



# WS-SecurityPolicy 1.3

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#### Abstract:

This document indicates the policy assertions for use with [WS-Policy] which apply to WSS: SOAP Message Security [WSS10, WSS11], [WS-Trust] and [WS-SecureConversation]

#### Status:

This document was last revised or approved by the WS-SX TC on the above date. The level of approval is also listed above. Check the current location noted above for possible later revisions of this document. This document is updated periodically on no particular schedule.

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# 1 Introduction

WS-Policy defines a framework for allowing web services to express their constraints and requirements. Such constraints and requirements are expressed as policy assertions. This document defines a set of security policy assertions for use with the [WS-Policy] framework with respect to security features provided in WSS: SOAP Message Security [WSS10, WSS11], [WS-Trust] and [WS-SecureConversation]. Within this specification the use of the namespace prefix `wsp` refers to the WS-Policy 1.5 namespace. This document takes the approach of defining a base set of assertions that describe how messages are to be secured. Flexibility with respect to token types, cryptographic algorithms and mechanisms used, including using transport level security is part of the design and allows for evolution over time. The intent is to provide enough information for compatibility and interoperability to be determined by web service participants along with all information necessary to actually enable a participant to engage in a secure exchange of messages.

Sections 11, 12 and all examples and all Appendices are non-normative.

## 1.1 Example

Table 1 shows an "Effective Policy" example, including binding assertions and associated property assertions, token assertions and integrity and confidentiality assertions. This example has a scope of [Endpoint Policy Subject], but for brevity the attachment mechanism is not shown.

Table 1: Example security policy.

```
(01) <wsp:Policy xmlns:wsp="..." xmlns:sp="...">
(02)   <sp:SymmetricBinding>
(03)     <wsp:Policy>
(04)       <sp:ProtectionToken>
(05)         <wsp:Policy>
(06)           <sp:Kerberos sp:IncludeToken=".../IncludeToken/Once" />
(07)           <wsp:Policy>
(08)             <sp:WSSKerberosV5ApReqToken11/>
(09)           <wsp:Policy>
(10)         </sp:Kerberos>
(11)       </wsp:Policy>
(12)     </sp:ProtectionToken>
(13)     <sp:SignBeforeEncrypting />
(14)     <sp:EncryptSignature />
(15)   </wsp:Policy>
(16) </sp:SymmetricBinding>
(17) <sp:SignedParts>
(18)   <sp:Body/>
(19)   <sp:Header
(20)     Namespace="http://schemas.xmlsoap.org/ws/2004/08/addressing"
(21)   />
(22) </sp:SignedParts>
(23) <sp:EncryptedParts>
(24)   <sp:Body/>
```

44 (23) </sp:EncryptedParts>  
 45 (24) </wsp:Policy>

46  
 47 Line 1 in Table 1 indicates that this is a policy statement and that all assertions contained by the  
 48 wsp:Policy element are required to be satisfied. Line 2 indicates the kind of security binding in force. Line  
 49 3 indicates a nested wsp:Policy element which contains assertions that qualify the behavior of the  
 50 SymmetricBinding assertion. Line 4 indicates a ProtectionToken assertion. Line 5 indicates a nested  
 51 wsp:Policy element which contains assertions indicating the type of token to be used for the  
 52 ProtectionToken. Lines 6 to 10 indicate that a Kerberos V5 APREQ token is to be used by both parties in  
 53 a message exchange for protection. Line 13 indicates that signatures are generated over plaintext rather  
 54 than ciphertext. Line 14 indicates that the signature over the signed messages parts is required to be  
 55 encrypted. Lines 17-20 indicate which message parts are to be covered by the primary signature; in this  
 56 case the soap:Body element, indicated by Line 18 and any SOAP headers in the WS-Addressing  
 57 namespace, indicated by line 19. Lines 21-23 indicate which message parts are to be encrypted; in this  
 58 case just the soap:Body element, indicated by Line 22.

## 59 1.2 Namespaces

60 The XML namespace URIs that MUST be used by implementations of this specification are:

61 <http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702>  
 62 <http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200802>

63  
 64 Table 2 lists XML namespaces that are used in this specification. The choice of any namespace prefix is  
 65 arbitrary and not semantically significant.

66 *Table 2: Prefixes and XML Namespaces used in this specification.*

Prefix	Namespace	Specification(s)
S	<a href="http://schemas.xmlsoap.org/soap/envelope/">http://schemas.xmlsoap.org/soap/envelope/</a>	[SOAP]
S12	<a href="http://www.w3.org/2003/05/soap-envelope">http://www.w3.org/2003/05/soap-envelope</a>	[SOAP12]
ds	<a href="http://www.w3.org/2000/09/xmldsig#">http://www.w3.org/2000/09/xmldsig#</a>	[XML-Signature]
enc	<a href="http://www.w3.org/2001/04/xmlenc#">http://www.w3.org/2001/04/xmlenc#</a>	[XML-Encrypt]
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>	[WSS10]
wsse	<a href="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd">http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd</a>	[WSS10]
wsse11	<a href="http://docs.oasis-open.org/wss/oasis-wss-wssecurity-secext-1.1.xsd">http://docs.oasis-open.org/wss/oasis-wss-wssecurity-secext-1.1.xsd</a>	[WSS11]
xsd	<a href="http://www.w3.org/2001/XMLSchema">http://www.w3.org/2001/XMLSchema</a>	[XML-Schema1], [XML-Schema2]
wst	<a href="http://docs.oasis-open.org/ws-sx/ws-trust/200512">http://docs.oasis-open.org/ws-sx/ws-trust/200512</a>	[WS-Trust]
wst14	<a href="http://docs.oasis-open.org/ws-sx/ws-trust/200802">http://docs.oasis-open.org/ws-sx/ws-trust/200802</a>	[WS-Trust]
wsc	<a href="http://docs.oasis-open.org/ws-sx/ws-secureconversation/200512">http://docs.oasis-open.org/ws-sx/ws-secureconversation/200512</a>	[WS-SecureConversation]



wsa	<a href="http://www.w3.org/2005/08/addressing">http://www.w3.org/2005/08/addressing</a>	[ <a href="#">WS-Addressing</a> ]
sp	<a href="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702">http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702</a>	This specification
sp13	<a href="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200802">http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200802</a>	This specification
wsp	<a href="http://www.w3.org/ns/ws-policy">http://www.w3.org/ns/ws-policy</a>	[ <a href="#">WS-Policy</a> ]

## 67 1.3 Schema Files

68 A normative copy of the XML Schemas [[XML-Schema1](#), [XML-Schema2](#)] description for this specification  
69 can be retrieved from the following address:

70 <http://docs.oasis-open.org/ws-sx/ws-securitypolicy/v1.2/ws-securitypolicy-1.2.xsd>  
71 <http://docs.oasis-open.org/ws-sx/ws-securitypolicy/v1.3/ws-securitypolicy-1.3.xsd>

## 72 1.4 Terminology

73 **Policy** - A collection of policy alternatives.

74 **Policy Alternative** - A collection of policy assertions.

75 **Policy Assertion** - An individual requirement, capability, other property, or a behavior.

76 **Initiator** - The role sending the initial message in a message exchange.

77 **Recipient** - The targeted role to process the initial message in a message exchange.

78 **Security Binding** - A set of properties that together provide enough information to secure a given  
79 message exchange.

80 **Security Binding Property** - A particular aspect of securing an exchange of messages.

81 **Security Binding Assertion** - A policy assertion that identifies the type of security binding being used to  
82 secure an exchange of messages.

83 **Security Binding Property Assertion** - A policy assertion that specifies a particular value for a particular  
84 aspect of securing an exchange of message.

85 **Assertion Parameter** - An element of variability within a policy assertion.

86 **Token Assertion** - Describes a token requirement. Token assertions defined within a security binding are  
87 used to satisfy protection requirements.

88 **Supporting Token** - A token used to provide additional claims.

### 89 1.4.1 Notational Conventions

90 The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD  
91 NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described  
92 in [[RFC2119](#)].

93 This specification uses the following syntax to define outlines for assertions:

- 94 • The syntax appears as an XML instance, but values in italics indicate data types instead of literal  
95 values.
- 96 • Characters are appended to elements and attributes to indicate cardinality:
  - 97 ○ "?" (0 or 1)
  - 98 ○ "\*" (0 or more)
  - 99 ○ "+" (1 or more)
- 100 • The character "|" is used to indicate a choice between alternatives.
- 101 • The characters "(" and ")" are used to indicate that contained items are to be treated as a group  
102 with respect to cardinality or choice.

- 103
- The characters "[" and "]" are used to call out references and property names.
  - Ellipses (i.e., "...") indicate points of extensibility. 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. By default, if a receiver does not recognize an extension, the receiver SHOULD ignore the extension; exceptions to this processing rule, if any, are clearly indicated below.
  - XML namespace prefixes (see Table 2) are used to indicate the namespace of the element being defined.
- 104  
105  
106  
107  
108  
109  
110

111

112 Elements and Attributes defined by this specification are referred to in the text of this document using  
113 XPath 1.0 expressions. Extensibility points are referred to using an extended version of this syntax:

- An element extensibility point is referred to using {any} in place of the element name. This indicates that any element name can be used, from any namespace other than the namespace of this specification.
  - An attribute extensibility point is referred to using @{any} in place of the attribute name. This indicates that any attribute name can be used, from any namespace other than the namespace of this specification.
- 114  
115  
116  
117  
118  
119

120 Extensibility points in the exemplar MAY NOT be described in the corresponding text.

121 In this document reference is made to the `wsu:Id` attribute and the `wsu:Created` and `wsu:Expires`  
122 elements in a utility schema (<http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd>). The `wsu:Id` attribute and the `wsu:Created` and `wsu:Expires` elements were added to the  
123 utility schema with the intent that other specifications requiring such an ID type attribute or timestamp  
124 element could reference it (as is done here).  
125  
126

127 WS-SecurityPolicy is designed to work with the general Web Services framework including WSDL service  
128 descriptions, UDDI businessServices and bindingTemplates and SOAP message structure and message  
129 processing model, and WS-SecurityPolicy SHOULD be applicable to any version of SOAP. The current  
130 SOAP 1.2 namespace URI is used herein to provide detailed examples, but there is no intention to limit  
131 the applicability of this specification to a single version of SOAP.

## 132 1.5 Normative References

- 133 [RFC2119] S. Bradner, "Key words for use in RFCs to Indicate Requirement  
134 Levels", RFC 2119, Harvard University, March 1997.  
135 <http://www.ietf.org/rfc/rfc2119.txt>  
136
- 137 [SOAP] W3C Note, "SOAP: Simple Object Access Protocol 1.1", 08 May 2000.  
138 <http://www.w3.org/TR/2000/NOTE-SOAP-20000508/>  
139
- 140 [SOAP12] W3C Recommendation, "SOAP 1.2 Part 1: Messaging Framework", 24  
141 June 2003.  
142 <http://www.w3.org/TR/2003/REC-soap12-part1-20030624/>  
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- 144 [SOAPNorm] W3C Working Group Note, "SOAP Version 1.2 Message  
145 Normalization", 8 October 2003.  
146 <http://www.w3.org/TR/2003/NOTE-soap12-n11n-20031008/>  
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148	[URI]	T. Berners-Lee, R. Fielding, L. Masinter, "Uniform Resource Identifiers (URI): Generic Syntax", RFC 3986, MIT/LCS, Day Software, Adobe Systems, January 2005.
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150		
151		<a href="http://www.ietf.org/rfc/rfc3986.txt">http://www.ietf.org/rfc/rfc3986.txt</a>
152		
153	[RFC2068]	IETF Standard, "Hypertext Transfer Protocol -- HTTP/1.1" January 1997
154		
155		<a href="http://www.ietf.org/rfc/rfc2068.txt">http://www.ietf.org/rfc/rfc2068.txt</a>
156		
157	[RFC2246]	IETF Standard, "The TLS Protocol", January 1999.
158		<a href="http://www.ietf.org/rfc/rfc2246.txt">http://www.ietf.org/rfc/rfc2246.txt</a>
159		
160	[SwA]	W3C Note, "SOAP Messages with Attachments", 11 December 2000
161		<a href="http://www.w3.org/TR/2000/NOTE-SOAP-attachments-20001211">http://www.w3.org/TR/2000/NOTE-SOAP-attachments-20001211</a>
162		
163	[WS-Addressing]	W3C Recommendation, "Web Services Addressing (WS-Addressing)", 9 May 2006.
164		
165		<a href="http://www.w3.org/TR/2006/REC-ws-addr-core-20060509">http://www.w3.org/TR/2006/REC-ws-addr-core-20060509</a>
166		
167	[WS-Policy]	W3C Recommendation, "Web Services Policy 1.5 - Framework", 04 September 2007.
168		
169		<a href="http://www.w3.org/TR/2007/REC-ws-policy-20070904/">http://www.w3.org/TR/2007/REC-ws-policy-20070904/</a>
170		W3C Member Submission "Web Services Policy 1.2 - Framework", 25 April 2006.
171		
172		<a href="http://www.w3.org/Submission/2006/SUBM-WS-Policy-20060425/">http://www.w3.org/Submission/2006/SUBM-WS-Policy-20060425/</a>
173		
174	[WS-PolicyAttachment]	W3C Recommendation, "Web Services Policy 1.5 - Attachment", 04 September 2007.
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176		<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>
177		W3C Member Submission "Web Services Policy 1.2 - Attachment", 25 April 2006.
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179		<a href="http://www.w3.org/Submission/2006/SUBM-WS-PolicyAttachment-20060425/">http://www.w3.org/Submission/2006/SUBM-WS-PolicyAttachment-20060425/</a>
180		
181		
182	[WS-Trust]	OASIS Committee Draft, "WS-Trust 1.4", 2008
183		<a href="http://docs.oasis-open.org/ws-sx/ws-trust/200802">http://docs.oasis-open.org/ws-sx/ws-trust/200802</a>
184		OASIS Standard, "WS-Trust 1.3", March 2007
185		<a href="http://docs.oasis-open.org/ws-sx/ws-trust/200512">http://docs.oasis-open.org/ws-sx/ws-trust/200512</a>
186		
187	[WS-SecureConversation]	OASIS Committee Draft, "WS-SecureConversation 1.4", July 2008
188		<a href="http://docs.oasis-open.org/ws-sx/ws-secureconversation/200512">http://docs.oasis-open.org/ws-sx/ws-secureconversation/200512</a>
189		
190	[WSS10]	OASIS Standard, "OASIS Web Services Security: SOAP Message Security 1.0 (WS-Security 2004)", March 2004.
191		

192		<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>
193		
194		
195	[WSS11]	OASIS Standard, "OASIS Web Services Security: SOAP Message Security 1.1 (WS-Security 2004)", February 2006.
196		
197		<a href="http://www.oasis-open.org/committees/download.php/16790/wss-v1.1-spec-os-SOAPMessageSecurity.pdf">http://www.oasis-open.org/committees/download.php/16790/wss-v1.1-spec-os-SOAPMessageSecurity.pdf</a>
198		
199		
200	[WSS:UsernameToken1.0]	OASIS Standard, "Web Services Security: UsernameToken Profile", March 2004
201		
202		<a href="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0.pdf">http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0.pdf</a>
203		
204		
205	[WSS:UsernameToken1.1]	OASIS Standard, "Web Services Security: UsernameToken Profile 1.1", February 2006
206		
207		<a href="http://www.oasis-open.org/committees/download.php/16782/wss-v1.1-spec-os-UsernameTokenProfile.pdf">http://www.oasis-open.org/committees/download.php/16782/wss-v1.1-spec-os-UsernameTokenProfile.pdf</a>
208		
209		
210	[WSS:X509Token1.0]	OASIS Standard, "Web Services Security X.509 Certificate Token Profile", March 2004
211		
212		<a href="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0.pdf">http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0.pdf</a>
213		
214		
215	[WSS:X509Token1.1]	OASIS Standard, "Web Services Security X.509 Certificate Token Profile", February 2006
216		
217		<a href="http://www.oasis-open.org/committees/download.php/16785/wss-v1.1-spec-os-x509TokenProfile.pdf">http://www.oasis-open.org/committees/download.php/16785/wss-v1.1-spec-os-x509TokenProfile.pdf</a>
218		
219		
220	[WSS:KerberosToken1.1]	OASIS Standard, "Web Services Security Kerberos Token Profile 1.1", February 2006
221		
222		<a href="http://www.oasis-open.org/committees/download.php/16788/wss-v1.1-spec-os-KerberosTokenProfile.pdf">http://www.oasis-open.org/committees/download.php/16788/wss-v1.1-spec-os-KerberosTokenProfile.pdf</a>
223		
224		
225	[WSS:SAMLTokenProfile1.0]	OASIS Standard, "Web Services Security: SAML Token Profile", December 2004
226		
227		<a href="http://docs.oasis-open.org/wss/oasis-wss-saml-token-profile-1.0.pdf">http://docs.oasis-open.org/wss/oasis-wss-saml-token-profile-1.0.pdf</a>
228		
229	[WSS:SAMLTokenProfile1.1]	OASIS Standard, "Web Services Security: SAML Token Profile 1.1", February 2006
230		
231		<a href="http://www.oasis-open.org/committees/download.php/16768/wss-v1.1-spec-os-SAMLTokenProfile.pdf">http://www.oasis-open.org/committees/download.php/16768/wss-v1.1-spec-os-SAMLTokenProfile.pdf</a>
232		
233		
234	[WSS:RELTTokenProfile1.0]	OASIS Standard, "Web Services Security Rights Expression Language (REL) Token Profile", December 2004
235		
236		<a href="http://docs.oasis-open.org/wss/oasis-wss-rel-token-profile-1.0.pdf">http://docs.oasis-open.org/wss/oasis-wss-rel-token-profile-1.0.pdf</a>
237		

