

[MS-BDCDP]:

Business Data Catalog Data Web Service Protocol

Intellectual Property Rights Notice for Open Specifications Documentation

- **Technical Documentation.** Microsoft publishes Open Specifications documentation (“this documentation”) for protocols, file formats, data portability, computer languages, and standards support. Additionally, overview documents cover inter-protocol relationships and interactions.
- **Copyrights.** This documentation is covered by Microsoft copyrights. Regardless of any other terms that are contained in the terms of use for the Microsoft website that hosts this documentation, you can make copies of it in order to develop implementations of the technologies that are described in this documentation and can distribute portions of it in your implementations that use these technologies or in your documentation as necessary to properly document the implementation. You can also distribute in your implementation, with or without modification, any schemas, IDLs, or code samples that are included in the documentation. This permission also applies to any documents that are referenced in the Open Specifications documentation.
- **No Trade Secrets.** Microsoft does not claim any trade secret rights in this documentation.
- **Patents.** Microsoft has patents that might cover your implementations of the technologies described in the Open Specifications documentation. Neither this notice nor Microsoft's delivery of this documentation grants any licenses under those patents or any other Microsoft patents. However, a given Open Specifications document might be covered by the Microsoft [Open Specifications Promise](#) or the [Microsoft Community Promise](#). If you would prefer a written license, or if the technologies described in this documentation are not covered by the Open Specifications Promise or Community Promise, as applicable, patent licenses are available by contacting iplg@microsoft.com.
- **License Programs.** To see all of the protocols in scope under a specific license program and the associated patents, visit the [Patent Map](#).
- **Trademarks.** The names of companies and products contained in this documentation might be covered by trademarks or similar intellectual property rights. This notice does not grant any licenses under those rights. For a list of Microsoft trademarks, visit www.microsoft.com/trademarks.
- **Fictitious Names.** The example companies, organizations, products, domain names, email addresses, logos, people, places, and events that are depicted in this documentation are fictitious. No association with any real company, organization, product, domain name, email address, logo, person, place, or event is intended or should be inferred.

Reservation of Rights. All other rights are reserved, and this notice does not grant any rights other than as specifically described above, whether by implication, estoppel, or otherwise.

Tools. The Open Specifications documentation does not require the use of Microsoft programming tools or programming environments in order for you to develop an implementation. If you have access to Microsoft programming tools and environments, you are free to take advantage of them. Certain Open Specifications documents are intended for use in conjunction with publicly available standards specifications and network programming art and, as such, assume that the reader either is familiar with the aforementioned material or has immediate access to it.

Support. For questions and support, please contact dochelp@microsoft.com.

Revision Summary

Date	Revision History	Revision Class	Comments
4/4/2008	0.1	New	Initial Availability
6/27/2008	1.0	Major	Revised and edited the technical content
12/12/2008	1.01	Editorial	Revised and edited the technical content
7/13/2009	1.02	Major	Changes made for template compliance
8/28/2009	1.03	Editorial	Revised and edited the technical content
11/6/2009	1.04	Editorial	Revised and edited the technical content
2/19/2010	2.0	Minor	Updated the technical content
3/31/2010	2.01	Editorial	Revised and edited the technical content
4/30/2010	2.02	Minor	Updated the technical content
6/7/2010	2.03	Editorial	Revised and edited the technical content
6/29/2010	2.04	Editorial	Changed language and formatting in the technical content.
7/23/2010	2.04	None	No changes to the meaning, language, or formatting of the technical content.
9/27/2010	2.04	None	No changes to the meaning, language, or formatting of the technical content.
11/15/2010	2.04	None	No changes to the meaning, language, or formatting of the technical content.
12/17/2010	2.04	None	No changes to the meaning, language, or formatting of the technical content.
3/18/2011	2.04	None	No changes to the meaning, language, or formatting of the technical content.
6/10/2011	2.04	None	No changes to the meaning, language, or formatting of the technical content.
1/20/2012	3.0	Major	Significantly changed the technical content.
4/11/2012	3.0	None	No changes to the meaning, language, or formatting of the technical content.
7/16/2012	3.0	None	No changes to the meaning, language, or formatting of the technical content.
9/12/2012	3.0	None	No changes to the meaning, language, or formatting of the technical content.
10/8/2012	3.1	Minor	Clarified the meaning of the technical content.
2/11/2013	3.1	None	No changes to the meaning, language, or formatting of the technical content.
7/30/2013	3.2	Minor	Clarified the meaning of the technical content.
11/18/2013	3.2	None	No changes to the meaning, language, or formatting of the technical content.

