



Web Services ReliableMessaging Policy Assertion (WS-RM Policy)

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Abstract:

This specification describes a domain-specific policy assertion for WS-ReliableMessaging [WS-RM] that can be specified within a policy alternative as defined in WS-Policy Framework [WS-Policy].

By using the XML [XML], SOAP [SOAP 1.1], [SOAP 1.2] and WSDL [WSDL 1.1] extensibility models, the WS* specifications are designed to be composed with each other to provide a rich Web services environment. This by itself does not provide a negotiation solution for Web services. This is a building block that is used in conjunction with other Web service and application-specific protocols to accommodate a wide variety of policy exchange models.

Status:

This document is a work in progress and will be updated to reflect issues as they are resolved by the Web Services Reliable Exchange (WS-RX) Technical Committee.

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1 Introduction

This specification defines a domain-specific policy assertion for reliable messaging for use with WS-Policy [WS-Policy] and WS-ReliableMessaging [WS-RM].

1.1 Goals and Requirements

1.1.1 Requirements

1.2 Notational Conventions

The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [KEYWORDS].

This specification uses the following syntax to define normative outlines for messages:

- The syntax appears as an XML instance, but values in italics indicate data types instead of values.
- Characters are appended to elements and attributes to indicate cardinality:
 - "?" (0 or 1)
 - "*" (0 or more)
 - "+" (1 or more)
- The character "|" is used to indicate a choice between alternatives.
- The characters "[" and "]" are used to indicate that contained items are to be treated as a group with respect to cardinality or choice.
- An ellipsis (i.e. "...") indicates a point of extensibility that allows other child, or attribute, content. Additional children and/or attributes MAY be added at the indicated extension points but MUST NOT contradict the semantics of the parent and/or owner, respectively. If an extension is not recognized it SHOULD be ignored.
- XML namespace prefixes (See Section [Namespace](#)) are used to indicate the namespace of the element being defined.

1.3 Namespace

The XML namespace [XML-ns] URI that MUST be used by implementations of this specification is:

```
http://docs.oasis-open.org/ws-rx/wsrmp/200510
```

Table 1 lists the XML namespaces that are used in this specification. The choice of any namespace prefix is arbitrary and not semantically significant.

The following namespaces are used in this document:

79 *Table 1*

Prefix	Namespace	Specification
wsp	http://schemas.xmlsoap.org/ws/2004/09/policy	[WS-Policy]
wsrmp	http://docs.oasis-open.org/ws-rx/wsrmp/200510	This specification.

80 **1.4 Compliance**

81 An implementation is not compliant with this specification if it fails to satisfy one or more of the MUST or
 82 REQUIRED level requirements defined herein. A SOAP Node MUST NOT use the XML namespace
 83 identifier for this specification (listed in Section [Namespace](#)) within SOAP Envelopes unless it is compliant
 84 with this specification.

85 Normative text within this specification takes precedence over normative outlines, which in turn take
 86 precedence over the XML Schema [[XML-Schema Part1](#), [XML-Schema Part2](#)] descriptions.

2 RM Policy Assertions

WS-Policy Framework [WS-Policy] and WS-Policy Attachment [WS-PolicyAttachment] collectively define a framework, model and grammar for expressing the requirements, and general characteristics of entities in an XML Web services-based system. To enable an RM Destination and an RM Source to describe their requirements for a given Sequence, this specification defines two assertions that leverage a single RM-policy assertion that leverages the WS-Policy framework.

2.1 Assertion Model

In general a RM policy assertion indicates that the Application Source and Application Destination MUST use WS-ReliableMessaging [WS-RM] to ensure reliable delivery of messages. Because an individual WS-RM Sequence only applies to messages carried in one direction (e.g. from an Application Source to an Application Destination) this specification defines separate assertions to cover inbound messages and outbound messages (for the purposes of this specification, the meaning and “inbound” and “outbound” are defined from the point of view of the service that is advertising these policies). These assertions can be combined using the WS-Policy Framework to indicate different combinations of supported behavior (e.g. WS-RM is required for inbound messages, but not for outbound messages; WS-RM is required for both inbound and outbound messages, etc.)

