[MS-QDEFF]:

Query Definition File Format

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Revision Summary

Date	Revision History	Revision Class	Comments
9/25/2015	1.0	New	Released new document.
5/6/2016	1.1	Minor	Clarified the meaning of the technical content.
7/15/2016	1.1	None	No changes to the meaning, language, or formatting of the technical content.
9/14/2016	1.1	None	No changes to the meaning, language, or formatting of the technical content.
6/20/2017	1.2	Minor	Clarified the meaning of the technical content.
9/19/2017	2.0	Major	Significantly changed the technical content.

Table of Contents

1   Introduction

The Query Definition File Format defines a file format that is used to store the Power Query Formulas of the queries in a spreadsheet and their associated metadata.

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

1.1   Glossary

This document uses the following terms:

base64 encoding: A binary-to-text encoding scheme whereby an arbitrary sequence of bytes is converted to a sequence of printable ASCII characters, as described in [RFC4648].

culture: A part of a language identification tagging system, as described in [RFC1766]. Culture names adhere to the format "<languagecode2>-<country/regioncode2>."

Data Protection Application Program Interface (DPAPI): An application programming interface (API) for creating protected data BLOBs. For more information, see [MSDN-DPAPI].

globally unique identifier (GUID): A term used interchangeably with universally unique identifier (UUID) in Microsoft protocol technical documents (TDs). Interchanging the usage of these terms does not imply or require a specific algorithm or mechanism to generate the value. Specifically, the use of this term does not imply or require that the algorithms described in [RFC4122] or [C706] must be used for generating the **GUID**. See also universally unique identifier (UUID).

Office Open XML (OOXML): A family of XML schemas, specified in [ECMA-376], that is used for office productivity applications.

Open Packaging Conventions (OPC): An open standard for a portable container technology that defines a structured way to store application data with related resources by using a standard .ZIP file format. OPC is a component of Office Open XML File Formats [ECMA-376].

Power Query Formula: A script language that defines how a query filters and combines data from one or more supported data sources.

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

SHA-256 hash: The value computed from the hashing function described in [FIPS180-3].

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

table: A list that is defined in a workbook.

UTF-8: A byte-oriented standard for encoding Unicode characters, defined in the Unicode standard. Unless specified otherwise, this term refers to the UTF-8 encoding form specified in [UNICODE5.0.0/2007] section 3.9.

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

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

XML document: A document object that is well formed, as described in [XML10/5], and might be valid. An XML document has a logical structure that is composed of declarations, elements, comments, character references, and processing instructions. It also has a physical structure that is composed of entities, starting with the root, or document, entity.

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

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

1.2   References

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

1.2.1   Normative References

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

[MS-MLANG] Microsoft Corporation, "https://go.microsoft.com/fwlink/p/?linkid=320633".

[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

1.2.2   Informative References

[ECMA-376-2/2] ECMA, "Information technology – Document description and processing languages – Office Open XML File Formats – Part 2: Open Packaging Conventions", 2nd edition, Standard ECMA-376-2, December 2008, http://www.ecma-international.org/publications/files/ECMA-ST/ECMA-376,%20Second%20Edition,%20Part%202%20-%20Open%20Packaging%20Conventions.zip

[ECMA-376] ECMA International, "Office Open XML File Formats", 1st Edition, ECMA-376, December 2006, http://www.ecma-international.org/publications/standards/Ecma-376.htm

[MSFT-Support] Microsoft Corporation, "Support", http://support.microsoft.com/

[XML] World Wide Web Consortium, "Extensible Markup Language (XML) 1.0 (Fourth Edition)", W3C Recommendation 16 August 2006, edited in place 29 September 2006, http://www.w3.org/TR/2006/REC-xml-20060816/

1.3   Overview

The Query Definition File Format Structure contains information about the queries in a spreadsheet, including the **Power Query Formula** of each query as well as metadata that describes its relationship to other elements in the spreadsheet. It is stored within a CustomXML Part in the spreadsheet file.

1.4   Relationship to Protocols and Other Structures

This file format is hosted within the structures that are defined in the following reference:

▪   [ECMA-376] describes the Custom XML Part within an **Office Open XML (OOXML)** document.

This file format makes use of the structures that are defined in the following references:

- [XML] describes the XML format.

- [ECMA-376-2/2] describes the **Open Packaging Conventions (OPC)** package format.

