



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

Committee Specification 01

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Related Work:

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- WS-ReliableMessaging Policy v1.1

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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.

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
46 Version" location noted above for possible later revisions of this document.

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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	[SOAP 1.2]	W3C Recommendation, " SOAP Version 1.2 Part 1: Messaging Framework " June 2003.
157		
158		http://www.w3.org/TR/2003/REC-soap12-part1-20030624/
159	[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.
160		
161		
162		http://ietf.org/rfc/rfc3986
163	[WS-RM]	OASIS WS-RX Technical Committee Specification 01, " Web Services Reliable Messaging (WS-ReliableMessaging) ," February 2008.
164		
165		http://docs.oasis-open.org/ws-rx/wsrn/v1.2/wsrn-1.2-spec-cs-01.html
166	[WSDL 1.1]	W3C Note, " Web Services Description Language (WSDL 1.1) ," 15 March 2001.
167		http://www.w3.org/TR/2001/NOTE-wsdl-20010315
168	[XML]	W3C Recommendation, " Extensible Markup Language (XML) 1.0 (Fourth Edition) ", September 2006.
169		
170		http://www.w3.org/TR/REC-xml/
171	[XML-ns]	W3C Recommendation, " Namespaces in XML ," 14 January 1999.
172		http://www.w3.org/TR/1999/REC-xml-names-19990114/
173	[XML-Schema Part1]	W3C Recommendation, " XML Schema Part 1: Structures ," October 2004.
174		http://www.w3.org/TR/xmlschema-1/
175	[XML-Schema Part2]	W3C Recommendation, " XML Schema Part 2: Datatypes ," October 2004.
176		http://www.w3.org/TR/xmlschema-2/
177	[XPath 1.0]	W3C Recommendation, " XML Path Language (XPath) Version 1.0 ," 16 November 1999.
178		
179		http://www.w3.org/TR/xpath

180 **1.3 Non Normative**

181	[RDDL 2.0]	Jonathan Borden, Tim Bray, eds. "Resource Directory Description Language (RDDL) 2.0," January 2004
182		
183		http://www.openhealth.org/RDDL/20040118/rddl-20040118.html
184	[SecurityPolicy]	OASIS WS-SX Technical Committee Editor Draft, " WS-SecurityPolicy 1.3 "
185		http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200802
186	[WS-Policy]	W3C Recommendation, " Web Services Policy 1.5 - Framework ," September 2007.
187		
188		http://www.w3.org/TR/2007/REC-ws-policy-20070904
189	[WS-PolicyAttachment]	W3C Recommendation, " Web Services Policy 1.5 - Attachment ,"
190		September 2007.
191		http://www.w3.org/TR/2007/REC-ws-policy-attach-20070904
192	[WS-Security]	Anthony Nadalin, Chris Kaler, Phillip Hallam-Baker, Ronald Monzillo, eds. " OASIS Web Services Security: SOAP Message Security 1.0 (WS-Security 2004) ",
193		OASIS Standard 200401, March 2004.
194		
195		http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0.pdf
196		
197		
198		Anthony Nadalin, Chris Kaler, Phillip Hallam-Baker, Ronald Monzillo, eds. " OASIS Web Services Security: SOAP Message Security 1.1 (WS-Security 2004) ", OASIS
199		Standard 200602, February 2006.
200		
201		http://docs.oasis-open.org/wss/v1.1/wss-v1.1-spec-os-SOAPMessageSecurity.pdf

202 1.4 Namespace

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

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

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

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

209 Table 1

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

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

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

213 1.5 Conformance

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

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

220 2 RM Policy Assertions

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

226 2.1 Assertion Model

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

231 2.2 Normative Outline

232 The normative outline for the RM assertion is:

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

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

249 /wsrmp:RMAssertion

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

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

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

256 /wsrmp:RMAssertion/wsp:Policy

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

258 /wsrmp:RMAssertion/wsp:Policy/wsrmp:SequenceSTR

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

262 /wsrmp:RMAssertion/wsp:Policy/wsrmp:SequenceTransportSecurity

263 When present, this assertion defines the requirement that an RM Sequence MUST be bound to

264 the session(s) of the underlying transport-level protocol used to carry the `CreateSequence` and

265 `CreateSequenceResponse` message. When present, this assertion MUST be used in

266 conjunction with the `sp:TransportBinding` assertion, see section 2.5.2.

