



# Web Services Reliable Messaging Policy Assertion (WS-RM Policy) Version 1.2

## Committee Specification 02

29 November 2008

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### Related Work:

This specification replaces or supercedes:

- WS-ReliableMessaging Policy v1.1

### Declared XML Namespaces:

<http://docs.oasis-open.org/ws-rx/wsrmp/200702>

### 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.

43 **Status:**

44 This document was last revised or approved by the WS-RX Technical Committee on the above  
45 date. The level of approval is also listed above. Check the "Latest Version" or "Latest Approved  
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47 Technical Committee members should send comments on this specification to the Technical  
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49 "Send A Comment" button on the Technical Committee's web page at [http://www.oasis-  
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51 For information on whether any patents have been disclosed that may be essential to  
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55 The non-normative errata page for this specification is located at [http://www.oasis-  
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# 119 1 Introduction

120 This specification defines a domain-specific policy assertion for reliable messaging for use with WS-Policy  
121 and WS-ReliableMessaging.

## 122 1.1 Terminology

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

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

- 127 • The syntax appears as an XML instance, but values in italics indicate data types instead of values.
- 128 • Characters are appended to elements and attributes to indicate cardinality:
  - 129 ○ "?" (0 or 1)
  - 130 ○ "\*" (0 or more)
  - 131 ○ "+" (1 or more)
- 132 • The character "|" is used to indicate a choice between alternatives.
- 133 • The characters "[" and "]" are used to indicate that contained items are to be treated as a group  
134 with respect to cardinality or choice.
- 135 • An ellipsis (i.e. "...") indicates a point of extensibility that allows other child, or attribute, content.  
136 Additional children and/or attributes MAY be added at the indicated extension points but MUST  
137 NOT contradict the semantics of the parent and/or owner, respectively. If an extension is not  
138 recognized it SHOULD be ignored.
- 139 • XML namespace prefixes (see section 1.4) are used to indicate the namespace of the element  
140 being defined.

141 Elements and Attributes defined by this specification are referred to in the text of this document using  
142 XPath 1.0 [[XPATH 1.0](#)] expressions. Extensibility points are referred to using an extended version of this  
143 syntax:

- 144 • An element extensibility point is referred to using {any} in place of the element name. This  
145 indicates that any element name can be used, from any namespace other than the wsrn:  
146 namespace.
- 147 • An attribute extensibility point is referred to using @{any} in place of the attribute name. This  
148 indicates that any attribute name can be used, from any namespace other than the wsrn:  
149 namespace.

## 150 1.2 Normative

151 **[KEYWORDS]** S. Bradner, "[Key words for use in RFCs to Indicate Requirement Levels](#)," RFC  
152 2119, Harvard University, March 1997.  
153 <http://www.ietf.org/rfc/rfc2119.txt>

154 **[SOAP 1.1]** W3C Note, "[SOAP: Simple Object Access Protocol 1.1](#)" 08 May 2000.  
155 <http://www.w3.org/TR/2000/NOTE-SOAP-20000508/>