- [MS-MLANG] describes the Power Query Formula language.

1.5   Applicability Statement

This structure is used to persist information about queries that utilize Power Query technology within a spreadsheet file. This structure applies to the case where a user authors such a query using spreadsheet software that produces the containing file.

1.6   Versioning and Localization

This document covers versioning issues in the following areas:

- **Structure Versions:** Version information related to this structure is stored within the structure. For more details, see section 2.3.1.

- **Localization:** Locale-specific information related to this structure is stored within the structure. For more details, see section 2.3.1.

1.7   Vendor-Extensible Fields

Each query is associated with an extensible set of metadata entries in which vendors store vendor-specific information. For more details, see section 2.5.1.

2   Structures

The Query Definition File Format Structure consists of a root **XML** element (section 2.1) containing a **base64-encoded** binary stream. The binary stream (section 2.2) consists of four variable-length fields, namely:

- Package Parts (section 2.3)

- Permissions (section 2.4)

- Metadata (section 2.5)

- Permission Bindings (section 2.6)

Each field is preceded by a 4-byte integer field that specifies its length.

2.1   Root Element

The following **XML schema** fragment defines this element.

```
<xs:schema targetNamespace="http://schemas.microsoft.com/DataMashup"
           elementFormDefault="qualified"
           xmlns:xs="http://www.w3.org/2001/XMLSchema"
           xmlns="http://schemas.microsoft.com/DataMashup">

  <xs:simpleType name="guid">
    <xs:restriction base="xs:string">
      <xs:pattern value="[0-9a-fA-F]{8}-[0-9a-fA-F]{4}-[0-9a-fA-F]{4}-[0-9a-fA-F]{4}-[0-9a-
fA-F]{12}" />
    </xs:restriction>
  </xs:simpleType>

  <xs:element name="DataMashup">
    <xs:complexType>
      <xs:simpleContent>
        <xs:extension base="xs:base64Binary">
          <xs:attribute name="sqmid" type="guid" use="optional" />
        </xs:extension>
      </xs:simpleContent>
    </xs:complexType>
  </xs:element>

</xs:schema>
```

sqmid: An arbitrary **GUID** used to correlate the spreadsheet for telemetry.

2.2   Top-level Binary Stream

The following table defines the top-level binary stream contained in the root element after **base64** decoding.

0	1	2	3	4	5	6	7	8	9	1 0	1	2	3	4	5	6	7	8	9	2 0	1	2	3	4	5	6	7	8	9	3 0	1
Version																															
Package Parts Length																															

Package Parts (variable)		
...	Permissions Length	
...	Permissions (variable)	
...		Metadata Length
...		Metadata (variable)
...		Permission Bindings Length
...		Permission Bindings (variable)

Version (4 bytes): Unsigned integer that MUST be set to 0.

Package Parts Length (4 bytes): Unsigned integer that specifies the length of the **Package Parts** field.

Package Parts (variable): Variable-length binary stream (section 2.3).

Permissions Length (4 bytes): Unsigned integer that specifies the length of the **Permissions** field.

Permissions (variable): Variable-length binary stream (section 2.4).

Metadata Length (4 bytes): Unsigned integer that specifies the length of the **Metadata** field.

Metadata (variable): Variable-length binary stream (section 2.5).

Permission Bindings Length (4 bytes): Unsigned integer that specifies the length of the **Permission Bindings** field.

Permission Bindings (variable): Variable-length binary stream (section 2.6).

2.3   Package Parts

The **Package Parts** binary stream is an **Open Packaging Conventions (OPC)** package that consists of the following parts:

Name	Content Type	Reference
/Config/Package.xml	text/xml	section 2.3.1
/Formulas/Section1.m	text/plain	section 2.3.2
/Content/*Guid1*	application/octet-stream	section 2.3.3
...		

Note that *Guid1* above is a placeholder for a **GUID**, and the package MAY contain one or more of such parts.