Date	Revision History	Revision Class	Comments
2/10/2014	3.2	None	No changes to the meaning, language, or formatting of the technical content.
4/30/2014	3.2	None	No changes to the meaning, language, or formatting of the technical content.
7/31/2014	3.2	None	No changes to the meaning, language, or formatting of the technical content.
10/30/2014	3.2	None	No changes to the meaning, language, or formatting of the technical content.
2/26/2016	4.0	Major	Significantly changed the technical content.
7/15/2016	4.0	None	No changes to the meaning, language, or formatting of the technical content.
9/14/2016	4.0	None	No changes to the meaning, language, or formatting of the technical content.
10/17/2016	4.0	None	No changes to the meaning, language, or formatting of the technical content.
7/24/2018	5.0	Major	Significantly changed the technical content.
10/1/2018	6.0	Major	Significantly changed the technical content.
3/19/2019	6.0	None	No changes to the meaning, language, or formatting of the technical content.
6/18/2019	6.0	None	No changes to the meaning, language, or formatting of the technical content.
7/20/2021	7.0	Major	Significantly changed the technical content.
10/5/2021	8.0	Major	Significantly changed the technical content.
2/15/2022	8.0	None	No changes to the meaning, language, or formatting of the technical content.

Table of Contents

1	Introduction	6
1.1	Glossary	6
1.2	References	7
1.2.1	Normative References	7
1.2.2	Informative References	8
1.3	Overview	8
1.4	Relationship to Other Protocols	8
1.5	Prerequisites/Preconditions	9
1.6	Applicability Statement	9
1.7	Versioning and Capability Negotiation	9
1.8	Vendor-Extensible Fields	9
1.9	Standards Assignments.....	9
2	Messages.....	10
2.1	Transport	10
2.2	Common Message Syntax	10
2.2.1	Namespaces	10
2.2.2	Messages.....	10
2.2.3	Elements	11
2.2.4	Complex Types.....	11
2.2.5	Simple Types	11
2.2.6	Attributes	11
2.2.7	Groups	11
2.2.8	Attribute Groups.....	11
3	Protocol Details.....	12
3.1	Protocol Server Details	12
3.1.1	Abstract Data Model.....	12
3.1.2	Timers	12
3.1.3	Initialization.....	12
3.1.4	Message Processing Events and Sequencing Rules	12
3.1.4.1	Resolve.....	13
3.1.4.1.1	Messages	13
3.1.4.1.1.1	ResolveSoapIn	13
3.1.4.1.1.2	ResolveSoapOut	14
3.1.4.1.2	Elements.....	14
3.1.4.1.2.1	Resolve	14
3.1.4.1.2.2	ResolveResponse	14
3.1.4.1.3	Complex Types	15
3.1.4.1.3.1	ResolveResult.....	15
3.1.4.1.3.2	IdentifierField.....	15
3.1.4.1.3.3	ArrayOfFieldRecord	16
3.1.4.1.3.4	FieldRecord	16
3.1.4.1.4	Simple Types	16
3.1.4.1.4.1	ResolveStatus	16
3.1.4.1.5	Attributes	17
3.1.4.1.6	Groups.....	17
3.1.4.1.7	Attribute Groups.....	17
3.1.5	Timer Events.....	17
3.1.6	Other Local Events.....	17
4	Protocol Examples.....	18
4.1	Retrieving Field Values for LobSystem Entities	18
5	Security.....	19
5.1	Security Considerations for Implementers	19

5.2	Index of Security Parameters	19
6	Appendix A: Full WSDL	20
7	Appendix B: Product Behavior	22
8	Change Tracking.....	23
9	Index.....	24

1 Introduction

The Business Data Catalog Data Web Service Protocol is an interface that protocol clients can use to search software systems that store business data and process rules for an instance of a particular entity.

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

1.1 Glossary

This document uses the following terms:

entity: An instance of an `EntityType` element that has a unique identity and an independent existence. An entity is an operational unit of consistency.

EntityInstance: A set of `Field` values that have a unique identity that represents a specific instance of an Entity, and are stored in a line-of-business (LOB) system.

EntityInstanceId: A set of `Field` values of an EntityInstance that collectively and uniquely identify an EntityInstance in a line-of-business (LOB) system.

field: The data elements that constitute an `Entity` in a line-of-business (LOB) system.

identifier: A string value that is used to uniquely identify a component of the CSDL and that is of type `SimpleIdentifier`.

line-of-business (LOB) system: A software system that is used to store business data and can also contain business rules and business logic that support business processes.

LobSystem: A type of `MetadataObject` that represents a specific version of a line-of business (LOB) system. An LOB system can be a database or a web service.

LobSystemInstance: A type of `MetadataObject` that represents a specific deployed instance of a `line-of-business (LOB) system`, as represented by a `LobSystem`. `LobSystemInstances` are contained by `LobSystems`. `LobSystemInstance Properties` describe how to connect to an instance of the `LobSystem` that contains them by providing information such as the server name, connection string, and authentication mode.

metadata store: A database that is stored on a back-end database server and contains all stored procedures and storage for the `MetadataObject` types.

