

[MS-DPRDL]: Report Definition Language Data Portability Overview

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Revision Summary

Date	Revision History	Revision Class	Comments
06/04/2010	0.1	Major	First release.
09/03/2010	0.1.1	Editorial	Changed language and formatting in the technical content.
02/09/2011	0.1.1	No change	No changes to the meaning, language, or formatting of the technical content.
07/07/2011	1.0	Major	Significantly changed the technical content.
11/03/2011	1.0	Major	Significantly changed the technical content.
01/19/2012	1.0	No change	No changes to the meaning, language, or formatting of the technical content.
02/23/2012	1.0	No change	No changes to the meaning, language, or formatting of the technical content.
03/27/2012	1.0	No change	No changes to the meaning, language, or formatting of the technical content.
05/24/2012	1.0	No change	No changes to the meaning, language, or formatting of the technical content.
06/29/2012	1.0	No change	No changes to the meaning, language, or formatting of the technical content.
07/16/2012	2.0	Major	Significantly changed the technical content.
10/08/2012	2.0	No change	No changes to the meaning, language, or formatting of the technical content.
10/23/2012	2.0	No change	No changes to the meaning, language, or formatting of the technical content.
03/26/2013	2.1	Minor	Clarified the meaning of the technical content.

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1 Introduction

The Microsoft SQL Server Reporting Services system includes a repository for Report Definition Language (RDL) documents, such as the Reporting Services report server database, Microsoft SharePoint Products and Technologies, or the file system and RDL documents [\[MS-RDL\]](#).

RDL documents represent the definition of the **report**. These documents are either set or retrieved in the report server database by using the SOAP endpoints—ReportService2005 [\[MS-RSWSRMNM2005\]](#), ReportService2006 [\[MS-RSWSRMSM2006\]](#), or ReportService2010 [\[MS-RSWSRM2010\]](#)—or they are opened or saved in a SharePoint library or in the file system.

1.1 Glossary

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

**dataset
report**

The following terms are defined in [\[MC-CSDL\]](#):

Entity Data Model (EDM)

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

data source

The following protocol abbreviations are used in this document:

SOAP: Simple Object Access Protocol

1.2 References

[ECMA-376-2/2] ECMA, "Office Open XML File Formats – Part 2: Open Packaging Conventions", 2nd edition, 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-376-3/2] ECMA, "Office Open XML File Formats – Part 3: Markup Compatibility and Extensibility", 2nd edition, ECMA-376-3, December 2008, <http://www.ecma-international.org/publications/files/ECMA-ST/ECMA-376,%20Second%20Edition,%20Part%203%20-%20Markup%20Compatibility%20and%20Extensibility.zip>

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

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

[MS-RDLRS] Microsoft Corporation, "[Report Definition Language Report State File Format](#)".

[MS-RSWSRMNM2005] Microsoft Corporation, "[Report Server Web Service for Report Management Native Mode: ReportService2005](#)".

[MS-RSWSRMSM2006] Microsoft Corporation, "[Report Server Web Service for Report Management SharePoint Mode: ReportService2006](#)".

[MS-RSWSRM2010] Microsoft Corporation, "[Report Server Web Service for Report Management: ReportService2010](#)".

[MS-SSAS] Microsoft Corporation, "[SQL Server Analysis Services Protocol](#)".

[MSDN-RMADS] Microsoft Corporation, "Retrieving Metadata from an Analytical Data Source",
<http://msdn.microsoft.com/en-us/library/ms123485.aspx>

[MSDN-SIOPN] Microsoft Corporation, "System.IO.Packaging Namespace",
<http://msdn.microsoft.com/en-us/library/system.io.packaging.aspx>

2 Data Portability Scenarios

2.1 Third-Party Reporting Platform Consuming RDL Documents in the Report Server Database

2.1.1 Data Description

The RDL [\[MS-RDL\]](#) document contains the definition of a report, with information about how to connect to **data sources**, which fields are used from the **datasets** that are retrieved from the data sources, how the data is aggregated, and the structure and layout of the report.

This RDL data is used to process data and to render a report. The data is stored in the report server database when Reporting Services is running in native mode.

This RDL data is created by using a Reporting Services RDL authoring tool (Report Builder or Report Designer in the Business Intelligence Development Studio), by using a third-party RDL authoring tool, or by using a text editor.

2.1.2 Format and Protocol Summary

The following table provides a comprehensive list of the formats and protocols that are used in this scenario.