2.3.1 Package.xml

The following **XML schema** fragment defines this part.

```
<xs:schema targetNamespace="http://schemas.microsoft.com/DataMashup"
           elementFormDefault="qualified"
           xmlns:xs="http://www.w3.org/2001/XMLSchema"
           xmlns="http://schemas.microsoft.com/DataMashup">

  <xs:simpleType name="version">
    <xs:restriction base="xs:string">
      <xs:pattern value="[0-9]+\.[0-9]+(\.[0-9]+(\.[0-9]+)?)?" />
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="culture">
    <xs:restriction base="xs:string">
      <xs:enumeration value="en-us" />
      <!-- Other culture names as specified by RFC1766 -->
    </xs:restriction>
  </xs:simpleType>

  <xs:element name="Package">
    <xs:complexType>
      <xs:all>
        <xs:element name="Version" type="version"></xs:element>
        <xs:element name="MinVersion" type="version"></xs:element>
        <xs:element name="Culture" type="culture"></xs:element>
      </xs:all>
    </xs:complexType>
  </xs:element>

</xs:schema>
```

Version: Specifies the version of the client used to create this file.

MinVersion: Specifies the minimum version of the client that is able to read this file.

Culture: Specifies the **culture** to be used when parsing date/time strings.

2.3.2 Section1.m

This part is the plain-text document that contains the **Power Query Formula** for each query in the spreadsheet. It is fully specified by [MS-MLANG].

2.3.3 Embedded Contents

Each of these parts can contain application-specific binary data.

2.4 Permissions

The Permissions binary stream is a **UTF-8** encoded **XML document** defined by the following schema fragment.

```
<xs:schema targetNamespace="http://schemas.microsoft.com/DataMashup"
           elementFormDefault="qualified"
           xmlns:xs="http://www.w3.org/2001/XMLSchema"
           xmlns="http://schemas.microsoft.com/DataMashup">
  <xs:element name="PermissionList">
    <xs:complexType>
      <xs:all>
```

```
            <xs:element name="CanEvaluateFuturePackages" type="xs:boolean" />
            <xs:element name="FirewallEnabled" type="xs:boolean" />
            <xs:element name="WorkbookGroupType" nillable="true">
              <xs:simpleType>
                <xs:restriction base="xs:string">
                  <xs:enumeration value="None" />
                  <xs:enumeration value="Public" />
                  <xs:enumeration value="Organizational" />
                  <xs:enumeration value="SeparatePrivate" />
                  <xs:enumeration value="Named" />
                  <xs:enumeration value="CombinedPrivate" />
                  <xs:enumeration value="SingleUnclassified" />
                  <xs:enumeration value="MultipleUnclassified" />
                </xs:restriction>
              </xs:simpleType>
            </xs:element>
          </xs:all>
        </xs:complexType>
      </xs:element>
    </xs:schema>
```

CanEvaluateFuturePackages: Specifies whether the client is allowed to read files created in a newer version of the client. This value is ignored when read, and is always written as "false".

FirewallEnabled: Specifies whether Privacy Level settings are used when combining data. See the [MSFT-Support] article "Privacy levels (Power Query)" for more information.

WorkbookGroupType: Specifies the Privacy Level of the current spreadsheet. See the [MSFT-Support] article "Privacy levels (Power Query)" for more information.

2.5   Metadata

The Metadata binary stream is defined in the following table.

0	1	2	3	4	5	6	7	8	9	1 0	1	2	3	4	5	6	7	8	9	2 0	1	2	3	4	5	6	7	8	9	3 0	1
Version																															
Metadata XML Length																															
Metadata XML (variable)																															
...									Content Length																						
...									Content (variable)																						

Version (4 bytes): Unsigned integer that MUST be set to 0.

Metadata XML Length (4 bytes): Unsigned integer that specifies the length of the **Metadata XML** field.

Metadata XML (variable): **UTF-8** encoded **XML document** that specifies the metadata for the collection of queries as well as each individual query (section 2.5.1).

Content Length (4 bytes): Unsigned integer that specifies the length of the **Content** field.

Content (variable): Open Packaging Conventions (OPC) package (section 2.5.2).

2.5.1   Metadata XML

The **Metadata XML** binary stream is a **UTF-8** encoded **XML document** that specifies the metadata associated with each query in the spreadsheet, as well as the entire collection of queries.

