

Web Services Metadata Exchange Interoperability Scenarios

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Introduction

Goals

The goal of this interoperability session is to exercise the different ways in which metadata can be conveyed and discovered according the WS-MetadataExchange specification. It is NOT a goal to demonstrate semantic understanding of specific metadata dialects. When specific metadata dialects are needed for illustration purposes, WSDL 1.1, and XML Schema are used.

Test environment

Client application interacts with two service endpoints, Service A and Service B, as well as with a metadata resource endpoint C and a metadata location D.

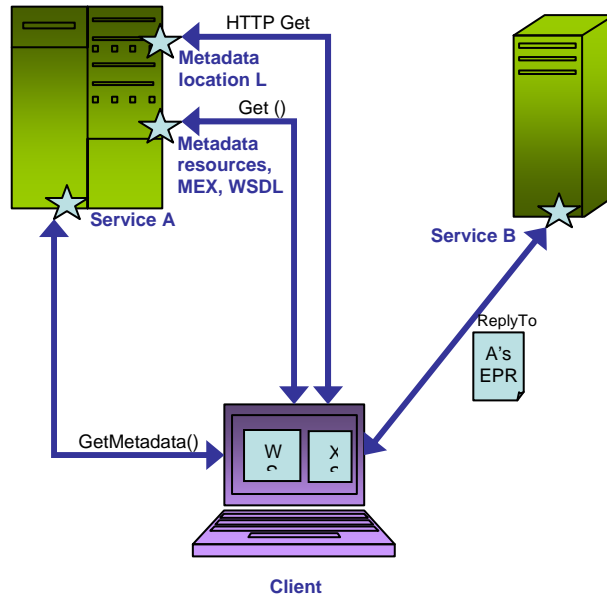
Service A endpoint provides access to an application defined interface [WSDL & schema] over WS-Addressing (v2004/08, 1.0) compliant, document/literal SOAP-HTTP binding. Service A conforms to the MEX specification and makes the metadata available using the different WS-MetadataExchange defined mechanisms. The WSDL description for Service A imports WSDL definitions and XML Schema type definitions.

Service B endpoint offers access to a second application interface, over the same SOAP-HTTP protocol. Service B metadata is not exchanged at runtime.

There are additional Metadata resources, M (mex:Metadata) and W (WSDL) which are available via the WS-Transfer Get operation over the same binding. HTTP Get is used to retrieve metadata when interacting with metadata location L.

Overview

For each scenario the interaction begins with the client application invoking operation start() on Service B. The start() operation takes a single parameter, the scenario name, allowing Service B to respond appropriately depending on the scenario being exercised. The return message from service B contains an endpoint reference for Service A in the Body of its response message. The client application uses this endpoint reference to retrieve metadata about service A, through different means in each scenario. The metadata retrieved is simply displayed by the client, since these interoperability tests do not attempt to exercise understanding of the semantics of specific metadata dialects and only test the retrieval of the metadata.



Notation

The namespaces used in this document are a subset of the ones used in the WS-MetadataExchange specification:

Prefix	XML Namespace	Specification(s)
s	http://schemas.xmlsoap.org/soap/envelope or http://www.w3.org/2003/05/soap-envelope	SOAP 1.1 [SOAP 1.1] or SOAP 1.2 [SOAP 1.2]
wsa04	http://schemas.xmlsoap.org/ws/2004/08/addressing	WS-Addressing 2004 [WS-Addressing 2004]
wsa10	http://www.w3.org/2005/08/addressing	WS-Addressing 1.0 Core [WS-Addressing 1.0 Core]
wsdl	http://schemas.xmlsoap.org/wsdl/	WSDL [WSDL 1.1]
mex	http://schemas.xmlsoap.org/ws/2004/09/mex	This specification
xs	http://www.w3.org/2001/XMLSchema	XML Schema [Part 1, 2]
ex	http://services.example.org/mex/interop	Example application

Bindings and specification versions

Interactions are carried over a SOAP HTTPS binding exclusively for every scenario (the specific version of SOAP is determined out of band – however, the same SOAP version should be used for all message exchanges within one execution of a scenario). The “start()” operation is invoked at the beginning of each scenario to retrieve the endpoint reference of the target service.; the use of a secure transport highlights the importance of protecting endpoint references in certain situations.

Each scenario is exercised twice over each of the supported versions of WS-Addressing (2004/08, 1.0), with the explicit understanding that in the course of an interaction (potentially comprising multiple message exchanges) a single version of the Web Services Addressing specification will be used. In particular when an interaction is initiated using one version of the spec (2004/08 or 1.0) that version will be the only one used until the interaction is completed.

Note that Service A and Service B could each consist of multiple endpoints to enable support for different versions of WS-Addressing.

Scenarios

Scenario set 1. Metadata embedded in EPR

Client invokes operation start("1") on Service B, and then extracts Service A's EPR from the Body of the response message received from Service B. Service A's EPR contains an embedded mex:Metadata element.

1.a Parse and display embedded metadata element

Client parses the embedded metadata section, and displays the contents in a table format showing dialect, identifier, type of metadata section (by value, by EPR reference and by URL reference).

