> $    
          139 </div></td></tr><tr><td style="border-bottom:1px solid
transparent;width:1px;"><div class="clp" style="height:19px;"> </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;"> $       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;"> $  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;"> $
 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;"> $    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;"> $            
  780 </div></td></tr></table></div>
```

4.3 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
from the Sales.xlsx workbook as an Atom feed.

Release: October 30, 2014

Request

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

Response

```
HTTP/1.1 200 OK
Cache-Control: private
Content-Type: application/atom+xml;charset=utf-8
Server: Microsoft-IIS/7.5
SPRequestGuid: a8fecc3b-a7ef-48e5-a988-b6152207fad1
X-SharePointHealthScore: 4
X-AspNet-Version: 2.0.50727
X-Powered-By: ASP.NET
MicrosoftSharePointTeamServices: 14.0.0.4732
Date: Wed, 20 Jan 2010 19:50:23 GMT
Content-Length: 1183


<?xml version="1.0" encoding="utf-8"?>
<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">
  <title type="text">C17:E17</title>

<id>http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Ranges('C17%7CE17'
)</id>
  <updated>2010-01-20T19:50:23Z</updated>
  <author>
    <name />
  </author>
  <link rel="self"
href="http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Ranges('C17%7CE1
7')?$format=atom" title="C17:E17" />
  <category term="ExcelServices.Range"
scheme="http://schemas.microsoft.com/ado/2007/08/dataservices/scheme" />
  <content type="application/xml">
    <x:range name="C17:E17">
      <x:row>
        <x:c>
          <x:v>18167</x:v>
          <x:fv> $18,167 </x:fv>
        </x:c>
        <x:c>
          <x:v>14500</x:v>
          <x:fv> $14,500 </x:fv>
        </x:c>
        <x:c>
          <x:v>15408</x:v>
          <x:fv> $15,408 </x:fv>
        </x:c>
      </x:row>
    </x:range>
  </content>
</entry>
```

4.4   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 named CommissionRate_Bikes in the Sales.xlsx workbook 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

```
GET
/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Charts('CommissionChart')?$format=image&rang
es('CommissionRate_Bikes')=0.03 HTTP/1.1
Accept: image/png
Host: www.contoso.com
```

Response

```
HTTP/1.1 200 OK
Cache-Control: private
Content-Type: image/png
Server: Microsoft-IIS/7.5
SPRequestGuid: 976f5ad3-5748-4049-9471-eb2ad4035047
X-SharePointHealthScore: 4
X-AspNet-Version: 2.0.50727
X-Powered-By: ASP.NET
MicrosoftSharePointTeamServices: 14.0.0.4732
Date: Wed, 20 Jan 2010 19:51:32 GMT
Content-Length: 9325

89504e47 0d0a1a0a 0000000d 49484452
000001b5 00000120 08060000 003301ed
2d000000 01735247 4200aece 1ce90000
00046741 4d410000 b18f0bfc 61050000
00097048 59730000 0ec30000 0ec301c7
6fa86400 00240249 44415478 5eed9ddd
91f320b2 8627a08d 600238a1 f862a3f1
d58964d7 496c0813 c8a9da1b 1f21091b
6124a3e6 bff54cd5 d4379f2d 24f5db0d
8f1a10fc 3cf94101 14400114 4001250a
fc28b103 33500005 50000550 e009d408
02144001 14400135 0a003535 aec41014
40011440 01a0460c a0000aa0 000aa851
00a8a971 2586a000 0aa0000a 00356200
05500005 50408d02 404d8d2b 31040550
00055000 a8110328 80022880 026a1410
42edef79 ffbd3d1f 6a64c010 14400114
40010d0a 9c86dadf fdf7f9f3 f3b3fefe
3eef7f9e 0c8fdbfc ddcd27de fab92dfb
eb163cfa 4e83cad8 80022880 02285045
817350fb bb3f7f7f 9c0c6d82 910ba7c7
6d82dd44 33f3ef16 6a8fe7ed c701e0e6
3ca1ef02 b0ac2207 17410114 40011418
598134a8 ed587e0a 6a264bf3 d23a537e
93c98dac 30f78e02 28800228 504d8173
509b6e6b cec64cf7 e3effde9 f73cdabb
fe84daf4 cd9c9dd9 6ecb77b6 3777677a
50339f01 b56a31c0 85500005 50408d02
```