MetadataObject: An abstract data structure that consists of a set of attributes that represent a `LobSystem`, `LobSystemInstance`, `DataClass`, `Entity`, `Method`, `MethodInstance`, `Parameter`, `TypeDescriptor`, `Identifier`, `FilterDescriptor`, `Action`, `ActionParameter`, or `Association`.

model: The highest level of data organization in Master Data Services. A model contains objects and entities.

site: A group of related pages and data within a SharePoint site collection. The structure and content of a site is based on a site definition. Also referred to as SharePoint site and web site.

SOAP action: The HTTP request header field used to indicate the intent of the SOAP request, using a URI value. See [\[SOAP1.1\]](#) section 6.1.1 for more information.

SOAP body: A container for the payload data being delivered by a SOAP message to its recipient. See [\[SOAP1.2-1/2007\]](#) section 5.3 for more information.

SOAP fault: A container for error and status information within a SOAP message. See [SOAP1.2-1/2007] section 5.4 for more information.

Uniform Resource Locator (URL): A string of characters in a standardized format that identifies a document or resource on the World Wide Web. The format is as specified in [RFC1738].

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

XML namespace: A collection of names that is used to identify elements, types, and attributes in XML documents identified in a URI reference [RFC3986]. A combination of XML namespace and local name allows XML documents to use elements, types, and attributes that have the same names but come from different sources. For more information, see [XMLNS-2ED].

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.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, <http://www.rfc-editor.org/rfc/rfc2119.txt>

[RFC2616] Fielding, R., Gettys, J., Mogul, J., et al., "Hypertext Transfer Protocol -- HTTP/1.1", RFC 2616, June 1999, <http://www.rfc-editor.org/rfc/rfc2616.txt>

[RFC3986] Berners-Lee, T., Fielding, R., and Masinter, L., "Uniform Resource Identifier (URI): Generic Syntax", STD 66, RFC 3986, January 2005, <http://www.rfc-editor.org/rfc/rfc3986.txt>

[SOAP1.1] Box, D., Ehnebuske, D., Kakivaya, G., et al., "Simple Object Access Protocol (SOAP) 1.1", W3C Note, May 2000, <http://www.w3.org/TR/2000/NOTE-SOAP-20000508/>

[SOAP1.2-1/2007] Gudgin, M., Hadley, M., Mendelsohn, N., et al., "SOAP Version 1.2 Part 1: Messaging Framework (Second Edition)", W3C Recommendation, April 2007, <http://www.w3.org/TR/2007/REC-soap12-part1-20070427/>

[SOAP1.2-2/2007] Gudgin, M., Hadley, M., Mendelsohn, N., et al., "SOAP Version 1.2 Part 2: Adjuncts (Second Edition)", W3C Recommendation, April 2007, <http://www.w3.org/TR/2007/REC-soap12-part2-20070427>

[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>

[XML10] World Wide Web Consortium, "Extensible Markup Language (XML) 1.0 (Third Edition)", February 2004, <http://www.w3.org/TR/2004/REC-xml-20040204/>

[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/>

[XMLSCHEMA1/2] Thompson, H., Beech, D., Maloney, M., and Mendelsohn, N., Eds., "XML Schema Part 1: Structures Second Edition", W3C Recommendation, October 2004, <http://www.w3.org/TR/2004/REC-xmlschema-1-20041028/>

[XMLSCHEMA2/2] Biron, P., and Malhotra, A., Eds., "XML Schema Part 2: Datatypes Second Edition", W3C Recommendation, October 2004, <http://www.w3.org/TR/2004/REC-xmlschema-2-20041028/>

1.2.2 Informative References

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

1.3 Overview

This document specifies a consistent selection process for information stored in any **line-of-business (LOB) system** for protocol client retrieval.

Enterprises store a variety of information in various line-of-business (LOB) systems. This protocol specifies unified information selection for all types of **LobSystems**. The protocol enables consistent processing for the user experience because it describes **LobSystems** in terms of **Models**, **LobSystemInstances**, and the business data types they store as **Entities**. It also describes how the protocol client selects information from the protocol server.

This protocol enables a protocol client to retrieve an **EntityInstanceId** and the values for a list of **field** names for an **Entity** associated with a **LobSystemInstance**. The protocol allows the protocol client to send the **LobSystemInstance** name, the **Entity** name, a value to resolve, and a list of **Entity** fields to the protocol server, and to receive the serialized **EntityInstanceId** and the list of **Entity** field name-value pairs.