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239 (REL) Token Profile 1.1", February 2006  
240 [http://www.oasis-open.org/committees/download.php/16687/oasis-  
242 wss-rel-token-profile-1.1.pdf](http://www.oasis-open.org/committees/download.php/16687/oasis-<br/>241 wss-rel-token-profile-1.1.pdf)

243 [WSS:SwAProfile1.1] OASIS Standard, "Web Services Security SOAP Messages with  
244 Attachments (SwA) Profile 1.1", February 2006  
245 [http://www.oasis-open.org/committees/download.php/16672/wss-v1.1-  
247 spec-os-SwAProfile.pdf](http://www.oasis-open.org/committees/download.php/16672/wss-v1.1-<br/>246 spec-os-SwAProfile.pdf)

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249 December 2002.  
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251

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255  
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259  
260

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262 November 1999.  
263 <http://www.w3.org/TR/1999/REC-xpath-19991116>  
264

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266 2002.  
267 <http://www.w3.org/TR/2002/REC-xmlsig-filter2-20021108/>  
268

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270 Edition", 28 October 2004.  
271 <http://www.w3.org/TR/2004/REC-xmlschema-1-20041028/>  
272

273 [XML-Schema2] W3C Recommendation, "XML Schema Part 2: Datatypes Second  
274 Edition", 28 October 2004.  
275 <http://www.w3.org/TR/2004/REC-xmlschema-2-20041028/>  
276

## 277 **1.6 Non-Normative References**

278 None.  
279

280

---

## 2 Security Policy Model

281 This specification defines policy assertions for the security properties for Web services. These assertions  
282 are primarily designed to represent the security characteristics defined in the [WSS: SOAP Message](#)  
283 [Security](#) [WSS10] [WSS11], [WS-Trust] and [WS-SecureConversation] specifications, but they can also  
284 be used for describing security requirements at a more general or transport-independent level.

285

286 The primary goal of this specification is to define an initial set of patterns or sets of assertions that  
287 represent common ways to describe how messages are secured on a communication path. The intent is  
288 to allow flexibility in terms of the tokens, cryptography, and mechanisms used, including leveraging  
289 transport security, but to be specific enough to ensure interoperability based on assertion matching.

290

291 It is a goal of the security policy model to leverage the WS-Policy framework's intersection algorithm for  
292 selecting policy alternatives and the attachment mechanism for associating policy assertions with web  
293 service artifacts. Consequently, wherever possible, the security policy assertions do not use parameters  
294 or attributes. This enables first-level, QName based assertion matching without security domain-specific  
295 knowledge to be done at the framework level. The first level matching is intended to provide a narrowed  
296 set of policy alternatives that are shared by the two parties attempting to establish a secure  
297 communication path. Parameters defined by this specification represent additional information for  
298 engaging behaviors that do not need to participate in matching. When multiple security policy assertions  
299 of the same type with parameters present occur in the same policy alternative the parameters should be  
300 treated as a union. Note that a service may choose to accept messages that do not match its policy.

301

302 In general, assertions defined in this specification allow additional attributes, based on schemas, to be  
303 added on to the assertion element as an extensibility mechanism but the WS-Policy framework will not  
304 match based on these attributes. Attributes specified on the assertion element that are not defined in this  
305 specification or in WS-Policy are to be treated as informational properties.

### 2.1 Security Assertion Model

306 The goal to provide richer semantics for combinations of security constraints and requirements and  
307 enable first-level QName matching, is enabled by the assertions defined in this specification being  
308 separated into simple patterns: what parts of a message are being secured (Protection Assertions),  
309 general aspects or pre-conditions of the security (Conditional Assertions), the security mechanism  
310 (Security Binding Assertions) that is used to provide the security, the token types and usage patterns  
311 (Supporting Token Assertions) used to provide additional claims, and token referencing and trust options  
312 (WSS and Trust Assertions).

313

314 To indicate the scope of protection, assertions identify message parts that are to be protected in a  
315 specific way, such as integrity or confidentiality protection, and are referred to as protection assertions.

316

317 The general aspects of security includes the relationships between or characteristics of the environment  
318 in which security is being applied, such as the tokens being used, which are for integrity or confidentiality  
319 protection and which are supporting, the applicable algorithms to use, etc.

320

321

322 The security binding assertion is a logical grouping which defines how the general aspects are used to  
323 protect the indicated parts. For example, that an asymmetric token is used with a digital signature to  
324 provide integrity protection, and that parts are encrypted with a symmetric key which is then encrypted  
325 using the public key of the recipient. At its simplest form, the security binding restricts what can be placed  
326 in the `wsse:Security` header and the associated processing rules.

327

328 The intent of representing characteristics as assertions is so that QName matching will be sufficient to  
329 find common alternatives and so that many aspects of security can be factored out and re-used. For  
330 example, it may be common that the mechanism is constant for an endpoint, but that the parts protected  
331 vary by message action.

332

333 Assertions defined by this specification MUST NOT include the `wsp:Ignorable` attribute in its attributes  
334 with a value of true.

## 335 **2.2 Nested Policy Assertions**

336 Assertions MAY be used to further qualify a specific aspect of another assertion. For example, an  
337 assertion describing the set of algorithms to use MAY qualify the specific behavior of a security binding. If  
338 the schema outline below for an assertion type requires a nested policy expression but the assertion does  
339 not further qualify one or more aspects of the behavior indicated by the assertion type (i.e., no assertions  
340 are needed in the nested policy expression), the assertion MUST include an empty `<wsp:Policy/>`  
341 element. For further information consult the section Policy Assertion Nesting of [WS-Policy].

## 342 **2.3 Security Binding Abstraction**

343 As previously indicated, individual assertions are designed to be used in multiple combinations. The  
344 binding represents common usage patterns for security mechanisms. These Security Binding assertions  
345 are used to determine how the security is performed and what to expect in the `wsse:Security` header.

346 Bindings are described textually and enforced programmatically. This specification defines several  
347 bindings but others can be defined and agreed to for interoperability if participating parties support it.

348

349 A binding defines the following security characteristics:

- 350 • The minimum set of tokens that will be used and how they are bound to messages. Note that  
351 services might accept messages containing more tokens than those specified in policy.
- 352 • Any necessary key transport mechanisms
- 353 • Any REQUIRED message elements (e.g. timestamps) in the `wsse:Security` header.
- 354 • The content and ordering of elements in the `wsse:Security` header. Elements not specified in  
355 the binding are not allowed.
- 356 • Various parameters, including those describing the algorithms to be used for canonicalization,  
357 signing and encryption.

358

359 Together the above pieces of information, along with the assertions describing conditions and scope,  
360 provide enough information to secure messages between an initiator and a recipient. A policy consumer  
361 has enough information to construct messages that conform to the service's policy and to process  
362 messages returned by the service. Note that a service MAY choose to reject messages despite them  
363 conforming to its policy, for example because a client certificate has been revoked. Note also that a  
364 service MAY choose to accept messages that do not conform to its policy.

365

366 The following list identifies the bindings defined in this specification. The bindings are identified primarily  
367 by the style of encryption used to protect the message exchange. A later section of this document  
368 provides details on the assertions for these bindings.

- 369 • TransportBinding (Section 7.3)
- 370 • SymmetricBinding (Section 7.4)
- 371 • AsymmetricBinding (Section 7.5)



---

## 372 3 Policy Considerations

373 The following sections discuss details of WS-Policy and WS-PolicyAttachment relevant to this  
374 specification.

### 375 3.1 Nested Policy

376 This specification makes extensive use of nested policy assertions as described in the [Policy Assertion](#)  
377 [Nesting](#) section of WS-Policy.

378

### 379 3.2 Policy Subjects

380 WS-PolicyAttachment defines various attachment points for policy. This section defines properties that  
381 are referenced later in this document describing the RECOMMENDED or REQUIRED attachment points  
382 for various assertions. In addition, [Appendix A](#) groups the various assertions according to policy subject.

383 Note: This specification does not define any assertions that have a scope of [Service Policy Subject].

#### 384 [Message Policy Subject]

385 This property identifies a Message Policy Subject [[WS-PolicyAttachment](#)]. WS-PolicyAttachment defines  
386 seven WSDL [WSDL 1.1] policy attachment points with Message Policy Subject:

387

388 wsdl:message

389 A policy expression containing one or more assertions with Message Policy Subject MUST NOT  
390 be attached to a wsdl:message.

391 wsdl:portType/wsdl:operation/wsdl:input, ./wsdl:output, or ./wsdl:fault

392 A policy expression containing one or more assertions with Message Policy Subject MUST NOT  
393 be attached to a descendant of wsdl:portType.

394 wsdl:binding/wsdl:operation/wsdl:input, ./wsdl:output, or ./wsdl:fault

395 A policy expression containing one or more of the assertions with Message Policy Subject MUST  
396 be attached to a descendant of wsdl:binding.

#### 397 [Operation Policy Subject]

398 A token assertion with Operation Policy Subject indicates usage of the token on a per-operation basis:

399 wsdl:portType/wsdl:operation

400 A policy expression containing one or more token assertions MUST NOT be attached to a  
401 wsdl:portType/wsdl:operation.

402 wsdl:binding/wsdl:operation

403 A policy expression containing one or more token assertions MUST be attached to a  
404 wsdl:binding/wsdl:operation.

405

406

#### 407 [Endpoint Policy Subject]

408 A token assertion instance with Endpoint Policy Subject indicates usage of the token for the entire set of  
409 messages described for the endpoint:

410 wsdl:portType

411 A policy expression containing one or more assertions with Endpoint Policy Subject MUST NOT  
412 be attached to a wsdl:portType.

413 wsdl:binding

414 A policy expression containing one or more of the assertions with Endpoint Policy Subject  
415 SHOULD be attached to a wsdl:binding.

416 wsdl:port

417 A policy expression containing one or more of the assertions with Endpoint Policy Subject MAY  
418 be attached to a wsdl:port

---

## 419 4 Protection Assertions

420 The following assertions are used to identify *what* is being protected and the level of protection provided.  
421 These assertions SHOULD apply to [Message Policy Subject]. These assertions MAY apply to [Endpoint  
422 Policy Subject] or [Operation Policy Subject]. Where they apply to [Operation Policy Subject] they apply to  
423 all messages of that operation. Where they apply to [Endpoint Policy Subject] they apply to all operations  
424 of that endpoint.

425 Note that when assertions defined in this section are present in a policy, the order of those assertions in  
426 that policy has no effect on the order of signature and encryption operations (see Section 6.3).

### 427 4.1 Integrity Assertions

428 Two mechanisms are defined for specifying the set of message parts to integrity protect. One uses  
429 QNames to specify either message headers or the message body while the other uses XPath  
430 expressions to identify any part of the message.

#### 431 4.1.1 SignedParts Assertion

432 The SignedParts assertion is used to specify the parts of the message outside of security headers that  
433 require integrity protection. This assertion can be satisfied using WSS: SOAP Message Security  
434 mechanisms or by mechanisms out of scope of SOAP message security, for example by sending the  
435 message over a secure transport protocol like HTTPS. The binding specific token properties detail the  
436 exact mechanism by which the protection is provided.

437  
438 There MAY be multiple SignedParts assertions present. Multiple SignedParts assertions present within a  
439 policy alternative are equivalent to a single SignedParts assertion containing the union of all specified  
440 message parts. Note that this assertion does not require that a given part appear in a message, just that if  
441 such a part appears, it requires integrity protection.

#### 442 Syntax

```
443 <sp:SignedParts xmlns:sp="..." ... >  
444   <sp:Body />?  
445   <sp:Header Name="xs:NCName"? Namespace="xs:anyURI" ... />*  
446   <sp:Attachments>  
447     <sp13:ContentSignatureTransform /> ?  
448     <sp13:AttachmentCompleteSignatureTransform /> ?  
449   </sp:Attachments> ?  
450   ...  
451 </sp:SignedParts>
```

452  
453 The following describes the attributes and elements listed in the schema outlined above:

454 /sp:SignedParts

455 This assertion specifies the parts of the message that need integrity protection. If no child  
456 elements are specified, all message headers targeted at the UltimateReceiver role [SOAP12] or  
457 actor [SOAP11] and the body of the message MUST be integrity protected.

458 /sp:SignedParts/sp:Body

459 Presence of this OPTIONAL empty element indicates that the entire body, that is the soap:Body  
460 element, it's attributes and content, of the message needs to be integrity protected.

461 /sp:SignedParts/sp:Header

462 Presence of this OPTIONAL element indicates a specific SOAP header, its attributes and content  
463 (or set of such headers) needs to be protected. There may be multiple sp:Header elements within  
464 a single sp:SignedParts element. If multiple SOAP headers with the same local name but  
465 different namespace names are to be integrity protected multiple sp:Header elements are  
466 needed, either as part of a single sp:SignedParts assertion or as part of separate sp:SignedParts  
467 assertions.

468 This element only applies to SOAP header elements targeted to the same actor/role as the  
469 Security header impacted by the policy. If it is necessary to specify a requirement to sign specific  
470 SOAP Header elements targeted to a different actor/role, that may be accomplished using the  
471 sp:SignedElements assertion.

472 /sp:SignedParts/sp:Header/@Name

473 This OPTIONAL attribute indicates the local name of the SOAP header to be integrity protected. If  
474 this attribute is not specified, all SOAP headers whose namespace matches the Namespace  
475 attribute are to be protected.

476 /sp:SignedParts/sp:Header/@Namespace

477 This REQUIRED attribute indicates the namespace of the SOAP header(s) to be integrity  
478 protected.

479 /sp:SignedParts/sp:Attachments

480 Presence of this OPTIONAL element indicates that all SwA (SOAP Messages with Attachments)  
481 attachments [SwA] are to be integrity protected. When SOAP Message Security is used to  
482 accomplish this, all message parts other than the part containing the primary SOAP envelope are  
483 to be integrity protected as outlined in WSS: SOAP Message Security [WSS:SwAProfile1.1].

484 /sp:SignedParts/sp:Attachments/sp13:ContentSignatureTransform

485 Presence of this OPTIONAL empty element indicates that the  
486 AttachmentContentSignatureTransform must be used as part of attachment protection.

487 /sp:SignedParts/sp:Attachments/sp13:AttachmentCompleteSignatureTransform

488 Presence of this OPTIONAL empty element indicates that the  
489 AttachmentCompleteSignatureTransform must be used as part of attachment protection.

490 This is the default if neither sp13:ContentSignatureTransform or  
491 sp13:AttachmentCompleteSignatureTransform are specified.

## 492 4.1.2 SignedElements Assertion

493 The SignedElements assertion is used to specify arbitrary elements in the message that require integrity  
494 protection. This assertion can be satisfied using WSS: SOAP Message Security mechanisms or by  
495 mechanisms out of scope of SOAP message security, for example by sending the message over a  
496 secure transport protocol like HTTPS. The binding specific token properties detail the exact mechanism  
497 by which the protection is provided.

498

499 There MAY be multiple SignedElements assertions present. Multiple SignedElements assertions present  
500 within a policy alternative are equivalent to a single SignedElements assertion containing the union of all  
501 specified XPath expressions.