156	<b>[SOAP 1.2]</b>	W3C Recommendation, "SOAP Version 1.2 Part 1: Messaging Framework" June 2003. <a href="http://www.w3.org/TR/2003/REC-soap12-part1-20030624/">http://www.w3.org/TR/2003/REC-soap12-part1-20030624/</a>
157		
158		
159	<b>[URI]</b>	T. Berners-Lee, R. Fielding, L. Masinter, "Uniform Resource Identifiers (URI): Generic Syntax," RFC 3986, MIT/LCS, U.C. Irvine, Xerox Corporation, January 2005. <a href="http://ietf.org/rfc/rfc3986">http://ietf.org/rfc/rfc3986</a>
160		
161		
162		
163	<b>[WS-RM]</b>	OASIS Committee Specification 02, "Web Services Reliable Messaging (WS-ReliableMessaging)," November 2008. <a href="http://docs.oasis-open.org/ws-rx/wsrp/200702/wsrp-1.2-spec-cs-02.doc">http://docs.oasis-open.org/ws-rx/wsrp/200702/wsrp-1.2-spec-cs-02.doc</a>
164		
165		
166	<b>[WSDL 1.1]</b>	W3C Note, "Web Services Description Language (WSDL 1.1)," 15 March 2001. <a href="http://www.w3.org/TR/2001/NOTE-wsdl-20010315">http://www.w3.org/TR/2001/NOTE-wsdl-20010315</a>
167		
168	<b>[XML]</b>	W3C Recommendation, "Extensible Markup Language (XML) 1.0 (Fourth Edition)", September 2006. <a href="http://www.w3.org/TR/REC-xml/">http://www.w3.org/TR/REC-xml/</a>
169		
170		
171	<b>[XML-ns]</b>	W3C Recommendation, "Namespaces in XML," 14 January 1999. <a href="http://www.w3.org/TR/1999/REC-xml-names-19990114/">http://www.w3.org/TR/1999/REC-xml-names-19990114/</a>
172		
173	<b>[XML-Schema Part1]</b>	W3C Recommendation, "XML Schema Part 1: Structures," October 2004. <a href="http://www.w3.org/TR/xmlschema-1/">http://www.w3.org/TR/xmlschema-1/</a>
174		
175	<b>[XML-Schema Part2]</b>	W3C Recommendation, "XML Schema Part 2: Datatypes," October 2004. <a href="http://www.w3.org/TR/xmlschema-2/">http://www.w3.org/TR/xmlschema-2/</a>
176		
177	<b>[XPATH 1.0]</b>	W3C Recommendation, "XML Path Language (XPath) Version 1.0," 16 November 1999. <a href="http://www.w3.org/TR/xpath">http://www.w3.org/TR/xpath</a>
178		
179		

### 180 **1.3 Non Normative**

181	<b>[RDDDL 2.0]</b>	Jonathan Borden, Tim Bray, eds. "Resource Directory Description Language (RDDDL) 2.0," January 2004 <a href="http://www.openhealth.org/RDDL/20040118/rddl-20040118.html">http://www.openhealth.org/RDDL/20040118/rddl-20040118.html</a>
182		
183		
184	<b>[SecurityPolicy]</b>	OASIS Committee Specification 01, "WS-SecurityPolicy 1.3", November 2008 <a href="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/v1.3/cs/ws-securitypolicy-1.3-spec-cs-01.doc">http://docs.oasis-open.org/ws-sx/ws-securitypolicy/v1.3/cs/ws-securitypolicy-1.3-spec-cs-01.doc</a>
185		
186		
187	<b>[WS-Policy]</b>	W3C Recommendation, "Web Services Policy 1.5 - Framework," September 2007. <a href="http://www.w3.org/TR/2007/REC-ws-policy-20070904">http://www.w3.org/TR/2007/REC-ws-policy-20070904</a>
188		
189		
190	<b>[WS-PolicyAttachment]</b>	W3C Recommendation, "Web Services Policy 1.5 - Attachment," September 2007. <a href="http://www.w3.org/TR/2007/REC-ws-policy-attach-20070904">http://www.w3.org/TR/2007/REC-ws-policy-attach-20070904</a>
191		
192		
193	<b>[WS-Security]</b>	Anthony Nadalin, Chris Kaler, Phillip Hallam-Baker, Ronald Monzillo, eds. "OASIS Web Services Security: SOAP Message Security 1.0 (WS-Security 2004)", OASIS Standard 200401, March 2004. <a href="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0.pdf">http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0.pdf</a>
194		
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198		
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200		Anthony Nadalin, Chris Kaler, Phillip Hallam-Baker, Ronald Monzillo, eds. "OASIS Web Services Security: SOAP Message Security 1.1 (WS-Security 2004)", OASIS Standard 200602, February 2006. <a href="http://docs.oasis-open.org/wss/v1.1/wss-v1.1-spec-os-SOAPMessageSecurity.pdf">http://docs.oasis-open.org/wss/v1.1/wss-v1.1-spec-os-SOAPMessageSecurity.pdf</a>
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202		

## 203 1.4 Namespace

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

205 <http://docs.oasis-open.org/ws-rx/wsrmp/200702>

206 Dereferencing the above URI will produce the Resource Directory Description Language [RDDL 2.0]  
207 document that describes this namespace.