2.2 Inbound Messages

The normative outline for the inbound RM assertion is:

```
<wsrm:RMInbound [wsp:Optional="true"]? ... >
...
</wsrm:RMInbound>
```

The RM-policy assertion indicates that the RM-Source and RM-Destination MUST use WS-ReliableMessaging [WS-RM] to ensure reliable delivery of messages. Specifically, the WS-ReliableMessaging protocol determines invariants maintained by the reliable messaging endpoints and the directives used to track and manage the delivery of a Sequence of messages.

The assertion defines a maximum message number parameter that the RM-Destination MAY include to indicate the maximum message number the RM-Destination will accept. This is useful for RM-Destinations that may be running in constrained environments that can not accept values as large as the default value of a maximum unsigned long.

Finally, this assertion defines an acknowledgement interval parameter that the RM-Destination MAY include. Per WS-ReliableMessaging [WS-RM], acknowledgements are sent on return messages or sent stand-alone. If a return message is not available to send an acknowledgement, an RM-Destination MAY wait for up to the acknowledgement interval before sending a stand-alone acknowledgement. If there are no unacknowledged messages, the RM-Destination MAY choose not to send an acknowledgement. This parameter does not alter the formulation of messages or acknowledgements as transmitted; it does not alter the meaning of the wsrm:AckRequested directive. Its purpose is to communicate the timing of acknowledgements so that the RM-Source may tune appropriately.

The RM assertion parameters do not affect the messages which are sent on the wire.

2.3 Normative Outline

The normative outline for the RM assertion is:

```
<wsrm:RMAssertion [wsp:Optional="true"]? ... >  
<wsrm:AcknowledgementInterval Milliseconds="xs:unsignedLong" ... /> ?  
<wsrm:MaxMessageNumber Number="xs:unsignedLong" ... /> ?  
...  
</wsrm:RMAssertion>
```

The following describes additional, normative constraints on the outline listed above:

/wsrm:RMInboundAssertion

A policy assertion that specifies that WS-ReliableMessaging [WS-RM] protocol MUST be used for inbound messages for the binding or port to which this assertion is attached (see Assertion Attachment)a Sequence.

/wsrm:RMInboundAssertion/@wsp:Optional="true"

Per WS-Policy [WS-Policy], this is compact notation for two policy alternatives, one with and one without the assertion. The intuition is that the behavior indicated by the assertion is optional, or in this case, that WS-ReliableMessaging MAY be used for inbound messages for the binding or port to which this assertion is attached.

/wsrm:RMInbound/{any}Assertion/wsrm:AcknowledgementInterval

This is an extensibility mechanism to allow different (extensible) types of information, based on a schema, to be expressed within the policyA parameter that specifies the duration after which the RM Destination will transmit an acknowledgement. If omitted, there is no implied value.

/wsrm:RMInbound/@{any}Assertion/wsrm:AcknowledgementInterval/@Milliseconds

This is an extensibility mechanism to allow additional attributes, based on schema, to be added to the policye acknowledgement interval, specified in milliseconds.

2.4 Outbound Messages

The normative outline for the outbound RM assertion is:

```
<wsrm:RMOutbound [wsp:Optional="true"]? ... >  
...  
</wsrm:RMOutbound>
```

The following describes additional, normative constraints on the outline listed above:

/wsrm:RMOutbound

A policy assertion that specifies that WS-ReliableMessaging [WS-RM] protocol MUST be used for outbound messages for the binding or port to which this assertion is attached (see Assertion Attachment)

/wsrm:RMOutbound/@wsp:Optional="true"

Per WS-Policy [WS-Policy], this is compact notation for two policy alternatives, one with and one without the assertion. The intuition is that the behavior indicated by the assertion is optional, or in this case, that WS-ReliableMessaging MAY be used for outbound messages for the binding or port to which this assertion is attached.

/wsrm:RMOutbound/{any}

165 This is an extensibility mechanism to allow different (extensible) types of information, based on a
166 schema, to be expressed within the policy.

167 /wsrmp:RMOutbound/@{any}

168 This is an extensibility mechanism to allow additional attributes, based on schema, to be added to
169 the policy.

170 /wsrmp:RMAssertion/wsrmp:MaxMessageNumber

171 A parameter that specifies the maximum message number that the RM Destination will accept. If
172 omitted, the default value of the maximum unsigned long will be assumed.