1.4 Relationship to Other Protocols

This protocol uses the SOAP messaging protocol for formatting requests and responses as described either in [\[SOAP1.1\]](#) or in [\[SOAP1.2-1/2007\]](#) and [\[SOAP1.2-2/2007\]](#). 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:

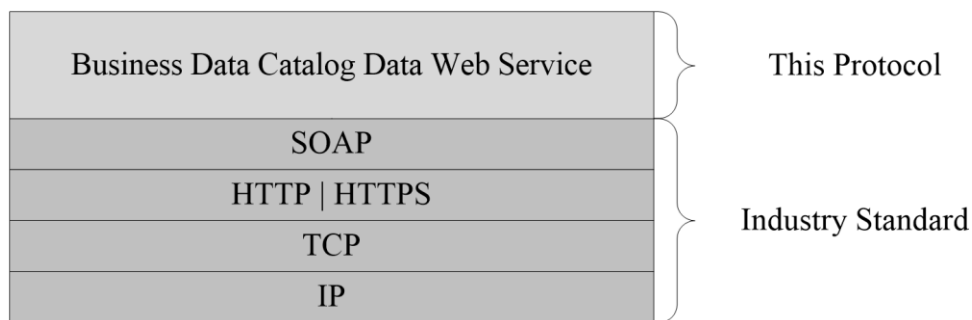


Figure 1: This protocol in relation to other protocols

1.5 Prerequisites/Preconditions

This protocol operates against a **site** that is known to protocol clients by its **URL**. The protocol client forms an endpoint by appending `"/_vti_bin/bdcfieldsresolver.asmx"` to the URL of the site, for example `"http://www.contoso.com/Repository/_vti_bin/bdcfieldsresolver.asmx"`. This protocol assumes that the underlying protocols perform authentication.

1.6 Applicability Statement

None.

1.7 Versioning and Capability Negotiation

This document describes versioning issues in the following areas:

- **Supported transports:** This protocol uses multiple transports with SOAP as specified in section [2.1](#).

1.8 Vendor-Extensible Fields

None.

1.9 Standards Assignments

None.

2 Messages

2.1 Transport

Protocol servers MUST support SOAP over HTTP. Protocol servers additionally support SOAP over HTTPS to secure communication with protocol clients.

Protocol messages MUST be formatted as specified either in [\[SOAP1.1\]](#), section 4 or in [\[SOAP1.2-1/2007\]](#) section 5. Protocol server faults MUST be returned using HTTP Status Codes as specified in [\[RFC2616\]](#) section 10, or using **SOAP faults** as specified in [\[SOAP1.1\]](#) section 4.4 or in [\[SOAP1.2-1/2007\]](#) section 5.4.

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 [\[XMLSCHEMA1/2\]](#) and [\[XMLSCHEMA2/2\]](#), and **WSDL**, as specified in [\[WSDL\]](#).

2.2.1 Namespaces

This protocol specifies and references **XML namespaces** using the mechanisms specified in [\[XMLNS\]](#). Although this document associates an 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
soap	http://schemas.xmlsoap.org/wsdl/soap/	[SOAP1.1]
tns	http://microsoft.com/webservices/SharePointPortalServer/BDCClientWS/	
s	http://www.w3.org/2001/XMLSchema	[XMLSCHEMA1/2] [XMLSCHEMA2/2]
soap12	http://schemas.xmlsoap.org/wsdl/soap12/	[SOAP1.2-1/2007] [SOAP1.2-2/2007]
(none)	http://microsoft.com/webservices/SharePointPortalServer/BDCClientWS/	
wsdl	http://schemas.xmlsoap.org/wsdl/	[WSDL]
mime	http://schemas.xmlsoap.org/wsdl/mime/	[WSDL]
http	http://schemas.xmlsoap.org/wsdl/http/	[WSDL]
tm	http://microsoft.com/wsdl/mime/textMatching/	[WSDL]
soapenc	http://schemas.xmlsoap.org/soap/encoding/	

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

This specification does not define any common **XML schema** complex type definitions.

2.2.5 Simple Types

This specification does not define any common **XML schema** simple type definitions.

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.

3 Protocol Details

This protocol operates between the protocol client and a protocol server. The protocol client initiates the communication, and the protocol server responds. The protocol server does not retain any states.

The client side of this protocol is simply a pass-through. That is, no additional timers or other state is required on the client side of this protocol. Calls made by the higher-layer protocol or application are passed directly to the transport, and the results returned by the transport are passed directly back to the higher-layer protocol or application.

Except where specified, protocol clients interpret HTTP status codes returned by the protocol server as specified in [\[RFC2616\]](#) section 10.

Protocol servers perform implementation-specific authorization checks and notify protocol clients of authorization faults using either HTTP status codes or **SOAP faults**.

3.1 Protocol 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 protocol server MUST maintain lists of the following **MetadataObject** types: **LobSystem**, **LobSystemInstance**, and **Entity**. The protocol server maintains the following relationships between these MetadataObject types:

- **LobSystems** contain all **Entities**.
- **LobSystems** contain all **LobSystemInstances**.