Interactions and messages:

Interactions	Endpoint	Message (from Appendix A)	Comment
Start("1") request	B	M-1a-start-request	Empty request message
Start() response	B	M-1a-start-response	Contains EPR with embedded metadata

1.b Extract and invoke metadata reference for specific dialect

The embedded metadata section contains a WSDL dialect metadata resource reference. The client parses the embedded metadata and sends a WS-Transfer GET request to the resource's EPR, which returns the WSDL description in the response message. The client displays the WSDL description.

Interactions and messages:

Interactions	Endpoint	Message (from Appendix A)	Comment
Start("1") request	B	M-1a-start-request	Empty request message
Start() response	B	M-1a-start-response	Contains EPR with embedded

			metadata, including EPR for WSDL metadata resource.
Get() request	W	M-1b-get-request	Requests WSDL description from metadata resource
Get() response	W	M-1b-get-response	WSDL metadata returned in response envelope

1.c Extract and invoke metadata location for specific dialect

The embedded metadata section contains the URL of the metadata location for XML Schema metadata. Client parses the embedded metadata section and sends an HTTP GET request to the URL, which returns the XML Schema information. Client displays XSD information.

Interactions and messages:

Interaction	Endpoint	Message (from Appendix A)	Comment
Start("1") request	B	M-1a-start-request	Empty request message
Start() response	B	M-1a-start-response	Contains EPR with embedded metadata, including URL for XSD metadata location.
HTTP Get request	L	No message	Requests XSD information from URL
HTTP Get response	L	M-1c-http-get-response	XSD metadata

Scenario set 2. Request for metadata to metadata resource.

Client invokes operation start("2") on Service B, and extracts Service A's EPR from the Body of the response message received from Service B. The EPR for Service A contains an embedded mex:Metadata element with metadata reference for the MetadataExchange dialect. Client sends a WS-Transfer Get() request to metadata resource.

2.a Request metadata from metadata resource returns Metadata element

Metadata resource sends back mex:Metadata element containing WSDL and XSD metadata in separate metadata sections. Client parses the metadata sections, and displays the contents in a table format showing dialect, identifier, type of metadata section (by value, by EPR reference and by URL reference).

Interactions and messages:

Interactions	Endpoint	Message (from Appendix A)	Comment
Start("2") request	B	M-1a-start-request	Empty request message
Start() response	B	M-2a-start-response	Contains EPR with embedded metadata with metadata reference
Get() request	M	M-2a-get-request	Get request to metadata resource
Get() response	M	M-2a-get-response	Contains mex:Metadata element

Scenario set 3. Direct request for metadata to service endpoint

Client invokes operation start("3") on Service B, and extracts Service A's EPR from the Body of the response message received from Service B. The EPR contains no embedded mex:Metadata element. The client sends a GetMetadata request to Service A endpoint, receives a GetMetadata response message back with a mex:Metadata element.

3.a Request metadata from endpoint, specifying no dialect or identifier

Server sends back a reply message with multiple metadata sections. Client parses the embedded metadata sections, and displays the contents in a table format showing dialect, identifier, type of metadata section (by value, by EPR reference and by URL reference).

Interactions and messages:

Interactions	Endpoint	Message (from Appendix A)	Comment
Start("3") request	B	M-1a-start-request	Empty request message
Start() response	B	M-3a-start-response	Contains EPR with no embedded metadata

GetMetadata request	A	M-3a-getmetadata-request	GetMetadata request with no dialect or identifier
GetMetadata response	A	M-3a-getmetadata-response	Contains several metadata sections

3.b Request metadata from endpoint, specifying WSDL as dialect and no identifier.

Server sends back a reply message with a WSDL metadata section containing Service A WSDL definitions. The client displays the WSDL information.

Interactions and messages:

Interactions	Endpoint	Message (from Appendix A)	Comment
Start("3") request	B	M-1a-start-request	Empty request message
Start() response	B	M-3a-start-response	Contains EPR with no embedded metadata
GetMetadata request	A	M-3b-getmetadata-request	GetMetadata request for WSDL dialect, no identifier
GetMetadata response	A	M-3b-getmetadata-response	Contains WSDL metadata section

3.c Request metadata from endpoint, specifying WSDL as dialect and namespace identifier.

Server sends back a reply message with a WSDL metadata section containing Service A WSDL definitions; namespace matches identifier in request. Client displays WSDL information.

Interactions and messages:

Interactions	Endpoint	Message (from Appendix A)	Comment
Start("3") request	B	M-1a-start-request	Empty request message
Start() response	B	M-3a-start-response	Contains EPR with no embedded metadata
GetMetadata request	A	M-3c-getmetadata-request	GetMetadata request for

			WSDL dialect and specific identifier
GetMetadata response	A	M-3c-getmetadata-response	Contains WSDL metadata section for identifier

Appendix A

The following messages are examples using SOAP 1.2 and WS-Addressing 1.0. Messages using SOAP 1.1 and WS-Addressing 2004/08 may be extrapolated from these examples.

Validating the exact form and content of WSDL and XML Schema documents used in these example messages is not a goal of this interoperability session.