Protocol or format name	Description	Reference
ReportService2005 web service protocol	This protocol is used to communicate with the report server to execute report server database operations. The ReportService2005 web service protocol is available in Microsoft SQL Server 2005, Microsoft SQL Server 2008, Microsoft SQL Server 2008 R2, and Microsoft SQL Server 2012.	[MS-RSWSRMNM2005]
ReportService2010 web service protocol	This protocol is used to communicate with the report server to execute report server database operations. The ReportService2010 web service protocol is available in SQL Server 2008 R2 and SQL Server 2012.	[MS-RWSRM2010]
Report Definition Language file format	This format specifies the file format for SQL Server Report Definition Language, a file type that is used to represent the metadata for defining a report.	[MS-RDL]

2.1.3 Data Portability Methodology

For this scenario, the documents that contain the RDL data are extracted from the report server database one by one and stored in a file on the file system. The method of extracting the RDL data from the report server database for use in a third-party reporting platform in this scenario is to use the **SOAP** endpoints that are provided by the report server.

In this scenario, the ReportService2005 [\[MS-RSWSRMNM2005\]](#) and the ReportService2010 [\[MS-RWSRM2010\]](#) SOAP endpoints enable implementers to programmatically extract the data from the report server database.

To extract the data, follow these steps:

1. Create a folder on the client machine for storing the retrieved RDL documents.
2. Use a SOAP proxy to access the ReportService2005 web service or the ReportService2010 web service, and then obtain the list of RDL documents in the report server database by using the **ListChildren()** SOAP web method.
 1. For the first call to **ListChildren()**, use "/" as the value for the *Item* parameter. This returns each **CatalogItem** that is at the root level.
 2. For each **CatalogItem** returned, follow these steps:
 1. If the **CatalogItem** is of type **Report**, store the **CatalogItem.Path**.
 2. If the **CatalogItem** is of type **Folder**, call **ListChildren** with **CatalogItem.Path** as the value for the *Item* parameter and go to substep 2.
3. Retrieve each RDL definition from the report server database. For each item path that is stored in step 2, follow these steps:
 1. Call the **GetReportDefinition()** SOAP web method, passing the item path as the value for the *Report* parameter.
 2. Create a file in the folder that was created in main step 1 of this procedure. Use the returned byte array as the contents of the file.
4. Use the RDL documentation [\[MS-RDL\]](#) to interpret the RDL data that was retrieved in the previous step for use in the third-party reporting platform.

2.1.3.1 Preconditions

Ensure that the Reporting Services service is started on the server. Grant the appropriate permissions to the user who is using the ReportService2005 or ReportService2010 SOAP endpoint to access the report server database.

2.1.3.2 Versioning

None.

2.1.3.3 Error Handling

None.

2.1.3.4 Coherency Requirements

There are no special coherency requirements.

2.1.3.5 Additional Considerations

There are no additional considerations.

2.2 Third-Party Reporting Platform Consuming RDL Documents in SharePoint

2.2.1 Data Description

The Report Definition Language (RDL) [\[MS-RDL\]](#) document contains the definition of a report with information about how to connect to data sources, which fields are used from the datasets retrieved from the data sources, how the data is aggregated, and the structure and layout of the report.

This RDL data is used to process data and to render a report. The data is stored in both the report server database and the SharePoint repository when running Reporting Services in SharePoint integrated mode.

This data is created by using a Reporting Services RDL authoring tool (Report Builder or Report Designer in the Business Intelligence Development Studio), by using a third-party RDL authoring tool, or by using a text editor.

In addition to an RDL document, there is an RDLX file. An RDLX file is a package that is compatible with a compressed (.zip) file. The contents of an RDLX file can be viewed by renaming it to a .zip file and then opening it with any file compression program that creates .zip files. The RDLX file contains an RDL [\[MS-RDL\]](#) document, an optional Report State [\[MS-RDLRS\]](#) document, and an optional Extended Properties document. (Documentation on the Extended Properties document is provided throughout this overview document.) An RDLX file might also contain optional embedded image files that can be used in the report and in other files that are for cache purposes only.

The structure within the RDLX file follows the rules that are outlined in the Open Packaging Conventions (OPC) [\[ECMA-376-2/2\]](#). Therefore, a user can extract the content of an RDLX file by implementing the OPC conventions, either manually or through a code library such as the System.IO.Packaging library that is included in the .NET Framework [\[MSDN-RMADS\]](#).

The following table lists the OPC relationship types that are required to extract content from an RDLX file.

Docu ment	OPC relationship type
RDL	http://schemas.microsoft.com/sqlserver/reporting/2011/01/reportpackage/relationships/reportdefinition
Report State	http://schemas.microsoft.com/sqlserver/reporting/2011/01/reportpackage/relationships/reportstate
Extended Properties	http://schemas.microsoft.com/sqlserver/reporting/2012/01/reportpackage/relationships/extendedproperties

The RDL document can be extracted by using the top-level RDL relationship and can then be viewed in a text editor, in the same manner that other RDL documents are viewed.