The protocol server MUST assign unique names to the following **MetadataObjects**.

- All **Entities** contained by a particular **LobSystem**.
- All **LobSystemInstances** contained by a **metadata store**.
- All **LobSystems** contained by a **metadata store**.

3.1.2 Timers

None.

3.1.3 Initialization

None.

3.1.4 Message Processing Events and Sequencing Rules

The following table summarizes the list of **WSDL** operations as defined by this specification:

Operation	Description
-----------	-------------

Operation	Description
Resolve	This operation retrieves the values of a list of Entity fields (4) associated with the EntityInstance that was specified in the input criteria.

3.1.4.1 Resolve

This operation searches for an **EntityInstance** that matches the specified input criteria. The input criteria are the **LobSystemInstance** name, the **Entity** name and value to resolve. The mechanism used by the protocol server to match the **EntityInstances** is implementation-specific.

```
<wsdl:operation name="Resolve">
  <wsdl:input message="tns:ResolveSoapIn" />
  <wsdl:output message="tns:ResolveSoapOut" />
</wsdl:operation>
```

The protocol client sends a **ResolveSoapIn** request message and the protocol server responds with a **ResolveSoapOut** response message. The protocol client MUST specify the following:

- The name of the **LobSystemInstance** to search.
- The name of the **Entity** to search.
- The search string that represents the value to resolve.
- The **field** names of the **Entity** for which to retrieve the values of the specified **EntityInstance**.

If exactly one **EntityInstance** is found, the protocol server sends the serialized **EntityInstanceId** of the specified **EntityInstance**, along with the list of name-value pairs for the fields of the specified **Entity** and the status of the operation.

This operation MUST return a **ResolveResult** message with the **ResolveStatus** element set, as specified in sections [3.1.4.1.3.1](#).

3.1.4.1.1 Messages

The following table summarizes the set of **WSDL** message definitions that are specific to this operation.

Message	Description
ResolveSoapIn	A request message for the Resolve operation.
ResolveSoapOut	The response message for the Resolve operation.

3.1.4.1.1.1 ResolveSoapIn

The **ResolveSoapIn** message is the request message for the **Resolve** operation.

The **SOAP action** value of the message is:

```
http://microsoft.com/webservices/SharePointPortalServer/BDCClientWS/Resolve
```

The **SOAP body** contains a **Resolve** element.

3.1.4.1.1.2 ResolveSoapOut

The **ResolveSoapOut** message is the response message for the **Resolve** operation.

The **SOAP body** contains a **ResolveResponse** element that MUST specify the status of the operation.

3.1.4.1.2 Elements

The following table summarizes the **XML schema** element definitions that are specific to this operation.

Element	Description
Resolve	A message containing the input data for the Resolve operation.
ResolveResponse	A message containing the output data of a Resolve operation.

3.1.4.1.2.1 Resolve

The **Resolve** message contains the input data for the **Resolve** operation.

```
<s:element name="Resolve">
  <s:complexType>
    <s:sequence>
      <s:element minOccurs="1" maxOccurs="1" name="systemInstance" type="s:string" />
      <s:element minOccurs="1" maxOccurs="1" name="entity" type="s:string" />
      <s:element minOccurs="1" maxOccurs="1" name="valueToResolve" type="s:string" />
      <s:element minOccurs="1" maxOccurs="1" name="fieldNames" type="s:string" />
    </s:sequence>
  </s:complexType>
</s:element>
```

systemInstance: This element contains the name of the **LobSystemInstance**. The value is encoded as specified in [XML10]. The protocol server MUST only match **EntityInstances** obtained from the specified **LobSystemInstance**.

entity: This element contains the name of the **Entity**. The value is encoded as specified in [XML10]. The protocol server MUST only match **EntityInstances** of the specified **Entity**.

valueToResolve: This element contains the value to resolve to an **EntityInstance**. The value is encoded as specified in [XML10]. The value is resolved to **EntityInstances** using an implementation-specific algorithm. For example, a specific implementation of a protocol server could resolve a given value of "ab" and **Entity** "Customer", by returning customers that have names starting with "ab". Another implementation of the protocol server could return customer whose names, last names, or addresses contain "ab".

fieldNames: This element contains the **field** names associated with the **Entity**. Each field name is encoded as specified in [RFC3986]. The field names are concatenated into a single string with a colon (:) between field names.

3.1.4.1.2.2 ResolveResponse

The **ResolveResponse** message contains the output data of a **Resolve** operation.

```

<s:element name="ResolveResponse">
  <s:complexType>
    <s:sequence>
      <s:element minOccurs="1" maxOccurs="1" name="ResolveResult" type="tns:ResolveResult" />
    </s:sequence>
  </s:complexType>
</s:element>

```

ResolveResult: This element contains the serialized **EntityInstanceId** element that is associated with the specified **EntityInstance** element, along with the list of name-value pairs for the **fields** of the specified **Entity** and the status of the operation.