Message

M-1a-start-request

```
(01) <s:Envelope
(02)     xmlns:s='http://www.w3.org/2003/05/soap-envelope'
(03)     xmlns:ex='http://services.example.org/mex/interop'
(04)     xmlns:wsa10='http://www.w3.org/2005/08/addressing' >
(05)   <s:Header>
(06)     <wsa10:Action>
(07)       http://services.example.org/mex/interop/startRequest
(08)     </wsa10:Action>
(09)     <wsa10:To>https://services.example.org/mex/interop/serviceB</wsa10:To>
(10)     <wsa10:ReplyTo>
(11)       <wsa10:Address>
(12)         http://www.w3.org/2005/08/addressing/anonymous
(13)       </wsa10:Address>
(14)     </wsa10:ReplyTo>
(15)     <wsa10:MessageID>
(16)       urn:uuid:lcec121a-82fe-41da-87e1-3b23f254f128
(17)     </wsa10:MessageID>
(18)   </s:Header>
(19)   <s:Body>
(20)     <ex:start>
(21)       <!-- the scenario number: "1", "2", or "3" -->
(22)     </ex:start>
(23)   </s:Body>
(24) </s:Envelope>
```

M-1a-start-response

```
(01) <s:Envelope
(02)     xmlns:s='http://www.w3.org/2003/05/soap-envelope'
(03)     xmlns:wsa10='http://www.w3.org/2005/08/addressing' >
(04)   <s:Header>
(05)     <wsa10:Action>
(06)       http://services.example.org/mex/interop/startResponse
(07)     </wsa10:Action>
(08)     <wsa10:To>http://www.w3.org/2005/08/addressing/anonymous</wsa10:To>
(09)     <wsa10:RelatesTo>
(10)       urn:uuid:lcec121a-82fe-41da-87e1-3b23f254f128
```

```
(11)     </wsa10:RelatesTo>
(12) </s:Header>
(13) <s:Body>
(14)   <wsa10:EndpointReference>
(15)     <wsa10:Address>
(16)       https://services.example.org/mex/interop/serviceA
(17)     </wsa10:Address>
(18)     <wsa10:Metadata>
(19)       <mex:Metadata xmlns:mex='http://schemas.xmlsoap.org/ws/2004/09/mex'>
(20)         <mex:MetadataSection Dialect='http://schemas.xmlsoap.org/wsdl/'
(21)           Identifier='http://services.example.org/stockquote'>
(22) <wsdl:definitions xmlns:wsdl='http://schemas.xmlsoap.org/wsdl/'
(23) name='StockQuote'
(24) targetNamespace='http://services.example.org/stockquote'
(25) xmlns:tns='http://services.example.org/stockquote'
(26) xmlns:tns2='http://services.example.org/stockquote/wsdl'
(27) xmlns:xsd1='http://services.example.org/stockquote/schemas'
(28) xmlns:wsoap='http://schemas.xmlsoap.org/wsdl/soap/'
(29) xmlns:xs='http://www.w3.org/2001/XMLSchema'>
(30)
(31)   <wsdl:import namespace='http://services.example.org/stockquote/wsdl'
location='https://services.example.org/stockquote/wsdl' />
(32)
(33)   <wsdl:binding name='StockQuoteBinding'
(34)     type='tns2:StockQuotePortType'>
(35)     <wsoap:binding style='document'
(36)       transport='http://schemas.xmlsoap.org/soap/http' />
(37)     <wsdl:operation name='GetLastTradePrice'>
(38)       <wsoap:operation soapAction=
(39)         'http://services.example.org/stockquote/GetLastTradePrice' />
(40)     <wsdl:input name='GetLastTradePriceInput'>
(41)       <wsoap:body use='literal' />
(42)     </wsdl:input>
(43)     <wsdl:output name='GetLastTradePriceOutput'>
(44)       <wsoap:body use='literal' />
(45)     </wsdl:output>
(46)   </wsdl:operation>
(47) </wsdl:binding>
(48)
(49)   <wsdl:service name='StockQuoteService'>
(50)     <wsdl:port name='StockQuotePort'
(51)       binding='tns:StockQuoteBinding' >
(52)       <wsoap:address
(53)         location='http://services.example.org/stockquote' />
(54)     </wsdl:port>
(55)   </wsdl:service>
(56) </wsdl:definitions>
(57)   </mex:MetadataSection>
(58)   <mex:MetadataSection
```

```

(59)         Dialect='http://www.w3.org/2001/XMLSchema'
(60)         Identifier='http://services.example.org/stockquote/schemas'>
(61)         <mex:Location>
(62)             https://services.example.org/mex/interop/schemas
(63)         </mex:Location>
(64)     </mex:MetadataSection>
(65)     <mex:MetadataSection
(66)         Dialect='http://schemas.xmlsoap.org/wsdl/'
(67)         Identifier='http://services.example.org/stockquote/wsdl'>
(68)     <mex:MetadataReference>
(69)         <wsa10:Address>
(70)             https://services.example.org/stockquote/wsdl
(71)         </wsa10:Address>
(72)     </mex:MetadataReference>
(73) </mex:MetadataSection>
(74) </mex:Metadata>
(75) </wsa10:EndpointReference>
(76) <s:Body/>
(77) </s:Envelope>