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

210 Table 1

Prefix	Namespace	Specification
wSDL	<a href="http://schemas.xmlsoap.org/wSDL/">http://schemas.xmlsoap.org/wSDL/</a>	[WSDL 1.1]
wsp	<a href="http://www.w3.org/ns/ws-policy">http://www.w3.org/ns/ws-policy</a>	WS-Policy 1.5
wsrmp	<a href="http://docs.oasis-open.org/ws-rx/wsrmp/200702">http://docs.oasis-open.org/ws-rx/wsrmp/200702</a>	This specification.
wsu	<a href="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd">http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd</a>	WS-Security-Utility Schema

211 The normative schema for WS-ReliableMessaging can be found linked from the namespace document that  
212 is located at the namespace URI specified above.

213 All sections explicitly noted as examples are informational and are not to be considered normative.

## 214 1.5 Conformance

215 An implementation is not compliant with this specification if it fails to satisfy one or more of the MUST or  
216 REQUIRED level requirements defined herein. A SOAP Node MUST NOT use the XML namespace  
217 identifier for this specification (listed in section 1.4) within SOAP Envelopes unless it is compliant with this  
218 specification.

219 Normative text within this specification takes precedence over normative outlines, which in turn take  
220 precedence over the XML Schema [XML-Schema Part1, XML-Schema Part2] descriptions.

---

## 221 2 RM Policy Assertions

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

### 227 2.1 Assertion Model

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

### 232 2.2 Normative Outline

233 The normative outline for the RM assertion is:

```
234 <wsrmp:RMAssertion [wsp:Optional="true"]? ... >  
235   <wsp:Policy>  
236     [ <wsrmp:SequenceSTR/> |  
237       <wsrmp:SequenceTransportSecurity/> ] ?  
238     <wsrmp:DeliveryAssurance>  
239       <wsp:Policy>  
240         [ <wsrmp:ExactlyOnce/> |  
241           <wsrmp:AtLeastOnce/> |  
242             <wsrmp:AtMostOnce/> ]  
243         <wsrmp:InOrder/> ?  
244       </wsp:Policy>  
245     </wsrmp:DeliveryAssurance> ?  
246   </wsp:Policy>  
247   ...  
248 </wsrmp:RMAssertion>
```

249 The following describes the content model of the RMAssertion element.

250 /wsrmp:RMAssertion

251       A policy assertion that specifies that WS-ReliableMessaging protocol MUST be used when  
252       sending messages.

253 /wsrmp:RMAssertion/@wsp:Optional="true"

254       Per WS-Policy, this is compact notation for two policy alternatives, one with and one without the  
255       assertion. The intuition is that the behavior indicated by the assertion is optional, or in this case,  
256       that WS-ReliableMessaging MAY be used.

257 /wsrmp:RMAssertion/wsp:Policy

258       This required element allows for the inclusion of nested policy assertions.

259 /wsrmp:RMAssertion/wsp:Policy/wsrmp:SequenceSTR

260       When present, this assertion defines the requirement that an RM Sequence MUST be bound to an  
261       explicit token that is referenced from a wsse:SecurityTokenReference in the  
262       CreateSequence message. See section 2.5.1.



263 /wsrmp:RMAssertion/wsp:Policy/wsrmp:SequenceTransportSecurity  
264       When present, this assertion defines the requirement that an RM Sequence MUST be bound to  
265       the session(s) of the underlying transport-level protocol used to carry the `CreateSequence` and  
266       `CreateSequenceResponse` message. When present, this assertion MUST be used in  
267       conjunction with the `sp:TransportBinding` assertion, see section 2.5.2.

268 /wsrmp:RMAssertion/wsp:Policy/wsrmp:DeliveryAssurance  
269       This expression, which may be omitted, describes the message delivery quality of service between  
270       the RM and application layer. When used by an RM Destination it expresses the delivery  
271       assurance in effect between the RM Destination and its corresponding application destination, and  
272       it also indicates requirements on any RM Source that transmits messages to this RM destination.  
273       Conversely when used by an RM Source it expresses the delivery assurance in effect between the  
274       RM Source and its corresponding application source, as well as indicating requirements on any  
275       RM Destination that receives messages from this RM Source. In either case the delivery  
276       assurance does not affect the messages transmitted on the wire. Absence of this expression from  
277       a `wsrmp:RMAssertion` policy assertion simply means that the endpoint has chosen not to  
278       advertise its delivery assurance characteristics.  
279       Note that when there are multiple policy alternatives of the RM Assertion, the Delivery Assurance  
280       on each MUST NOT conflict.