The Report State document can be extracted by using the RDL-level Report State relationship and can then be viewed in a text editor. The state information in the Report State document makes references to an **Entity Data Model** (EDM) that has to be extracted from SQL Server Analysis Services by using the methodology that is described in [Data Portability Methodology \(section 2.2.3\)](#).

The Extended Properties document can be extracted by using the top-level Extended Properties relationship and can then be viewed in a text editor. The Extended Properties document supplies a set of metadata properties for **RDLXReport**. For instance, one of those metadata properties may be

used to version **RDLXReport**. A versional **RDLXReport** allows a client application to programmatically determine if it can process **RDLXReport** or not.

The RDLX document is created by using a Reporting Services report authoring tool named Microsoft Power View or by using a third-party RDL authoring tool.

2.2.2 Format and Protocol Summary

The following table provides a comprehensive list of the formats and protocols that are used in this scenario.

Protocol or format name	Description	Reference
ReportService2006 web service protocol	This protocol is used to communicate with the report server in SharePoint integrated mode to execute report server database operations.	[MS-RSWSRMSM2006]
Report Definition Language file format	This format is used to specify the file format for SQL Server Report Definition Language (RDL), a file type that is used to represent the metadata for defining a report.	[MS-RDL]
Report State file format	This format is used to specify the file format for SQL Server Report State, a file type that is used to represent filter state of a report.	[MS-RDLRS]
Extended Properties file format	This format is used to specify the file format for RDLX Extended Properties, a file type that is used to represent the metadata properties for the RDLX file.	For more information on the Extended Properties document and format, see sections 2.2.1 , 2.2.3 , 2.2.3.5 , and 3 .
Conceptual Schema Definition Language (CSDL)	This format is used to specify the EDM that is used by both the RDL and Report State formats.	[MC-CSDL]

2.2.3 Data Portability Methodology

Because the data is stored in both the SharePoint repository and the report server database, the approach for this scenario is to extract the data by accessing the report server database by using the steps outlined in section [2.1.3](#). However, instead of using the ReportService2005 [\[MS-RSWSRMNM2005\]](#) SOAP endpoint, the ReportService2006 [\[MS-RSWSRMSM2006\]](#) SOAP endpoint is used in this scenario.

The ReportService2006 SOAP endpoint enables implementers to programmatically manage objects on a report server that is configured for SharePoint integrated mode.

To extract the data, follow these steps:

1. Create a folder on the client machine for storing the retrieved RDL documents.
2. Use a SOAP proxy to access the ReportService2006 web service or the ReportService2010 web service, and then obtain the list of RDL documents in the report server database by using the **ListChildren()** SOAP web method.

1. For the first call to **ListChildren()**, use "/" as the value for the *Item* parameter. This returns each **CatalogItem** that is at the root level.
2. For each **CatalogItem** returned, follow these steps:
 1. If the **CatalogItem** is of type **Report** or **RDLXReport**, store the **CatalogItem.Path**.
 2. If the **CatalogItem** is of type **Folder**, call **ListChildren** with **CatalogItem.Path** as the value for the *Item* parameter and go to substep 2.
3. Retrieve each RDL definition from the report server database. For each item path that is stored in step 2, follow these steps:
 1. For an item of type **Report**, call the **GetReportDefinition()** SOAP web method, passing the item path as the value for the *Report* parameter. For an item of type **RDLXReport**, call the **GetItemDefinition()** SOAP web method, passing the item path as the value for the *Item* parameter.
 2. Create a file in the folder that was created in main step 1 of this procedure. Use the returned byte array as the contents of the file.
4. For an item of type **RDLXReport**, rename the file to a .zip file and open it with any .zip tool.
 1. Extract the .rels file and open it by using a text editor.
 2. Find the RDL relationship, and then use its **Target** attribute value to obtain the location of the RDL file.
 3. Extract the RDL file from this location within the .zip file.
 4. To extract the optional Report State file, append ".rels" to the location of the Report RDL file, and then extract this .rels file from the .zip file and open it by using a text editor.
 5. Find the Report State relationship, and then use its **Target** attribute value to obtain the location of the Report State file.
 6. Extract the Report State file from this location within the .zip file.
 7. To extract the Extended Properties file, find the Extended Properties relationship in the .rels file that was extracted in step 1, and then use its **Target** attribute value to obtain the location of the Extended Properties file.
 8. Extract the Extended Properties file from this location within the .zip file.
5. Use the RDL documentation [\[MS-RDL\]](#) to interpret the RDL data that was retrieved in step 4 for use in the third-party reporting platform.
6. Use the Report State documentation [\[MS-RDLRS\]](#) to interpret the Report State that was retrieved in step 4 for use in the third-party reporting platform.
7. Use the Extended Properties documentation (see the Extended Properties document and format information in this document) to interpret the Extended Properties data that was retrieved in step 4 for use in the third-party reporting platform.