```

M-1b-get-request

```

(01) <s:Envelope
(02)     xmlns:s='http://www.w3.org/2003/05/soap-envelope'
(03)     xmlns:wsa10='http://www.w3.org/2005/08/addressing'>
(04)     <s:Header>
(05)         <wsa10:Action>
(06)             http://schemas.xmlsoap.org/ws/2004/09/transfer/Get
(07)         </wsa10:Action>
(08)         <wsa10:To>https://services.example.org/stockquote/wsdl</wsa10:To>
(09)         <wsa10:ReplyTo>
(10)             <wsa10:Address>
(11)                 http://www.w3.org/2005/08/addressing/anonymous
(12)             </wsa10:Address>
(13)         </wsa10:ReplyTo>
(14)         <wsa10:MessageID>
(15)             urn:uuid:1cecl21a-82fe-41da-87e1-3b23f254f129
(16)         </wsa10:MessageID>
(17)     </s:Header>
(18)     <s:Body/>
(19) </s:Envelope>

```

M-1b-get-response

```

(20) <s:Envelope
(21)     xmlns:s='http://www.w3.org/2003/05/soap-envelope'
(22)     xmlns:wsa10='http://www.w3.org/2005/08/addressing'>
(23)     <s:Header>
(24)         <wsa10:Action>
(25)             http://schemas.xmlsoap.org/ws/2004/09/transfer/GetResponse
(26)         </wsa10:Action>

```

```

(27) <wsa10:To>http://www.w3.org/2005/08/addressing/anonymous</wsa10:To>
(28) <wsa10:RelatesTo>
(29)   urn:uuid:1cecl21a-82fe-41da-87e1-3b23f254f129
(30) </wsa10:RelatesTo>
(31) </s:Header>
(32) <s:Body>
(33) <wsdl:definitions xmlns:wsdl='http://schemas.xmlsoap.org/wsdl/'
(34) name='StockQuote'
(35) targetNamespace='http://services.example.org/stockquote/wsdl'
(36) xmlns:tns='http://services.example.org/stockquote/wsdl'
(37) xmlns:xsd1='http://services.example.org/stockquote/schemas'
(38) xmlns:wsoap='http://schemas.xmlsoap.org/wsdl/soap/'
(39) xmlns:xs='http://www.w3.org/2001/XMLSchema' >
(40)
(41)   <wsdl:types>
(42)     <xs:schema>
(43)       <xs:import
(44)         namespace='http://services.example.org/stockquote/schemas'
(45)         schemaLocation='https://services.example.org/mex/interop/schemas' />
(46)     </xs:schema>
(47)   </wsdl:types>
(48)
(49)   <wsdl:message name='GetLastTradePriceInput' >
(50)     <wsdl:part name='body' element='xsd1:TradePriceRequest' />
(51)   </wsdl:message>
(52)
(53)   <wsdl:message name='GetLastTradePriceOutput' >
(54)     <wsdl:part name='body' element='xsd1:TradePrice' />
(55)   </wsdl:message>
(56)
(57)   <wsdl:portType name='StockQuotePortType' >
(58)     <wsdl:operation name='GetLastTradePrice' >
(59)       <wsdl:input message='tns:GetLastTradePriceInput'
(60)         name='GetLastTradePriceInput' />
(61)       <wsdl:output message='tns:GetLastTradePriceOutput'
(62)         name='GetLastTradePriceOutput' />
(63)     </wsdl:operation>
(64)   </wsdl:portType>
(65) </wsdl:definitions>
(66) </s:Body>
(67) </s:Envelope>

```

M-1c-http-get-response

```

(01) <xs:schema targetNamespace='http://services.example.org/stockquote/schemas'
(02)   xmlns:xs='http://www.w3.org/2001/XMLSchema' >
(03)   <xs:element name='TradePriceRequest' >
(04)     <xs:complexType>
(05)       <xs:all>
(06)         <xs:element name='tickerSymbol' type='xs:string' />

```

```

(07)         </xs:all>
(08)     </xs:complexType>
(09) </xs:element>
(10) <xs:element name='TradePrice'>
(11)     <xs:complexType>
(12)         <xs:all>
(13)             <xs:element name='price' type='xs:float' />
(14)         </xs:all>
(15)     </xs:complexType>
(16) </xs:element>
(17) </xs:schema>

```

M-2a-start-response

```

(01) <s:Envelope
(02)     xmlns:s='http://www.w3.org/2003/05/soap-envelope'
(03)     xmlns:wsa10='http://www.w3.org/2005/08/addressing'>
(04) <s:Header>
(05)     <wsa10:Action>
(06)         http://services.example.org/mex/interop/startResponse
(07)     </wsa10:Action>
(08)     <wsa10:To>http://www.w3.org/2005/08/addressing/anonymous</wsa10:To>
(09)     <wsa10:RelatesTo>
(10)         urn:uuid:1cec121a-82fe-41da-87e1-3b23f254f128
(11)     </wsa10:RelatesTo>
(12) </s:Header>
(13) <s:Body>
(14)     <wsa10:EndpointReference>
(15)         <wsa10:Address>
(16)             https://services.example.org/mex/interop/serviceB
(17)         </wsa10:Address>
(18)         <wsa10:Metadata>
(19)             <mex:Metadata xmlns:mex='http://schemas.xmlsoap.org/ws/2004/09/mex'>
(20)                 <mex:MetadataSection
(21)                     Dialect='http://schemas.xmlsoap.org/ws/2004/09/mex'>
(22)                     <mex:MetadataReference>
(23)                         <wsa10:Address>
(24)                             https://services.example.org/stockquote/metadata
(25)                         </wsa10:Address>
(26)                     </mex:MetadataReference>
(27)                 </mex:MetadataSection>
(28)             </mex:Metadata>
(29)         </wsa10:Metadata>
(30)     </wsa10:EndpointReference>
(31) </s:Body/>
(32) </s:Envelope>