```
a7a1662d b7636b21 f884a0b6 1c3fc1cc
c26d0559 0ea8bdc7 f82c34f9 174d8801
62801818 3906feef 7fff4704 5a31d4e6
ab99aec3 40c6f601 b58fe3cc ecc965dc
2d04b5d4 ee47e348 2308bf68 400c1003
c4c0b831 20a1da39 a8791343 662089a0
662687ac 9349e6cc cd9f4492 365104a8
8d1bc434 40f88e18 20066c0c 9487daf4
669a81d1 3ba5ddbe abf61a6f 0b4cf9f7
bf3b9ad2 fff13ac0 49cb801a 95828691
182006c6 8f81934d ff7cf8b9 4c6dbdc2
e3969649 496ef44c 19a0367e 30d320e1
43628018 38d3eedb 630550eb 7f3511a0
4665a041 24068881 f163a012 d42497a9
5b06a88d 1fcc3448 f8901820 0624e410
646a92cb d42d03d4 a80c3488 c4003130
7e0c48c8 01d498fa cfab0fc4 0031400c
74190340 6d55804c 6dfc2734 9eb2f121
31400c00 35a0d6e5 d3168d13 8d133140
0c486200 a80135a0 46371231 400ca889
01a006d4 d404b3e4 a98e3264 03c480ae
18006a40 0da8f194 4e0c1003 6a6200a8
013535c1 cc13b7ae 276efc89 3f253150
116a7daf 2ac2ec47 2a90a402 5186b821
06fa8a81 2a50b3fb a82d8b1a 07d68034
dbccd815 f8bd3bda 2e6aec2c 86bc96b1
0b25a76e 100ad4fa 0a4c1a0a fc410c10
03921828 0fb5799b 982d8c5c 00cdd09a
96d80f6d 126abffb bc49b3f2 3f5bcf48
1c4e191a 0a628018 d01c03f5 a1b673c5
4fa81970 6db7a979 1535599a b7d70c9b
84525135 57d42bd9 f6ef7ffe e359e2f7
4a1a5ed9 d6f2509b aef0ea42 0c6c0e6a
6fe0036a 26c3fbfd 9db23c67 2fb61564
a19dafcd 67295d90 743f02c5 2b37043d
d96e80f6 dffffc2b ebaf3967 4f36722f
e5da9b2a 50b317b1 636b21f8 04a1b6c9
d4de3b5f e780da7b d3527703 53fe4617
62a0750c 94825a6b bbb87ef9 ba651e16
243f690b 1a9baec3 40c6f61d 6a4bc667
92b510d4 e87e2cf7 e4c35325 dad68c81
5250ab69 03d76a57 67ca436d 82989b99
cd408a81 dad3bc02 b0406cfe 99279cac
9343dcbf fdef2416 4d65e87e 6c178434
0068efc6 0050231e 52da0409 024e666a
4bb7e13b f5de4efe d84ed9f7 a6fccff0
7a97ddcc 0df1a6f4 7bf3464e db05d4a8
48291589 b2f9e207 a8e5d3f2 8a7179ba
f137498d a4d0e316 783f4d72 a2426580
1a15e98a 0d408f36 03b531ea 628919aa
3926f448 1021805a dfab8918 1180da18
15a9c746 987bca1b 3b402daf 9ea5e2b3
573f5582 9ae43275 cb00b531 2a52a90a
ca79fbf1 7faf8d25 31b28d91 5efd2421
87205393 5ca66e19 a0d64fa3 46e3716d
5ff4da58 129740ad 2e9512af 06d4aedd
90d260f5 e37fa0d6 8f2f8eea 45af7e92
a0804c8d bd97589d 81182816 03bd3696
3cf890a9 4980d9ac 0c99da18 4f87342c
```

Release: October 30, 2014

```
fafd04d4 c6f071af 7e924084 4c8da7f4
624fe9a5 a1d5eb34 e4d2768f 74fe5e1b
cb9134ac 71afbdfa 09a8ad0a 90a98df1
74985a59 7bad88a9 76692a8f 8fc6a88b
bdfa09a8 01b561b3 2e4943de 6b4594d8
a2b50c3e 026a29b1 0dd4801a 504bdce6
24c72a08 2995585b 59a006d4 5262ba22
d4fa5e55 84eec731 2a524ab0 9bb23498
fdfb191f f5efa39e eb5215a8 d97dd496
458d036b 40ae8b13 ef2d4a6c cb1f2d68
9cb24128 cb648d51 895281d6 7345cc61
9b967300 b531ea63 af7e2a0f b579a57d
67657e6f 2b9a7995 fe89561f fba9d93b
9b77c0be 3fefeb5e 6acbc766 e57f078e
fe563402 abc8d4c6 a848a90d 77af1531
d52e4de5 f1d11875 b1573f09 9aff93ab
f4fb50db b962186a a6cb7281 d7e67b93
d979691d 9b848e51 115a37be bd56c4d6
baf4747d 7c34465d eed54fe5 a166f22a
938d99ae c7c0e6a0 f6064250 33dd8eb6
5bd1fd3e b4f3b57b acc8a8e9 fe7aaad8
dc4b998a dd6b45c4 df6f7fe3 a332b19f
3bc67af5 93a8fd97 143265ec d85868fc
eb036a5e 86971b6a ef4d4bdd 0d4cf95b
bb2ea52a a276dd6a da878fc6 68877af4
9301b7e4 276d4511 d37518c8 d83ea0e6
ed6c6d2b 95016228 53a3fb71 8ca7bbdc
4f8b67cf 57aa229e bd0f8edf 8f577c34
465deed5 4fe5a1e6 4d0c9981 140335ef
ce36d0f3 27863051 84aed3c8 a5cb7aad
88408eee c7d162a0 d7ba541e 6af34c45
379d7666 42bae36d af630253 fed7e38e
a6f4efbd 0e106b20 b31fc778 3a4cadf8
bd56c454 bb3495c7 4763d4c5 5efd14db
e6bbc789 ba1f1fb7 30ac2437 50a20c50
1ba322a5 36debd56 c454bb34 95c74763
d4c55efd 24e18300 6a7daf26 c2cbd763
54a21c0d 77af1531 876d5ace 818fc6a8
8fbdfaa9 12d42497 a95b864c 6d8c8a94
da70f75a 1153edd2 541e1f8d 51177bf5
93841c82 4c4d7299 ba6580da 181529b5
f1eeb522 a6daa5a9 3c3e1aa3 2ef6ea27
0939805a e44c3b4d 0d8d165b 7aad885a
f4cd6107 3e026a29 7104d456 05c8d4c6
a84829c1 6ecad260 f6ef677c d4bf8f7a
ae4b400d a85dea1d 371accfe 1b4c7cd4
bf8f809a 049d95cb 90a98d51 91c8d4f4
fb09a88d e1e35efd 24410763 6a8ca90d
9bddf55a 115361ad a9bc461f 199b4afc
b6f47baf 7e026a74 3f0e0b28 4985eeb5
224a6cd1 5a46a38f b0e95fcf fffee7fb
afd12935 ae811a50 4b0ea2d4 20ac595e
63e35253 bf1ad7d2 e8236cfa 0e3403bd
c1a0d6f7 aa228ca9 8dd18f9f daa86a6c
5c5235e9 adbc461f 619332a8 d97dd496
ed63026b 40aedbcc 7c2c4aec 6e3fe3af
ecef6d4d 13daa3ed 4c1a0ad4 3ea15662
0c20c793 584a23ac b17149d1 a3c7b21a
7d844d9a a0e66df6 396d83fd dacdda40
```