The following **XML schema** fragment defines this XML document.

```
<xs:schema targetNamespace="http://schemas.microsoft.com/DataMashup"
           elementFormDefault="qualified"
           xmlns:xs="http://www.w3.org/2001/XMLSchema"
           xmlns="http://schemas.microsoft.com/DataMashup">

  <xs:element name="LocalPackageMetadataFile">
    <xs:complexType>
      <xs:all>
        <xs:element name="Items">
          <xs:complexType>
            <xs:sequence minOccurs="0" maxOccurs="unbounded">
              <xs:element name="Item" type="Item" />
            </xs:sequence>
          </xs:complexType>
        </xs:element>
      </xs:all>
    </xs:complexType>
  </xs:element>

  <xs:complexType name="Item">
    <xs:all>
      <xs:element name="ItemLocation" type="ItemLocation" />
      <xs:element name="StableEntries">
        <xs:complexType>
          <xs:sequence minOccurs="0" maxOccurs="unbounded">
            <xs:element name="Entry" type="Entry" />
          </xs:sequence>
        </xs:complexType>
      </xs:element>
    </xs:all>
  </xs:complexType>

  <xs:complexType name="ItemLocation">
    <xs:all>
      <xs:element name="ItemType">
        <xs:simpleType>
          <xs:restriction base="xs:string">
            <xs:enumeration value="Formula" />
            <xs:enumeration value="AllFormulas" />
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
      <xs:element name="ItemPath" type="xs:string" />
    </xs:all>
  </xs:complexType>

  <xs:complexType name="Entry">
    <xs:attribute name="Type" type="xs:string" />
    <xs:attribute name="Value">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:pattern value="l[0-9]+" />
          <xs:pattern value="f[0-9]+\.[0-9]+" />
          <xs:pattern value="s.*" />
          <xs:pattern value="c[0-9a-fA-F]{8}-[0-9a-fA-F]{4}-[0-9a-fA-F]{4}-[0-9a-fA-F]{4}-[0-
9a-fA-F]{12}" />
          <xs:pattern value="d[0-9]{4}-[0-9]{2}-[0-9]{2}T[0-9]{2}:[0-9]{2}:[0-9]{2}\.[0-
9]{7}" />
        </xs:restriction>
      </xs:simpleType>
```
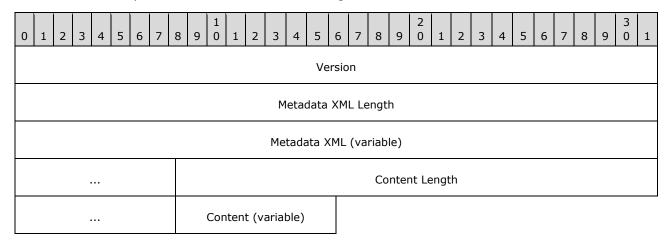
```
        </xs:attribute>
    </xs:complexType>

   </xs:schema>
```

Items: Container for all metadata collections. Can contain one or more metadata entry collections.

Items.Item: A single collection of metadata entries for a particular query.

Items.Item.ItemLocation: Contains information about the query that this collection of metadata entries applies to.

Items.Item.ItemLocation.ItemType: This value MUST be "Formula" if this collection of metadata entries applies to a single query. Otherwise it MUST be "AllFormulas".

Items.Item.ItemLocation.ItemPath: If the value of ItemType is "Formula", this value MUST be of the form "Section1/*Query Name*", where *Query Name* is the name of the query. Otherwise, it MUST be the empty string.

Items.Item.StableEntries: The collection of metadata entries.

Items.Item.StableEntries.Entry: A single metadata entry.

Items.Item.StableEntries.Entry.Type: The name of the metadata entry.

Items.Item.StableEntries.Entry.Value: The value of the metadata entry. This value is composed of a single-letter prefix followed by the value itself, with the prefix denoting the data type of the value:

- l: integer value, or Boolean value with 0=false, 1=true

- f: decimal value

- s: string value

- c: GUID referencing binary content (section 2.5.2)

- d: date/time value

Note: The following metadata entries are added to the query.

Name	Data Type	Description
AddedToDataModel	Boolean	Whether the query has been loaded to the **spreadsheet data model**.
BufferNextRefresh	Boolean	Whether data will be buffered on the next refresh.
FillCount	Integer	The number of rows retrieved during the most recent refresh.
FillEnabled	Boolean	Whether the query will load to the **worksheet**.
FillErrorCode	String	A code indicating the error that occurred in the most recent refresh.
FillErrorCount	Integer	The number of rows retrieved that contained errors in the most recent refresh.
FillErrorMessage	String	The message for the error that occurred in the most recent refresh.
FillLastUpdated	Date/Time	The date/time of the most recent refresh.