```

M-2a-get-request

```

(01) <s:Envelope
(02)     xmlns:s='http://www.w3.org/2003/05/soap-envelope'

```

```

(03)   xmlns:wsa10='http://www.w3.org/2005/08/addressing' >
(04)   <s:Header>
(05)     <wsa10:Action>
(06)       http://schemas.xmlsoap.org/ws/2004/09/transfer/Get
(07)     </wsa10:Action>
(08)     <wsa10:To> https://services.example.org/stockquote/metadata</wsa10:To>
(09)     <wsa10:ReplyTo>
(10)       <wsa10:Address>
(11)         http://www.w3.org/2005/08/addressing/anonymous
(12)       </wsa10:Address>
(13)     </wsa10:ReplyTo>
(14)     <wsa10:MessageID>
(15)       urn:uuid:1cecl21a-82fe-41da-87e1-3b23f254f120
(16)     </wsa10:MessageID>
(17)   </s:Header>
(18)   <s:Body/>
(19) </s:Envelope>

```

M-2a-get-response

```

(01) <s:Envelope
(02)   xmlns:s='http://www.w3.org/2003/05/soap-envelope'
(03)   xmlns:wsa10='http://www.w3.org/2005/08/addressing' >
(04)   <s:Header>
(05)     <wsa10:Action>
(06)       http://schemas.xmlsoap.org/ws/2004/09/transfer/GetResponse
(07)     </wsa10:Action>
(08)     <wsa10:To>http://www.w3.org/2005/08/addressing/anonymous</wsa10:To>
(09)     <wsa10:RelatesTo>
(10)       urn:uuid:1cecl21a-82fe-41da-87e1-3b23f254f120
(11)     </wsa10:RelatesTo>
(12)   </s:Header>
(13)   <s:Body>
(14)     <mex:Metadata xmlns:mex='http://schemas.xmlsoap.org/ws/2004/09/mex' >
(15)       <mex:MetadataSection Dialect='http://schemas.xmlsoap.org/wsdl/'
(16)         Identifier='http://services.example.org/stockquote' >
(17) <wsdl:definitions xmlns:wsdl='http://schemas.xmlsoap.org/wsdl/'
(18) name='StockQuote'
(19) targetNamespace='http://services.example.org/stockquote'
(20) xmlns:tns='http://services.example.org/stockquote'
(21) xmlns:tns2='http://services.example.org/stockquote/wsdl'
(22) xmlns:xsd1='http://services.example.org/stockquote/schemas'
(23) xmlns:wsoap='http://schemas.xmlsoap.org/wsdl/soap/'
(24) xmlns:xs='http://www.w3.org/2001/XMLSchema' >
(25)
(26)   <wsdl:import namespace='http://services.example.org/stockquote/wsdl'
location='https://services.example.org/stockquote/wsdl' />
(27)
(28)   <wsdl:binding name='StockQuoteBinding'
(29)     type='tns2:StockQuotePortType' >

```

```

(30)     <wssoap:binding style='document'
(31)         transport='http://schemas.xmlsoap.org/soap/http' />
(32)     <wsdl:operation name='GetLastTradePrice'>
(33)         <wssoap:operation soapAction=
(34)             'http://services.example.org/stockquote/GetLastTradePrice' />
(35)         <wsdl:input name='GetLastTradePriceInput'>
(36)             <wssoap:body use='literal' />
(37)         </wsdl:input>
(38)         <wsdl:output name='GetLastTradePriceOutput'>
(39)             <wssoap:body use='literal' />
(40)         </wsdl:output>
(41)     </wsdl:operation>
(42) </wsdl:binding>
(43)
(44) <wsdl:service name='StockQuoteService'>
(45)     <wsdl:port name='StockQuotePort'
(46)         binding='tns:StockQuoteBinding' >
(47)         <wssoap:address
(48)             location='http://services.example.org/stockquote' />
(49)         </wsdl:port>
(50) </wsdl:service>
(51) </wsdl:definitions>
(52) </mex:MetadataSection>
(53) <mex:MetadataSection
(54)     Dialect='http://www.w3.org/2001/XMLSchema'
(55)     Identifier='http://services.example.org/stockquote/schemas'>
(56) <mex:Location>
(57)     https://services.example.org/mex/interop/schemas
(58) </mex:Location>
(59) </mex:MetadataSection>
(60) <mex:MetadataSection
(61)     Dialect='http://schemas.xmlsoap.org/wsdl/'
(62)     Identifier='http://services.example.org/stockquote/wsdl'>
(63) <mex:MetadataReference>
(64)     <wsa10:Address>
(65)         https://services.example.org/stockquote/wsdl
(66)     </wsa10:Address>
(67) </mex:MetadataReference>
(68) </mex:MetadataSection>
(69) </mex:Metadata>
(70) </s:Body>
(71) </s:Envelope>