```
67de157b a2d9e7ce d7d3eafe 2f90992c
efc72967 56fe77e0 c8d63345 ba10a988
f52a628f 7069754f c4dd1871 d7ab9fce
2433f6d8 73b31f7d a8ed5cf1 136adb03
4db6f7ca c64c96e6 a5756c12 9abffbb0
d7a04d69 6c35da94 a2478f65 35fa089b
ea81ba3c d46c3666 ba1e039b 83da1b38
86da92a9 598e8576 bede404f 6015dd8f
e1eec798 194b678e a1fb31ff c3478f60
4ab92700 500f001a fd2468fe 9fe73235
e70a766c 2d34fe75 04351f62 39a0b68c
eff17ba4 41a9c6a5 a5ee1a6d 6aa96789
6b6bf411 36c5833a 25a60ca4 253f62a8
cd17335d 87818c6d 0f6a33c0 bce34350
a3fb317f 0650aa22 a63c1da6 96d56853
aa26bd95 d7e8236c 8a875a6a 3c96879a
37312404 293b61c4 9ffd6827 917cdca4
3f318489 224c1489 5ce54563 e392da08
f4565ea3 8fb04913 d49e66a6 a2dbcd77
9b3e79ff cce0da7c bfce6a9c 41e57fe7
94f5a6f4 7fbc0e70 12d78ca9 31a67666
6cd03db6 f538616f 504abd1f 00500f00
29beead5 4f279bfe f97051f7 e3e31678
3f4d72f5 4265801a 50036af9 bbb0258d
66af8da5 c4165b06 9bea815a 820801d4
fa5e4d64 26f59415 a604adc6 b254c47a
155163fc 486d22ee c688bb5e fd54096a
92cbd42d 03d4c8d4 c8d4c8d4 a420fe56
ae57007c bbefa3ef 7bb54942 0e41a626
b94cdd32 a950330e 2ef19b12 74a9657b
0dda14bb 34da94a2 478f6535 fa089bea
659f1272 00b5c04c 3b82b65e d0a634c4
1afd94a2 478f6535 fa089bea b50f406d
552047a6 26edbeda 2bd77a56 1d15b15e
45ec112e adee89b8 1b23ee7a f5135003
6abb1364 7a0dda94 c656a34d 297af458
56a38fb0 a91ea881 1a50036a 113bf21e
65e1ad33 ea1ec194 724f00a0 1e0034fa
09a80135 a006d4ba 7a9d05a8 01b514d8
0235a006 d4801a50 8b5c664d dad802ea
7aa0066a 400da801 35a006d4 4ec740af
a0ae08b5 be571561 f6232f5f 4b67af32
a696f7a5 ed5e1b4b 699666ca 6193b24c
cdeea3b6 2c5c1c58 03725d9c f8635162
6fd1e2cd 3e6c47df 09500dd4 801a50cb
0b272904 00403d00 487dd433 a805cdff
c9058de7 d5f6b7ab ebbb70b2 dbcb7cee
a76656f7 7700b8d9 5ee6e83b 8949e96b
3f5211a9 88290d04 65df40a5 2e519752
ea838400 e75614f1 a1b673c5 0fa8994c
cc4bdd5e 1b811e7d 27b128c3 82c65444
2a624a45 a42c503b db53d0ba dbbbd736
4f828073 509baef0 da332db0 e3b5bd01
1f6aa1dd adcd6726 cb3bfa4e 62902943
f723dd8f 671b157b 7cebc645 1b107b6d
2c5374c6 a67a0fbd 12069c86 9abd881d
5bdb8c8d ad5fd686 da766352 7f33d2f3
ff2f15b4 b9eff3cc f9b029be 229ed195
638feb17 713746dc f5e827f3 e021f911
```