3.1.4.1.3 Complex Types

The following table summarizes the XML schema complex type definitions that are specific to this operation.

Complex type	Description
ResolveResult	A message containing the output data of a Resolve operation.
IdentifierField	An element containing the Identifier of the EntityInstance .
ArrayOfFieldRecord	An element containing an array of elements of type FieldRecord .
FieldRecord	An element containing the Entity field (4) name-value pair.

3.1.4.1.3.1 ResolveResult

The **ResolveResult** message contains the output data of a **Resolve** operation.

```

<s:complexType name="ResolveResult">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="1" name="Identifier" type="tns:IdentifierField" />
    <s:element minOccurs="0" maxOccurs="1" name="Results" type="tns:ArrayOfFieldRecord" />
    <s:element minOccurs="1" maxOccurs="1" name="Status" type="tns:ResolveStatus" />
  </s:sequence>
</s:complexType>

```

Identifier: This element contains the **Identifier** of the **EntityInstance** found. If exactly one **EntityInstance** is not found, the value MUST be absent.

Results: This element contains the list of name-value pairs of the **fields** of the specified **Entity** if the **fieldNames** element is not absent. If exactly one **EntityInstance** element is not found, the value MUST be absent.

Status: This element contains the status of the operation. This **ResolveStatus** element MUST be present. The protocol server MUST set this value as specified in section [3.1.4.1.4.1](#).

3.1.4.1.3.2 IdentifierField

The **IdentifierField** element contains the **Identifier** of the **EntityInstance**. If exactly one **EntityInstance** is not found, the value MUST be absent.

```

<s:complexType name="IdentifierField">
  <s:simpleContent>
    <s:extension base="s:string"/>
  </s:simpleContent>
</s:complexType>

```

3.1.4.1.3.3 ArrayOfFieldRecord

This **ArrayOfFieldRecord** element contains an array of elements of type **FieldRecord**, as specified in section [3.1.4.1.3.4](#).

```

<s:complexType name="ArrayOfFieldRecord">
  <s:sequence>
    <s:element name="FieldRecord" type="tns:FieldRecord" nillable="true" minOccurs="0"
      maxOccurs="unbounded"/>
  </s:sequence>
</s:complexType>

```

FieldRecord: This element contains the **Entity field** name-value pair.

3.1.4.1.3.4 FieldRecord

The **FieldRecord** element contains the **Entity field** name-value pair. The name of the field is contained in the **FieldName** attribute of the element and the value of the field is the value of the element.

```

<s:complexType name="FieldRecord">
  <s:simpleContent>
    <s:extension base="s:string">
      <s:attribute name="FieldName" type="s:string"/>
    </s:extension>
  </s:simpleContent>
</s:complexType>

```

FieldName: This attribute contains the name of the field. Each field name is encoded as specified in [\[RFC3986\]](#).

3.1.4.1.4 Simple Types

The following table summarizes the **XML schema** simple type definitions that are specific to this operation.

Simple type	Description
ResolveStatus	An enumeration that specifies the status of the Resolve operation.

3.1.4.1.4.1 ResolveStatus

The **ResolveStatus** simple type specifies the enumeration of status of the **Resolve** operation, as specified in section [3.1.4.1](#).

```

<s:simpleType name="ResolveStatus">
  <s:restriction base="s:string">
    <s:enumeration value="NoMatch"/>
  </s:restriction>
</s:simpleType>

```



```

    <s:enumeration value="MultipleMatch"/>
    <s:enumeration value="UniqueMatch"/>
    <s:enumeration value="InvalidData"/>
  </s:restriction>
</s:simpleType>

```

The values for this enumeration are specified in the following table.

Value	Description
NoMatch	The protocol server MUST return this value when there are no EntityInstances were found.
MultipleMatch	The protocol server MUST return this value when more than one EntityInstances were found.
UniqueMatch	The protocol server MUST return this value when exactly one EntityInstance was found.
InvalidData	The protocol server MUST return this value when the operation has failed because input data is not valid or an implementation-specific error has occurred.

3.1.4.1.5 Attributes

None.

3.1.4.1.6 Groups

None.

3.1.4.1.7 Attribute Groups

None.

3.1.5 Timer Events

None.

3.1.6 Other Local Events

None.

4 Protocol Examples

4.1 Retrieving Field Values for LobSystem Entities

This scenario resolves the specified value to an **EntityInstance**. For this example, the protocol client is aware of the **LobSystemInstance** name, the Entity name, the value to resolve and the **Entity field** names. The steps are as follows.