173 /wsrmp:RMAssertion/wsrmp:MaxMessageNumber/@Number

174 The maximum message number.

175 2.5 Assertion Attachment

176 Because the RM policy assertions indicate ~~indicates~~ endpoint behavior over an RM Sequence, the
177 assertion has Endpoint Policy Subject [WS-PolicyAttachment].

178 WS-PolicyAttachment defines three WSDL [WSDL 1.1] policy attachment points with Endpoint Policy
179 Subject:

180 • wsdl:portType – A policy expression containing an RM policy assertion MUST NOT be attached to a
181 wsdl:portType; RM policy assertions specify ~~the RM policy assertion MUST NOT be attached to a~~
182 wsdl:portType; the RM policy assertion specifies a concrete behavior whereas the wsdl:portType is an
183 abstract construct.

184 • wsdl:binding – A policy expression containing an ~~the~~ RM policy assertion SHOULD be attached to a
185 wsdl:binding.

186 • wsdl:port – A policy expression containing an ~~the~~ RM policy assertion MAY be attached to a
187 wsdl:port.

188 If a ~~the~~ RM policy assertion appears in a policy expression attached to both a wsdl:port and its
189 corresponding wsdl:binding, the parameters in the former MUST be used and the latter ignored.

190 2.6 Assertion Example

191 Table 2 lists an example use of RM policy assertions ~~the RM policy assertion~~.

192 Table 2: Example policy with RM policy assertions

```
193 (01) <wsdl:definitions
194 (02)   targetNamespace="example.com"
195 (03)   xmlns:tns="example.com"
196 (04)   xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
197 (05)   xmlns:wsp="http://schemas.xmlsoap.org/ws/2004/09/policy"
198 (06)   xmlns:wsrmp="http://docs.oasis-open.org/ws-rx/wsrmp/200510"
199 (07)   xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-
200 wss-wssecurity-utility-1.0.xsd">
201 (08)
202 (09)   <wsp:UsingPolicy wsdl:required="true" />
203 (10)
204 (11)   <wsp:Policy wsu:Id="MyPolicy" >
205 (12)     <wsrmp:RMInbound />
206 (13)     <wsrmp:RMOutbound wsp:Optional="true"
207     <wsrmp:AcknowledgementInterval-Milliseconds="200" />
```

```

208 (14) <!-- omitted assertions -->/wsrmp:RMAssertion>
209 (15) </wsp:Policy<!-- omitted assertions -->
210 (16) </wsp:Policy>
211 (17) <!-- omitted elements -->
212 (18) <!-- omitted elements -->
213 (19) <wsdl:binding name="MyBinding" type="tns:MyPortType" >
214 (20) <wsp:PolicyReference URI="#MyPolicy" /><wsdl:binding
215 name="MyBinding" type="tns:MyPortType">
216 (21) <!-- omitted elements --wsp:PolicyReference URI="#MyPolicy" />
217 (22) </wsdl:binding<!-- omitted elements -->
218 (23) </wsdl:binding>
219 (24) </wsdl:definitions>
220 (25) </wsdl:definitions>

```

221 Line (09) in Table 2 indicates that WS-Policy [WS-Policy] is in use as a required extension.

222 Lines (11-15) are a policy expression that includes two RM policy assertions (6) are a policy expression that
 223 includes a RM policy assertion (Lines 12-14) to indicate that WS-ReliableMessaging [WS-RM] must be
 224 used. Line (13) indicates the RM Destination may buffer acknowledgements for up to two-tenths of a
 225 second.

226 Line (12) indicates that WS-ReliableMessaging [WS-RM] must be used for all inbound messages of the
 227 binding, port or endpoint to which "MyPolicy" is attached (20-23) are a WSDL [WSDL 1.1] binding. Line
 228 (24) indicates that the policy in Lines (11-16) applies to this binding, specifically indicating that WS-
 229 ReliableMessaging must be used over all the messages in the binding.

230 Line (13) indicates that WS-ReliableMessaging may be used for all outbound messages of the binding,
 231 port or endpoint to which "MyPolicy" is attached.