```
436dbe98 e93a0c64 6c3150b3 dd8fa14c
edd53529 b1884c2d 389db754 d0a63cf1
a696d568 53aa26bd 95d7e823 6c8a0775
6a3c4a10 700e6a13 c4dccc6c 065204d4
a63ec669 82c9ce44 91a3ef24 160135a0
96f0ae1a dd8f7967 4d02807a 00480148
af7e9220 e01cd49e 66a6a2db dde0cc84
74c7db5e c73820f3 a6ed6fe6 8d1c7d27
b08a3135 c6d41853 cb0b2769 83d96b63
29b5a7e7 e9ef1a6d 1234ff27 a7f4bfc6
cc02efa7 49ae5ea8 0c50036a 400da8a5
34f24765 0175bdec 53828893 999ab944
dfab8930 fb31dc98 5111eb55 4469636a
7c54ea57 7a4fa9e5 88bbfee3 aee7ecb3
12d42497 a95b864c 8d4c6dc4 4cad0400
8c0e2dc7 094bd8d4 d29e9e01 90f200d2
ab9f24e4 10646a92 cbd42d03 d4801a50
7b67082d 21d06b63 a911001a 6d929003
a80556f4 a622d265 92d24048 cb96883b
32b5fc63 8b25fcd4 f2c1a3e7 ec13a8ad
0a90a991 a991a991 a9491f2e be95036a
f51e7a81 1a50633f b58477d4 3466351a
6d22abb9 4ef609d4 801a5003 6a4f3f4b
6d0901b2 9a7a59cd b70c73c4 d714801a
50036a40 0da8b1f3 353b5f4b 68d87319
c6d41853 634c8d31 b594cc65 c4ac26c5
de5e336a 09670acc 7e6cff72 3650036a
400da8a5 34f2402d aedbf4a8 9ee5e8f6
6e0e35bb 1dcdb21d 87b79496 b7bee366
cb9aa3ef 04560135 a006d480 1a508b9f
5042a616 028dbf2b f666457f b310b2bf
4abf5d0c 39f45dda da92400d a80135a0
06d4809a 2027728a f850db9c ed006a26
4bdb2cd9 bfecae1d da7c34f6 06811a50
036a400d a801b558 66ec1e67 6034773d
06f6585b f654b3db d6bcb7ac 096d126a
3e036af1 01195379 7bed5e88 b9f7bd63
b4d954c2 1ede53cb 5b8f7a5e 7d43635d
9240a9c0 4491691d 7fb379e8 04b08f0d
457f2698 59b8add9 590ea82d 6378f97e
4b342ee6 9c39eff1 ecb9b029 6ee0bba5
9f4af8c8 42ed6cbc e43abe84 4d2d7d64
74c1a63a 75c9405a f253046a f38d986e
459bb1b9 7fcf5f9a 19923f4f c3b510d4
e87ee4e9 32e6a9b3 54e31273 ed12c794
b0874c8d ba1413ab 25626ffc d98f9b89
212bac76 a1b6eca0 3d276b73 e6e64f22
61a2484c 209e39a6 d7a03d63 837fac36
9b4ad803 d4805a4c 1d2b117b e343edb9
80eadd6d f11e375b 12b76df7 e0d1947e
6fdec8e9 0c948922 4c1461a2 08134562
1a73c931 bd024062 8b2dd3ab 4da71bff
a940f6ee c7c72d2d cb9218e1 97016a40
0da801b5 94469e97 afe3c6cd d4bf7cbd
8c956d33 b41c903a 7b0ea006 d4801a50
036af15d af646a67 2953f978 a006d480
1a50036a 40ad327a ca5d0ea8 0135a006
d4801a50 2b4799ca 67066a40 0da80135
a006d42a a3a7dce5 801a5003 6a400da8
```