281 /wsrmp:RMAssertion/wsp:Policy/wsrmp:DeliveryAssurance/wsp:Policy  
282       This required element identifies additional requirements for the use of the  
283       `wsrmp:DeliveryAssurance`.

284 /wsrmp:RMAssertion/wsp:Policy/wsrmp:DeliveryAssurance/wsp:Policy/wsrmp:ExactlyOnce  
285       This expresses the ExactlyOnce Delivery Assurance defined in [WS-RM].

286 /wsrmp:RMAssertion/wsp:Policy/wsrmp:DeliveryAssurance/wsp:Policy/wsrmp:AtLeastOnce  
287       This expresses the AtLeastOnce Delivery Assurance defined in [WS-RM].

288 /wsrmp:RMAssertion/wsp:Policy/wsrmp:DeliveryAssurance/wsp:Policy/wsrmp:AtMostOnce  
289       This expresses the AtMostOnce Delivery Assurance defined in [WS-RM].

290 /wsrmp:RMAssertion/wsp:Policy/wsrmp:DeliveryAssurance/wsp:Policy/wsrmp:InOrder  
291       This expresses the InOrder Delivery Assurance defined in [WS-RM].

292 /wsrmp:RMAssertion/{any}  
293       This is an extensibility mechanism to allow different (extensible) types of information, based on a  
294       schema, to be passed.

295 /wsrmp:RMAssertion/@{any}  
296       This is an extensibility mechanism to allow different (extensible) types of information, based on a  
297       schema, to be passed.

## 298 **2.3 Assertion Attachment**

299 The RM policy assertion is allowed to have the following Policy Subjects [WS-PolicyAttachment]:

- 300       • Endpoint Policy Subject
- 301       • Message Policy Subject

302 WS-PolicyAttachment defines a set of WSDL/1.1 policy attachment points for each of the above Policy  
303 Subjects. Since an RM policy assertion specifies a concrete behavior, it MUST NOT be attached to the  
304 abstract WSDL policy attachment points.

305 The following is the list of WSDL/1.1 elements whose scope contains the Policy Subjects allowed for an  
306 RM policy assertion but which MUST NOT have RM policy assertions attached:

- 307 • wsdl:message
- 308 • wsdl:portType/wsdl:operation/wsdl:input
- 309 • wsdl:portType/wsdl:operation/wsdl:output
- 310 • wsdl:portType/wsdl:operation/wsdl:fault
- 311 • wsdl:portType

312 The following is the list of WSDL/1.1 elements whose scope contains the Policy Subjects allowed for an  
313 RM policy assertion and which MAY have RM policy assertions attached:

- 314 • wsdl:port
- 315 • wsdl:binding
- 316 • wsdl:binding/wsdl:operation/wsdl:input
- 317 • wsdl:binding/wsdl:operation/wsdl:output
- 318 • wsdl:binding/wsdl:operation/wsdl:fault

319 If an RM policy assertion is attached to any of:

- 320 • wsdl:binding/wsdl:operation/wsdl:input
- 321 • wsdl:binding/wsdl:operation/wsdl:output
- 322 • wsdl:binding/wsdl:operation/wsdl:fault

323 then an RM policy assertion, specifying `wsp:Optional="true"` MUST be attached to the corresponding  
324 `wsdl:binding` or `wsdl:port`, indicating that the endpoint supports WS-RM. Any messages, regardless  
325 of whether they have an attached Message Policy Subject RM policy assertion, MAY be sent to that  
326 endpoint using WS-RM. Additionally, the receiving endpoint MUST NOT reject any message belonging to  
327 a Sequence, simply because there was no Message Policy Subject RM policy assertion attached to that  
328 message. There might be certain RM implementations that are incapable of applying RM Quality of  
329 Service (QoS) semantics on a per-message basis. In order to ensure the broadest interoperability, when  
330 an endpoint decorates its WSDL with RM policy assertions using Message Policy Subject, it MUST also be  
331 prepared to accept that all messages sent to that endpoint might be sent within the context of an RM  
332 Sequence, regardless of whether the corresponding `wsdl:input`, `wsdl:output` or `wsdl:fault` had an attached  
333 RM policy assertion.