232 Lines (19-22) are a WSDL [WSDL 1.1] binding. Line (20) indicates that the policy in Lines (11-15) applies
 233 to this binding, specifically indicating that WS-ReliableMessaging must be used for all inbound messages
 234 in the binding and that WS-ReliableMessaging may be used for all outbound messages in the binding.

3 Security Considerations

It is strongly RECOMMENDED that policies and assertions be signed to prevent tampering.

It is RECOMMENDED that policies SHOULD NOT be accepted unless they are signed and have an associated security token to specify the signer has proper claims for the given policy. That is, a relying party shouldn't rely on a policy unless the policy is signed and presented with sufficient claims to pass the relying parties acceptance criteria.

It should be noted that the mechanisms described in this document could be secured as part of a SOAP message using WS-Security [WSS] or embedded within other objects using object-specific security mechanisms.

4 References

4.1 Normative

[KEYWORDS]

S. Bradner, "Key words for use in RFCs to Indicate Requirement Levels," RFC 2119, Harvard University, March 1997.

[SOAP 1.1]

W3C Note, "SOAP: Simple Object Access Protocol 1.1" 08 May 2000.

[SOAP 1.2]

W3C Recommendation, "[SOAP Version 1.2 Part 1: Messaging Framework](#)" June 2003.

[URI]

T. Berners-Lee, R. Fielding, L. Masinter, "Uniform Resource Identifiers (URI): Generic Syntax," RFC 3986, MIT/LCS, U.C. Irvine, Xerox Corporation, January 2005.

[WS-RM]

OASIS WS-RX Technical Committee Draft, "Web Services Reliable Messaging (WS-ReliableMessaging)," September 2005.

[WS-Policy]

D. Box, et al, "Web Services Policy Framework (WS-Policy)," September 2004.

[WS-PolicyAttachment]

D. Box, et al, "Web Services Policy Attachment (WS-PolicyAttachment)," September 2004.

[WSDL 1.1]

W3C Note, "Web Services Description Language (WSDL 1.1)," 15 March 2001.

[XML]

W3C Recommendation, "[Extensible Markup Language \(XML\) 1.0 \(Second Edition\)](#)", October 2000.

[XML-ns]

W3C Recommendation, "Namespaces in XML," 14 January 1999.

[XML-Schema Part1]

W3C Recommendation, "XML Schema Part 1: Structures," 2 May 2001.

[XML-Schema Part2]

W3C Recommendation, "XML Schema Part 2: Datatypes," 2 May 2001.

4.2 Non Normative

[WSS]

OASIS Web Services Security: SOAP Message Security 1.0 (WS-Security 2004)", Chris Kaler, Phillip Hallam-Baker, Ronald Monzillo, eds, OASIS Standard 200401, March 2004.

277 **A. Acknowledgments**

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291 Microsoft, Stephen Todd, IBM, Sanjiva Weerawarana, IBM, Roger Wolter, Microsoft.

292 The following individuals were members of the committee during the development of this specification:

293 TBD

B. XML Schema

A normative copy of the XML Schema [XML-Schema Part1, XML-Schema Part2] description for this specification may be retrieved from the following address:

<http://docs.oasis-open.org/ws-rx/wsrmp/200510/wsrmp-1.1-schema-200510.xsd>

The following copy is provided for reference.

```
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-->
<xs:schema xmlns:tns="http://docs.oasis-open.org/ws-rx/wsrmp/200510"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://docs.oasis-open.org/ws-rx/wsrmp/200510"
elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:complexType name="SimpleExAssertion">
    <xs:sequence>
      <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>
  <xs:element name="RMInbound" type="tns:SimpleExAssertion"/>
</xs:schema>
```

```

350     <xs:element name="RMOutbound" type="tns:SimpleExAssertion"/>
351 </xs:schema>

```

```

352 <?xml version="1.0" encoding="UTF-8"?>
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388 HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF
389 MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.
390 -->
391 <xs:schema xmlns:tns="http://docs.oasis-open.org/ws-rx/wsrmp/200510"
392 xmlns:xs="http://www.w3.org/2001/XMLSchema"
393 targetNamespace="http://docs.oasis-open.org/ws-rx/wsrmp/200510"
394 elementFormDefault="qualified" attributeFormDefault="unqualified">
395     <xs:element name="RMAssertion">
396         <xs:complexType>
397             <xs:sequence>
398                 <xs:element
399 name="AcknowledgementInterval" minOccurs="0">
400                     <xs:complexType>
401                         <xs:attribute
402 name="Milliseconds" type="xs:unsignedLong" use="required"/>
403                         <xs:anyAttribute
404 namespace="##any" processContents="lax"/>
405                     </xs:complexType>
406                 </xs:element>
407                 <xs:element name="MaxMessageNumber"
408 minOccurs="0">
409                     <xs:complexType>