```
01b57294 a97c66a0 06d4801a 50036a40
ad327aca 5d0ea801 35a006d4 801a502b
4799ca67 066a400d a80135a0 06d42aa3
a7dce580 1a50036a 400da801 b57294a9
7c66a006 d4801a50 036a402d 137adaaf
2a02d480 1a50036a 400da825 43cdeea3
b62c6afc b906e476 51636739 2db3358d
b31872ca 06a1c608 a006d480 1a50036a
402d0d6a f316325b 50b9709a 81165c7e
dfaceecf d633a52a 60efab70 a7d8ddeb
7a75529b 4ad8c3d6 33f10d7b acdf4af8
29c7362d b1f71f3a ae579b24 50cab74a
bf0fb5cd dd1870ed 2c746cb2 340f766c
124a458c a9a0bd56 c4987baf d5b00035
ea524c3c f65a97da 426dbafa ab7bd16e
0e6aefc8 00eff777 cae49c3d d5569085
76be369f a57441d2 fd48f723 dd8f743f
c634e692 637a0580 c496de7b 729a43ed
cdb0df79 5ceb05a6 8f2ceebd f3750ea8
b9e37139 fe2e15b4 39ee4d7a 0e6c8adb
1fcae824 d538b55c 091fd94c 2df5dea4
e54bd8d4 d2474607 6caa5397 0c70253f
f9ba1ffd ab9b6e45 9bb105ba 264d5667
92b510d4 e87ea4cb 24e6a9b3 54e31273
ed12c794 b087ee47 ea524cac 9688bd1c
e3846da1 3641cced 329c61f5 ea8634d3
fc1788cd 3f33e4d6 c921eedf fe77128b
98fdf8ac 355e9323 68632adc de31bd56
44a94d25 ec016a40 2d261e4b c45e8ef6
4182808c 99dad2a5 f8eea6f0 2686ccf0
7a7fbf99 1be24de9 0f4e923c 611d636a
8ca931a6 c6985a4c 632e39a6 5700486c
614c2d02 2c8fdbe7 fb6911c5 b21e02d4
801a5003 6a298dfc 5159a016 3fa696ea
03091832 666a73df e1d4cdb8 33755f72
77c23240 0da80135 a096daa0 5ea5dbdb
d8d92ba8 2508c80c 35c92de4 2f03d480
1a50036a 402d7e3c 11a8e5e7 50d63302
35a006d4 801a5003 6a59c1d2 f264400d
a80135a0 06d4805a 4b0e65bd 3650036a
400da801 35a09615 2c2d4f06 d4801a50
036a400d a8b5e450 d66b0335 a006d480
1a50036a 59c1d2f2 64400da8 0135a006
d4805a4b 0e65bd36 50036a40 0da80135
a096152c 2d4f06d4 801a5003 6a400da8
65e250fb 5545801a 50036a40 0da801b5
64a8cd2b f3bf162d 0eaf0169 8f395ad0
38658350 63045003 6a400da8 0135a096
06357fcf 346f2b9a f9e4f30e d8f7e77d
dd4b6db9 a059dddf 01a0bf15 8de0ae80
1a50036a 400da801 35013e9c 22818d40
b72734dd 920bbcec 06a10bd3 a6cd44bd
bd66d824 343e1863 2b6eaf6b bbc5deff
15f6882b e123f653 a32ec5d4 b112b1a7
603fb505 5673f7e3 6b73d037 d64cb7a3
ed5674a1 16daf9da 3d56425a 32353235
323532b5 98c65c72 4caf0090 d8c27e6a
9184b1e3 66afb131 2f8bcb0d b5f7389e
bb49a9fc ef52419b fb3ecf9c 0f9be2f7
```

803aa36b ce634bf8 c8666a39 eff3ccb9
4ad864ce 79e61e72 1f8b4d75 ea9201ae
e4a7dcd6 33a65bd1 666cdece d636c80c
f442991a dd8f7499 c43c7596 6a5c62ae
5de29812 f6d0fd48 5d8a89d5 12b1377e
f7a33731 648655a0 1b721946 fb79be86
d1fc8921 4c1479c6 04e1d963 7a0ddab3
76b8c76b b3a9843d 400da8c5 d4b112b1
373ed4e6 598c6e97 dffe0ed8 1ba8d9c9
224e596f dec8e90c 943135c6 d4185363
4c2da631 971cd32b 0024b630 a6168197
c72dfc7e 5a44d16c 870035a0 06d4805a
4a237f54 16a8c58f a9a5fa40 0285cc63
6aed5713 e1e5eb70 770b15b1 5e459456
e4123ea2 fb91eec7 98782c11 7b0aba1f
254c2d53 864c8d4c 8d4c8d4c 2da63197
1cd32b00 24b6d0fd 588641d9 cf0ad480
1a50036a 298d3cdd 8f713d1b 47f58c4c
2d23da80 1a50036a 400da8c5 77bdf69a
7d4ab090 794c4d72 0bf9cb00 35a006d4
801a5003 6af9e9d2 e88c400d a80135a0
06d4805a 2304e5bf 2c50036a 400da801
35a0969f 2e8dce08 d4801a50 036a400d
a8354250 fecb0235 a006d480 1a50036a
f9e9d2e8 8c400da8 0135a006 d4805a26
04b55f55 04a80135 a006d480 1a504b86
9add476d d95ac65b 03d2dd7e c65fbddf
db9ae6b5 0f9bf08e 801a5003 6a400da8
01352142 d662de46 a0d3fe32 af9daea7
cd669eb7 17c84c26 f7b3fdce 05205bcf
b0f5ccb4 39604c83 d4eb0ba3 31f71e3a
a6843dac fd18174b 677c56c2 4f3956df
3863837f 6caf3649 a094efe5 6b1f6a07
776332ba 573666b2 346faf19 3609a522
c654d05e 2b62ccbd 0335f932 4c00e03a
ed435ba8 4d573730 9abb1e77 36075d6e
70c9d42c c7423b5f 6fa027b0 8aee47ba
1fe97ea4 fb51fa70 f1ad9cb6 8729636f
af36099a ff67be4c cdb9ba1d 5b0b8d8d
f910cb01 b5650c2f df6f2907 e7bcc7b3
e7c2a6b8 ccc0e874 56db5cc7 97f091ed
7ecc758f 67cf53c2 a6963e32 f663539d
ba64602b f92902b5 f9464cb7 a297b1cd
000b7d46 f763d418 d2b72748 56168fab
6ca55716 97faa944 63c998da 75baeaa4
7147a6b6 87cecdc4 90a993d1 03d8dc35
e9c16be9 8dbc3f7f 992802d4 222787b8
15b70404 5a8ed794 b007a801 b518d895
88bd1c75 a971a636 cd70dc74 01dea639
8feecc48 bf7bd0f9 de9bd21f 62df19e3
1853634c 8d3135c6 d4621a73 c931bd02
40628b2d d3ab4d67 da7d7b6c f6eec7c7
cd7b3f4d 72578965 801a5003 6a402da5
91a72bbf 8fae7c09 0a3243ad fd6a2246
04a006d4 801a5003 6af15daf 646a127c
562c03d4 801a5003 6a400da8 55c44ed9
4b0135a0 06d4801a 50036a65 4953f1ec
400da801 35a006d4 805a45ec 94bd1450
036a400d a80135a0 56963415 cf0ed480