334 Rather than turn away messages that were unnecessarily sent with RM semantics, the receiving endpoint  
335 described by the WSDL MUST accept these messages.

336 By attaching an RM policy assertion that specifies `wsp:Optional="true"` to the corresponding endpoint  
337 that has attached RM policy assertions at the Message Policy Subject level, the endpoint is describing the  
338 above constraint in policy.

339 In the case where an optional RM Assertion applies to an output message, there is no requirement on the  
340 client to support an RM Destination implementation

## 341 2.4 Assertion Example

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

343 Table 2: Example policy with RM policy assertion

```
344 (01) <wsdl:definitions
345 (02)   targetNamespace="example.com"
346 (03)   xmlns:tns="example.com"
347 (04)   xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
348 (05)   xmlns:wsp="http://www.w3.org/ns/ws-policy"
349 (06)   xmlns:wsrmp="http://docs.oasis-open.org/ws-rx/wsrmp/200702"
350 (07)   xmlns:wssu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-
351 wssecurity-utility-1.0.xsd">
352 (08)
353 (09) <wsp:UsingPolicy wsdl:required="true" />
354 (10)
355 (11) <wsp:Policy wsu:Id="MyPolicy" >
356 (12)   <wsrmp:RMAssertion>
357 (13)     <wsp:Policy/>
358 (14)   </wsrmp:RMAssertion>
359 (15)   <!-- omitted assertions -->
360 (16) </wsp:Policy>
361 (17)
362 (18) <!-- omitted elements -->
363 (19)
364 (20) <wsdl:binding name="MyBinding" type="tns:MyPortType" >
365 (21)   <wsp:PolicyReference URI="#MyPolicy" />
366 (22)   <!-- omitted elements -->
367 (23) </wsdl:binding>
368 (24)
369 (25) </wsdl:definitions>
```

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

371 Lines (11-16) are a policy expression that includes a RM policy assertion (lines 12-14) to indicate that WS-  
372 ReliableMessaging must be used.

373 Lines (20-23) are a WSDL binding. Line (21) indicates that the policy in lines (11-16) applies to this  
374 binding, specifically indicating that WS-ReliableMessaging must be used over all the messages in the  
375 binding.

## 376 2.5 Sequence Security Policy

377 WS-SecurityPolicy [[SecurityPolicy](#)] provides a framework and grammar for expressing the security  
378 requirements and characteristics of entities in a XML web services based system. The following assertions  
379 MAY be used in conjunction with WS-SecurityPolicy to express additional security requirements particular  
380 to RM Sequences.

### 381 2.5.1 RM Assertion with Sequence STR Assertion

382 This version of the RM assertion includes the requirement that an RM Sequence MUST be bound to an  
383 explicit token that is referenced from a `wsse:SecurityTokenReference` in the `CreateSequence`  
384 message.

385 This assertion MUST apply to [Endpoint Policy Subject]. The normative outline for this form of the  
386 Sequence STR Assertion is:

```
387 <wsrmp:RMAssertion [wsp:Optional="true"]? ...>
388   <wsp:Policy>
```

```
389     <wsrmp:SequenceSTR/>
390     <wsp:Policy>
391 </wsrmp:RMAssertion>
```

392 The following describes the content model of the `SequenceSTR` element.

393 `/wsrmp:SequenceSTR`

394 A policy assertion that specifies security requirements which MUST be used with an RM Sequence  
395 that are particular to WS-RM and beyond what can be expressed in WS-SecurityPolicy.