Name	Data Type	Description
FillColumnTypes	String	List of the column data types retrieved in the most recent refresh.
FillColumnNames	String	List of the column names retrieved in the most recent refresh.
FilledCompleteResultToWorksheet	Boolean	Whether the most recent refresh loaded the entire data set to the worksheet.
FillStatus	String	The final status of the most recent refresh.
FillTargetNameCustomized	Boolean	Whether the name of the **table** associated with the query has been renamed.
FillTargetName	String	The name of the table associated with the query.
FillToDataModelEnabled	Boolean	Whether the query load to the spreadsheet data model.
IsFunctionQuery	Boolean	Whether the query is a function query (see [MS-MLANG]).
IsPrivate	Boolean	Whether the query is private.
PublishedPackageID	String	The **GUID** of package that contains the query after it was sent to the Data Catalog.
PublishedPackageLastModifiedAt	Date/Time	The timestamp when the query was most recently sent to the Data Catalog.
QueryGroupID	String	The GUID of the query group that the query belongs to.
QueryID	String	A GUID associated with the query for telemetry.
RecoveryTargetColumn	Integer	The column index of the top-left cell of the table the query was loaded to most recently.
RecoveryTargetRow	Integer	The row index of the top-left cell of the table the query was loaded to most recently.
RecoveryTargetSheet	String	The name of the worksheet the query was loaded to most recently.
RelationshipInfoContainer	String	Information about the columns of the data set retrieved by this query.
ResultType	String	The data type of the result retrieved by the query.

Note: The following metadata entries are created for the query collection.

Name	Data Type	Description
IsRelationshipDetectionEnabled	Boolean	Whether relationship detection is enabled.
QueryGroups	String	The query groups for the spreadsheet.
Relationships	String	The relationships created for the queries.

2.5.2 Metadata Content

The Metadata Content binary stream is an **Open Packaging Conventions (OPC)** package consisting of zero or more of the following parts.

Name	Content Type
GUID	application/octet-stream

Each part holds the binary content that is referenced by the part's **GUID** in the **Metadata XML** defined in section 2.5.1.

2.6 Permission Bindings

The Permission Bindings binary stream is a cryptographic checksum that MUST be generated as follows:

- Compute the **SHA-256 hash** of the Package Parts binary stream (section 2.3) and the Permissions binary stream (section 2.4), and concatenate them.

- Encrypt the concatenated hashes using the **Data Protection Application Program Interface (DPAPI)** with the following parameters:

  - **Data protection scope**: Current user

  - **Optional entropy**: **UTF-8** encoding of the string "DataExplorer Package Components"

When reading the Query Definition File Format Structure from the spreadsheet, if the Permission Bindings cryptographic checksum computed using the algorithm above does not match what is persisted in the spreadsheet file, the Permissions binary stream persisted in the spreadsheet file MUST be discarded, and replaced with the following defaults.

```
<PermissionList xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <CanEvaluateFuturePackages>false</CanEvaluateFuturePackages>
  <FirewallEnabled>true</FirewallEnabled>
  <WorkbookGroupType xsi:nil="true" />
</PermissionList>
```

3   Structure Examples

The examples below illustrate the various structures persisted in the Query Definition File Format Structure after a query has been created with the Power Query Formula "=1+1", loaded into a **query table** in the **worksheet**, and then refreshed.