```
1a50036a  400da855  c44ed94b  0135a006
d4801a50  036a6549  53f1ec40  0da80135
a006d480  5a45ec94  bd145003  6a400da8
0135a056  963415cf  0ed4801a  50036a40
0da855c4  cebc92f1  b4af9ab3  fe63c6ab
0335a006  d4801a50  036a19b1  727c2abb
dfdab237  53feb522  811a5003  6a400da8
01b53a50  9bb79ad9  aed01fda  4c34e566
801a5003  6a400da8  01b5148e  c497f5a1
165f32fa  48a006d4  801a5003  6a402d1a
1aa907ce  1b869aae  476f17ec  d4f3daf2
400da801  35a006d4  805a2ea6  449fc78e
add9ee47  77aced4c  97e43236  c72f1a10
03c40031  a02906a2  61e21c98  793f35c1
2d985daf  33676cc6  a9da7eb0  690c8f6a
f393367b  4c146193  eeba54bf  f59f20e6
66617376  06d4be46  1915f1ab  445d1ca0
cd4fdaec  016a5d54  93a89b90  c65e7da8
3d1fcfdb  a6ab30ff  bb6a5231  a2946e74
10363512  fee465b5  f9499b3d  40ed6440
373c5c1a  7b0da0b6  a8f4b8e5  7f3fada1
fe5c1a05  50000550  a003051a  41addc6a
221d68ca  2da0000a  a0000a34  52a011d4
1a59cb65  51000550  0005542b  00d454bb
17e35000  0550e05a  0a00b56b  f91b6b51
00055040  b502404d  b57b310e  05500005
aea50050  bb96bfb1  16055000  05542b00
d454bb17  e3500005  50e05a0a  00b56bf9
3b60edf2  32fced71  79211000  05504081
02404d81  13f398f0  f7fcfbcb  7326ce82
02f10a2c  0f556716  308f3f77  e523cdb6
5af3d3a1  cef77047  593003a8  9d8a7b6f
892f4de9  8d59585a  4dc6a6d1  4f8e4d99
d74a3d55  05721f3c  81e076d7  f2346560
b6ec1230  7cd330ef  7b69ed18  ab3e01b5
1395d47d  5229b110  f3895bc9  78a8f3a4
bc09e48c  97a87c2a  7d7e328d  e57b59b9
793f420d  605b1fa4  7e862780  0df037d4
54d864db  83bbfbe0  b1dad8b1  cf80da89
06d73696  33d05e4e  7d3c1f23  8f47f94f
ca0ac0a6  ce4faf6e  ad29580d  08a6d853
033605f1  b634216e  376aff0d  7f74b3b7
fa67db3d  bcdad7e9  8315508b  f6eed453
6e606676  18709e52  4ce3d2f1  43cbb175
7b4fca83  3734eafc  f4f2e2d4  70da8624
d8d89c08  e69e0e1d  3cde6629  3fba51df
0dff7d6a  23861933  0c8d0b06  fdf3373d
ccf7d96d  0cd4a22a  f7fb296c  7e42fe59
b6cb99ff  1e9668ab  e11a1a94  b94df9dd
341c5afc  b4199c37  be5aa166  ec1d2ff4
0ec66646  8ec3836e  541387c3  006da173
785c7020  ff00b518  a829eea2  b34f99ef
41e11841  7a3ac63e  703cd6ca  e86c6934
5045fcf4  4318000b  acc77c98  d237d6e9
d483d162  6db70a1f  8c0b0e62  2350fbd6
3eab1bcc  de795a1e  24607d77  7d74ffce
fecabff1  ecb730c9  f6fda083  f331f6ab
1bebf48d  1eb40e85  7d37eeb8  2050dbad
8dfa6605  7ef6fd8f  18b8ceb8  d2da05ec
```