### 502 Syntax

```
503 <sp:SignedElements XPathVersion="xs:anyURI"? xmlns:sp="..." ... >  
504   <sp:XPath>xs:string</sp:XPath>+  
505   <sp13:Xpath2 Filter="xs:string">xs:string</sp13:Xpath2>+  
506   ...  
507 </sp:SignedElements>
```

508 The following describes the attributes and elements listed in the schema outlined above:  
509 /sp:SignedElements  
510 This assertion specifies the parts of the message that need integrity protection.  
511 /sp:SignedElements/@XPathVersion  
512 This OPTIONAL attribute contains a URI which indicates the version of XPath to use. If no  
513 attribute is provided, then XPath 1.0 is assumed.  
514 /sp:SignedElements/sp:XPath  
515 This element contains a string specifying an XPath expression that identifies the nodes to be  
516 integrity protected. The XPath expression is evaluated against the S:Envelope element node of  
517 the message. Multiple instances of this element MAY appear within this assertion and SHOULD  
518 be treated as separate references in a signature when message security is used.  
519 /sp:SignedElements/sp:XPath2  
520 This element contains a string specifying an XPath 2 expression that identifies the nodes to be  
521 integrity protected. The XPath expression is evaluated against the S:Envelope element node of  
522 the message. Multiple instances of this element MAY appear within this assertion and SHOULD  
523 be treated as separate references in a signature when message security is used.  
524 /sp:SignedElements/sp:XPath2@Filter  
525 This REQUIRED attribute contains a string to specify an [XPath Filter 2.0] transform to apply.

## 526 4.2 Confidentiality Assertions

527 Two mechanisms are defined for specifying the set of message parts to confidentiality protect. One uses  
528 QNames to specify either message headers or the message body while the other uses XPath  
529 expressions to identify any part of the message.

### 530 4.2.1 EncryptedParts Assertion

531 The EncryptedParts assertion is used to specify the parts of the message that require confidentiality. This  
532 assertion can be satisfied with WSS: SOAP Message Security mechanisms or by mechanisms out of  
533 scope of SOAP message security, for example by sending the message over a secure transport protocol  
534 like HTTPS. The binding specific token properties detail the exact mechanism by which the protection is  
535 provided.

536  
537 There MAY be multiple EncryptedParts assertions present. Multiple EncryptedParts assertions present  
538 within a policy alternative are equivalent to a single EncryptedParts assertion containing the union of all  
539 specified message parts. Note that this assertion does not require that a given part appear in a message,  
540 just that if such a part appears, it requires confidentiality protection.

#### 541 Syntax

```
542 <sp:EncryptedParts xmlns:sp="..." ... >  
543   <sp:Body />?  
544   <sp:Header Name="xs:NCName" ? Namespace="xs:anyURI" ... />?  
545   <sp:Attachments />?  
546   ...  
547 </sp:EncryptedParts>
```

548  
549 The following describes the attributes and elements listed in the schema outlined above:  
550 /sp:EncryptedParts

551 This assertion specifies the parts of the message that need confidentiality protection. The single  
552 child element of this assertion specifies the set of message parts using an extensible dialect.

553 If no child elements are specified, the body of the message MUST be confidentiality protected.

554 /sp:EncryptedParts/sp:Body

555 Presence of this OPTIONAL empty element indicates that the entire body of the message needs  
556 to be confidentiality protected. In the case where mechanisms from WSS: SOAP Message  
557 Security are used to satisfy this assertion, then the soap:Body element is encrypted using the  
558 #Content encryption type.

559 /sp:EncryptedParts/sp:Header

560 Presence of this OPTIONAL element indicates that a specific SOAP header (or set of such  
561 headers) needs to be protected. There may be multiple sp:Header elements within a single Parts  
562 element. Each header or set of headers MUST be encrypted. Such encryption will encrypt such  
563 elements using WSS 1.1 Encrypted Headers. As such, if WSS 1.1 Encrypted Headers are not  
564 supported by a service, then this element cannot be used to specify headers that require  
565 encryption using message level security. If multiple SOAP headers with the same local name but  
566 different namespace names are to be encrypted then multiple sp:Header elements are needed,  
567 either as part of a single sp:EncryptedParts assertion or as part of separate sp:EncryptedParts  
568 assertions.

569 /sp:EncryptedParts/sp:Header/@Name

570 This OPTIONAL attribute indicates the local name of the SOAP header to be confidentiality  
571 protected. If this attribute is not specified, all SOAP headers whose namespace matches the  
572 Namespace attribute are to be protected.

573 /sp:EncryptedParts/sp:Header/@Namespace

574 This REQUIRED attribute indicates the namespace of the SOAP header(s) to be confidentiality  
575 protected.

576 /sp:EncryptedParts/sp:Attachments

577 Presence of this OPTIONAL empty element indicates that all SwA (SOAP Messages with  
578 Attachments) attachments [SwA] are to be confidentiality protected. When SOAP Message  
579 Security is used to accomplish this, all message parts other than the part containing the primary  
580 SOAP envelope are to be confidentiality protected as outlined in WSS: SOAP Message Security  
581 [WSS:SwAProfile1.1].

## 582 4.2.2 EncryptedElements Assertion

583 The EncryptedElements assertion is used to specify arbitrary elements in the message that require  
584 confidentiality protection. This assertion can be satisfied using WSS: SOAP Message Security  
585 mechanisms or by mechanisms out of scope of SOAP message security, for example by sending the  
586 message over a secure transport protocol like HTTPS. The binding specific token properties detail the  
587 exact mechanism by which the protection is provided.

588

589 There MAY be multiple EncryptedElements assertions present. Multiple EncryptedElements assertions  
590 present within a policy alternative are equivalent to a single EncryptedElements assertion containing the  
591 union of all specified XPath expressions.

### 592 Syntax

```
593 <sp:EncryptedElements XPathVersion="xs:anyURI"? xmlns:sp="..." ... >  
594 <sp:XPath>xs:string</sp:XPath>+  
595 ...  
596 </sp:EncryptedElements>
```

597 The following describes the attributes and elements listed in the schema outlined above:  
598 /sp:EncryptedElements  
599 This assertion specifies the parts of the message that need confidentiality protection. Any such  
600 elements are subject to #Element encryption.  
601 /sp:EncryptedElements/@XPathVersion  
602 This OPTIONAL attribute contains a URI which indicates the version of XPath to use. If no  
603 attribute is provided, then XPath 1.0 is assumed.  
604 /sp:EncryptedElements/sp:XPath  
605 This element contains a string specifying an XPath expression that identifies the nodes to be  
606 confidentiality protected. The XPath expression is evaluated against the S:Envelope element  
607 node of the message. Multiple instances of this element MAY appear within this assertion and  
608 SHOULD be treated as separate references.

### 609 **4.2.3 ContentEncryptedElements Assertion**

610 The ContentEncryptedElements assertion is used to specify arbitrary elements in the message that  
611 require confidentiality protection of their content. This assertion can be satisfied using WSS: SOAP  
612 Message Security mechanisms or by mechanisms out of scope of SOAP message security, for example  
613 by sending the message over a secure transport protocol like HTTPS. The binding specific token  
614 properties detail the exact mechanism by which the protection is provided.

615  
616 There MAY be multiple ContentEncryptedElements assertions present. Multiple  
617 ContentEncryptedElements assertions present within a policy alternative are equivalent to a single  
618 ContentEncryptedElements assertion containing the union of all specified XPath expressions.

#### 619 **Syntax**

```
620 <sp:ContentEncryptedElements XPathVersion="xs:anyURI"? ...>  
621   <sp:XPath>xs:string</sp:XPath>+  
622   ...  
623 </sp:ContentEncryptedElements>
```

624 The following describes the attributes and elements listed in the schema outlined above:  
625 /sp:ContentEncryptedElements  
626 This assertion specifies the parts of the message that need confidentiality protection. Any such  
627 elements are subject to #Content encryption.  
628 /sp:ContentEncryptedElements/@XPathVersion  
629 This OPTIONAL attribute contains a URI which indicates the version of XPath to use. If no  
630 attribute is provided, then XPath 1.0 is assumed.  
631 /sp:ContentEncryptedElements/sp:XPath  
632 This element contains a string specifying an XPath expression that identifies the nodes to be  
633 confidentiality protected. The XPath expression is evaluated against the S:Envelope element  
634 node of the message. Multiple instances of this element MAY appear within this assertion and  
635 SHOULD be treated as separate references.

### 636 **4.3 Required Elements Assertion**

637 A mechanism is defined for specifying, using XPath expressions, the set of header elements that a  
638 message MUST contain.

639

640 Note: Specifications are expected to provide domain specific assertions that specify which headers are  
641 expected in a message. This assertion is provided for cases where such domain specific assertions have  
642 not been defined.

### 643 4.3.1 RequiredElements Assertion

644 The RequiredElements assertion is used to specify header elements that the message MUST contain.  
645 This assertion specifies no security requirements.

646  
647 There MAY be multiple RequiredElements assertions present. Multiple RequiredElements assertions  
648 present within a policy alternative are equivalent to a single RequiredElements assertion containing the  
649 union of all specified XPath expressions.

#### 650 Syntax

```
651 <sp:RequiredElements XPathVersion="xs:anyURI"? xmlns:sp="..." ... >  
652 <sp:XPath>xs:string</sp:XPath> +  
653 ...  
654 </sp:RequiredElements>
```

655  
656 The following describes the attributes and elements listed in the schema outlined above:

657 /sp:RequiredElements

658 This assertion specifies the headers elements that MUST appear in a message.

659 /sp:RequiredElements/@XPathVersion

660 This OPTIONAL attribute contains a URI which indicates the version of XPath to use. If no  
661 attribute is provided, then XPath 1.0 is assumed.

662 /sp:RequiredElements/sp:XPath

663 This element contains a string specifying an XPath expression that identifies the header elements  
664 that a message MUST contain. The XPath expression is evaluated against the  
665 S:Envelope/S:Header element node of the message. Multiple instances of this element MAY  
666 appear within this assertion and SHOULD be treated as a combined XPath expression.

### 667 4.3.2 RequiredParts Assertion

668 RequiredParts is a QName based alternative to the RequiredElements assertion (which is based on  
669 XPATH) for specifying header elements that MUST be present in the message. This assertion specifies  
670 no security requirements.

671  
672 There MAY be multiple RequiredParts assertions present. Multiple RequiredParts assertions present  
673 within a policy alternative are equivalent to a single RequiredParts assertion containing the union of all  
674 specified Header elements.

#### 675 Syntax

```
676 <sp:RequiredParts XPathVersion="xs:anyURI"? xmlns:sp="..." ... >  
677 <sp:Header Name="..." Namespace="..." /> +  
678 </sp:RequiredParts>
```

679  
680 The following describes the attributes and elements listed in the schema outlined above:

681 /sp:RequiredParts/sp:Header

682 This assertion specifies the headers elements that MUST be present in the message.

683 /sp:RequiredParts/sp:Header/@Name



684            This REQUIRED attribute indicates the local name of the SOAPHeader that needs to be present  
685            in the message.  
686   /sp:RequiredParts/sp:Header/@Namespace  
687            This REQUIRED attribute indicates the namespace of the SOAP header that needs to be present  
688            in the message.

689

## 5 Token Assertions

690 Token assertions specify the type of tokens to use to protect or bind tokens and claims to the message.  
691 These assertions do not recommend usage of a Policy Subject. Assertions which contain them SHOULD  
692 recommend a policy attachment point. With the exception of transport token assertions, the token  
693 assertions defined in this section are not specific to any particular security binding.

### 5.1 Token Inclusion

695 Any token assertion MAY also carry an OPTIONAL `sp:IncludeToken` attribute. The schema type of  
696 this attribute is `xs:anyURI`. This attribute indicates whether the token SHOULD be included, that is  
697 written, in the message or whether cryptographic operations utilize an external reference mechanism to  
698 refer to the key represented by the token. This attribute is defined as a global attribute in the WS-  
699 SecurityPolicy namespace and is intended to be used by any specification that defines token assertions.

#### 5.1.1 Token Inclusion Values

701 The following table describes the set of valid token inclusion mechanisms supported by this specification:

http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702/IncludeToken/Never	The token MUST NOT be included in any messages sent between the initiator and the recipient; rather, an external reference to the token SHOULD be used.
http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702/IncludeToken/Once	The token MUST be included in only one message sent from the initiator to the recipient. References to the token MAY use an internal reference mechanism. Subsequent related messages sent between the recipient and the initiator MAY refer to the token using an external reference mechanism.
http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702/IncludeToken/AlwaysToRecipient	The token MUST be included in all messages sent from initiator to the recipient. The token MUST NOT be included in messages sent from the recipient to the initiator.
http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702/IncludeToken/AlwaysToInitiator	The token MUST be included in all messages sent from the recipient to the initiator. The token MUST NOT be included in messages sent from the initiator to the recipient.
http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702/IncludeToken/Always	The token MUST be included in all messages sent between the initiator and the recipient. This is the default behavior.

702

703 Note: In examples, the namespace URI is replaced with "...". For example,  
704 .../IncludeToken/Never is actually http://docs.oasis-open.org/ws-sx/ws-  
705 securitypolicy/200702/IncludeToken/Never. Other token inclusion URI values MAY be defined but are out-  
706 of-scope of this specification.

707 The default behavior characteristics defined by this specification if this attribute is not specified on a token  
708 assertion are .../IncludeToken/Always.

## 709 **5.1.2 Token Inclusion and Token References**

710 A token assertion MAY carry a sp:IncludeToken attribute that requires that the token be included in the  
711 message. The Web Services Security specifications [WSS10, WSS11] define mechanisms for how tokens  
712 are included in a message.

713 Several Token assertions (see Section 5.3) support mechanisms for referencing tokens in addition to  
714 Direct References, for example external URI references or references using a Thumbprint.

715 Certain combination of sp:IncludeToken value and token reference assertions can result in a token  
716 appearing in a message more than once. For example, if a token assertion carries a sp:IncludeToken  
717 attribute with a value of '.../Always' and that token assertion also contains a nested  
718 sp:RequireEmbeddedTokenReference (see Section 5.3.3) assertion, then the token would be included  
719 twice in the message. While such combinations are not in error, they are probably best avoided for  
720 efficiency reasons.

721 If a token assertion contains multiple reference assertions, then references to that token are REQUIRED  
722 to contain all the specified reference types. For example, if a token assertion contains nested  
723 sp:RequireIssuerSerialReference and sp:RequireThumbprintReference assertions then references to that  
724 token contain both reference forms. Again, while such combinations are not in error, they are probably  
725 best avoided for efficiency reasons.

## 726 **5.2 Token Issuer and Required Claims**

### 727 **5.2.1 Token Issuer**

728 Any token assertion MAY also carry an OPTIONAL sp:Issuer element. The schema type of this element is  
729 wsa:EndpointReferenceType. This element indicates the token issuing authority by pointing to the issuer  
730 endpoint address. This element is defined as a global element in the WS-SecurityPolicy namespace and  
731 is intended to be used by any specification that defines token assertions.

### 732 **5.2.2 Token Issuer Name**

733 Any token assertion MAY also carry an OPTIONAL sp:IssuerName element. The schema type of this  
734 element is xs:anyURI. This element indicated the token issuing authority by pointing to the issuer by using  
735 its logical name. This element is defined as a global element in the WS-SecurityPolicy namespace and is  
736 intended to be used by any specification that defines token assertions.

737  
738 It is out of scope of this specification how the relationship between the issuer's logical name and the  
739 physical manifestation of the issuer in the security token is defined.

740 While both sp:Issuer and sp:IssuerName elements are OPTIONAL they are also mutually exclusive and  
741 cannot be specified both at the same time.

### 742 **5.2.3 Required Claims**

743 Any token assertion MAY also carry an OPTIONAL wst:Claims element. The element content is defined in  
744 the WS-Trust namespace. This specification does not further define or limit the content of this element or  
745 the wst:Claims/@Dialect attribute as it is out of scope of this document.

746  
747 This element indicates the REQUIRED claims that the security token must contain in order to satisfy the  
748 requirements of the token assertion.

749  
750 Individual token assertions MAY further limit what claims MAY be specified for that specific token  
751 assertion.

## 752 5.2.4 Processing Rules and Token Matching

753 The sender is free to compose the requirements expressed by token assertions inside the receiver's  
754 policy to as many tokens as it sees fit. As long as the union of all tokens in the received message  
755 contains the REQUIRED set of claims from REQUIRED token issuers the message is valid according to  
756 the receiver's policy.

757 For example if the receiver's policy contains two token assertions, one requires IssuedToken from issuer  
758 A with claims C1 and C2 and the second requires IssuedToken from issuer B with claims C3 and C4, the  
759 sender can satisfy such requirements with any of the following security token decomposition:

- 760  
761 1. Two tokens, T1 and T2. T1 is issued by issuer A and contains claims C1 and C2 and  
762 T2 is issued by issuer B and contains claims C3 and C4.
- 763 2. Three tokens, T1, T2 and T3. T1 is issued by issuer A and contains claim C1, T2 is  
764 also issued by issuer A and contains claim C2 and T3 is issued by issuer B and  
765 contains claims C3 and C4.
- 766 3. Three tokens, T1, T2 and T3. T1 is issued by issuer A and contains claims C1 and C2,  
767 T2 is issued by issuer B and contains claim C3 and T3 is also issued by issuer B and  
768 contains claim C4.
- 769 4. Four tokens, T1, T2, T3 and T4. T1 is issued by issuer A and contains claim C1, T2 is  
770 also issued by issuer A and contains claim C2, T3 is issued by issuer B and contains  
771 claim C3 and T4 is also issued by issuer B and contains claim C4.

