

# [MS-ESREST]: Excel Services REST Protocol Specification

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## 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.

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Preliminary

# 1 Introduction

This document specifies the Excel Services REST Protocol extensions to the Atom Publishing Protocol (AtomPub) [\[RFC5023\]](#) and its extensions specified in the Open Data Protocol (ODATA) Specification [\[MS-ODATA\]](#).

The extensions specified in this document 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 contain RFC 2119 language. Sections 1.5 and 1.9 are also normative but cannot contain RFC 2119 language. All other sections and examples in this specification are informative.

## 1.1 Glossary

The following terms are defined in [\[MS-OFCGLOS\]](#):

**atom feed**  
**cell**  
**formula**  
**Hypertext Markup Language (HTML)**  
**list**  
**named range**  
**number format**  
**PivotTable**  
**published item**  
**range**  
**row**  
**site**  
**table**  
**Uniform Resource Locator (URL)**  
**Web Services Description Language (WSDL)**  
**workbook**  
**workbook file**  
**worksheet**  
**XML namespace**  
**XML schema**

The following terms are specific to this document:

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

**HTML fragment:** Lines of text that adhere to HTML tag rules, as described in [HTML], but do not have processing instructions or any other type of header information.

**MAY, SHOULD, MUST, SHOULD NOT, MUST NOT:** These terms (in all caps) are used as described 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](mailto:dochelp@microsoft.com). We will assist you in finding the relevant information. Please check the archive site, <http://msdn2.microsoft.com/en-us/library/E4BD6494-06AD-4aed-9823-445E921C9624>, as an additional source.

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

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

[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.ietf.org/rfc/rfc2616.txt>

[RFC4287] Nottingham, M., and Sayre, E.R., "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.S., Ed., Beech, D., Ed., Maloney, M., Ed., and Mendelsohn, N., Ed., "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-OFGLS] Microsoft Corporation, "[Microsoft Office Master Glossary](#)".

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

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

## 1.3 Protocol Overview (Synopsis)

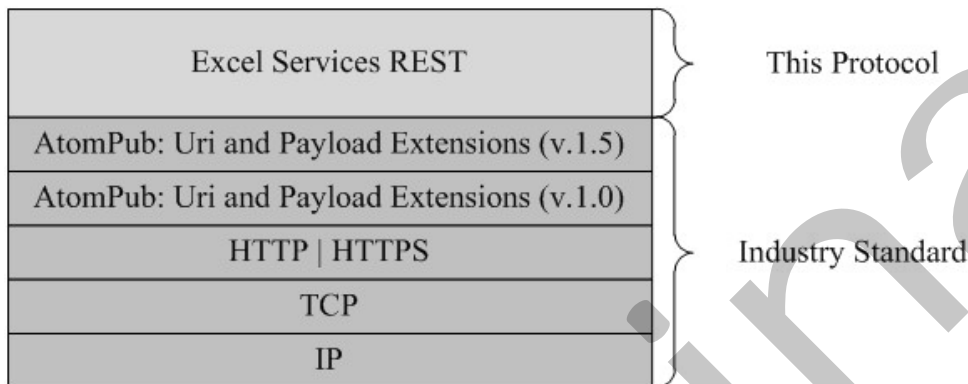
This protocol enables protocol clients to access information stored in **workbooks** maintained by a protocol server using common Web technologies. Various types of resources within spreadsheets can be retrieved, such as **ranges**, **tables**, charts, and **PivotTable** reports. The information returned by the protocol can be in one of several formats, such as **HTML**, image, 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 **site (1)** that is identified by a **URL** that is known by protocol clients. 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:** Clients specify the protocol version as described in [\[MS-ODATA\]](#).
- **Localization:** This document does not specify any localization-dependent behavior.
- **Capability negotiation:** Capability negotiation is performed as described in [\[MS-ODATA\]](#).

## **1.8 Vendor-Extensible Fields**

None.

## **1.9 Standards Assignments**

None.

Preliminary



## 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	<a href="http://schemas.microsoft.com/office/excel/server/webservices">http://schemas.microsoft.com/office/excel/server/webservices</a>	
xs	<a href="http://www.w3.org/2001/XMLSchema">http://www.w3.org/2001/XMLSchema</a>	<a href="#">[XMLSCHEMA1]</a> <a href="#">[XMLSCHEMA2]</a>
atom	<a href="http://www.w3.org/2005/Atom">http://www.w3.org/2005/Atom</a>	<a href="#">[RFC4287]</a>

#### 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
<b>Range</b>	A range of <b>cells</b> in a worksheet.
<b>Row</b>	Represents a <b>row(2)</b> in a <b>worksheet</b> .

##### 2.2.4.1 Range

Represents a range of cells in a worksheet.