3.1   Root Element

```
<DataMashup sqmid="7690c5d6-5698-463c-a560-a0093d4f6332"
xmlns="http://schemas.microsoft.com/DataMashup">AAAAAEUDAABQSwMEFAACAAgAta0pR62KRJynAAAA+QAAA
BIAHABDb25maWcvUGFja2FnZS54bWWwgohgAKKAUAAAAAAAAAAAAAAAAAAAAAAAAAAAAhY9NDoIwGESvQrqnP4jGkI+ycC
uJCdG4bUqFRiiGFsvdXHgkryCJYti5nMmb5M3r8YRsbJvgrnqrO5MihikKlJFdqU2VosFdwi3KOByEvIpKBRNsbDJanaL
auVtCiPce+xXu+opElDJyzveFrFUrQm2sE0Yq9FuV/1eIw+kjwyMcxTimmzVmMWVA5h5ybRbMpIwpkEUJu6FxQ6+4MuGx
ADJHIN8b/A1QSwMEFAACAAgAta0pRw/K6aukAAAA6QAAABMAHABBbQ29udGVudF9UeXBlX1c10ueG1sIKIYACigFAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAG2OSw7CMAxErxJ5n7qwQAg1ZQHcgAtEwf2I5qPGReFsLDgSVyBtd4ilZ+Z55vN6V8dkB/GgMf
beKdgUJQhyxt961yqYuJF7ONbV9Rkoihx1UUHHHA6I0XRkdSx8IJedxo9Wcz7HFoM2d90Sbstyh8Y7JseS5x9QV2dq9DS
wuKQsr7UZB3Fac3OVAqbEuMj417A/eR3C0BvN2cQkbZR2IXEZXn8BUEsDBBQAAgAIALWtKUdi3rmEPAAAAESAAAATABwA
Rm9ybXVsYXMvU2VjdGlvbjEubSCiGAooBQAAAAAAAAAAAAAAAAAAAAAAAAAAAArTk0uyczPUwiG0IbWvFy8XMUZiUWpK
QqBpalFlYYKtgo5qSW8XApAEJxfWpScChQx1Dbk5crMQxa1BgBQSwEClECLQAUAAIACAC1rSlHrYpEnKcAAAD5AAAAEgAAA
AAAAAAAAAAAAAAAAAAQ29uZmlnL1BhY2thZ2UueG1sUEsBAi0AFAACAAgAta0pRw/K6aukAAAA6QAAABMAAAAAAAAAAAAA
AAAA8wAAAFtDb250ZW50X1R5cGVzXS54bWxQSwECLQAUAAIACAC1rSlHYt65hDwAAABBAAAAEwAAAAAAAAAAAAAAAAADk
AQAARm9ybXVsYXMvU2VjdGlvbjEubVBLBQYAAAAAAwADAMIAAABtAgAAAAA=77u/PD94bWwgdmVyc2lvbj0iMS4wIi
iBlbmNvZGluZz0idXRmLTgiPz48UGVybWlzc2lvbkxpc3QgeG1sbnM6eHNpPSJodHRwOi8vd3d3LnczLm9yZy8yMDAxL1
hNTFNjaGVtYS1pbnN0YW5jZSIgeG1sbnM6eHNkPSJodHRwOi8vd3d3LnczLm9yZy8yMDAxL1hNTFNjaGVtYSI+PENhbkV
2YWx1YXRlRnV0dXJlUGFja2FnZXM+ZmFsc2U8L0NhbkV2YWx1YXRlRnV0dXJlUGFja2FnZXM+PEZpcmV3YWxsRW5hYmxl
ZD50cnVlPC9GaXJld2FsbEVuYWJsZWQ+PFdvcmtib29rR3JvdXBUeXBlIHhzaTpuaWw9InRydWUiIC8+PC9QZXJtaXNzaW
9uTGlzdD7LBwAAAAAAAAKkhAADvu788P3htCB2ZXJzaW9uPSIxLjAiIGVuY29kaW5nPSJVdGYtOCI/PjxMb2NhdGlvbnM+
thZ2VNZXRhZGF0YT4YZpbGUgeG1sbnM6eHNpPSJodHRwOi8vd3d3LnczLm9yZy8yMDAxL1hNTFNjaGVtYS1pbnN0YW5jZSI
geG1sbnM6eHNkPSJodHRwOi8vd3d3LnczLm9yZy8yMDAxL1hNTFNjaGVtYSI+PEl0ZW1zPjxJdGVtPjxJdGVtTG9jYXRpb