## 772 5.3 Token Properties

### 773 5.3.1 [Derived Keys] Property

774 This boolean property specifies whether derived keys SHOULD be used as defined in WS-  
775 SecureConversation. If the value is 'true', derived keys MUST be used. If the value is 'false', derived keys  
776 MUST NOT be used. The value of this property applies to a specific token. The value of this property is  
777 populated by assertions specific to the token. The default value for this property is 'false'.

778 See the [Explicit Derived Keys] and [Implied Derived Key] properties below for information on how  
779 particular forms of derived keys are specified.

780 Where the key material associated with a token is asymmetric, this property applies to the use of  
781 symmetric keys encrypted with the key material associated with the token.

### 782 5.3.2 [Explicit Derived Keys] Property

783 This boolean property specifies whether Explicit Derived Keys (see Section 7 of [WS-  
784 SecureConversation]) are allowed. If the value is 'true' then Explicit Derived Keys MAY be used. If the  
785 value is 'false' then Explicit Derived Keys MUST NOT be used.

### 786 5.3.3 [Implied Derived Keys] Property

787 This boolean property specifies whether Implied Derived Keys (see Section 7.3 of [WS-  
788 SecureConversation]) are allowed. If the value is 'true' then Implied Derived Keys MAY be used. If the  
789 value is 'false' then Implied Derived Keys MUST NOT be used.

## 790 5.4 Token Assertion Types

791 The following sections describe the token assertions defined as part of this specification.

### 792 5.4.1 UsernameToken Assertion

793 This element represents a requirement to include a username token.

794 There are cases where encrypting the UsernameToken is reasonable. For example:

- 795 1. When transport security is not used.
- 796 2. When a plaintext password is used.
- 797 3. When a weak password hash is used.
- 798 4. When the username needs to be protected, e.g. for privacy reasons.

799 When the UsernameToken is to be encrypted it SHOULD be listed as a  
800 SignedEncryptedSupportingToken (Section 8.5), EndorsingEncryptedSupportingToken (Section 8.6) or  
801 SignedEndorsingEncryptedSupportingToken (Section 8.7).

802

### 803 Syntax

```
804 <sp:UsernameToken sp:IncludeToken="xs:anyURI"? xmlns:sp="..." ... >  
805 (   
806   <sp:Issuer>wsa:EndpointReferenceType</sp:Issuer> |   
807   <sp:IssuerName>xs:anyURI</sp:IssuerName>   
808 ) ?   
809 <wst:Claims Dialect="..."> ... </wst:Claims> ?   
810 <wsp:Policy xmlns:wsp="...">   
811   ( (   
812     <sp:NoPassword ... /> |   
813     <sp:HashPassword ... />   
814   ) |   
815   (   
816     <sp13:Created .../> ?   
817     <sp13:Nonce .../> ?   
818   ) ) ?   
819   (   
820     <sp:RequireDerivedKeys /> |   
821     <sp:RequireImpliedDerivedKeys ... /> |   
822     <sp:RequireExplicitDerivedKeys ... />   
823   ) ?   
824   (   
825     <sp:WssUsernameToken10 ... /> |   
826     <sp:WssUsernameToken11 ... />   
827   ) ?   
828   ...   
829 </wsp:Policy>   
830 ...   
831 </sp:UsernameToken>
```

832

833 The following describes the attributes and elements listed in the schema outlined above:

834 /sp:UsernameToken

835 This identifies a UsernameToken assertion.

836 /sp:UsernameToken/@sp:IncludeToken

837 This OPTIONAL attribute identifies the token inclusion value for this token assertion.

838 /sp:UsernameToken/sp:Issuer

839 This OPTIONAL element, of type wsa:EndpointReferenceType, contains reference to the issuer  
840 of the sp:UsernameToken.

841 /sp:UsernameToken/sp:IssuerName

842 This OPTIONAL element, of type xs:anyURI, contains the logical name of the sp:UsernameToken  
843 issuer.

844 /sp:UsernameToken/wst:Claims

845 This OPTIONAL element identifies the REQUIRED claims that a security token must contain in  
846 order to satisfy the token assertion requirements.

847 /sp:UsernameToken/wsp:Policy

848 This REQUIRED element identifies additional requirements for use of the sp:UsernameToken  
849 assertion.

850 /sp:UsernameToken/wsp:Policy/sp:NoPassword

851 This OPTIONAL element is a policy assertion that indicates that the wsse:Password element  
852 MUST NOT be present in the Username token.

853 /sp:UsernameToken/wsp:Policy/sp:HashPassword

854 This OPTIONAL element is a policy assertion that indicates that the wsse:Password element  
855 MUST be present in the Username token and that the content of the wsse:Password element  
856 MUST contain a hash of the timestamp, nonce and password as defined in [WSS: Username  
857 Token Profile].

858 /sp13:UsernameToken/wsp:Policy/sp13:Created

859 This OPTIONAL element is a policy assertion that MUST only be used with the default clear text  
860 password case, and, if present, indicates that the wsse:Created element MUST be present in the  
861 Username token.

862 /sp13:UsernameToken/wsp:Policy/sp13:Nonce

863 This OPTIONAL element is a policy assertion that MUST only be used with the default clear text  
864 password case, and, if present, that indicates that the wsse:Nonce element MUST be present in  
865 the Username token.

866 /sp:UsernameToken/wsp:Policy/sp:RequireDerivedKeys

867 This OPTIONAL element is a policy assertion that sets the [Derived Keys], [Explicit Derived Keys]  
868 and [Implied Derived Keys] properties for this token to 'true'.

869 /sp:UsernameToken/wsp:Policy/sp:RequireExplicitDerivedKeys

870 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Explicit Derived  
871 Keys] properties for this token to 'true' and the [Implied Derived Keys] property for this token to  
872 'false'.

873 /sp:UsernameToken/wsp:Policy/sp:RequireImpliedDerivedKeys

874 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Implied Derived  
875 Keys] properties for this token to 'true' and the [Explicit Derived Keys] property for this token to  
876 'false'.

877 /sp:UsernameToken/wsp:Policy/sp:WssUsernameToken10

878 This OPTIONAL element is a policy assertion that indicates that a Username token should be  
879 used as defined in [WSS:UsernameTokenProfile1.0].

880 /sp:UsernameToken/wsp:Policy/sp:WssUsernameToken11

881 This OPTIONAL element is a policy assertion that indicates that a Username token should be  
882 used as defined in [WSS:UsernameTokenProfile1.1].

## 883 5.4.2 ICreatessuedToken Assertion

884 This element represents a requirement for an issued token, which is one issued by some token issuer  
885 using the mechanisms defined in WS-Trust. This assertion is used in 3<sup>rd</sup> party scenarios. For example,  
886 the initiator may need to request a SAML token from a given token issuer in order to secure messages  
887 sent to the recipient.

### 888 Syntax

```

889 <sp:IssuedToken sp:IncludeToken="xs:anyURI"? xmlns:sp="..." ... >
890 (
891 <sp:Issuer>wsa:EndpointReferenceType</sp:Issuer> |
892 <sp:IssuerName>xs:anyURI</sp:IssuerName>
893 ) ?
894 <wst:Claims Dialect="..."> ... </wst:Claims> ?
895 <sp:RequestSecurityTokenTemplate TrustVersion="xs:anyURI"? >
896 ...
897 </sp:RequestSecurityTokenTemplate>
898 <wsp:Policy xmlns:wsp="...">
899 (
900 <sp:RequireDerivedKeys ... /> |
901 <sp:RequireImpliedDerivedKeys ... /> |
902 <sp:RequireExplicitDerivedKeys ... />
903 ) ?
904 <sp:RequireExternalReference ... /> ?
905 <sp:RequireInternalReference ... /> ?
906 ...
907 </wsp:Policy>
908 ...
909 </sp:IssuedToken>

```

910 The following describes the attributes and elements listed in the schema outlined above:

911 /sp:IssuedToken

912 This identifies an IssuedToken assertion.

913 /sp:IssuedToken/@sp:IncludeToken

914 This OPTIONAL attribute identifies the token inclusion value for this token assertion.

915 /sp:IssuedToken/sp:Issuer

916 This OPTIONAL element, of type wsa:EndpointReferenceType, contains a reference to the issuer  
917 for the issued token.

918 /sp:IssuedToken/sp:IssuerName

919 This OPTIONAL element, of type xs:anyURI, contains the logical name of the sp:IssuedToken  
920 issuer.

921 /sp:IssuedToken/wst:Claims

922 This OPTIONAL element identifies the REQUIRED claims that a security token must contain in  
923 order to satisfy the token assertion requirements.

924 /sp:IssuedToken/sp:RequestSecurityTokenTemplate

925 This REQUIRED element contains elements which MUST be copied into the  
926 wst:SecondaryParameters of the RST request sent to the specified issuer. Note: the initiator is  
927 NOT REQUIRED to understand the contents of this element.

928 See Appendix B for details of the content of this element.

929 /sp:IssuedToken/sp:RequestSecurityTokenTemplate/@TrustVersion

930 This OPTIONAL attribute contains a WS-Trust specification namespace URI identifying the  
931 version of WS-Trust referenced by the contents of this element. For example, when using Trust  
932 1.3 the URI <http://docs.oasis-open.org/ws-sx/ws-trust/200512> should be used and when using  
933 Trust 1.4 the URI <http://docs.oasis-open.org/ws-sx/ws-trust/200802> should be used.

934 /sp:IssuedToken/wsp:Policy

935 This REQUIRED element identifies additional requirements for use of the sp:IssuedToken  
936 assertion.

937 /sp:IssuedToken/wsp:Policy/sp:RequireDerivedKeys

938 This OPTIONAL element is a policy assertion that sets the [Derived Keys], [Explicit Derived Keys]  
939 and [Implied Derived Keys] properties for this token to 'true'.

940 /sp:IssuedToken/wsp:Policy/sp:RequireExplicitDerivedKeys

941 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Explicit Derived  
942 Keys] properties for this token to 'true' and the [Implied Derived Keys] property for this token to  
943 'false'.

944 /sp:IssuedToken/wsp:Policy/sp:RequireImpliedDerivedKeys

945 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Implied Derived  
946 Keys] properties for this token to 'true' and the [Explicit Derived Keys] property for this token to  
947 'false'.

948 /sp:IssuedToken/wsp:Policy/sp:RequireInternalReference

949 This OPTIONAL element is a policy assertion that indicates whether an internal reference is  
950 REQUIRED when referencing this token.

951 Note: This reference will be supplied by the issuer of the token.

952 /sp:IssuedToken/wsp:Policy/sp:RequireExternalReference

953 This OPTIONAL element is a policy assertion that indicates whether an external reference is  
954 REQUIRED when referencing this token.

955 Note: This reference will be supplied by the issuer of the token.

956 Note: The IssuedToken MAY or MAY NOT be associated with key material and such key material may be  
957 symmetric or asymmetric. The Binding assertion will imply the type of key associated with this token.  
958 Services MAY also include information in the sp:RequestSecurityTokenTemplate element to  
959 explicitly define the expected key type. See [Appendix B](#) for details of the  
960 sp:RequestSecurityTokenTemplate element.

### 961 5.4.3 X509Token Assertion

962 This element represents a requirement for a binary security token carrying an X509 token.

#### 963 Syntax

```
964 <sp:X509Token sp:IncludeToken="xs:anyURI"? xmlns:sp="..." ... >  
965   (  
966     <sp:Issuer>wsa:EndpointReferenceType</sp:Issuer> |  
967     <sp:IssuerName>xs:anyURI</sp:IssuerName>  
968   ) ?  
969   <wst:Claims Dialect="..."> ... </wst:Claims> ?
```



```

970 <wsp:Policy xmlns:wsp="...">
971   (
972     <sp:RequireDerivedKeys ... /> |
973     <sp:RequireExplicitDerivedKeys ... /> |
974     <sp:RequireImpliedDerivedKeys ... />
975   ) ?
976 <sp:RequireKeyIdentifierReference ... /> ?
977 <sp:RequireIssuerSerialReference ... /> ?
978 <sp:RequireEmbeddedTokenReference ... /> ?
979 <sp:RequireThumbprintReference ... /> ?
980   (
981     <sp:WssX509V3Token10 ... /> |
982     <sp:WssX509Pkcs7Token10 ... /> |
983     <sp:WssX509PkiPathV1Token10 ... /> |
984     <sp:WssX509V1Token11 ... /> |
985     <sp:WssX509V3Token11 ... /> |
986     <sp:WssX509Pkcs7Token11 ... /> |
987     <sp:WssX509PkiPathV1Token11 ... />
988   ) ?
989   ...
990 </wsp:Policy>
991 ...
992 </sp:X509Token>

```

- 993
- 994 The following describes the attributes and elements listed in the schema outlined above:
- 995 /sp:X509Token
  - 996 This identifies an X509Token assertion.
- 997 /sp:X509Token/@sp:IncludeToken
  - 998 This OPTIONAL attribute identifies the token inclusion value for this token assertion.
- 999 /sp:X509Token/sp:Issuer
  - 1000 This OPTIONAL element, of type wsa:EndpointReferenceType, contains reference to the issuer
  - 1001 of the sp:X509Token.
- 1002 /sp:X509Token/sp:IssuerName
  - 1003 This OPTIONAL element, of type xs:anyURI, contains the logical name of the sp:X509Token
  - 1004 issuer.
- 1005 /sp:X509Token/wst:Claims
  - 1006 This OPTIONAL element identifies the REQUIRED claims that a security token must contain in
  - 1007 order to satisfy the token assertion requirements.
- 1008 /sp:X509Token/wsp:Policy
  - 1009 This REQUIRED element identifies additional requirements for use of the sp:X509Token
  - 1010 assertion.
- 1011 /sp:X509Token/wsp:Policy/sp:RequireDerivedKeys
  - 1012 This OPTIONAL element is a policy assertion that sets the [Derived Keys], [Explicit Derived Keys]
  - 1013 and [Implied Derived Keys] properties for this token to 'true'.
- 1014 /sp:X509Token/wsp:Policy/sp:RequireExplicitDerivedKeys
  - 1015 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Explicit Derived
  - 1016 Keys] properties for this token to 'true' and the [Implied Derived Keys] property for this token to
  - 1017 'false'.
- 1018 /sp:X509Token/wsp:Policy/sp:RequireImpliedDerivedKeys

1019 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Implied Derived  
1020 Keys] properties for this token to 'true' and the [Explicit Derived Keys] property for this token to  
1021 'false'.

1022 /sp:X509Token/wsp:Policy/sp:RequireKeyIdentifierReference

1023 This OPTIONAL element is a policy assertion that indicates that a key identifier reference is  
1024 REQUIRED when referencing this token.

1025 /sp:X509Token/wsp:Policy/sp:RequireIssuerSerialReference

1026 This OPTIONAL element is a policy assertion that indicates that an issuer serial reference is  
1027 REQUIRED when referencing this token.

1028 /sp:X509Token/wsp:Policy/sp:RequireEmbeddedTokenReference

1029 This OPTIONAL element is a policy assertion that indicates that an embedded token reference is  
1030 REQUIRED when referencing this token.

1031 /sp:X509Token/wsp:Policy/sp:RequireThumbprintReference

1032 This OPTIONAL element is a policy assertion that indicates that a thumbprint reference is  
1033 REQUIRED when referencing this token.

1034 /sp:X509Token/wsp:Policy/sp:WssX509V3Token10

1035 This OPTIONAL element is a policy assertion that indicates that an X509 Version 3 token should  
1036 be used as defined in [WSS:X509TokenProfile1.0].

1037 /sp:X509Token/wsp:Policy/sp:WssX509Pkcs7Token10

1038 This OPTIONAL element is a policy assertion that indicates that an X509 PKCS7 token should be  
1039 used as defined in [WSS:X509TokenProfile1.0].

1040 /sp:X509Token/wsp:Policy/sp:WssX509PkiPathV1Token10

1041 This OPTIONAL element is a policy assertion that indicates that an X509 PKI Path Version 1  
1042 token should be used as defined in [WSS:X509TokenProfile1.0].

1043 /sp:X509Token/wsp:Policy/sp:WssX509V1Token11

1044 This OPTIONAL element is a policy assertion that indicates that an X509 Version 1 token should  
1045 be used as defined in [WSS:X509TokenProfile1.1].

1046 /sp:X509Token/wsp:Policy/sp:WssX509V3Token11

1047 This OPTIONAL element is a policy assertion that indicates that an X509 Version 3 token should  
1048 be used as defined in [WSS:X509TokenProfile1.1].