1. The protocol client encodes and concatenates the **Entity** field names using the colon (:) as a separator.

If the values of the fields **ProductKey**, **ProductName**, **Price** and **Color** are to be obtained, the client prepares a string of the form "ProductKey:ProductName:Price:Color"

2. The protocol client issues a **Resolve** request to the protocol server with the **LobSystemInstance** name, the **Entity** name, the value to resolve and the concatenated **Entity** field names.

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"><soap:Body><Resolve
xmlns="http://microsoft.com/webservices/SharePointPortalServer/BDCClientWS/"><systemI
nstance>bdcdpExampleInstance</systemInstance><entity>Product</entity><valueToResolve>
1</valueToResolve><fieldNames>ProductKey:ProductName:Price:Color</fieldNames></Resolv
e></soap:Body></soap:Envelope>
```

3. The protocol server responds with the status of the operation. If the **EntityInstance** is found, the protocol server also returns the specified **EntityInstance** and the name-value pairs for the fields.

```
"<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"><soap:Body><ResolveResponse
xmlns="http://microsoft.com/webservices/SharePointPortalServer/BDCClientWS/"><Resolve
Result><Identifier>__bg40001300</Identifier><Results><FieldRecord
FieldName="ProductKey">1</FieldRecord><FieldRecord
FieldName="ProductName">Bag</FieldRecord><FieldRecord
FieldName="Price">3.0000</FieldRecord><FieldRecord
FieldName="Color">Yellow</FieldRecord></Results><Status>UniqueMatch</Status></Resolve
Result></ResolveResponse></soap:Body></soap:Envelope>
```

5 Security

5.1 Security Considerations for Implementers

None.

5.2 Index of Security Parameters

None.

6 Appendix A: Full WSDL

For ease of implementation, the full WSDL and schema are provided in this appendix.

```
<?xml version="1.0" encoding="utf-8"?>
<wsdl:definitions xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
xmlns:tm="http://microsoft.com/wsdl/mime/textMatching/"
xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
xmlns:mime="http://schemas.xmlsoap.org/wsdl/mime/"
xmlns:tns="http://microsoft.com/webservices/SharePointPortalServer/BDCClientWS/"
xmlns:s="http://www.w3.org/2001/XMLSchema"
xmlns:soap12="http://schemas.xmlsoap.org/wsdl/soap12/"
xmlns:http="http://schemas.xmlsoap.org/wsdl/http/"
targetNamespace="http://microsoft.com/webservices/SharePointPortalServer/BDCClientWS/"
xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/">
  <wsdl:documentation xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/">BDC Field Resolver Web
Service for Clients</wsdl:documentation>
  <wsdl:types>
    <s:schema elementFormDefault="qualified"
targetNamespace="http://microsoft.com/webservices/SharePointPortalServer/BDCClientWS/">
      <s:element name="Resolve">
        <s:complexType>
          <s:sequence>
            <s:element minOccurs="1" maxOccurs="1" name="systemInstance"
type="s:string" />
            <s:element minOccurs="1" maxOccurs="1" name="entity" type="s:string" />
            <s:element minOccurs="1" maxOccurs="1" name="valueToResolve"
type="s:string" />
            <s:element minOccurs="1" maxOccurs="1" name="fieldNames" type="s:string" />
          </s:sequence>
        </s:complexType>
      </s:element>
      <s:element name="ResolveResponse">
        <s:complexType>
          <s:sequence>
            <s:element minOccurs="1" maxOccurs="1" name="ResolveResult"
type="tns:ResolveResult" />
          </s:sequence>
        </s:complexType>
      </s:element>
      <s:complexType name="ResolveResult">
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="1" name="Identifier"
type="tns:IdentifierField" />
          <s:element minOccurs="0" maxOccurs="1" name="Results"
type="tns:ArrayOfFieldRecord" />
          <s:element minOccurs="1" maxOccurs="1" name="Status" type="tns:ResolveStatus"
/>
        </s:sequence>
      </s:complexType>
      <s:complexType name="IdentifierField">
        <s:simpleContent>
          <s:extension base="s:string" />
        </s:simpleContent>
      </s:complexType>
      <s:complexType name="ArrayOfFieldRecord">
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="unbounded" name="FieldRecord"
nillable="true" type="tns:FieldRecord" />
        </s:sequence>
      </s:complexType>
      <s:complexType name="FieldRecord">
        <s:simpleContent>
          <s:extension base="s:string">
            <s:attribute name="FieldName" type="s:string" />
          </s:extension>
        </s:simpleContent>
      </s:complexType>
    </s:schema>
  </wsdl:types>

```