To extract the EDM schema [\[MC-CSDL\]](#), follow these steps:

1. In the RDL data, find either the **ConnectString** element (Embedded Data Source) or the **DataSourceReference** element (Shared DataSource), and then extract its value.

2. If the value came from a **DataSourceReference** element, use a SOAP proxy to access the ReportService2010 web service, and then call the **GetDataSourceContents** () SOAP web method with this value. The **GetDataSourceContents** method returns a **DataSourceDefinition** value that contains a **ConnectionString** property.
3. Create an instance of a .NET ADOMD connection by using the **ConnectionString** value, and then call the **GetSchemaDataset** method with the schema name DISCOVER_CSDL_METADATA (see [\[MS-SSAS\]](#) section 3.1.4.2.2.1.3.61). Use the [\[MS-RMADS\]](#) documentation for more information about how to do this.
4. Use the DISCOVER_CSDL_METADATA documentation to interpret the data that was retrieved in the previous step.
5. After the CSDL is extracted, use the CSDL documentation to interpret it.

2.2.3.1 Preconditions

Ensure that the Reporting Services service is started on the server and that the SharePoint service is running. Grant the appropriate permissions to the user who is using the ReportService2006 SOAP endpoint to access the report server database.

2.2.3.2 Versioning

None.

2.2.3.3 Error Handling

None.

2.2.3.4 Coherency Requirements

There are no special coherency requirements.

2.2.3.5 Additional Considerations

The Extended Properties document may contain an optional **MustUnderstand** attribute on the top-level **Properties** element.

Attribute	Namespace	Reference
MustUnderstand	http://schemas.openxmlformats.org/markup-compatibility/2006	[ECMA-376-3/2]

The [\[ECMA-376-3/2\]](#) documentation can be used to interpret the **MustUnderstand** attribute.

2.3 Third-Party Reporting Platform Consuming RDL Documents in the File System

2.3.1 Data Description

The Report Definition Language (RDL) [\[MS-RDL\]](#) document contains the definition of a report, with information about how to connect to data sources, which fields are used from the datasets retrieved from the data sources, how the data is aggregated, and the structure and layout of the report. This RDL data is used to process data and to render a report. The data is stored in the file system on the local computer.

This data is created by using a Reporting Services RDL authoring tool (Report Builder or Report Designer in the Business Intelligence Development Studio), by using a third-party RDL authoring tool, or by using a text editor.

2.3.2 Format and Protocol Summary

No formats or protocols are used in this scenario.

2.3.3 Data Portability Methodology

In this scenario, the RDL data is stored in the file system as reports (*.rdl files). By default, reports are saved in the Documents folder on the local machine (in Windows Vista, this folder is C:\Users\\Documents\). Use the RDL documentation [\[MS-RDL\]](#) to interpret the RDL data in these files.

2.3.3.1 Preconditions

None.

2.3.3.2 Versioning

None.

2.3.3.3 Error Handling

None.

2.3.3.4 Coherency Requirements

There are no special coherency requirements.

2.3.3.5 Additional Considerations

There are no additional considerations.

3 Appendix A: Full XML Schema for the Extended Properties Format

For ease of implementation, the following full XML schema is provided here.

```
<?xml version="1.0" encoding="utf-8"?>
<!-- Copyright (c) Microsoft Corporation. All rights reserved. -->
<xs:schema
targetNamespace="http://schemas.microsoft.com/sqlserver/reporting/2012/01/extendedproperties"
elementFormDefault="qualified"
xmlns="http://schemas.microsoft.com/sqlserver/reporting/2012/01/extendedproperties"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
version="1.0">
<xs:element name="Properties">
<xs:complexType>
<xs:choice minOccurs="0" maxOccurs="unbounded">
<xs:any namespace="##other" processContents="lax" />
</xs:choice>
<xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
</xs:element>
</xs:schema>
```

4 Change Tracking

This section identifies changes that were made to the [MS-DPRDL] protocol document between the October 2012 and March 2013 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.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
2.1.2 Format and Protocol Summary	1157765 Added Microsoft SQL Server 2012 to product list.	N	Content updated.

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