This complex type is defined as follows.

```

<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.

#### 2.2.4.2 Row

Represents a row(2) in a worksheet.

This complex type is defined as follows.

```

<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.

##### 2.2.4.2.1 Cell

Represents a cell in a worksheet.

This complex type is defined as follows.

```

<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". **MUST** be present if the cell is not empty.

#### 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
<b>Error</b>	An enumeration of the set of <b>cell error values</b> 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 <b>formula</b> .
Name	Worksheet cell contains text not recognized by a formula.
Null	Worksheet cell contains an empty intersection of two areas.
Num	Worksheet cell contains invalid numeric values in a formula.
Ref	Worksheet cell contains a reference that is not valid.
Value	Worksheet cell contains a formula that includes worksheet cells that contain different data types.

### 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 Specification 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.	<b>EntitySet</b>
Ranges	The list of ranges that are exposed by the spreadsheet.	<b>EntitySet</b>
Charts	The list of charts that are exposed by the spreadsheet	<b>EntitySet</b>
Tables	The list of tables that are exposed by the spreadsheet.	<b>EntitySet</b>
PivotTables	The list of pivot tables that are exposed by the spreadsheet.	<b>EntitySet</b>
Range	A range from the spreadsheet.	<b>Entity</b>
Table	A table from the spreadsheet	<b>Entity</b>
PivotTable	A PivotTable from the spreadsheet	<b>Entity</b>
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	Entry point for creating a view session on the protocol server.	<b>EntitySet</b>

When the **\$format** 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 that is 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 should 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.

### 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**.
- 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 Ranges Entity Set

Ranges in the spreadsheet are represented as an **EntitySet**, which contains **Entities** of a single **EntityType** as specified in section [3.1.1.3](#). The **Ranges** entity set represents the list of ranges exposed by the spreadsheet. 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**.

### 3.1.1.3 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 [2.2.4.1](#) in a **content** element with a **type** attribute set to "application/xml", as specified in [\[MS-ODATA\]](#).

#### 3.1.1.4 Tables Entity Set

Tables in the spreadsheet are represented as an **EntitySet**, which contains **Entities** of a single **EntityType** as specified in section [3.1.1.5](#). The Tables entity set represents the list of tables exposed by the spreadsheet. 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)**.

#### 3.1.1.5 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](#) in a **content** element with a **type** attribute set to "application/xml", as specified in [\[MS-ODATA\]](#).

#### 3.1.1.6 PivotTables Entity Set

PivotTables in the spreadsheet are represented as an **EntitySet**, which contains **Entities** of a single **EntityType** as specified in section [3.1.1.7](#). The **PivotTables** entity set represents the list of PivotTables exposed by the spreadsheet. 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.

#### 3.1.1.7 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](#) in a **content** element with a **type** attribute set to "application/xml", as specified in [\[MS-ODATA\]](#).

#### 3.1.1.8 Charts Entity Set

Charts in the spreadsheet are represented as an **EntitySet**. 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.

#### **3.1.1.9 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. [<1>](#) The content of the Entity Set result is single entity which represents the session. Making a request to the entity URL will return a result as described in 3.1.1.1.

#### **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.

#### HTTP Request

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

#### HTTP 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?$format=atom" title="Ranges" />
  <content type="application/atom+xml; charset=utf-8"
src="http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Ranges?$format=atom" />
</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?$format=atom" title="Charts" />
    <content type="application/atom+xml; charset=utf-8"
src="http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Charts?$format=atom" />
  </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?$format=atom" title="Tables" />
    <content type="application/atom+xml; charset=utf-8"
src="http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/Tables?$format=atom" />
  </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?$format=atom" title="PivotTables" />
    <content type="application/atom+xml; charset=utf-8"
src="http://www.contoso.com/_vti_bin/ExcelRest.aspx/Cycles/Sales.xlsx/Model/PivotTables?$format=atom" />
  </entry>

```

```
</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: eaelc496-30f7-4263-92aa-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">&nbsp;</div></td><td style="font-
size:1px;height:1px;line-height:1px;width:97px;"><div class="clp"
style="width:97px;">&nbsp;</div></td><td style="font-size:1px;height:1px;line-
height:1px;width:78px;"><div class="clp" style="width:78px;">&nbsp;</div></td><td
style="font-size:1px;height:1px;line-height:1px;width:62px;"><div class="clp"
style="width:62px;">&nbsp;</div></td><td style="font-size:1px;height:1px;line-
height:1px;width:62px;"><div class="clp" style="width:62px;">&nbsp;</div></td><td
style="font-size:1px;height:1px;line-height:1px;width:69px;"><div class="clp"
style="width:69px;">&nbsp;</div></td><td style="font-size:1px;height:1px;line-
height:1px;width:83px;"><div class="clp" style="width:83px;">&nbsp;</div></td></tr><tr><td
style="border-bottom:1px solid transparent;width:1px;"><div class="clp"
style="height:19px;">&nbsp;</div></td><td data-range="B9" style="text-align:left;vertical-
align:bottom;font:bold 11pt 'Calibri';color:#000000;text-decoration:none;border-top:solid 1px
#F79646;border-left:solid 1px #F79646;"><div class="cv-nw1" 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-nw1" 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-nw1" 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-nw1" style="width:60px;max-
height:18px;">Clothing</div></td><td data-range="F9" style="text-align:left;vertical-
```