1049 /sp:X509Token/wsp:Policy/sp:WssX509Pkcs7Token11

1050 This OPTIONAL element is a policy assertion that indicates that an X509 PKCS7 token should be  
1051 used as defined in [WSS:X509TokenProfile1.1].

1052 /sp:X509Token/wsp:Policy/sp:WssX509PkiPathV1Token11

1053 This OPTIONAL element is a policy assertion that indicates that an X509 PKI Path Version 1  
1054 token should be used as defined in [WSS:X509TokenProfile1.1].

## 1055 5.4.4 KerberosToken Assertion

1056 This element represents a requirement for a Kerberos token [WSS:KerberosToken1.1].

### 1057 Syntax

```
1058 <sp:KerberosToken sp:IncludeToken="xs:anyURI"? xmlns:sp="..." ... >  
1059 (  
1060   <sp:Issuer>wsa:EndpointReferenceType</sp:Issuer> |  
1061   <sp:IssuerName>xs:anyURI</sp:IssuerName>  
1062 ) ?
```

```

1063 <wst:Claims Dialect="..."> ... </wst:Claims> ?
1064 <wsp:Policy xmlns:wsp="...">
1065   (
1066     <sp:RequireDerivedKeys ... /> |
1067     <sp:RequireImpliedDerivedKeys ... /> |
1068     <sp:RequireExplicitDerivedKeys ... />
1069   ) ?
1070 <sp:RequireKeyIdentifierReference ... /> ?
1071   (
1072     <sp:WssKerberosV5ApReqToken11 ... /> |
1073     <sp:WssGssKerberosV5ApReqToken11 ... />
1074   ) ?
1075
1076   ...
1077 </wsp:Policy>
1078   ...
1079 </sp:KerberosToken>

```

1080

1081 The following describes the attributes and elements listed in the schema outlined above:

1082 /sp:KerberosToken

1083 This identifies a KerberosV5ApReqToken assertion.

1084 /sp:KerberosToken/@sp:IncludeToken

1085 This OPTIONAL attribute identifies the token inclusion value for this token assertion.

1086 /sp:KerberosToken/sp:Issuer

1087 This OPTIONAL element, of type wsa:EndpointReferenceType, contains reference to the issuer  
1088 of the sp:KerberosToken.

1089 /sp:KerberosToken/sp:IssuerName

1090 This OPTIONAL element, of type xs:anyURI, contains the logical name of the sp:KerberosToken  
1091 issuer.

1092 /sp:KerberosToken/wst:Claims

1093 This OPTIONAL element identifies the REQUIRED claims that a security token must contain in  
1094 order to satisfy the token assertion requirements.

1095 /sp:KerberosToken/wsp:Policy

1096 This REQUIRED element identifies additional requirements for use of the sp:KerberosToken  
1097 assertion.

1098 /sp:KerberosToken/wsp:Policy/sp:RequireDerivedKeys

1099 This OPTIONAL element is a policy assertion that sets the [Derived Keys], [Explicit Derived Keys]  
1100 and [Implied Derived Keys] properties for this token to 'true'.

1101 /sp:KerberosToken/wsp:Policy/sp:RequireExplicitDerivedKeys

1102 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Explicit Derived  
1103 Keys] properties for this token to 'true' and the [Implied Derived Keys] property for this token to  
1104 'false'.

1105 /sp:KerberosToken/wsp:Policy/sp:RequireImpliedDerivedKeys

1106 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Implied Derived  
1107 Keys] properties for this token to 'true' and the [Explicit Derived Keys] property for this token to  
1108 'false'.

1109 /sp:KerberosToken/wsp:Policy/sp:RequireKeyIdentifierReference

1110 This OPTIONAL element is a policy assertion that indicates that a key identifier reference is  
1111 REQUIRED when referencing this token.

1112 /sp:KerberosToken/wsp:Policy/sp:WssKerberosV5ApReqToken11

1113 This OPTIONAL element is a policy assertion that indicates that a Kerberos Version 5 AP-REQ  
1114 token should be used as defined in [WSS:KerberosTokenProfile1.1].

1115 /sp:KerberosToken/wsp:Policy/sp:WssGssKerberosV5ApReqToken11

1116 This OPTIONAL element is a policy assertion that indicates that a GSS Kerberos Version 5 AP-  
1117 REQ token should be used as defined in [WSS:KerberosTokenProfile1.1].

## 1118 5.4.5 SpnegoContextToken Assertion

1119 This element represents a requirement for a SecurityContextToken obtained by executing an n-leg  
1120 RST/RSTR SPNEGO binary negotiation protocol with the Web Service, as defined in WS-Trust.

### 1121 Syntax

```
1122 <sp:SpnegoContextToken sp:IncludeToken="xs:anyURI"? xmlns:sp="..." ... >  
1123   (  
1124     <sp:Issuer>wsa:EndpointReferenceType</sp:Issuer> |  
1125     <sp:IssuerName>xs:anyURI</sp:IssuerName>  
1126   ) ?  
1127   <wst:Claims Dialect="..."> ... </wst:Claims> ?  
1128   <wsp:Policy xmlns:wsp="...">  
1129     (  
1130       <sp:RequireDerivedKeys ... /> |  
1131       <sp:RequireImpliedDerivedKeys ... /> |  
1132       <sp:RequireExplicitDerivedKeys ... />  
1133     ) ?  
1134     <sp:MustNotSendCancel ... /> ?  
1135     <sp:MustNotSendAmend ... /> ?  
1136     <sp:MustNotSendRenew ... /> ?  
1137     ...  
1138   </wsp:Policy>  
1139   ...  
1140 </sp:SpnegoContextToken>
```

1141

1142 The following describes the attributes and elements listed in the schema outlined above:

1143 /sp:SpnegoContextToken

1144 This identifies a SpnegoContextToken assertion.

1145 /sp:SpnegoContextToken/@sp:IncludeToken

1146 This OPTIONAL attribute identifies the token inclusion value for this token assertion.

1147 /sp:SpnegoContextToken/sp:Issuer

1148 This OPTIONAL element, of type wsa:EndpointReferenceType, contains a reference to the issuer  
1149 for the Spnego Context Token.

1150 /sp:SpnegoContextToken/sp:IssuerName

1151 This OPTIONAL element, of type xs:anyURI, contains the logical name of the  
1152 sp:SpnegoContextToken issuer.

1153 /sp:SpnegoContextToken/wst:Claims

1154 This OPTIONAL element identifies the REQUIRED claims that a security token must contain in  
1155 order to satisfy the token assertion requirements.

1156 /sp:SpnegoContextToken/wsp:Policy

1157 This REQUIRED element identifies additional requirements for use of the  
 1158 sp:SpnegoContextToken assertion.

1159 /sp:SpnegoContextToken/wsp:Policy/sp:RequireDerivedKeys

1160 This OPTIONAL element is a policy assertion that sets the [Derived Keys], [Explicit Derived Keys]  
 1161 and [Implied Derived Keys] properties for this token to 'true'.

1162 /sp:SpnegoContextToken/wsp:Policy/sp:RequireExplicitDerivedKeys

1163 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Explicit Derived  
 1164 Keys] properties for this token to 'true' and the [Implied Derived Keys] property for this token to  
 1165 'false'.

1166 /sp:SpnegoContextToken/wsp:Policy/sp:RequireImpliedDerivedKeys

1167 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Implied Derived  
 1168 Keys] properties for this token to 'true' and the [Explicit Derived Keys] property for this token to  
 1169 'false'.

1170 sp:SpnegoContextToken/wsp:Policy/sp:MustNotSendCancel

1171 This OPTIONAL element is a policy assertion that indicates that the STS issuing the SP/Nego  
 1172 token does not support SCT/Cancel RST messages. If this assertion is missing it means that  
 1173 SCT/Cancel RST messages are supported by the STS.

1174 /sp:SpnegoContextToken/wsp:Policy/sp:MustNotSendAmend

1175 This OPTIONAL element is a policy assertion that indicates that the STS issuing the SP/Nego  
 1176 token does not support SCT/Amend RST messages. If this assertion is missing it means that  
 1177 SCT/Amend RST messages are supported by the STS.

1178 /sp:SpnegoContextToken/wsp:Policy/sp:MustNotSendRenew

1179 This OPTIONAL element is a policy assertion that indicates that the STS issuing the SP/Nego  
 1180 token does not support SCT/Renew RST messages. If this assertion is missing it means that  
 1181 SCT/Renew RST messages are supported by the STS.

## 1182 5.4.6 SecurityContextToken Assertion

1183 This element represents a requirement for a SecurityContextToken token.

### 1184 Syntax

```

1185 <sp:SecurityContextToken sp:IncludeToken="xs:anyURI"? xmlns:sp="..." ... >
1186 (
1187   <sp:Issuer>wsa:EndpointReferenceType</sp:Issuer> |
1188   <sp:IssuerName>xs:anyURI</sp:IssuerName>
1189 ) ?
1190 <wst:Claims Dialect="..."> ... </wst:Claims> ?
1191 <wsp:Policy xmlns:wsp="...">
1192   (
1193     <sp:RequireDerivedKeys ... /> |
1194     <sp:RequireImpliedDerivedKeys ... /> |
1195     <sp:RequireExplicitDerivedKeys ... />
1196   ) ?
1197   <sp:RequireExternalUriReference ... /> ?
1198   <sp:SC13SecurityContextToken... /> ?
1199   ...
1200 </wsp:Policy>
1201 ...
1202 </sp:SecurityContextToken>

```

1203

1204 The following describes the attributes and elements listed in the schema outlined above:

1205 /sp:SecurityContextToken

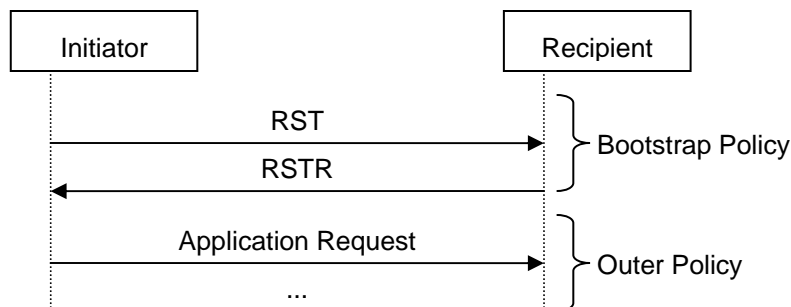
- 1206 This identifies a SecurityContextToken assertion.
- 1207 /sp:SecurityContextToken/@sp:IncludeToken
- 1208 This OPTIONAL attribute identifies the token inclusion value for this token assertion.
- 1209 /sp:SecurityContextToken/sp:Issuer
- 1210 This OPTIONAL element, of type wsa:EndpointReferenceType, contains reference to the issuer
- 1211 of the sp:SecurityContextToken.
- 1212 /sp:SecurityContextToken/sp:IssuerName
- 1213 This OPTIONAL element, of type xs:anyURI, contains the logical name of the
- 1214 sp:SecurityContextToken issuer.
- 1215 /sp:SecurityContextToken/wst:Claims
- 1216 This OPTIONAL element identifies the REQUIRED claims that a security token must contain in
- 1217 order to satisfy the token assertion requirements.
- 1218 /sp:SecurityContextToken/wsp:Policy
- 1219 This REQUIRED element identifies additional requirements for use of the
- 1220 sp:SecurityContextToken assertion.
- 1221 /sp:SecurityContextToken/wsp:Policy/sp:RequireDerivedKeys
- 1222 This OPTIONAL element is a policy assertion that sets the [Derived Keys], [Explicit Derived Keys]
- 1223 and [Implied Derived Keys] properties for this token to 'true'.
- 1224 /sp:SecurityContextToken/wsp:Policy/sp:RequireExplicitDerivedKeys
- 1225 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Explicit Derived
- 1226 Keys] properties for this token to 'true' and the [Implied Derived Keys] property for this token to
- 1227 'false'.
- 1228 /sp:SecurityContextToken/wsp:Policy/sp:RequireImpliedDerivedKeys
- 1229 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Implied Derived
- 1230 Keys] properties for this token to 'true' and the [Explicit Derived Keys] property for this token to
- 1231 'false'.
- 1232 /sp:SecurityContextToken/wsp:Policy/sp:RequireExternalUriReference
- 1233 This OPTIONAL element is a policy assertion that indicates that an external URI reference is
- 1234 REQUIRED when referencing this token.
- 1235 /sp:SecurityContextToken/wsp:Policy/sp:SC13SecurityContextToken
- 1236 This OPTIONAL element is a policy assertion that indicates that a Security Context Token should
- 1237 be used as defined in [[WS-SecureConversation](#)].
- 1238
- 1239 Note: This assertion does not describe how to obtain a Security Context Token but rather assumes that
- 1240 both parties have the token already or have agreed separately on a mechanism for obtaining the token. If
- 1241 a definition of the mechanism for obtaining the Security Context Token is desired in policy, then either the
- 1242 sp:SecureConversationToken or the sp:IssuedToken assertion SHOULD be used instead.

### 1243 **5.4.7 SecureConversationToken Assertion**

- 1244 This element represents a requirement for a Security Context Token retrieved from the indicated issuer
- 1245 address. If the sp:Issuer address is absent, the protocol MUST be executed at the same address as the
- 1246 service endpoint address.

1247

1248 Note: This assertion describes the token accepted by the target service. Because this token is issued by  
 1249 the target service and MAY NOT have a separate port (with separate policy), this assertion SHOULD  
 1250 contain a bootstrap policy indicating the security binding and policy that is used when requesting this  
 1251 token from the target service. That is, the bootstrap policy is used to obtain the token and then the  
 1252 current (outer) policy is used when making requests with the token. This is illustrated in the diagram  
 1253 below.



1254

1255

1256 If the bootstrap policy assertion is used to indicate the security binding and policy in effect when  
 1257 requesting a secure conversation token from the target service, then subsequent Amend, Renew and  
 1258 Cancel messages MUST comply with the following rules.

1259 **Amending Context**

1260 To amend an existing secure conversation token, a requestor uses the context amending mechanism as  
 1261 described by the WS-SecureConversation specification. The message exchange MUST be secured  
 1262 using the existing (to be amended) SCT in accordance with the target service (outer) policy, combined  
 1263 with endorsing supporting tokens carrying the new claims to be associated with the amended context with  
 1264 the inclusion mode set to:

1265 <http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702/IncludeToken/AlwaysToRecipient>

1266 See the EndorsingSupportingTokens Assertion section for more details on the usage of the endorsing  
 1267 supporting tokens.

1268 **Renewing Context**

1269 To renew an existing secure conversation token, a requestor uses the context renewal mechanism as  
 1270 described by the WS-SecureConversation specification. The message exchange MUST be secured  
 1271 according to the requirements of the bootstrap policy assertion, combined with the existing (to be  
 1272 renewed) SCT used as an endorsing supporting token with the inclusion mode set to:

1273 <http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702/IncludeToken/AlwaysToRecipient>

1274 See the EndorsingSupportingTokens Assertion section for more details on the usage of endorsing  
 1275 support tokens.

1276 **Canceling Context**

1277 To cancel an existing secure conversation token, a requestor uses the context cancelling mechanism as  
 1278 described by the WS-SecureConversation specification. The message exchange MUST be secured  
 1279 using the existing (to be cancelled) SCT in accordance with the target service (outer) policy.

1280 **Handling Policy Alternatives**

1281 If there are policy alternatives present in either the bootstrap policy assertion or the target service (outer)  
 1282 policy assertion, the following rules MUST be followed.

- 1283 • The policy alternative used as a basis for the context renewal MUST be the same as the policy  
 1284 alternative which was previously used for the context issuance.

- If the target service (outer) policy has policy alternatives and SecureConversationToken assertion appears in multiple alternatives as follows:

1287 Policy

1288 Policy-alternative-1

1289 SecureConversationToken-assertion-1

1290 Policy-alternative-2

1291 SecureConversationToken-assertion-2

1292 The policy alternative used as basis for context amend and cancel MUST be the same as the policy  
1293 alternative that was used to obtain the context. This means that Policy-alternative-1 above cannot be  
1294 used to amend and cancel SecureConversationToken-assertion-2 and vice-versa.

- If the target service (outer) policy has policy alternatives that are outside the SecureConversationToken assertion as follows:

1297 Policy

1298 SecureConversationToken-assertion-1

1299 Policy-alternative-1

1300 Policy-alternative-2

1301 Any policy alternative can be used to amend or cancel the context. This means that either Policy-  
1302 alternative-1 or Policy-alternative-2 can be used to amend or cancel SecureConversationToken-  
1303 assertion-1.

