



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 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 Part~~ [Schema Part 1, Part 2](#)]
 87 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 a single RM policy assertion that leverages the WS-Policy framework.

2.1 Assertion Model

The RM policy assertion indicates that the RM Source and RM Destination MUST use WS-ReliableMessaging [WS-RM] to ensure reliable ~~delivery of messages~~ ~~message delivery~~. 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 wsrmp: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.

2.2 Normative Outline

The normative outline for the RM version assertion is:

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

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

/wsrmp:RMAssertion

A policy assertion that specifies that WS-ReliableMessaging [WS-RM] protocol MUST be used for a Sequence.

/wsrmp:RMAssertion/@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.

/wsrmp:RMAssertion/wsrmp:AcknowledgementInterval

128 A parameter that specifies the duration after which the RM Destination will transmit an
 129 acknowledgement. If omitted, there is no implied value.

130 /wsrmp:RMAssertion/wsrmp:AcknowledgementInterval/@Milliseconds

131 The acknowledgement interval, specified in milliseconds.

132 /wsrmp:RMAssertion/wsrmp:MaxMessageNumber

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

135 /wsrmp:RMAssertion/wsrmp:MaxMessageNumber/@Number

136 The maximum message number.

137 2.3 Assertion Attachment

138 Because the RM policy assertion indicates endpoint behavior over an RM Sequence, the assertion has
 139 Endpoint Policy Subject [[WS-PolicyAttachment](#)].

140 WS-PolicyAttachment defines three WSDL [[WSDL 1.1](#)] policy attachment points with Endpoint Policy
 141 Subject:

- 142 • wsdl:portType – A policy expression containing the RM policy assertion MUST NOT be attached to
 143 a wsdl:portType; the RM policy assertion specifies a concrete behavior whereas the wsdl:portType is an
 144 abstract construct.
- 145 • wsdl:binding – A policy expression containing the RM policy assertion SHOULD be attached to a
 146 wsdl:binding.
- 147 • wsdl:port – A policy expression containing the RM policy assertion MAY be attached to a wsdl:port.

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

150 2.4 Assertion Example

151 Table 2 lists an example use of the RM policy assertion.

152 Table 2: Example policy with RM policy assertion

```

153 (01)<wsdl:definitions
154 (02)   targetNamespace="example.com"
155 (03)   xmlns:tns="example.com"
156 (04)   xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
157 (05)   xmlns:wsp="http://schemas.xmlsoap.org/ws/2004/09/policy"
158 (06)   xmlns:wsrmp="http://docs.oasis-open.org/ws-rx/wsrmp/200510"
159 (07)   xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-
160 wss-wssecurity-utility-1.0.xsd">
161 (08)
162 (09) <wsp:UsingPolicy wsdl:required="true" />
163 (10)
164 (11) <wsp:Policy wsu:Id="MyPolicy" >
165 (12)   <wsrmp:RMAssertion>
166 (13)     <wsrmp:AcknowledgementInterval Milliseconds="200" />
167 (14)   </wsrmp:RMAssertion>
168 (15)   <!-- omitted assertions -->
169 (16) </wsp:Policy>
170 (17)
171 (18) <!-- omitted elements -->

```

```

172 (19)
173 (20) <wsdl:binding name="MyBinding" type="tns:MyPortType" >
174 (21)   <wsp:PolicyReference URI="#MyPolicy" />
175 (22)   <!-- omitted elements -->
176 (23) </wsdl:binding>
177 (24)
178 (25)</wsdl:definitions>

```

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

180 Lines (11-16) are a policy expression that includes a RM policy assertion (Lines 12-14) to indicate that
 181 WS-ReliableMessaging [WS-RM] must be used. Line (13) indicates the RM Destination may buffer
 182 acknowledgements for up to two-tenths of a second.

183 Lines (20-23) are a WSDL [WSDL 1.1] binding. Line (21) indicates that the policy in Lines (11-16) applies
 184 to this binding, specifically indicating that WS-ReliableMessaging must be used over all the messages in
 185 the binding.

186 2.5 Delivery Assurance

187 ~~The Delivery Assurance indicates a delivery assurance claim in effect between an Application Source and~~
 188 ~~an RM Source or an Application Destination and an RM Destination. The wsrmp:DeliveryAssurance-~~
 189 ~~described below specifies the Delivery Assurance as defined by WS-ReliableMessaging [WS-RM].~~

190 ~~Note: This section is subject to change since the technical committee has not yet determined whether the~~
 191 ~~DeliveryAssurance should be represented as a separate policy assertion or be expressed within a context~~
 192 ~~of a wsrmp:RMAssertion.~~

193 The normative outline of a Delivery Assurance is:

```

194 <wsrmp:DeliveryAssertion mode="[AtLeastOnce|AtMostOnce|ExactlyOnce]"
195 ordered="[xs:boolean]"? ... ="">

```

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

197 ~~/wsrmp:DeliveryAssertion~~

198 ~~An assertion that makes a claim as to the delivery assurance policy in effect at the destination-~~
 199 ~~endpoint.~~

200 ~~/wsrmp:DeliveryAssertion/@mode~~

201 ~~This required attribute specifies whether or not all of the messages within an RM Sequence will be~~
 202 ~~delivered by the RM Destination to the Application Destination, and whether or not duplicate~~
 203 ~~messages will be delivered.~~