## 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%7CE17')?$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&ranges('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 ddc227de fab92dfb
eb163cfa 4e83cad8 80022880 02285045
817350fb bb3f7f7f 9c0c6d82 910ba7c7
6d82dd44 33f3ef16 6a8fe7ed c701e0e6
3calef02 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 3ba5ddb8 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 eba3967 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



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 36deb56 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  
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4001e50a 0035e50e c63c1440 0114b892  
0240ed4a dec65614 40011450 ae005053  
ee60cc43 01144081 2b2900d4 aee4ed0b  
d9faef7f fee3b9f7 ebcfb0b8 fd3c7f7e  
d6dfdfb f3af814e f33ddc1e e22ba796  
175f9882 28d09902 40ad3387 703b7914  
3040fbef 7ffef5f1 6b3e777f 3e60f0b8  
3d7fef2d b096c76e ce820257 5700a85d  
3d0294da 1f05b5bf fb1f3f7e7 f6dcd8f  
26c0bd32 b829937b 27528fe7 6dcae8ee  
af0ccf9c 63fa6ccd f6de508c 3deef9fc  
bbff3a30 fd7bde7f 9decf175 8f7b9ffb  
e527a71e ddfb74be fb743d6b 5b4282a8  
347a306b 640580da c8dee3de 77158882  
9a69f8f7 ba1b67e0 fd3e5f49 db66ff0b  
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 balf77a0
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
```

```
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="DatesTextFormatted">
      <atom:title>DatesTextFormatted</atom:title>
    </collection>
  </workspace>
</service>
```

Preliminary

## **5 Security**

### **5.1 Security Considerations for Implementers**

None.

### **5.2 Index of Security Parameters**

None.

Preliminary

## 6 Appendix A: Full WSDL

None.

Preliminary

## 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 15 Technical Preview

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.

[<1> Section 3.1.1.9](#): This entity set is available only in SharePoint Server 15 Technical Preview.

## 8 Change Tracking

This section identifies changes that were made to the [MS-ESREST] protocol document between the June 2011 and January 2012 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.
- An extensive rewrite, addition, or deletion of major portions of content.
- The removal of a document from the documentation set.
- Changes made for template compliance.

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 language and 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 or language changes were introduced. The technical content of the document is identical to the last released version, but minor editorial and formatting changes, as well as updates to the header and footer information, and to the revision summary, may have been made.

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.
- New content added for template compliance.
- Content updated for template compliance.
- Content removed for template compliance.
- 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 [protocol@microsoft.com](mailto:protocol@microsoft.com).

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
<a href="#">1 Introduction</a>	Stated that sections 1.8, 2, and 3 of this specification are normative and contain RFC 2119 language. Sections 1.5 and 1.9 are also normative but cannot contain RFC 2119 language.	N	New content added.
<a href="#">1 Introduction</a>	Stated that all sections and examples in this specification, other than sections 1.8, 2, 3, 1.5, and 1.9, are informative.	N	New content added.
<a href="#">1.1 Glossary</a>	Added the glossary terms "number format", "Web Services Description Language (WSDL)", and "XML schema".	N	New content added.
<a href="#">3.1.1 Abstract Data Model</a>	Stated that this section describes a conceptual model of possible data organization that an implementation maintains to participate in this protocol.	N	New content added.
<a href="#">3.1.1 Abstract Data Model</a>	Added OData and Sessions, along with their descriptions and Entity Data Model terms, to the table of spreadsheet data structures.	N	New content added.
<a href="#">3.1.1.9 Sessions Entity Set</a>	Added this new section.	Y	New content added.
<a href="#">4.5 Retrieve the OData service document for a workbook</a>	Added this new section.	N	New content added.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
<a href="#">Z Appendix B: Product Behavior</a>	Updated the list of applicable product versions.	N	Content updated.
<a href="#">Z Appendix B: Product Behavior</a>	Added Microsoft® SharePoint® Server 15 Technical Preview to the list of applicable product versions.	N	New content added.
	Replaced all instances of [MC-APDSU] with [MS-ODATA].	N	Content updated.
	Updated the reference for an entity set with the category element present to [MS-ODATA] section 2.2.6.2.1.	N	Content updated.



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