24+PEl0ZW1UeXBlPkFsbEZvcm11bGFzPC9JdGVtVHlwZT48SXRlbVBhdGggGgLz48L0l0ZW1Mb2NhdGlvbj48U3RhYmxlR
W50cmllcyAvPjwvSXRlbT48SXRlbT48SXRlbUxvY2F0aW9uPjxJdGVtVHlwZT5Gb3JtdWxhPHWPPC9JdGVtVHlwZT48SXRlbV
BhdGg+U2VjdGlvbjEvUXVlcnkxPC9JdGVtUGF0aD48L0l0ZW1Mb2NhdGlvbj48U3RhYmxlRW50cmllcz48RW50cnkgVHl
wZT0iSXNNcmi2YXRlIiBWYWx1ZT0ibDAiIC8+PEVudHJ5IFR5cGU9IlJlc3VsdFR5cGUiIFZhbHVlPSJzTnVtYmVyIiAv
PjxFbnRyeSBUeBlPSJGaWxsRW5hYmxlZCIgVmFsdWU9ImwxIiAvPjxFbnRyeSBUeBlPSJGaWxsVG9EYXRhTW9kZWxFb
mFibGVkIiBWYWx1ZT0ibDAiIC8+PEVudHJ5IFR5cGU9IkZpbGxDb3VudCIgVmFsdWU9ImwxIiAvPjxFbnRyeSBUeBlP
SJGaWxsRXJyb3JDb2RlIiBWYWx1ZT0ic1Vua25vd24iIC8+PEVudHJ5IFR5cGU9IkZpbGxDb3VudCIgVmFsdWU9ImwxIiA
vPjxFbnRyeSBUeBlPSJGaWxsRXJyb3JDb2RlIiBWYWx1ZT0ic1Vua25vd24iIC8+PEVudHJ5IFR5cGU9IkZpbGxDb2x1b
W5OYW1lcyIgVmFsdWU9ImQyMDE1LTA5LTEwVDA0OjQ1OjQxLjkyNzU5MDBaIiAvPjxFbnRyeSBUeBlPSJSZWxhdGlvbnNoaX
BJbmZvZXVudGFpbmVyIiBWYWx1ZT0ic3smcXVvdDtjb2x1bW5Db3VudCZxdW90OzoxLCZxdW90O2tleUNvbHVtbk5hbWV
zJnF1b3Q7OltdLCZxdW90O3F1ZXJ5UmVsYXRpb25zaGlwcyZxdW90OzpbXSwmcXVvdDtjb2x1bW5JZGVudGl0aWVzJnF1
b3Q7OlsmcXVvdDtTZWN0aW9uMS9RdWVyeTEvQXV0b1JlbW92ZWRDb2x1bW5zMS57UXVlcnkxLDB9JnF1b3Q7XSwmcXVvd
DtDb2x1bW5Db3VudCZxdW90OzoxLCZxdW90O3leUNvbHVtbktlZW50aXRpZXMmcXVvdDs6W119IiAvPjxFbnRyeSBUeBlP
SJGaWxsTGFzdFVwZGF0ZWQiIFZhbHVlPSJkMjAxNS0wOS0xMFQwNDo0NTo0Mi4yNjA2NjIwWjEZSIgLz48L1N0YWJsZUVudHJp
ZXMoL0l1ZW0+PC9JdGVtcz48L1BhY2thZ2VNZXRhZGF0YT48UGVybWlzc2lvbkJpbmRpbmcgeG1sbnM6eHNpPSJodHRwOi8v
d3d3LnczLm9yZy8yMDAxL1hNTFNjaGVtYS1pbnN0YW5jZSIgeG1sbnM6eHNkPSJodHRwOi8vd3d3LnczLm9yZy8yMDAxL1zP
jwvTG9jYXRpb25zPjwvUGFja2FnZU1ldGFkYXRhPjxYAAAABQSwUGAAAAAAAAAAAAAAAAAAAAAAAA2gAAAEAAADQjJ3fARXREY
x6AMBPwpfrAQAAACLWGAG5O6FHjkAGtB+m5EQAAAAAgAAAAAA2YAAMAAAAAQAAAaH8KNe2ciHwfVosIvSCr6gAAAAA
EgAAAoAAAABAAAAA40fOKWe6kmTAWJSBXs4cYUAAAAPNy7uF6Dtr9PvADu+eZdeV7JutpIQTh41qqT3QnFoWPwE0Xyrur
5N6Q2s2TEzjlBDfkEmNaGtr3htemOjWZYXKQHP+R5u/90zHWiwOwjjowFAAAAF2UC6Jm8C98hVmJBo638e4Qk65V</Dat
aMashup>
```