```

        </s:complexType>
        <s:simpleType name="ResolveStatus">
            <s:restriction base="s:string">
                <s:enumeration value="NoMatch" />
                <s:enumeration value="MultipleMatch" />
                <s:enumeration value="UniqueMatch" />
                <s:enumeration value="InvalidData" />
            </s:restriction>
        </s:simpleType>
    </s:schema>
</wsdl:types>
<wsdl:message name="ResolveSoapIn">
    <wsdl:part name="parameters" element="tns:Resolve" />
</wsdl:message>
<wsdl:message name="ResolveSoapOut">
    <wsdl:part name="parameters" element="tns:ResolveResponse" />
</wsdl:message>
<wsdl:portType name="BDCFieldsResolverSoap">
    <wsdl:operation name="Resolve">
        <wsdl:input message="tns:ResolveSoapIn" />
        <wsdl:output message="tns:ResolveSoapOut" />
    </wsdl:operation>
</wsdl:portType>
<wsdl:binding name="BDCFieldsResolverSoap" type="tns:BDCFieldsResolverSoap">
    <soap:binding transport="http://schemas.xmlsoap.org/soap/http" />
    <wsdl:operation name="Resolve">
        <soap:operation
soapAction="http://microsoft.com/webservices/SharePointPortalServer/BDCClientWS/Resolve"
style="document" />
        <wsdl:input>
            <soap:body use="literal" />
        </wsdl:input>
        <wsdl:output>
            <soap:body use="literal" />
        </wsdl:output>
    </wsdl:operation>
</wsdl:binding>
<wsdl:binding name="BDCFieldsResolverSoap12" type="tns:BDCFieldsResolverSoap">
    <soap12:binding transport="http://schemas.xmlsoap.org/soap/http" />
    <wsdl:operation name="Resolve">
        <soap12:operation
soapAction="http://microsoft.com/webservices/SharePointPortalServer/BDCClientWS/Resolve"
style="document" />
        <wsdl:input>
            <soap12:body use="literal" />
        </wsdl:input>
        <wsdl:output>
            <soap12:body use="literal" />
        </wsdl:output>
    </wsdl:operation>
</wsdl:binding>
</wsdl:definitions>

```

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 updates to those products.

- Microsoft Office SharePoint Server 2007
- Microsoft SharePoint Server 2010
- Microsoft SharePoint Server 2013
- Microsoft SharePoint Server 2016
- Microsoft SharePoint Server 2019
- Microsoft SharePoint Server Subscription Edition

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

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

8 Change Tracking

No table of changes is available. The document is either new or has had no changes since its last release.

9 Index

A

Abstract data model
[server](#) 12
[Applicability](#) 9
[Attribute groups](#) 11
[Attributes](#) 11

C

[Capability negotiation](#) 9
[Change tracking](#) 23
Client
[overview](#) 12
[Complex types](#) 11

D

Data model - abstract
[server](#) 12

E

Events
[local - server](#) 17
[timer - server](#) 17
Examples
[retrieving field values for LobSystem Entities](#) 18

F

[Fields - vendor-extensible](#) 9
[Full WSDL](#) 20

G

[Glossary](#) 6
[Groups](#) 11

I

[Implementer - security considerations](#) 19
[Index of security parameters](#) 19
[Informative references](#) 8
Initialization
[server](#) 12
[Introduction](#) 6

L

Local events
[server](#) 17

M

Message processing
[server](#) 12
Messages
[attribute groups](#) 11
[attributes](#) 11
[complex types](#) 11

[elements](#) 11
[enumerated](#) 10
[groups](#) 11
[namespaces](#) 10
[simple types](#) 11
[syntax](#) 10
[transport](#) 10

N

[Namespaces](#) 10
[Normative references](#) 7

O

Operations
[Resolve](#) 13
[Overview \(synopsis\)](#) 8

P

[Parameters - security index](#) 19
[Preconditions](#) 9
[Prerequisites](#) 9
[Product behavior](#) 22
Protocol Details
[overview](#) 12

R

[References](#) 7
[informative](#) 8
[normative](#) 7
[Relationship to other protocols](#) 8
[Retrieving field values for LobSystem Entities](#)
[example](#) 18

S

Security
[implementer considerations](#) 19
[parameter index](#) 19
Sequencing rules
[server](#) 12
Server
[abstract data model](#) 12
[initialization](#) 12
[local events](#) 17
[message processing](#) 12
[overview](#) 12
[Resolve operation](#) 13
[sequencing rules](#) 12
[timer events](#) 17
[timers](#) 12
[Simple types](#) 11
[Standards assignments](#) 9
Syntax
[messages - overview](#) 10

T

Timer events

[server](#) 17
Timers
[server](#) 12
[Tracking changes](#) 23
[Transport](#) 10
Types
[complex](#) 11
[simple](#) 11

V

[Vendor-extensible fields](#) 9
[Versioning](#) 9

W

[WSDL](#) 20