```

M-3a-start-response

```

(01) <s:Envelope
(02)     xmlns:s='http://www.w3.org/2003/05/soap-envelope'
(03)     xmlns:wsa10='http://www.w3.org/2005/08/addressing'>
(04) <s:Header>
(05)     <wsa10:Action>

```

```

(06)     http://services.example.org/mex/interop/startResponse
(07)     </wsa10:Action>
(08)     <wsa10:To>http://www.w3.org/2005/08/addressing/anonymous</wsa10:To>
(09)     <wsa10:RelatesTo>
(10)         urn:uuid:1cecl21a-82fe-41da-87e1-3b23f254f128
(11)     </wsa10:RelatesTo>
(12) </s:Header>
(13) <s:Body>
(14)     <wsa10:EndpointRefernce>
(15)         <wsa10:Address>
(16)             https://services.example.org/mex/interop/serviceA
(17)         </wsa10:Address>
(18)     </wsa10:EndpointReference>
(19) </s:Body/>
(20) </s:Envelope>

```

M-3a-getmetadata-request

```

(01) <s:Envelope
(02)     xmlns:s='http://www.w3.org/2003/05/soap-envelope'
(03)     xmlns:wsa10='http://www.w3.org/2005/08/addressing' >
(04) <s:Header>
(05)     <wsa10:To>https://services.example.org/mex/interop/serviceA</wsa10:To>
(06)     <wsa10:Action>
(07)         http://schemas.xmlsoap.org/ws/2004/09/mex/GetMetadata/Request
(08)     </wsa10:Action>
(09)     <wsa10:MessageID>
(10)         urn:uuid:73d7edfc-5c3c-49b9-ba46-2480caee43e9
(11)     </wsa10:MessageID>
(12)     <wsa10:ReplyTo>
(13)         <wsa10:Address>
(14)             http://www.w3.org/2005/08/addressing/anonymous
(15)         </wsa10:Address>
(16)     </wsa10:ReplyTo>
(17) </s:Header>
(18) <s:Body>
(19)     <mex:GetMetadata xmlns:mex='http://schemas.xmlsoap.org/ws/2004/09/mex' />
(20) </s:Body>
(21) </s:Envelope>

```

M-3a-getmetadata-response

```

(01) <s:Envelope
(02)     xmlns:s='http://www.w3.org/2003/05/soap-envelope'
(03)     xmlns:wsa10='http://www.w3.org/2005/08/addressing' >
(04) <s:Header>
(05)     <wsa10:Action>
(06)         http://schemas.xmlsoap.org/ws/2004/09/mex/GetMetadata/Response
(07)     </wsa10:Action>
(08)     <wsa10:To>http://www.w3.org/2005/08/addressing/anonymous</wsa10:To>
(09)     <wsa10:RelatesTo>

```

```
(10) urn:uuid:1cecl21a-82fe-41da-87e1-3b23f254f128
(11) </wsa10:RelatesTo>
(12) </s:Header>
(13) <s:Body>
(14) <mex:Metadata xmlns:mex='http://schemas.xmlsoap.org/ws/2004/09/mex'>
(15) <mex:MetadataSection Dialect='http://schemas.xmlsoap.org/wsdl/'
(16) Identifier='http://services.example.org/stockquote'>
(17) <wsdl:definitions xmlns:wsdl='http://schemas.xmlsoap.org/wsdl/'
(18) name='StockQuote'
(19) targetNamespace='http://services.example.org/stockquote'
(20) xmlns:tns='http://services.example.org/stockquote'
(21) xmlns:tns2='http://services.example.org/stockquote/wsdl'
(22) xmlns:xsd='http://services.example.org/stockquote/schemas'
(23) xmlns:wsoap='http://schemas.xmlsoap.org/wsdl/soap/'
(24) xmlns:xs='http://www.w3.org/2001/XMLSchema'>
(25)
(26) <wsdl:import namespace='http://services.example.org/stockquote/wsdl'
location='https://services.example.org/stockquote/wsdl' />
(27)
(28) <wsdl:binding name='StockQuoteBinding'
(29) type='tns2:StockQuotePortType'>
(30) <wsoap:binding style='document'
(31) transport='http://schemas.xmlsoap.org/soap/http' />
(32) <wsdl:operation name='GetLastTradePrice'>
(33) <wsoap:operation soapAction=
(34) 'http://services.example.org/stockquote/GetLastTradePrice' />
(35) <wsdl:input name='GetLastTradePriceInput'>
(36) <wsoap:body use='literal' />
(37) </wsdl:input>
(38) <wsdl:output name='GetLastTradePriceOutput'>
(39) <wsoap:body use='literal' />
(40) </wsdl:output>
(41) </wsdl:operation>
(42) </wsdl:binding>
(43)
(44) <wsdl:service name='StockQuoteService'>
(45) <wsdl:port name='StockQuotePort'
(46) binding='tns:StockQuoteBinding' >
(47) <wsoap:address
(48) location='http://services.example.org/stockquote' />
(49) </wsdl:port>
(50) </wsdl:service>
(51) </wsdl:definitions>
(52) </mex:MetadataSection>
(53) <mex:MetadataSection
(54) Dialect='http://www.w3.org/2001/XMLSchema'
(55) Identifier='http://services.example.org/stockquote/schemas'>
(56) <mex:Location>
(57) https://services.example.org/stockquote/schemas
```

```

(58)     </mex:Location>
(59)     </mex:MetadataSection>
(60)     <mex:MetadataSection
(61)         Dialect='http://schemas.xmlsoap.org/wsdl/'
(62)         Identifier='http://services.example.org/stockquote/wsdl'>
(63)     <mex:MetadataReference>
(64)         <wsa10:Address>
(65)             https://services.example.org/stockquote/wsdl
(66)         </wsa10:Address>
(67)     </mex:MetadataReference>
(68)     </mex:MetadataSection>
(69) </mex:Metadata>
(70) </s:Body>
(71) </s:Envelope>