1304

## 1305 Syntax

```
1306 <sp:SecureConversationToken sp:IncludeToken="xs:anyURI"? xmlns:sp="..." ... >  
1307 (  
1308 <sp:Issuer>wsa:EndpointReferenceType</sp:Issuer> |  
1309 <sp:IssuerName>xs:anyURI</sp:IssuerName>  
1310 ) ?  
1311 <wst:Claims Dialect="..."> ... </wst:Claims> ?  
1312 <wsp:Policy xmlns:wsp="...">  
1313 (  
1314 <sp:RequireDerivedKeys ... /> |  
1315 <sp:RequireImpliedDerivedKeys ... /> |  
1316 <sp:RequireExplicitDerivedKeys ... />  
1317 ) ?  
1318 <sp:RequireExternalUriReference ... /> ?  
1319 <sp:SC13SecurityContextToken ... /> ?  
1320 <sp:MustNotSendCancel ... /> ?  
1321 <sp:MustNotSendAmend ... /> ?  
1322 <sp:MustNotSendRenew ... /> ?  
1323 <sp:BootstrapPolicy ... >  
1324 <wsp:Policy> ... </wsp:Policy>  
1325 </sp:BootstrapPolicy> ?  
1326 </wsp:Policy>  
1327 ...  
1328 </sp:SecureConversationToken>
```

1329

1330 The following describes the attributes and elements listed in the schema outlined above:

1331 /sp:SecureConversationToken

1332 This identifies a SecureConversationToken assertion.

1333 /sp:SecureConversationToken/@sp:IncludeToken

1334 This OPTIONAL attribute identifies the token inclusion value for this token assertion.



- 1335 /sp:SecureConversationToken/sp:Issuer  
1336 This OPTIONAL element, of type wsa:EndpointReferenceType, contains a reference to the issuer  
1337 for the Security Context Token.
- 1338 /sp:SecureConversationToken/sp:IssuerName  
1339 This OPTIONAL element, of type xs:anyURI, contains the logical name of the  
1340 sp:SecureConversationToken issuer.
- 1341 /sp:SpnegoContextToken/wst:Claims  
1342 This OPTIONAL element identifies the REQUIRED claims that a security token must contain in  
1343 order to satisfy the token assertion requirements.
- 1344 /sp:SecureConversationToken/wsp:Policy  
1345 This REQUIRED element identifies additional requirements for use of the  
1346 sp:SecureConversationToken assertion.
- 1347 /sp:SecureConversationToken/wsp:Policy/sp:RequireDerivedKeys  
1348 This OPTIONAL element is a policy assertion that sets the [Derived Keys], [Explicit Derived Keys]  
1349 and [Implied Derived Keys] properties for this token to 'true'.
- 1350 /sp:SecureConversationToken/wsp:Policy/sp:RequireExplicitDerivedKeys  
1351 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Explicit Derived  
1352 Keys] properties for this token to 'true' and the [Implied Derived Keys] property for this token to  
1353 'false'.
- 1354 /sp:SecureConversationToken/wsp:Policy/sp:RequireImpliedDerivedKeys  
1355 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Implied Derived  
1356 Keys] properties for this token to 'true' and the [Explicit Derived Keys] property for this token to  
1357 'false'.
- 1358 /sp:SecureConversationToken/wsp:Policy/sp:RequireExternalUriReference  
1359 This OPTIONAL element is a policy assertion that indicates that an external URI reference is  
1360 REQUIRED when referencing this token.
- 1361 /sp:SecureConversationToken/wsp:Policy/sp:SC13SecurityContextToken  
1362 This OPTIONAL element is a policy assertion that indicates that a Security Context Token should  
1363 be used as obtained using the protocol defined in [[WS-SecureConversation](#)].
- 1364 /sp:SecureConversationToken/wsp:Policy/sp:MustNotSendCancel  
1365 This OPTIONAL element is a policy assertion that indicates that the STS issuing the secure  
1366 conversation token does not support SCT/Cancel RST messages. If this assertion is missing it  
1367 means that SCT/Cancel RST messages are supported by the STS.
- 1368 /sp:SecureConversationToken/wsp:Policy/sp:MustNotSendAmend  
1369 This OPTIONAL element is a policy assertion that indicates that the STS issuing the secure  
1370 conversation token does not support SCT/Amend RST messages. If this assertion is missing it  
1371 means that SCT/Amend RST messages are supported by the STS.
- 1372 /sp:SecureConversationToken/wsp:Policy/sp:MustNotSendRenew  
1373 This OPTIONAL element is a policy assertion that indicates that the STS issuing the secure  
1374 conversation token does not support SCT/Renew RST messages. If this assertion is missing it  
1375 means that SCT/Renew RST messages are supported by the STS.
- 1376 /sp:SecureConversationToken/wsp:Policy/sp:BootstrapPolicy  
1377 This OPTIONAL element is a policy assertion that contains the policy indicating the requirements  
1378 for obtaining the Security Context Token.

1379 /sp:SecureConversationToken/wsp:Policy/sp:BootstrapPolicy/wsp:Policy  
1380 This element contains the security binding requirements for obtaining the Security Context Token.  
1381 It will typically contain a security binding assertion (e.g. sp:SymmetricBinding) along with  
1382 protection assertions (e.g. sp:SignedParts) describing the parts of the RST/RSTR messages that  
1383 are to be protected.

#### 1384 Example

```
1385 <wsp:Policy xmlns:wsp="..." xmlns:sp="...">  
1386   <sp:SymmetricBinding>  
1387     <wsp:Policy>  
1388       <sp:ProtectionToken>  
1389         <wsp:Policy>  
1390           <sp:SecureConversationToken>  
1391             <sp:Issuer>  
1392               <wsa:Address>http://example.org/sts</wsa:Address>  
1393             </sp:Issuer>  
1394           <wsp:Policy>  
1395             <sp:SC13SecurityContextToken />  
1396           <sp:BootstrapPolicy>  
1397             <wsp:Policy>  
1398               <sp:AsymmetricBinding>  
1399                 <wsp:Policy>  
1400                   <sp:InitiatorToken>  
1401                     ...  
1402                   </sp:InitiatorToken>  
1403                   <sp:RecipientToken>  
1404                     ...  
1405                   </sp:RecipientToken>  
1406                 </wsp:Policy>  
1407               </sp:AsymmetricBinding>  
1408             <sp:SignedParts>  
1409               ...  
1410             </sp:SignedParts>  
1411             ...  
1412           </wsp:Policy>  
1413         </sp:BootstrapPolicy>  
1414       </wsp:Policy>  
1415     </sp:SecureConversationToken>  
1416   </wsp:Policy>  
1417 </sp:ProtectionToken>  
1418   ...  
1419 </wsp:Policy>  
1420 </sp:SymmetricBinding>  
1421 <sp:SignedParts>  
1422   ...  
1423 </sp:SignedParts>  
1424   ...  
1425 </wsp:Policy>
```

#### 1426 5.4.8 SamlToken Assertion

1427 This element represents a requirement for a SAML token.

#### 1428 Syntax

```
1429 <sp:SamlToken sp:IncludeToken="xs:anyURI" ? xmlns:sp="..." ... >  
1430   (  
1431     <sp:Issuer>wsa:EndpointReferenceType</sp:Issuer> |  
1432     <sp:IssuerName>xs:anyURI</sp:IssuerName>  
1433   ) ?  
1434   <wst:Claims Dialect="..."> ... </wst:Claims> ?
```

```

1435 <wsp:Policy xmlns:wsp="...">
1436   (
1437     <sp:RequireDerivedKeys ... /> |
1438     <sp:RequireImpliedDerivedKeys ... /> |
1439     <sp:RequireExplicitDerivedKeys ... />
1440   ) ?
1441   <sp:RequireKeyIdentifierReference ... /> ?
1442   (
1443     <sp:WssSamlV11Token10 ... /> |
1444     <sp:WssSamlV11Token11 ... /> |
1445     <sp:WssSamlV20Token11 ... />
1446   ) ?
1447   ...
1448 </wsp:Policy>
1449 ...
1450 </sp:SamlToken>

```

- 1451
- 1452 The following describes the attributes and elements listed in the schema outlined above:
- 1453 /sp:SamlToken
- 1454 This identifies a SamlToken assertion.
- 1455 /sp:SamlToken/@sp:IncludeToken
- 1456 This OPTIONAL attribute identifies the token inclusion value for this token assertion.
- 1457 /sp:SamlToken/sp:Issuer
- 1458 This OPTIONAL element, of type wsa:EndpointReferenceType, contains reference to the issuer
- 1459 of the sp:SamlToken.
- 1460 /sp:SamlToken/sp:IssuerName
- 1461 This OPTIONAL element, of type xs:anyURI, contains the logical name of the sp:SamlToken
- 1462 issuer.
- 1463 /sp:SamlToken/wst:Claims
- 1464 This OPTIONAL element identifies the REQUIRED claims that a security token must contain in
- 1465 order to satisfy the token assertion requirements.
- 1466 /sp:SamlToken/wsp:Policy
- 1467 This REQUIRED element identifies additional requirements for use of the sp:SamlToken
- 1468 assertion.
- 1469 /sp:SamlToken/wsp:Policy/sp:RequireDerivedKeys
- 1470 This OPTIONAL element is a policy assertion that sets the [Derived Keys], [Explicit Derived Keys]
- 1471 and [Implied Derived Keys] properties for this token to 'true'.
- 1472 /sp:SamlToken/wsp:Policy/sp:RequireExplicitDerivedKeys
- 1473 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Explicit Derived
- 1474 Keys] properties for this token to 'true' and the [Implied Derived Keys] property for this token to
- 1475 'false'.
- 1476 /sp:SamlToken/wsp:Policy/sp:RequireImpliedDerivedKeys
- 1477 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Implied Derived
- 1478 Keys] properties for this token to 'true' and the [Explicit Derived Keys] property for this token to
- 1479 'false'.
- 1480 /sp:SamlToken/wsp:Policy/sp:RequireKeyIdentifierReference
- 1481 This OPTIONAL element is a policy assertion that indicates that a key identifier reference is
- 1482 REQUIRED when referencing this token.

1483 /sp:SamIToken/wsp:Policy/sp:WssSamIV11Token10  
1484 This OPTIONAL element is a policy assertion that identifies that a SAML Version 1.1 token  
1485 should be used as defined in [WSS:SAMLTOKENPROFILE1.0].

1486 /sp:SamIToken/wsp:Policy/sp:WssSamIV11Token11  
1487 This OPTIONAL element is a policy assertion that identifies that a SAML Version 1.1 token  
1488 should be used as defined in [WSS:SAMLTOKENPROFILE1.1].

1489 /sp:SamIToken/wsp:Policy/sp:WssSamIV20Token11  
1490 This OPTIONAL element is a policy assertion that identifies that a SAML Version 2.0 token  
1491 should be used as defined in [WSS:SAMLTOKENPROFILE1.1].

1492  
1493 Note: This assertion does not describe how to obtain a SAML Token but rather assumes that both parties  
1494 have the token already or have agreed separately on a mechanism for obtaining the token. If a definition  
1495 of the mechanism for obtaining the SAML Token is desired in policy, the sp:IssuedToken assertion  
1496 SHOULD be used instead.

## 1497 5.4.9 RelToken Assertion

1498 This element represents a requirement for a REL token.

### 1499 Syntax

```
1500 <sp:RelToken sp:IncludeToken="xs:anyURI"? xmlns:sp="..." ... >  
1501 (   
1502   <sp:Issuer>wsa:EndpointReferenceType</sp:Issuer> |   
1503   <sp:IssuerName>xs:anyURI</sp:IssuerName>  
1504 ) ?  
1505 <wst:Claims Dialect="..."> ... </wst:Claims> ?  
1506 <wsp:Policy xmlns:wsp="...">  
1507 (   
1508   <sp:RequireDerivedKeys ... /> |   
1509   <sp:RequireImpliedDerivedKeys ... /> |   
1510   <sp:RequireExplicitDerivedKeys ... />  
1511 ) ?  
1512 <sp:RequireKeyIdentifierReference ... /> ?  
1513 (   
1514   <sp:WssRelV10Token10 ... /> |   
1515   <sp:WssRelV20Token10 ... /> |   
1516   <sp:WssRelV10Token11 ... /> |   
1517   <sp:WssRelV20Token11 ... />  
1518 ) ?  
1519 ...  
1520 </wsp:Policy>  
1521 ...  
1522 </sp:RelToken>
```

1523  
1524 The following describes the attributes and elements listed in the schema outlined above:

1525 /sp:RelToken

1526 This identifies a RelToken assertion.

1527 /sp:RelToken/@sp:IncludeToken

1528 This OPTIONAL attribute identifies the token inclusion value for this token assertion.

1529 /sp:RelToken/sp:Issuer

1530 This OPTIONAL element, of type wsa:EndpointReferenceType, contains reference to the issuer  
1531 of the sp:RelToken.

1532 /sp:RelToken/sp:IssuerName  
1533 This OPTIONAL element, of type xs:anyURI, contains the logical name of the sp:RelToken  
1534 issuer.

1535 /sp:RelToken/wst:Claims  
1536 This OPTIONAL element identifies the REQUIRED claims that a security token must contain in  
1537 order to satisfy the token assertion requirements.

1538 /sp:RelToken/wsp:Policy  
1539 This REQUIRED element identifies additional requirements for use of the sp:RelToken assertion.

1540 /sp:RelToken/wsp:Policy/sp:RequireDerivedKeys  
1541 This OPTIONAL element is a policy assertion that sets the [Derived Keys], [Explicit Derived Keys]  
1542 and [Implied Derived Keys] property for this token to 'true'.

1543 /sp:RelToken/wsp:Policy/sp:RequireExplicitDerivedKeys  
1544 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Explicit Derived  
1545 Keys] properties for this token to 'true' and the [Implied Derived Keys] property for this token to  
1546 'false'.

1547 /sp:RelToken/wsp:Policy/sp:RequireImpliedDerivedKeys  
1548 This OPTIONAL element is a policy assertion that sets the [Derived Keys] and [Implied Derived  
1549 Keys] properties for this token to 'true' and the [Explicit Derived Keys] property for this token to  
1550 'false'.

1551 /sp:RelToken/wsp:Policy/sp:RequireKeyIdentifierReference  
1552 This OPTIONAL element is a policy assertion that indicates that a key identifier reference is  
1553 REQUIRED when referencing this token.

1554 /sp:RelToken/wsp:Policy/sp:WssRelV10Token10  
1555 This OPTIONAL element is a policy assertion that identifies that a REL Version 1.0 token should  
1556 be used as defined in [\[WSS:RELTokenProfile1.0\]](#).

1557 /sp:RelToken/wsp:Policy/sp:WssRelV20Token10  
1558 This OPTIONAL element is a policy assertion that identifies that a REL Version 2.0 token should  
1559 be used as defined in [\[WSS:RELTokenProfile1.0\]](#).

1560 /sp:RelToken/wsp:Policy/sp:WssRelV10Token11  
1561 This OPTIONAL element is a policy assertion that identifies that a REL Version 1.0 token should  
1562 be used as defined in [\[WSS:RELTokenProfile1.1\]](#).

1563 /sp:RelToken/wsp:Policy/sp:WssRelV20Token11  
1564 This OPTIONAL element is a policy assertion that identifies that a REL Version 2.0 token should  
1565 be used as defined in [\[WSS:RELTokenProfile1.1\]](#).

1566  
1567 Note: This assertion does not describe how to obtain a REL Token but rather assumes that both parties  
1568 have the token already or have agreed separately on a mechanism for obtaining the token. If a definition  
1569 of the mechanism for obtaining the REL Token is desired in policy, the sp:IssuedToken assertion  
1570 SHOULD be used instead.

## 1571 **5.4.10 HttpsToken Assertion**

1572 This element represents a requirement for a transport binding to support the use of HTTPS.

### 1573 **Syntax**

```

1574 <sp:HttpsToken xmlns:sp="..." ... >
1575 (
1576   <sp:Issuer>wsa:EndpointReferenceType</sp:Issuer> |
1577   <sp:IssuerName>xs:anyURI</sp:IssuerName>
1578 ) ?
1579 <wst:Claims Dialect="..."> ... </wst:Claims> ?
1580 <wsp:Policy xmlns:wsp="...">
1581 (
1582   <sp:HttpBasicAuthentication /> |
1583   <sp:HttpDigestAuthentication /> |
1584   <sp:RequireClientCertificate /> |
1585   ...
1586 )?
1587   ...
1588 </wsp:Policy>
1589   ...
1590 </sp:HttpsToken>

```

1591 The following describes the attributes and elements listed in the schema outlined above:

1592 /sp:HttpsToken

1593         This identifies an Https assertion stating that use of the HTTPS protocol specification is  
1594         supported.