```
77c30d3d ceb98ecf 98cc79a4 c1f96035
f2c667ee 2ac6a4bf 4c6fd708 b6a9cb7b
a47141a0 b6073585 5d8ef3cc 39058da5
3bf32ff4 6ac5282f 89beba1c 432fec0e
36387ff8 b4efbcb7 35fa58a7 ce2ed463
508f362e 08d442b5 51e9acc0 fdf1b37e
6732ed3d 73b8605b 1aca652c 6dbcc93b
072fec0e ffd4bf33 3e33b05d 1abb50b5
811aa81d 646ae34e 9e304629 9d69e6f8
6bf3aed6 b00de597 177687b5 cbad5823
7673efe4 9e2aba50 b7b66903 355053da
f87f7dfa 52d158ae 9959a72f 81c64c9e
781fa3a1 e13feac6 1af4bdad 9783defe
19bd0b75 31e96d8f b6f73a2f 0f35ad8d
bfb6a7af 7d402c95 73ac7781 ded66cc7
ffc66ef8 bfd6a575 62cf10be da3cf42d
7eb94d2f 1b2f6b3b 4e5ddd0f 776dc473
8f2f4d8e fe62cfef 6c978ef7 6f2f06b5
cf6d5654 34fef318 a0f37e96 790e53d8
4d7234be 364443b9 31603fab 196d60de
9aa5a22e 6d7a4d57 706dd63e 9cc93ce6
6b23c1d7 451c7b94 f4de5c0c 6a3662df
dbaca869 fc0360d3 d14d72fc 5cbb5d87
b3c933b0 eca29bd9 b523763d 7e3e20aa
a84b7ec3 1e5c8ecc 666e32d7 372da5cd
9e8098d7 849ab7cd 8a9ac63f 0036b326
ddd8135e 9a360165 2eaee4d5 0a3b36e3
eec3a7a2 2eed80cd 7d1f72e8 7721036d
c2d0f678 b5f40250 736697b9 2b4d4404
6e99162d c75903e3 48b33d53 17e4fdb3
2b32c715 39476605 54bc8766 bbaebc45
bd353c48 edb40ff3 1265832e 53b689e0
d53e35f6 38c62987 dab69be0 63bb8ea1
2b9fbfe2 8933a616 cad832b7 c99cee8c
023b1b7c 0e157fee c3a1d7b0 0f6587ef
b7ed0a35 a186ff95 a1d907c7 3e17a73f
08c8a3f8 db8ec59f 89ea5e8f 550cb5d0
ac38e35c 6f5dc0d1 2be4fce4 1808cc75
dfad5e03 ef3af7f5 6583cf21 e22f3486
e48d030e 614720ea ec420b73 3d0aac19
3aaa5d2f 53956e30 7bd08028 869ab1da
ddb86ffa af095015 ef34b91e f56cbc0e
2dc6b0d4 c49c7dd4 1f7283cf a35726bc
c9224302 c0d8b03e 14be00e7 3d240e69
d75a3d86 8fbff3d5 5c39d45c b04d5b92
87329af3 9a755802 b075e814 ef9646de
e0733fbe 869d7dea 78c7b7e1 b5bd8fb3
6665fff1 f5ed0e47 8ebf6fb6 6dbfbf00
d40219db 398d0639 1ab075ed 28a79760
e40d3e3f de0754d1 cdfdced6 36ef080e
d9b3b393 590f1f7f f1b5fb22 50bb0ad8
e21dcf91 2515780f ccbb1018 7983cf45
2dffc169 3b5e5352 d1d2e7b6 efd88df7
12bfabcc 3af639bd 2c1e1a66 193ffee2
a2e04250 036c7121 c151a90a bc33b111
5faafe66 fd76a7f1 b121e0da ea8cad7d
93a09bef b7639aef b80b4c88 ebe69ecb
dfc8c5a0 565e50ae 80028f9b 3b8b4e33
d8869bdb 7e189c06 0a6342fa bd42d262
```

```
a03fe371 e09de005 cd095013 88461114
f85460bb 966368d7 ea311bcc 0bf9da9d
29d8bbd9 ee8c4c6f 85a4196b 2ba0475d
4734457e a096a21e 6551c02a b059cb91
493b0446 05055cb0 f9af1d04 9762ab70
4f1d5c02 a875e004 6e617005 820d0860
1bdcab9d ddfec1ac 46fbeac1 c8efd365
541ba865 1493535d 58816083 3281cd5d
05f7c2f2 607a8a02 5f760538 cad8522e
3b6859a0 36a8e3b8 ed960a68 58cbb1a5
7e5c3b5e 819de5fe fc8725b2 b497a440
2d3eba38 12052605 34ace588 23c752c0
edca3e78 f500b0cd 6e056a63 4537775b
5d01ef49 f9826be9 55979c0b 0614b0bd
03fa56d5 cfed6ea0 965b51ce a74881a3
1772afb3 969e2287 0e6ecae7 e4a37995
10c66d37 7e056a83 8739b75f 50816956
e3eebb65 175a4baf a0c29cfa b4026fb0
5df11db4 18b9805a 8c4a1c73 4d05e6a9
faeb6a0c 9b9d8297 2ea0abac a5774de7
f76c35af 8b1c7907 a8f51cbb dc5b7305
ec42b7ee 46acf367 eaf6e56b 2e353780
02591400 6a5964e4 24975260 c82d492e
e5218cbd b00240ed c2cec774 99028c65
c874a314 0ad45000 a8d55099 6ba85080
3134156e c408e50a 0035e50e c63c1440
0114b892 0240ed4a dec65614 40011450
ae005053 ee60cc43 01144081 2b2900d4
aee46d6c 45011440 01e50a00 35e50ec6
3c144001 14b89202 40ed4ade c6561440
011450ae 005053ee 60cc4301 1440812b
2900d4ae e46d6c45 01144001 e50a0035
e50ec63c 14400114 b8920240 ed4adec6
56144001 1450ae00 5053ee60 cc430114
40812b29 00d4aee4 6d6c4501 144001e5
0a0035e5 0ec63c14 400114b8 920240ed
4adec656 14400114 50ae0050 53ee60cc
43011440 812b2900 d4aee46d 6c450114
4001e50a 0035e50e c63c1440 0114b892
0240ed4a dec65614 40011450 ae005053
ee60cc43 01144081 2b2900d4 aee4ed0b
d9faef7f fee3b9f7 ebcbf0b8 fd3c7f7e
d6dfdffb f3af814e f33ddc1e e22ba796
175f9882 28d09902 40ad3387 703b7914
3040fbef 7ffef5f1 6b3e777f 3e60f0b8
3d7fef2d b096c76e ce820257 5700a85d
3d0294da 1f05b5bf fbf3f7e7 f6dccd8f
26c0bd32 b829937b 27528fe7 6dcae8ee
af0ccf9c 63fa6ccd f6de508c 3deef9fc
bbff3a30 fd7bde7f 9decf175 8f7b9ffb
e527a71e ddfb74be fb743d6b 5b4282a8
347a306b 640580da c8dee3de 77158882
9a69f8f7 ba1b67e0 fd3e5f49 dbe6ff0b
c02cbc96 eecbf5d8 0d28638f f3a064ee
2b449abd cf271536 508cb8f7 d7f967f8
1d809d18 4381c114 006a8339 8cdb8d53
20196a01 8018782d 2033b07a 83c000e5
0d21934d 5918c61e e7675a36 ebf361b3
f7f97728 eeddbb6f 4b9cba1c 8502fd2a
```