```

```
410                                     <xs:attribute-
411 name="Number" type="xs:unsignedLong" use="required"/>
412                                     <xs:anyAttribute-
413 namespace="##any" processContents="lax"/>
414                                     </xs:complexType>
415                                     </xs:element>
416                                     <xs:any namespace="##other"
417 processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
418                                     </xs:sequence>
419                                     <xs:anyAttribute namespace="##any"
420 processContents="lax"/>
421                                     </xs:complexType>
422                                     </xs:element>
423 </xs:schema>
```

C. Revision History

Revision	Date	By Whom	What
wd-01.doc	2005-07-06	Ümit Yalçınalp	Initial version created based on submission by the authors.
1.0-wd-01.swx	2005-09-01	Ümit Yalçınalp	Reformatted using Open Office
1.1-wd-01.swx	2005-09-18	Ümit Yalçınalp	Applied resolution i001 Applied resolution i015/16 (doc identifier) Partial application of i017, final yyyy/mm required, changed doc URI to TBD pending yyyy/mm Deleted original copyright section
1.1-wd-01.swx	2005-10-02	Anish Karmarkar	Applied resolution of i013 + minor editorial changes + fixed resolution of i017
1.1-wd-01.swx	2005-10-04	Ümit Yalçınalp	Applied actual value for yyyy/mm. Added resolution of i009
1.1-wd-01.swx	2005-10-06	Ümit Yalçınalp	Editorial fixes suggested by Anish Updated wd draft date to October 6th
1.1-wd-01.swx	2005-10-19	Ümit Yalçınalp	Editorial change to remove .swx suffix from doc id
wd-02	2005-11-03	Gilbert Pilz	Start wd-02 by changing title page from cd-01.
wd-02	2005-11-30	Gilbert Pilz	i072 – editorial nits
wd-02	2005-11-30	Gilbert Pilz	i074 - Use of [tcShortName] in artifact locations namespaces, etc
wd-02	2005-12-01	Gilbert Pilz	Updated fix to i074 to remove trailing '/' from wsrmp namespace.
wd-02	2005-12-01	Anish Karmarkar	Applied resolution for i022
wd-02	2005-12-01	Anish Karmarkar	Applied resolution for i024
wd-02	2005-12-01	Anish Karmarkar	Applied resolution for i054
wd-02	2005-12-01	Anish Karmarkar	Applied resolution of i073
wd-2	2005-12-05	Anish Karmarkar	Applied resolution of i055
wd-2	2005-12-05	Ümit Yalçınalp	Changed fixed date in footer to current date
wd-3	2005-12-21	Doug Davis	Added i050
wd-3	2005-12-23	Ümit Yalçınalp	I057 resolution
wd-3	2005-12-23	Ümit Yalçınalp	Changed the ref to WS-RM to the WS-RX committee

Revision	Date	By Whom	What
			draft instead of original version Fixed Dug's email address
wd-3	2005-12-23	Ümit Yalçinalp	I060 resolution
wd-03	2005-12-27	Gilbert Pilz	Remove schema example and put it in its own artifact (wsrmp-1.1-schema-200510.xsd). Convert source file to OpenDocument format. Make line numbers all the same style.
wd-03	2005-12-28	Anish Karmarkar	Included a section link to c:\temp\wsrmp-1.1-schema-200510.xsd
wd-03	2006-01-04	Gilbert Pilz	Fixed formatting of included section.
wd-03	2006-01-05	Gilbert Pilz	Fix closing tag of normative outline for RMAssertion.
wd-04	2006-11-11	Doug Davis	Minor tweaks/typos
wd-05	2006-01-23	Gilbert Pilz	Start wd-05 by accepting all changes from wd-04
wd-06	2006-01-23	Doug Davis	Minor typos found by Marc

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