1595 /sp:HttpsToken/sp:Issuer

1596         This OPTIONAL element, of type wsa:EndpointReferenceType, contains reference to the issuer  
1597         of the sp:HttpsToken.

1598 /sp:HttpsToken/sp:IssuerName

1599         This OPTIONAL element, of type xs:anyURI, contains the logical name of the sp:HttpsToken  
1600         issuer.

1601 /sp:HttpsToken/wst:Claims

1602         This OPTIONAL element identifies the REQUIRED claims that a security token must contain in  
1603         order to satisfy the token assertion requirements.

1604 /sp:HttpsToken/wsp:Policy

1605         This REQUIRED element identifies additional requirements for use of the sp:HttpsToken  
1606         assertion.

1607 /sp:HttpsToken/wsp:Policy/sp:HttpBasicAuthentication

1608         This OPTIONAL element is a policy assertion that indicates that the client MUST use HTTP Basic  
1609         Authentication [[RFC2068](#)] to authenticate to the service.

1610 /sp:HttpsToken/wsp:Policy/sp:HttpDigestAuthentication

1611         This OPTIONAL element is a policy assertion that indicates that the client MUST use HTTP  
1612         Digest Authentication [[RFC2068](#)] to authenticate to the service.

1613 /sp:HttpsToken/wsp:Policy/sp:RequireClientCertificate

1614         This OPTIONAL element is a policy assertion that indicates that the client MUST provide a  
1615         certificate when negotiating the HTTPS session.

## 1616 5.4.11 KeyValueToken Assertion

1617 This element represents a requirement for a KeyValue token. The next section defines the KeyValue  
1618 security token abstraction for purposes of this token assertion.

1619

1620 This document defines requirements for KeyValue token when used in combination with RSA  
1621 cryptographic algorithm. Additional cryptographic algorithms can be introduced in other specifications by  
1622 introducing new nested assertions besides *sp:RsaKeyValue*.

### 1623 Syntax

```
1624 <sp:KeyValueToken sp:IncludeToken="xs:anyURI"? xmlns:sp="..." ... >  
1625 <wsp:Policy xmlns:wsp="...">  
1626 <sp:RsaKeyValue ... /> ?  
1627 ...  
1628 </wsp:Policy>  
1629 ...  
1630 </sp:KeyValueToken>
```

1631 The following describes the attributes listed in the schema outlined above:

1632 /sp:KeyValueToken

1633 This identifies a RsaToken assertion.

1634 /sp:KeyValueToken/@sp:IncludeToken

1635 This OPTIONAL attribute identifies the token inclusion value for this token assertion.

1636 /sp:KeyValueToken/wsp:Policy

1637 This REQUIRED element identifies additional requirements for use of the sp:KeyValueToken  
1638 assertion.

1639 /sp:KeyValueToken/wsp:Policy/sp:RsaKeyValue

1640 This OPTIONAL element is a policy assertion that indicates that the ds:RSAKeyValue element  
1641 must be present in the KeyValue token. This indicates that an RSA key pair must be used.

### 1642 5.4.11.1 KeyValue Token

1643 XML Signature specification allows reference an arbitrary key pair by using the corresponding public key  
1644 value. This allows using an arbitrary key pair to sign or encrypt XML elements. The purpose of this  
1645 section is to define the KeyValue token abstraction that represents such key pair referencing mechanism.

1646 Although the *ds:KeyValue* element as defined in the XML Signature specification is generic enough to be  
1647 used with any asymmetric cryptographic algorithm this document only profiles the usage of *ds:KeyValue*  
1648 element in combination with RSA cryptographic algorithm.

1651 The RSA key pair is represented by the *ds:KeyInfo* element containing the *ds:KeyValue* element with the  
1652 RSA public key value in *ds:RSAKeyValue* as defined in the XML Signature specification:

```
1653 <ds:KeyInfo xmlns="http://www.w3.org/2000/09/xmldsig#">  
1654 <ds:KeyValue>  
1655 <ds:RSAKeyValue>  
1656 <ds:Modulus>ds:CryptoBinary</ds:Modulus>  
1657 <ds:Exponent>ds:CryptoBinary</ds:Exponent>  
1658 </ds:RSAKeyValue>  
1659 <ds:KeyValue>  
1660 </ds:KeyInfo>
```

1661 When the KeyValue token is used the corresponding public key value appears directly in the signature or  
1662 encrypted data *ds:KeyInfo* element like in the following example. There is no KeyValue token  
1663 manifestation outside the *ds:KeyInfo* element.

```
1665 <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">  
1666 <SignedInfo>  
1667 <CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-  
1668 c14n#" />  
1669 <SignatureMethod Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-sha1" />  
1670 <Reference URI="#_1">  
1671 <Transforms>
```

```

1672     <Transform Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
1673   </Transforms>
1674   <DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1" />
1675   <DigestValue>...</DigestValue>
1676   </Reference>
1677 </SignedInfo>
1678 <SignatureValue>...</SignatureValue>
1679 <KeyInfo>
1680   <KeyValue>
1681     <RSAKeyValue>
1682       <Modulus>...</Modulus>
1683       <Exponent>...</Exponent>
1684     </RSAKeyValue>
1685   </KeyValue>
1686 </KeyInfo>
1687 </Signature>

```

1688  
1689 Since there is no representation of the KeyValue token outside the *ds:KeyInfo* element and thus no  
1690 identifier can be associated with the token, the KeyValue token cannot be referenced by using  
1691 *wsse:SecurityTokenReference* element. However the *ds:KeyInfo* element representing the KeyValue  
1692 token can be used whenever a security token can be used as illustrated on the following example:

```

1693 <t:RequestSecurityToken xmlns:t="...">
1694   <t:RequestType>...</t:RequestType>
1695   ...
1696   <t:UseKey>
1697     <KeyInfo xmlns="http://www.w3.org/2000/09/xmldsig#">
1698       <KeyValue>
1699         <RSAKeyValue>
1700           <Modulus>...</Modulus>
1701           <Exponent>...</Exponent>
1702         </RSAKeyValue>
1703       </KeyValue>
1704     </KeyInfo>
1705   </t:UseKey>
1706 </t:RequestSecurityToken>

```



1707

## 6 Security Binding Properties

1708 This section defines the various properties or conditions of a security binding, their semantics, values and  
1709 defaults where appropriate. Properties are used by a binding in a manner similar to how variables are  
1710 used in code. Assertions populate, (or set) the value of the property (or variable). When an assertion that  
1711 populates a value of a property appears in a policy, that property is set to the value indicated by the  
1712 assertion. The security binding then uses the value of the property to control its behavior. The properties  
1713 listed here are common to the various security bindings described in Section 7. Assertions that define  
1714 values for these properties are defined in Section 7. The following properties are used by the security  
1715 binding assertions.

### 1716 6.1 [Algorithm Suite] Property

1717 This property specifies the algorithm suite REQUIRED for performing cryptographic operations with  
1718 symmetric or asymmetric key based security tokens. An algorithm suite specifies actual algorithms and  
1719 allowed key lengths. A policy alternative will define what algorithms are used and how they are used. This  
1720 property defines the set of available algorithms. The value of this property is typically referenced by a  
1721 security binding and is used to specify the algorithms used for all message level cryptographic operations  
1722 performed under the security binding.

1723 Note: In some cases, this property MAY be referenced under a context other than a security binding and  
1724 used to control the algorithms used under that context. For example, supporting token assertions define  
1725 such a context. In such contexts, the specified algorithms still apply to message level cryptographic  
1726 operations.

1727 An algorithm suite defines values for each of the following operations and properties:

- 1728 • [Sym Sig] Symmetric Key Signature
- 1729 • [Asym Sig] Signature with an asymmetric key
- 1730 • [Dig] Digest
- 1731 • [Enc] Encryption
- 1732 • [Sym KW] Symmetric Key Wrap
- 1733 • [Asym KW] Asymmetric Key Wrap
- 1734 • [Comp Key] Computed key
- 1735 • [Enc KD] Encryption key derivation
- 1736 • [Sig KD] Signature key derivation
- 1737 • [Min SKL] Minimum symmetric key length
- 1738 • [Max SKL] Maximum symmetric key length
- 1739 • [Min AKL] Minimum asymmetric key length
- 1740 • [Max AKL] Maximum asymmetric key length

1741

1742 The following table provides abbreviations for the algorithm URI used in the table below:

Abbreviation	Algorithm URI
HmacSha1	<a href="http://www.w3.org/2000/09/xmlsig#hmac-sha1">http://www.w3.org/2000/09/xmlsig#hmac-sha1</a>
RsaSha1	<a href="http://www.w3.org/2000/09/xmlsig#rsa-sha1">http://www.w3.org/2000/09/xmlsig#rsa-sha1</a>
Sha1	<a href="http://www.w3.org/2000/09/xmlsig#sha1">http://www.w3.org/2000/09/xmlsig#sha1</a>
Sha256	<a href="http://www.w3.org/2001/04/xmlenc#sha256">http://www.w3.org/2001/04/xmlenc#sha256</a>

Sha512 <http://www.w3.org/2001/04/xmlenc#sha512>  
 Aes128 <http://www.w3.org/2001/04/xmlenc#aes128-cbc>  
 Aes192 <http://www.w3.org/2001/04/xmlenc#aes192-cbc>  
 Aes256 <http://www.w3.org/2001/04/xmlenc#aes256-cbc>  
 TripleDes <http://www.w3.org/2001/04/xmlenc#tripledes-cbc>  
 KwAes128 <http://www.w3.org/2001/04/xmlenc#kw-aes128>  
 KwAes192 <http://www.w3.org/2001/04/xmlenc#kw-aes192>  
 KwAes256 <http://www.w3.org/2001/04/xmlenc#kw-aes256>  
 KwTripleDes <http://www.w3.org/2001/04/xmlenc#kw-tripledes>  
 KwRsaOaep <http://www.w3.org/2001/04/xmlenc#rsa-oaep-mgf1p>  
 KwRsa15 [http://www.w3.org/2001/04/xmlenc#rsa-1\\_5](http://www.w3.org/2001/04/xmlenc#rsa-1_5)  
 PSha1 [http://docs.oasis-open.org/ws-sx/ws-secureconversation/200512/dk/p\\_sha1](http://docs.oasis-open.org/ws-sx/ws-secureconversation/200512/dk/p_sha1)  
 PSha1L128 [http://docs.oasis-open.org/ws-sx/ws-secureconversation/200512/dk/p\\_sha1](http://docs.oasis-open.org/ws-sx/ws-secureconversation/200512/dk/p_sha1)  
 PSha1L192 [http://docs.oasis-open.org/ws-sx/ws-secureconversation/200512/dk/p\\_sha1](http://docs.oasis-open.org/ws-sx/ws-secureconversation/200512/dk/p_sha1)  
 PSha1L256 [http://docs.oasis-open.org/ws-sx/ws-secureconversation/200512/dk/p\\_sha1](http://docs.oasis-open.org/ws-sx/ws-secureconversation/200512/dk/p_sha1)  
 XPath <http://www.w3.org/TR/1999/REC-xpath-19991116>  
 XPath20 <http://www.w3.org/2002/06/xmldsig-filter2>  
 C14N <http://www.w3.org/TR/2001/REC-xml-c14n-20010315>  
 ExC14N <http://www.w3.org/2001/10/xml-exc-c14n#>  
 SNT <http://www.w3.org/TR/soap12-n11n>  
 STRT10 <http://docs.oasis-open.org/wss/2004/xx/oasis-2004xx-wss-soap-message-security-1.0#STR-Transform>  
 AbsXPath <http://docs.oasis-open.org/...TBD.../AbsXPath>

1743

1744 The tables below show all the base algorithm suites defined by this specification. This table defines  
 1745 values for properties which are common for all suites:

Property	Algorithm / Value
[Sym Sig]	HmacSha1
[Asym Sig]	RsaSha1
[Comp Key]	PSha1
[Max SKL]	256
[Min AKL]	1024
[Max AKL]	4096

1746 This table defines additional properties whose values can be specified along with the default value for that  
 1747 property.

Property	Algorithm / Value
[C14n Algorithm]	ExC14N
[Soap Norm]	None
[STR Trans]	None
[XPath]	None

1748 This table defines values for the remaining components for each algorithm suite.

Algorithm Suite	[Dig]	[Enc]	[Sym KW]	[Asym KW]	[Enc KD]	[Sig KD]	[Min SKL]
Basic256	Sha1	Aes256	KwAes256	KwRsaOaep	PSha1L256	PSha1L192	256
Basic192	Sha1	Aes192	KwAes192	KwRsaOaep	PSha1L192	PSha1L192	192
Basic128	Sha1	Aes128	KwAes128	KwRsaOaep	PSha1L128	PSha1L128	128
TripleDes	Sha1	TripleDes	KwTripleDes	KwRsaOaep	PSha1L192	PSha1L192	192
Basic256Rsa15	Sha1	Aes256	KwAes256	KwRsa15	PSha1L256	PSha1L192	256
Basic192Rsa15	Sha1	Aes192	KwAes192	KwRsa15	PSha1L192	PSha1L192	192
Basic128Rsa15	Sha1	Aes128	KwAes128	KwRsa15	PSha1L128	PSha1L128	128
TripleDesRsa15	Sha1	TripleDes	KwTripleDes	KwRsa15	PSha1L192	PSha1L192	192

Algorithm Suite	[Dig]	[Enc]	[Sym KW]	[Asym KW]	[Enc KD]	[Sig KD]	[Min SKL]
Basic256Sha256	Sha256	Aes256	KwAes256	KwRsaOaep	PSha1L256	PSha1L192	256
Basic192Sha256	Sha256	Aes192	KwAes192	KwRsaOaep	PSha1L192	PSha1L192	192
Basic128Sha256	Sha256	Aes128	KwAes128	KwRsaOaep	PSha1L128	PSha1L128	128
TripleDesSha256	Sha256	TripleDes	KwTripleDes	KwRsaOaep	PSha1L192	PSha1L192	192
Basic256Sha256Rsa15	Sha256	Aes256	KwAes256	KwRsa15	PSha1L256	PSha1L192	256
Basic192Sha256Rsa15	Sha256	Aes192	KwAes192	KwRsa15	PSha1L192	PSha1L192	192
Basic128Sha256Rsa15	Sha256	Aes128	KwAes128	KwRsa15	PSha1L128	PSha1L128	128
TripleDesSha256Rsa15	Sha256	TripleDes	KwTripleDes	KwRsa15	PSha1L192	PSha1L192	192

## 1749 6.2 [Timestamp] Property

1750 This boolean property specifies whether a `wsu:Timestamp` element is present in the `wsse:Security`  
 1751 header. If the value is 'true', the timestamp element **MUST** be present and **MUST** be integrity protected  
 1752 either by transport or message level security. If the value is 'false', the timestamp element **MUST NOT** be  
 1753 present. The default value for this property is 'false'.

## 1754 6.3 [Protection Order] Property

1755 This property indicates the order in which integrity and confidentiality are applied to the message, in  
 1756 cases where both integrity and confidentiality are **REQUIRED**:

EncryptBeforeSigning	Signature <b>MUST</b> be computed over ciphertext. Encryption key and signing key <b>MUST</b> be derived from the same source key unless distinct keys are provided, see Section 7.5 on the AsymmetricBinding.
SignBeforeEncrypting	Signature <b>MUST</b> be computed over plaintext. The resulting signature <b>SHOULD</b> be encrypted. Supporting signatures <b>MUST</b> be over the plain text signature.

1757 The default value for this property is 'SignBeforeEncrypting'.

## 1758 6.4 [Signature Protection] Property

1759 This boolean property specifies whether the signature **MUST** be encrypted. If the value is 'true', the  
 1760 primary signature **MUST** be encrypted and any signature confirmation elements **MUST** also be encrypted.  
 1761 The primary signature element is **NOT REQUIRED** to be encrypted if the value is 'true' when there is  
 1762 nothing in the message that is covered by this signature that is encrypted. If the value is 'false', the  
 1763 primary signature **MUST NOT** be encrypted and any signature confirmation elements **MUST NOT** be  
 1764 encrypted. The default value for this property is 'false'.

## 1765 6.5 [Token Protection] Property

1766 This boolean property specifies whether signatures **MUST** cover the token used to generate that  
 1767 signature. If the value is 'true', then each token used to generate a signature **MUST** be covered by that  
 1768 signature. If the value is 'false', then the token **MUST NOT** be covered by the signature. Note that in  
 1769 cases where derived keys are used the 'main' token, and **NOT** the derived key token, is covered by the  
 1770 signature. It is **RECOMMENDED** that assertions that define values for this property apply to [Endpoint  
 1771 Policy Subject]. The default value for this property is 'false'.