204 ~~A value of 'AtMostOnce' means that messages received by the RM Destination will be delivered to~~
 205 ~~the Application Destination at most once, without duplication. It is possible that some messages in~~
 206 ~~a sequence may not be delivered.~~

207 ~~A value of 'AtLeastOnce' means that every message received by the RM Destination will be~~
 208 ~~delivered to the Application Destination. Some messages may be delivered more than once.~~

209 ~~A value of 'ExactlyOnce' means that every message received by the RM Destination will be~~
 210 ~~delivered to the Application Destination without duplication.~~

211 ~~/wsrmp:DeliveryAssertion/@ordered~~

212 This attribute, of type *xs:boolean*, specifies whether, or not, the destination endpoint ensures that
213 the messages within an RM Sequence will be delivered in order, by the RM Destination to the
214 Application Destination. Order is determined by the value of the RM message number. Ordered
215 delivery would mean that the messages would be delivered in ascending order of the message
216 number value. A value of 'true' indicates that messages will be delivered in order. A value of 'false'
217 makes no claims as to the order of delivery of the messages within a RM Sequence. If omitted,
218 the default implied value is 'false'.

219 **3 Security Considerations**

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

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

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

4 References

4.1 Normative

4.2 Non-Normative

[KEYWORDS]

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

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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 2396, MIT/LCS, U.C. Irvine, Xerox Corporation, August 1998.

[WS-RM]

OASIS WS-RX Technical Committee Draft, "Web Services Reliable Messaging (WS-ReliableMessaging)," September 2005.
~~R. Bilorusets, et al, "Web Services Reliable Messaging (WS-ReliableMessaging)," February 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.

[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.~~

[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.
~~"Extensible Markup Language (XML) Third Edition," 4 February 2004.~~

[XML-ns]

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

[XML-Schema Part1]

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

261 **[XML-Schema Part2]**

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

263 **4.3 Non Normative**

264 **[WSS]**

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

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

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

283 TBD

B. XML Schema

A normative copy of the XML Schema [XML-Schema Part1, XML-Schema Part-Schema Part 1, Part 2] 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.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
  targetNamespace="http://docs.oasis-open.org/ws-rx/wsrmp/200510"
  xmlns:tns="http://docs.oasis-open.org/ws-rx/wsrmp/200510"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified">
  <xs:element name="RMAssertion" >
    <xs:complexType>
      <xs:sequence>
        <xs:element name="AcknowledgementInterval" minOccurs="0" >
          <xs:complexType>
            <xs:attribute name="Milliseconds"
              type="xs:unsignedLong"
              use="required" />
            <xs:anyAttribute namespace="##any" processContents="lax" />
          </xs:complexType>
        </xs:element>
        <xs:element name="MaxMessageNumber" minOccurs="0" >
          <xs:complexType>
            <xs:attribute name="Number"
              type="xs:unsignedLong"
              use="required" />
            <xs:anyAttribute namespace="##any" processContents="lax" />
          </xs:complexType>
        </xs:element>
        <xs:any namespace="##other"
          processContents="lax"
          minOccurs="0"
          maxOccurs="unbounded" />
      </xs:sequence>
      <xs:anyAttribute namespace="##any" processContents="lax" />
    </xs:complexType>
  </xs:element>
</xs:schema>

<?xml version="1.0" encoding="UTF-8"?>
<!--
--
```

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~~—>~~

```

<xs:schema
  targetNamespace="http://docs.oasis-open.org/ws-rx/wsrmp/200510"
  xmlns:tns="http://docs.oasis-open.org/ws-rx/wsrmp/200510"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified">
  —
  <xs:element name="RMAssertion">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="AcknowledgementInterval" minOccurs="0">
          <xs:complexType>
            <xs:attribute name="Milliseconds"
              type="xs:unsignedLong"
              use="required"/>
            <xs:anyAttribute namespace="##any" processContents="lax"/>
          </xs:complexType>
        </xs:element>
        <xs:element name="MaxMessageNumber" minOccurs="0">
          <xs:complexType>

```

```
390      <xs:attribute name="Number"
391                    type="xs:unsignedLong"
392                    use="required" />
393      <xs:anyAttribute namespace="##any" processContents="lax" />
394    </xs:complexType>
395  </xs:element>
396  <xs:any namespace="##other"
397          processContents="lax"
398          minOccurs="0"
399          maxOccurs="unbounded" />
400 </xs:sequence>
401 <xs:anyAttribute namespace="##any" processContents="lax" />
402 </xs:complexType>
403 </xs:element>
404 </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
			<u>draft instead of original version</u> <u>Fixed Dug's email address</u>
<u>wd-3</u>	<u>2005-12-23</u>	<u>Ümit Yalçınalp</u>	<u>I060 resolution</u>
<u>wd-03</u>	<u>2005-12-27</u>	<u>Gilbert Pilz</u>	<u>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.</u>
<u>wd-03</u>	<u>2005-12-28</u>	<u>Anish Karmarkar</u>	<u>Included a section link to c:\temp\wsrmp-1.1-schema-200510.xsd</u>
<u>wd-03</u>	<u>2006-01-04</u>	<u>Gilbert Pilz</u>	<u>Fixed formatting of included section.</u>
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 ed-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.

Revision	Date	By Whom	What
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

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