## 396 **2.5.2 RM Assertion with Sequence Transport Security Assertion**

397 This version of the RM assertion includes the requirement that an RM Sequence MUST be bound to the  
398 session(s) of the underlying transport-level security protocol (e.g. SSL/TLS) used to carry the  
399 `CreateSequence` and `CreateSequenceResponse` messages.

400 This assertion MUST apply to [Endpoint Policy Subject]. This assertion MUST be used in conjunction with  
401 the `sp:TransportBinding` assertion that requires the use of some transport-level security mechanism  
402 (e.g. `sp:HttpsToken`).

403 The normative outline for this form of the RM Assertion with the Sequence Transport Security Assertion is:

```
404 <wsp:Policy>
405   <wsp:ExactlyOne>
406     <wsp:All>
407       <wsrm:RMAssertion [wsp:Optional="true"]> ...>
408         <wsp:Policy>
409           <wsrmp:SequenceTransportSecurity/>
410         </wsp:Policy>
411       </wsrm:RMAssertion>
412     <sp:TransportBinding ...>
413       ...
414     </sp:TransportBinding>
415   </wsp:All>
416 </wsp:ExactlyOne>
417 </wsp:Policy>
```

418 The following describes the content model of the `SequenceTransportSecurity` element.

419 `/wsrmp:SequenceTransportSecurity`

420 A policy assertion that specifies that any Sequences targeted to the indicated endpoint MUST be  
421 bound to the underlying session(s) of the transport-level security used to carry messages related to the  
422 Sequence.

423 This form of the RM Assertion says that an endpoint MAY have RM as an option but always requires  
424 HTTPS to be used. All the `SequenceTransportSecurity` assertion indicates is that RM's rules for  
425 protecting the Sequence over TLS are followed.

---

## 426 **3 Security Considerations**

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

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

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

---

## 435 Appendix A. Schema

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

438 <http://docs.oasis-open.org/ws-rx/wsrmp/200702/wsrmp-1.1-schema-200702.xsd>

439 The following copy is provided for reference.

```
440 <?xml version="1.0" encoding="UTF-8"?>
441 <!-- Copyright (C) OASIS (R) 1993-2007. All Rights Reserved.
442      OASIS trademark, IPR and other policies apply. -->
443 <xs:schema xmlns:tns="http://docs.oasis-open.org/ws-rx/wsrmp/200702"
444   xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://docs.oasis-
445   open.org/ws-rx/wsrmp/200702" elementFormDefault="qualified"
446   attributeFormDefault="unqualified">
447   <xs:element name="RMAssertion">
448     <xs:complexType>
449       <xs:sequence>
450         <xs:any namespace="##other" processContents="lax" minOccurs="0"
451 maxOccurs="unbounded"/>
452       </xs:sequence>
453       <xs:anyAttribute namespace="##any" processContents="lax"/>
454     </xs:complexType>
455   </xs:element>
456   <xs:element name="SequenceSTR">
457     <xs:complexType>
458       <xs:sequence/>
459       <xs:anyAttribute namespace="##any" processContents="lax"/>
460     </xs:complexType>
461   </xs:element>
462   <xs:element name="SequenceTransportSecurity">
463     <xs:complexType>
464       <xs:sequence/>
465       <xs:anyAttribute namespace="##any" processContents="lax"/>
466     </xs:complexType>
467   </xs:element>
468   <xs:element name="DeliveryAssurance">
469     <xs:complexType>
470       <xs:sequence>
471         <xs:any namespace="##any" processContents="lax" minOccurs="0"
472 maxOccurs="unbounded"/>
473       </xs:sequence>
474     </xs:complexType>
475   </xs:element>
476   <xs:element name="ExactlyOnce">
477     <xs:complexType>
478       <xs:sequence/>
479     </xs:complexType>
480   </xs:element>
481   <xs:element name="AtLeastOnce">
482     <xs:complexType>
483       <xs:sequence/>
484     </xs:complexType>
485   </xs:element>
486   <xs:element name="AtMostOnce">
487     <xs:complexType>
488       <xs:sequence/>
489     </xs:complexType>
```

```
490 </xs:element>
491 <xs:element name="InOrder">
492   <xs:complexType>
493     <xs:sequence/>
494   </xs:complexType>
495 </xs:element>
496 </xs:schema>
```

---

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