3.2   Package.xml

```
<Package>
  <Version>2.24.4065.1401</Version>
```

```
    <MinVersion>2.21.0.0</MinVersion>
    <Culture>en-US</Culture>
  </Package>
```

3.3   Section1.m

```
section Section1;

shared Query1 = let
    Source = 1+1
in
    Source;
```

3.4   Permissions XML

```
<PermissionList xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <CanEvaluateFuturePackages>false</CanEvaluateFuturePackages>
  <FirewallEnabled>true</FirewallEnabled>
  <WorkbookGroupType xsi:nil="true" />
</PermissionList>
```

3.5   Metadata XML

```
<LocalPackageMetadataFile>
  <Items>
    <Item>
      <ItemLocation>
        <ItemType>AllFormulas</ItemType>
        <ItemPath />
      </ItemLocation>
      <StableEntries />
    </Item>
    <Item>
      <ItemLocation>
        <ItemType>Formula</ItemType>
        <ItemPath>Section1/Query1</ItemPath>
      </ItemLocation>
      <StableEntries>
        <Entry Type="IsPrivate" Value="l0" />
        <Entry Type="ResultType" Value="sNumber" />
        <Entry Type="FillEnabled" Value="l1" />
        <Entry Type="FillToDataModelEnabled" Value="l0" />
        <Entry Type="FillCount" Value="l1" />
        <Entry Type="FillErrorCount" Value="l0" />
        <Entry Type="FillColumnTypes" Value="sBQ==" />
        <Entry Type="FillColumnNames" Value="s[&quot;Query1&quot;]" />
        <Entry Type="FillErrorCode" Value="sUnknown" />
        <Entry Type="FillLastUpdated" Value="d2015-09-10T04:45:41.9275900Z" />
        <Entry Type="RelationshipInfoContainer"
Value="s{&quot;columnCount&quot;:1,&quot;keyColumnNames&quot;:[],&quot;queryRelationships&quo
t;:[],&quot;columnIdentities&quot;:[&quot;Section1/Query1/AutoRemovedColumns1.{Query1,0}&quot
;],&quot;ColumnCount&quot;:1,&quot;KeyColumnNames&quot;:[],&quot;ColumnIdentities&quot;:[&quo
t;Section1/Query1/AutoRemovedColumns1.{Query1,0}&quot;],&quot;RelationshipInfo&quot;:[]}" />
        <Entry Type="FilledCompleteResultToWorksheet" Value="l1" />
        <Entry Type="AddedToDataModel" Value="l0" />
        <Entry Type="RecoveryTargetSheet" Value="sSheet2" />
        <Entry Type="RecoveryTargetColumn" Value="l1" />
        <Entry Type="RecoveryTargetRow" Value="l1" />
        <Entry Type="NameUpdatedAfterFill" Value="l0" />
        <Entry Type="FillTarget" Value="sQuery1" />
        <Entry Type="BufferNextRefresh" Value="l1" />
        <Entry Type="FillStatus" Value="sComplete" />
        <Entry Type="QueryID" Value="s7e04362e-92f5-4d82-8b07-2761eaf68ae5" />
```

```
          </StableEntries>
        </Item>
        <Item>
          <ItemLocation>
            <ItemType>Formula</ItemType>
            <ItemPath>Section1/Query1/Source</ItemPath>
          </ItemLocation>
          <StableEntries />
        </Item>
      </Items>
</LocalPackageMetadataFile>
```

4 Security

4.1 Security Considerations for Implementers

None.

4.2 Index of Security Fields

Security Field	Reference
Permission Bindings	Section 2.6

5   Appendix A: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include updates to those products.

▪   Microsoft Excel 2016

Exceptions, if any, are noted in this section. If an update version, service pack or Knowledge Base (KB) number appears with a product name, the behavior changed in that update. The new behavior also applies to subsequent updates unless otherwise specified. If a product edition appears with the product version, behavior is different in that product edition.

Unless otherwise specified, any statement of optional behavior in this specification that is prescribed using the terms "SHOULD" or "SHOULD NOT" implies product behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term "MAY" implies that the product does not follow the prescription.

6 Change Tracking

This section identifies changes that were made to this document since the last release. Changes are classified as Major, Minor, or None.

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

- A document revision that incorporates changes to interoperability requirements.
- A document revision that captures changes to protocol functionality.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

The revision class **None** means that no new technical changes were introduced. Minor editorial and formatting changes may have been made, but the relevant technical content is identical to the last released version.

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

Section	Description	Revision class
2.4 Permissions	Updated lowercase use of normative term in description for CanEvaluateFuturePackages element.	Minor
2.5.1 Metadata XML	Updated the format of ItemPath when the value of ItemType is Formula.	Major
2.5.1 Metadata XML	Updated lowercase use of normative term in description for FillEnabled.	Minor

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