```

M-3b-getmetadata-request

```

(01) <s:Envelope
(02)     xmlns:s='http://www.w3.org/2003/05/soap-envelope'
(03)     xmlns:wsa10='http://www.w3.org/2005/08/addressing'>
(04) <s:Header>
(05)     <wsa10:To>https://services.example.org/mex/interop/serviceA</wsa10:To>
(06)     <wsa10:Action>
(07)         http://schemas.xmlsoap.org/ws/2004/09/mex/GetMetadata/Request
(08)     </wsa10:Action>
(09)     <wsa10:MessageID>
(10)         urn:uuid:73d7edfc-5c3c-49b9-ba46-2480caee43e9
(11)     </wsa10:MessageID>
(12)     <wsa10:ReplyTo>
(13)         <wsa10:Address>
(14)             http://www.w3.org/2005/08/addressing/anonymous
(15)         </wsa10:Address>
(16)     </wsa10:ReplyTo>
(17) </s:Header>
(18) <s:Body>
(19)     <mex:GetMetadata xmlns:mex='http://schemas.xmlsoap.org/ws/2004/09/mex'>
(20)         <mex:Dialect>
(21)             http://schemas.xmlsoap.org/wsdl/
(22)         </mex:Dialect>
(23)     </mex:GetMetadata>
(24) </s:Body>
(25) </s:Envelope>

```

M-3b-getmetadata-response

```

(01) <s:Envelope
(02)     xmlns:s='http://www.w3.org/2003/05/soap-envelope'
(03)     xmlns:wsa10='http://www.w3.org/2005/08/addressing' >
(04) <s:Header>
(05)     <wsa10:To>http://www.w3.org/2005/08/addressing/anonymous</wsa10:To>

```

```
(06) <wsa10:Action>
(07)     http://schemas.xmlsoap.org/ws/2004/09/mex/GetMetadata/Response
(08) </wsa10:Action>
(09) <wsa10:RelatesTo>
(10)     urn:uuid:73d7edfc-5c3c-49b9-ba46-2480caee43e9
(11) </wsa10:RelatesTo>
(12) </s:Header>
(13) <s:Body>
(14)     <mex:Metadata xmlns:mex='http://schemas.xmlsoap.org/ws/2004/09/mex'>
(15)         <mex:MetadataSection Dialect='http://schemas.xmlsoap.org/wsdl/'
(16)             Identifier='http://services.example.org/stockquote' >
(17) <wsdl:definitions xmlns:wsdl='http://schemas.xmlsoap.org/wsdl/'
(18) name='StockQuote'
(19) targetNamespace='http://services.example.org/stockquote'
(20) xmlns:tns='http://services.example.org/stockquote'
(21) xmlns:tns2='http://services.example.org/stockquote/wsdl'
(22) xmlns:xsd1='http://services.example.org/stockquote/schemas'
(23) xmlns:wsoap='http://schemas.xmlsoap.org/wsdl/soap/'
(24) xmlns:xs='http://www.w3.org/2001/XMLSchema' >
(25)
(26)     <wsdl:import namespace='http://services.example.org/stockquote/wsdl'
location='https://services.example.org/stockquote/wsdl' />
(27)
(28)     <wsdl:binding name='StockQuoteBinding'
(29)         type='tns2:StockQuotePortType'>
(30)         <wsoap:binding style='document'
(31)             transport='http://schemas.xmlsoap.org/soap/http' />
(32)         <wsdl:operation name='GetLastTradePrice'>
(33)             <wsoap:operation soapAction=
(34)                 'http://services.example.org/stockquote/GetLastTradePrice' />
(35)             <wsdl:input name='GetLastTradePriceInput'>
(36)                 <wsoap:body use='literal' />
(37)             </wsdl:input>
(38)             <wsdl:output name='GetLastTradePriceOutput'>
(39)                 <wsoap:body use='literal' />
(40)             </wsdl:output>
(41)         </wsdl:operation>
(42)     </wsdl:binding>
(43)
(44)     <wsdl:service name='StockQuoteService'>
(45)         <wsdl:port name='StockQuotePort'
(46)             binding='tns:StockQuoteBinding' >
(47)             <wsoap:address
(48)                 location='http://services.example.org/stockquote' />
(49)             </wsdl:port>
(50)     </wsdl:service>
(51) </wsdl:definitions>
(52)     </mex:MetadataSection>
(53)     <mex:MetadataSection
```

```

(54)         Dialect='http://schemas.xmlsoap.org/wsdl/'
(55)         Identifier='http://services.example.org/stockquote/wsdl'>
(56)         <mex:MetadataReference>
(57)             <wsa10:Address>
(58)                 https://services.example.org/stockquote/wsdl
(59)             </wsa10:Address>
(60)         </mex:MetadataReference>
(61)     </mex:MetadataSection>
(62) </mex:Metadata>
(63) </s:Body>
(64) </s:Envelope>