```
00d4faf5 0d7796a0 4014d48e ba1f77a0
b62450b1 b08a3d2e d07d38db 1e0fb74d
a676e2de 815a4290 51b44b05 805a976e
e1a65215 889bfdb8 8e51b95d 7d0674e6
ff5fbbf0 4a666aae f5cb3d7e f6466e3f
3fd7fde8 66805bf0 a6ea4e79 1468ad00
506bed01 aedf5881 fdc917df 265bd809
26b9bb1f e7f3d957 0cccbf2b d1f63e37
026e279a 9824ef60 92cb660c 0da8350e
402e9f59 01a09659 504e8702 28800228
d04e01a0 d64e7bae 8c022880 02289059
01a09659 504e8702 28800228 d04e01a0
d64e7bae 8c022880 02289059 01a09659
504e8702 28800228 d04e01a0 d64e7bae
8c022880 02289059 01a09659 504e8702
28800228 d04e01a0 d64e7bae 8c022880
02289059 01a09659 504e8702 28800228
d04e01a0 d64e7bae 8c022880 02289059
01a09659 504e8702 28800228 d04e01a0
d64e7bae 8c022880 02289059 01a09659
504e8702 28800228 d04e01a0 d64e7bae
8c022880 02289059 01a09659 504e8702
28800228 d04e81ff 0789e388 1dbe1730
00000000 0049454e 44ae4260 82
```

4.5   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

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

Response

```
HTTP/1.1 200 OK
Cache-Control: private
Content-Type: application/xml;charset=utf-8
Server: Microsoft-IIS/7.5
X-SharePointHealthScore: 0
DataServiceVersion: 1.0;
X-AspNet-Version: 4.0.30319
SPRequestGuid: 7cab629b-4882-d026-23a5-2bd43a07d980
X-Powered-By: ASP.NET
MicrosoftSharePointTeamServices: 15.0.0.3407
X-Content-Type-Options: nosniff
```

Release: October 30, 2014

```
Date: Tue, 18 Oct 2011 19:38:41 GMT
Content-Length: 461
<?xml version="1.0" encoding="utf-8" standalone="yes"?>
<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">
  <workspace>
    <atom:title>Default</atom:title>
    <collection href="DatesTextFormated">
      <atom:title>DatesTextFormated</atom:title>
    </collection>
  </workspace>
</service>
```

5   Security

5.1   Security Considerations for Implementers

None.

5.2   Index of Security Parameters

None.

6 Appendix A: Full WSDL

None.

7   Appendix B: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include released service packs:

- Microsoft SharePoint Server 2010

- Microsoft SharePoint Server 2013

Exceptions, if any, are noted below. If a service pack or Quick Fix Engineering (QFE) number appears with the product version, behavior changed in that service pack or QFE. The new behavior also applies to subsequent service packs of the product 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.

8 Change Tracking

This section identifies changes that were made to the [MS-ESREST] protocol document between the July 2014 and October 2014 releases. Changes are classified as New, Major, Minor, Editorial, or No change.

The revision class **New** means that a new document is being released.

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 or functionality.

- The removal of a document from the documentation set.

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 **Editorial** means that the formatting in the technical content was changed. Editorial changes apply to grammatical, formatting, and style issues.

The revision class **No change** means that no new technical changes were introduced. Minor editorial and formatting changes may have been made, but the technical content of the document is identical to the last released version.

Major and minor changes can be described further using the following change types:

- New content added.

- Content updated.

- Content removed.

- New product behavior note added.

- Product behavior note updated.

- Product behavior note removed.

- New protocol syntax added.

- Protocol syntax updated.

- Protocol syntax removed.

- New content added due to protocol revision.

- Content updated due to protocol revision.

- Content removed due to protocol revision.

- New protocol syntax added due to protocol revision.

- Protocol syntax updated due to protocol revision.

- Protocol syntax removed due to protocol revision.

- Obsolete document removed.

Editorial changes are always classified with the change type **Editorially updated.**

Some important terms used in the change type descriptions are defined as follows:

- **Protocol syntax** refers to data elements (such as packets, structures, enumerations, and methods) as well as interfaces.

- **Protocol revision** refers to changes made to a protocol that affect the bits that are sent over the wire.

The changes made to this document are listed in the following table. For more information, please contact dochelp@microsoft.com.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
1.5 Prerequisites/Preconditions	Added details about the format of the URL.	N	New content added.

9 Index