267 /wsrmp:RMAssertion/wsp:Policy/wsrmp:DeliveryAssurance

268 This expression, which may be omitted, describes the message delivery quality of service between

269 the RM and application layer. When used by an RM Destination it expresses the delivery

270 assurance in effect between the RM Destination and its corresponding application destination, and

271 it also indicates requirements on any RM Source that transmits messages to this RM destination.

272 Conversely when used by an RM Source it expresses the delivery assurance in effect between the

273 RM Source and its corresponding application source, as well as indicating requirements on any

274 RM Destination that receives messages from this RM Source. In either case the delivery

275 assurance does not affect the messages transmitted on the wire. Absence of this expression from

276 a `wsrmp:RMAssertion` policy assertion simply means that the endpoint has chosen not to

277 advertise its delivery assurance characteristics.

278 Note that when there are multiple policy alternatives of the RM Assertion, the Delivery Assurance

279 on each MUST NOT conflict.

280 /wsrmp:RMAssertion/wsp:Policy/wsrmp:DeliveryAssurance/wsp:Policy

281 This required element identifies additional requirements for the use of the

282 `wsrmp:DeliveryAssurance`.

283 /wsrmp:RMAssertion/wsp:Policy/wsrmp:DeliveryAssurance/wsp:Policy/wsrmp:ExactlyOnce

284 This expresses the ExactlyOnce Delivery Assurance defined in [\[WS-RM\]](#).

285 /wsrmp:RMAssertion/wsp:Policy/wsrmp:DeliveryAssurance/wsp:Policy/wsrmp:AtLeastOnce

286 This expresses the AtLeastOnce Delivery Assurance defined in [\[WS-RM\]](#).

287 /wsrmp:RMAssertion/wsp:Policy/wsrmp:DeliveryAssurance/wsp:Policy/wsrmp:AtMostOnce

288 This expresses the AtMostOnce Delivery Assurance defined in [\[WS-RM\]](#).

289 /wsrmp:RMAssertion/wsp:Policy/wsrmp:DeliveryAssurance/wsp:Policy/wsrmp:InOrder

290 This expresses the InOrder Delivery Assurance defined in [\[WS-RM\]](#).

291 /wsrmp:RMAssertion/{ any }

292 This is an extensibility mechanism to allow different (extensible) types of information, based on a

293 schema, to be passed.

294 /wsrmp:RMAssertion/@{ any }

295 This is an extensibility mechanism to allow different (extensible) types of information, based on a

296 schema, to be passed.

297 **2.3 Assertion Attachment**

298 The RM policy assertion is allowed to have the following Policy Subjects [\[WS-PolicyAttachment\]](#):

- 299 • Endpoint Policy Subject
- 300 • Message Policy Subject

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

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

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

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

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

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

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

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

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

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

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

340 2.4 Assertion Example

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

342 Table 2: Example policy with RM policy assertion

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

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

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

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

375 2.5 Sequence Security Policy

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

380 2.5.1 RM Assertion with Sequence STR Assertion

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

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

```
386 <wsrmp:RMAssertion [wsp:Optional="true"]? ...>
```

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

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

392 `/wsrmp:SequenceSTR`

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

395 **2.5.2 RM Assertion with Sequence Transport Security Assertion**

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

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

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

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

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

418 `/wsrmp:SequenceTransportSecurity`

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

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

425 **3 Security Considerations**

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

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

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

434 Appendix A. Schema

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

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

438 The following copy is provided for reference.

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

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

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