```

M-3c-getmetadata-request

```

(01) <s:Envelope
(02)     xmlns:s='http://www.w3.org/2003/05/soap-envelope'
(03)     xmlns:wsa10='http://www.w3.org/2005/08/addressing'>
(04) <s:Header>
(05)     <wsa10:To>https://services.example.org/mex/interop/serviceA</wsa10:To>
(06)     <wsa10:Action>
(07)         http://schemas.xmlsoap.org/ws/2004/09/mex/GetMetadata/Request
(08)     </wsa10:Action>
(09)     <wsa10:MessageID>
(10)         urn:uuid:73d7edfc-5c3c-49b9-ba46-2480caee43e9
(11)     </wsa10:MessageID>
(12)     <wsa10:ReplyTo>
(13)         <wsa10:Address>
(14)             http://www.w3.org/2005/08/addressing/anonymous
(15)         </wsa10:Address>
(16)     </wsa10:ReplyTo>
(17) </s:Header>
(18) <s:Body>
(19)     <mex:GetMetadata xmlns:mex='http://schemas.xmlsoap.org/ws/2004/09/mex'>
(20)         <mex:Dialect>
(21)             http://schemas.xmlsoap.org/wsdl/
(22)         </mex:Dialect>
(23)         <mex:Identifier>
(24)             http://services.example.org/stockquote
(25)         </mex:Identifier>
(26)     </mex:GetMetadata>
(27) </s:Body>
(28) </s:Envelope>

```

M-3c-getmetadata-response

```

(01) <s:Envelope
(02)     xmlns:s='http://www.w3.org/2003/05/soap-envelope'
(03)     xmlns:wsa10='http://www.w3.org/2005/08/addressing' >
(04) <s:Header>
(05)     <wsa10:To>http://www.w3.org/2005/08/addressing/anonymous</wsa10:To>
(06)     <wsa10:Action>

```

```
(07)     http://schemas.xmlsoap.org/ws/2004/09/mex/GetMetadata/Response
(08)     </wsa10:Action>
(09)     <wsa10:RelatesTo>
(10)         urn:uuid:73d7edfc-5c3c-49b9-ba46-2480caee43e9
(11)     </wsa10:RelatesTo>
(12) </s:Header>
(13) <s:Body>
(14)     <mex:Metadata xmlns:mex='http://schemas.xmlsoap.org/ws/2004/09/mex'>
(15)         <mex:MetadataSection Dialect='http://schemas.xmlsoap.org/wsdl/
(16)             Identifier='http://services.example.org/stockquote' >
(17) <wsdl:definitions xmlns:wsdl='http://schemas.xmlsoap.org/wsdl/'
(18) name='StockQuote'
(19) targetNamespace='http://services.example.org/stockquote'
(20) xmlns:tns='http://services.example.org/stockquote'
(21) xmlns:tns2='http://services.example.org/stockquote/wsdl'
(22) xmlns:xsd1='http://services.example.org/stockquote/schemas'
(23) xmlns:wsoap='http://schemas.xmlsoap.org/wsdl/soap/'
(24) xmlns:xs='http://www.w3.org/2001/XMLSchema' >
(25)
(26)     <wsdl:import namespace='http://services.example.org/stockquote/wsdl'
location='https://services.example.org/stockquote/wsdl' />
(27)
(28)     <wsdl:binding name='StockQuoteBinding'
(29)         type='tns2:StockQuotePortType' >
(30)         <wsoap:binding style='document'
(31)             transport='http://schemas.xmlsoap.org/soap/http' />
(32)         <wsdl:operation name='GetLastTradePrice' >
(33)             <wsoap:operation soapAction=
(34)                 'http://services.example.org/stockquote/GetLastTradePrice' />
(35)             <wsdl:input name='GetLastTradePriceInput' >
(36)                 <wsoap:body use='literal' />
(37)             </wsdl:input>
(38)             <wsdl:output name='GetLastTradePriceOutput' >
(39)                 <wsoap:body use='literal' />
(40)             </wsdl:output>
(41)         </wsdl:operation>
(42)     </wsdl:binding>
(43)
(44)     <wsdl:service name='StockQuoteService' >
(45)         <wsdl:port name='StockQuotePort'
(46)             binding='tns:StockQuoteBinding' >
(47)             <wsoap:address
(48)                 location='http://services.example.org/stockquote' />
(49)             </wsdl:port>
(50)         </wsdl:service>
(51) </wsdl:definitions>
(52)     </mex:MetadataSection>
(53) </mex:Metadata>
(54) </s:Body>
```

(55) </s:Envelope>