## 1772 6.6 [Entire Header and Body Signatures] Property

1773 This boolean property specifies whether signature digests over the SOAP body and SOAP headers  
1774 MUST only cover the entire body and entire header elements. If the value is 'true', then each digest over  
1775 the SOAP body MUST be over the entire SOAP body element and not a descendant of that element. In  
1776 addition each digest over a SOAP header MUST be over an actual header element and not a descendant  
1777 of a header element. This restriction does not specifically apply to the wsse:Security header. However  
1778 signature digests over child elements of the wsse:Security header MUST be over the entire child element  
1779 and not a descendent of that element. If the value is 'false', then signature digests MAY be over a  
1780 descendant of the SOAP Body or a descendant of a header element. Setting the value of this property to  
1781 'true' mitigates against some possible re-writing attacks. It is RECOMENDED that assertions that define  
1782 values for this property apply to [Endpoint Policy Subject]. The default value for this property is 'false'.

## 1783 6.7 [Security Header Layout] Property

1784 This property indicates which layout rules to apply when adding items to the security header. The  
1785 following table shows which rules are defined by this specification.

Strict	Items are added to the security header following the numbered layout rules described below according to a general principle of 'declare before use'.
Lax	Items are added to the security header in any order that conforms to WSS: SOAP Message Security
LaxTimestampFirst	As Lax except that the first item in the security header MUST be a wsu:Timestamp. Note that the [Timestamp] property MUST also be set to 'true' in this case.
LaxTimestampLast	As Lax except that the last item in the security header MUST be a wsu:Timestamp. Note that the [Timestamp] property MUST also be set to 'true' in this case.

1786

### 1787 6.7.1 Strict Layout Rules for WSS 1.0

- 1788 1. Tokens that are included in the message MUST be declared before use. For example:
- 1789 a. A local signing token MUST occur before the signature that uses it.
- 1790 b. A local token serving as the source token for a derived key token MUST occur before that  
1791 derived key token.
- 1792 c. A local encryption token MUST occur before the reference list that points to  
1793 xenc:EncryptedData elements that use it.
- 1794 d. If the same token is used for both signing and encryption, then it SHOULD appear before  
1795 the ds:Signature and xenc:ReferenceList elements in the security header that are  
1796 generated using the token.
- 1797 2. Signed elements inside the security header MUST occur before the signature that signs them.  
1798 For example:
- 1799 a. A timestamp MUST occur before the signature that signs it.

- 1800           b. A Username token (usually in encrypted form) MUST occur before the signature that  
1801           signs it.
- 1802           c. A primary signature MUST occur before the supporting token signature that signs the  
1803           primary signature's signature value element.
- 1804        3. When an element in a security header is encrypted, the resulting xenc:EncryptedData element  
1805        has the same order requirements as the source plain text element, unless requirement 4  
1806        indicates otherwise. For example, an encrypted primary signature MUST occur before any  
1807        supporting token signature per 2.c above and an encrypted token has the same ordering  
1808        requirements as the unencrypted token.
- 1809        If there are any encrypted elements in the message then a top level xenc:ReferenceList element or a top  
1810        level xenc:EncryptedKey element which contains an xenc:ReferenceList element MUST be present in the  
1811        security header. The xenc:ReferenceList or xenc:EncryptedKey MUST occur before any  
1812        xenc:EncryptedData elements in the security header that are referenced from the reference list. Strict  
1813        Layout Rules for WSS 1.1
- 1814        1. Tokens that are included in the message MUST be declared before use. For example:
- 1815           a. A local signing token MUST occur before the signature that uses it.
- 1816           b. A local token serving as the source token for a derived key token MUST occur before that  
1817           derived key token.
- 1818           c. A local encryption token MUST occur before the reference list that points to  
1819           xenc:EncryptedData elements that use it.
- 1820           d. If the same token is used for both signing and encryption, then it SHOULD appear before  
1821           the ds:Signature and xenc:ReferenceList elements in the security header that are  
1822           generated using the token.
- 1823        2. Signed elements inside the security header MUST occur before the signature that signs them.  
1824        For example:
- 1825           a. A timestamp MUST occur before the signature that signs it.
- 1826           b. A Username token (usually in encrypted form) MUST occur before the signature that  
1827           signs it.
- 1828           c. A primary signature MUST occur before the supporting token signature that signs the  
1829           primary signature's signature value element.
- 1830           d. A wsse11:SignatureConfirmation element MUST occur before the signature that signs it.
- 1831        3. When an element in a security header is encrypted, the resulting xenc:EncryptedData element  
1832        has the same order requirements as the source plain text element, unless requirement 4  
1833        indicates otherwise. For example, an encrypted primary signature MUST occur before any  
1834        supporting token signature per 2.c above and an encrypted token has the same ordering  
1835        requirements as the unencrypted token.
- 1836        4. If there are any encrypted elements in the message then a top level xenc:ReferenceList element  
1837        MUST be present in the security header. The xenc:ReferenceList MUST occur before any  
1838        xenc:EncryptedData elements in the security header that are referenced from the reference list.  
1839        However, the xenc:ReferenceList is NOT REQUIRED to appear before independently encrypted  
1840        tokens such as the xenc:EncryptedKey token as defined in WSS.
- 1841        5. An xenc:EncryptedKey element without an internal reference list [[WSS: SOAP Message Security](#)  
1842        1.1] MUST obey rule 1 above.

---

## 1843 7 Security Binding Assertions

1844 The appropriate representation of the different facets of security mechanisms requires distilling the  
1845 common primitives (to enable reuse) and then combining the primitive elements into patterns. The policy  
1846 scope of assertions defined in this section is the policy scope of their containing element.

### 1847 7.1 AlgorithmSuite Assertion

1848 This assertion indicates a requirement for an algorithm suite as defined under the [Algorithm Suite]  
1849 property described in Section 6.1. The scope of this assertion is defined by its containing assertion.

#### 1850 Syntax

```
1851 <sp:AlgorithmSuite xmlns:sp="..." ... >  
1852   <wsp:Policy xmlns:wsp="...">  
1853     (<sp:Basic256 ... /> |  
1854     <sp:Basic192 ... /> |  
1855     <sp:Basic128 ... /> |  
1856     <sp:TripleDes ... /> |  
1857     <sp:Basic256Rsa15 ... /> |  
1858     <sp:Basic192Rsa15 ... /> |  
1859     <sp:Basic128Rsa15 ... /> |  
1860     <sp:TripleDesRsa15 ... /> |  
1861     <sp:Basic256Sha256 ... /> |  
1862     <sp:Basic192Sha256 ... /> |  
1863     <sp:Basic128Sha256 ... /> |  
1864     <sp:TripleDesSha256 ... /> |  
1865     <sp:Basic256Sha256Rsa15 ... /> |  
1866     <sp:Basic192Sha256Rsa15 ... /> |  
1867     <sp:Basic128Sha256Rsa15 ... /> |  
1868     <sp:TripleDesSha256Rsa15 ... /> |  
1869     ...)  
1870     <sp:InclusiveC14N ... /> ?  
1871     <sp:InclusiveC14N11 ... /> ?  
1872     <sp:SOAPNormalization10 ... /> ?  
1873     <sp:STRTransform10 ... /> ?  
1874     (<sp:XPath10 ... /> |  
1875     <sp:XPathFilter20 ... /> |  
1876     <sp:AbsXPath ... /> |  
1877     ...)?  
1878     ...  
1879   </wsp:Policy>  
1880   ...  
1881 </sp:AlgorithmSuite>
```

1882  
1883 The following describes the attributes and elements listed in the schema outlined above:

1884 /sp:AlgorithmSuite

1885       This identifies an AlgorithmSuite assertion.

1886 /sp:AlgorithmSuite/wsp:Policy

1887       This REQUIRED element contains one or more policy assertions that indicate the specific  
1888       algorithm suite to use.

1889 /sp:AlgorithmSuite/wsp:Policy/sp:Basic256

1890       This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1891       set to 'Basic256'.

- 1892 /sp:AlgorithmSuite/wsp:Policy/sp:Basic192  
1893 This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1894 set to 'Basic192'.
- 1895 /sp:AlgorithmSuite/wsp:Policy/sp:Basic128  
1896 This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1897 set to 'Basic128'.
- 1898 /sp:AlgorithmSuite/wsp:Policy/sp:TripleDes  
1899 This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1900 set to 'TripleDes'.
- 1901 /sp:AlgorithmSuite/wsp:Policy/sp:Basic256Rsa15  
1902 This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1903 set to 'Basic256Rsa15'.
- 1904 /sp:AlgorithmSuite/wsp:Policy/sp:Basic192Rsa15  
1905 This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1906 set to 'Basic192Rsa15'.
- 1907 /sp:AlgorithmSuite/wsp:Policy/sp:Basic128Rsa15  
1908 This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1909 set to 'Basic128Rsa15'.
- 1910 /sp:AlgorithmSuite/wsp:Policy/sp:TripleDesRsa15  
1911 This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1912 set to 'TripleDesRsa15'.
- 1913 /sp:AlgorithmSuite/wsp:Policy/sp:Basic256Sha256  
1914 This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1915 set to 'Basic256Sha256'.
- 1916 /sp:AlgorithmSuite/wsp:Policy/sp:Basic192Sha256  
1917 This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1918 set to 'Basic192Sha256'.
- 1919 /sp:AlgorithmSuite/wsp:Policy/sp:Basic128Sha256  
1920 This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1921 set to 'Basic128Sha256'.
- 1922 /sp:AlgorithmSuite/wsp:Policy/sp:TripleDesSha256  
1923 This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1924 set to 'TripleDesSha256'.
- 1925 /sp:AlgorithmSuite/wsp:Policy/sp:Basic256Sha256Rsa15  
1926 This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1927 set to 'Basic256Sha256Rsa15'.
- 1928 /sp:AlgorithmSuite/wsp:Policy/sp:Basic192Sha256Rsa15  
1929 This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1930 set to 'Basic192Sha256Rsa15'.
- 1931 /sp:AlgorithmSuite/wsp:Policy/sp:Basic128Sha256Rsa15  
1932 This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1933 set to 'Basic128Sha256Rsa15'.
- 1934 /sp:AlgorithmSuite/wsp:Policy/sp:TripleDesSha256Rsa15

1935 This OPTIONAL element is a policy assertion that indicates that the [Algorithm Suite] property is  
1936 set to 'TripleDesSha256Rsa15'.

1937 /sp:AlgorithmSuite/wsp:Policy/sp:InclusiveC14N

1938 This OPTIONAL element is a policy assertion that indicates that the [C14N] property of an  
1939 algorithm suite is set to 'C14N'. Note: as indicated in Section 6.1 the default value of the [C14N]  
1940 property is 'ExC14N'.

1941 /sp:AlgorithmSuite/wsp:Policy/sp:InclusiveC14N11

1942  
1943 This optional element is a policy assertion that indicates that the  
1944 [C14N] property of an algorithm suite is set to 'C14N11'. Note: as  
1945 indicated in Section 6.1 the default value of the [C14N] property is  
1946 'ExC14N'.

1947 /sp:AlgorithmSuite/wsp:Policy/sp:SoapNormalization10

1948 This OPTIONAL element is a policy assertion that indicates that the [SOAP Norm] property is set  
1949 to 'SNT'.

1950 /sp:AlgorithmSuite/wsp:Policy/sp:STRTransform10

1951 This OPTIONAL element is a policy assertion that indicates that the [STR Transform] property is  
1952 set to 'STRT10'.

1953 /sp:AlgorithmSuite/wsp:Policy/sp:XPath10

1954 This OPTIONAL element is a policy assertion that indicates that the [XPath] property is set to  
1955 'XPath'.

1956 /sp:AlgorithmSuite/wsp:Policy/sp:XPathFilter20

1957 This OPTIONAL element is a policy assertion that indicates that the [XPath] property is set to  
1958 'XPath20'.

1959 /sp:AlgorithmSuite/wsp:Policy/sp:AbsXPath

1960 This OPTIONAL element is a policy assertion that indicates that the [XPath] property is set to  
1961 'AbsXPath' (see [AbsoluteLocationPath](#) in [XPATH]).

1962

## 1963 7.2 Layout Assertion

1964 This assertion indicates a requirement for a particular security header layout as defined under the  
1965 [Security Header Layout] property described in Section 6.7. The scope of this assertion is defined by its  
1966 containing assertion.

### 1967 Syntax

```
1968 <sp:Layout xmlns:sp="..." ... >  
1969   <wsp:Policy xmlns:wsp="..." >  
1970     <sp:Strict ... /> |  
1971     <sp:Lax ... /> |  
1972     <sp:LaxTsFirst ... /> |  
1973     <sp:LaxTsLast ... /> |  
1974     ...  
1975   </wsp:Policy>  
1976   ...  
1977 </sp:Layout>
```

1978

1979 The following describes the attributes and elements listed in the schema outlined above:

1980 /sp:Layout



- 1981 This identifies a Layout assertion.
- 1982 /sp:Layout/wsp:Policy
- 1983 This REQUIRED element contains one or more policy assertions that indicate the specific security  
1984 header layout to use.
- 1985 /sp:Layout/wsp:Policy/sp:Strict
- 1986 This OPTIONAL element is a policy assertion that indicates that the [Security Header Layout]  
1987 property is set to 'Strict'.
- 1988 /sp:Layout/wsp:Policy/sp:Lax
- 1989 This OPTIONAL element is a policy assertion that indicates that the [Security Header Layout]  
1990 property is set to 'Lax'.
- 1991 /sp:Layout/wsp:Policy/sp:LaxTsFirst
- 1992 This OPTIONAL element is a policy assertion that indicates that the [Security Header Layout]  
1993 property is set to 'LaxTimestampFirst'. Note that the [Timestamp] property MUST also be set to  
1994 'true' by the presence of an sp:IncludeTimestamp assertion.
- 1995 /sp:Layout/wsp:Policy/sp:LaxTsLast
- 1996 This OPTIONAL element is a policy assertion that indicates that the [Security Header Layout]  
1997 property is set to 'LaxTimestampLast'. Note that the [Timestamp] property MUST also be set to  
1998 'true' by the presence of an sp:IncludeTimestamp assertion.

### 1999 7.3 TransportBinding Assertion

- 2000 The TransportBinding assertion is used in scenarios in which message protection and security correlation  
2001 is provided by means other than [WSS: SOAP Message Security](#), for example by a secure transport like  
2002 HTTPS. Specifically, this assertion indicates that the message is protected using the means provided by  
2003 the transport. This binding has one binding specific token property; [Transport Token]. This assertion  
2004 MUST apply to [Endpoint Policy Subject].

#### 2005 Syntax

```

2006 <sp:TransportBinding xmlns:sp="..." ... >
2007   <wsp:Policy xmlns:wsp="...">
2008     <sp:TransportToken ... >
2009       <wsp:Policy> ... </wsp:Policy>
2010       ...
2011     </sp:TransportToken>
2012     <sp:AlgorithmSuite ... > ... </sp:AlgorithmSuite>
2013     <sp:Layout ... > ... </sp:Layout> ?
2014     <sp:IncludeTimestamp ... /> ?
2015     ...
2016   </wsp:Policy>
2017   ...
2018 </sp:TransportBinding>

```

- 2019
- 2020 The following describes the attributes and elements listed in the schema outlined above:

- 2021 /sp:TransportBinding
- 2022 This identifies a TransportBinding assertion.
- 2023 /sp:TransportBinding/wsp:Policy
- 2024 This indicates a nested `wsp:Policy` element that defines the behavior of the TransportBinding  
2025 assertion.
- 2026 /sp:TransportBinding/wsp:Policy/sp:TransportToken

2027 This REQUIRED element is a policy assertion that indicates a requirement for a Transport Token.  
2028 The specified token populates the [Transport Token] property and indicates how the transport is  
2029 secured.

2030 /sp:TransportBinding/wsp:Policy/sp:TransportToken/wsp:Policy

2031 This indicates a nested policy that identifies the type of Transport Token to use.

2032 /sp:TransportBinding/wsp:Policy/sp:AlgorithmSuite

2033 This REQUIRED element is a policy assertion that indicates a value that populates the [Algorithm  
2034 Suite] property. See Section 6.1 for more details.

2035 /sp:TransportBinding/wsp:Policy/sp:Layout

2036 This OPTIONAL element is a policy assertion that indicates a value that populates the [Security  
2037 Header Layout] property. See Section 6.7 for more details.

2038 /sp:TransportBinding/wsp:Policy/sp:IncludeTimestamp

2039 This OPTIONAL element is a policy assertion that indicates that the [Timestamp] property is set  
2040 to 'true'.

## 2041 7.4 SymmetricBinding Assertion

2042 The SymmetricBinding assertion is used in scenarios in which message protection is provided by means  
2043 defined in [WSS: SOAP Message Security](#). This binding has two binding specific token properties;  
2044 [Encryption Token] and [Signature Token]. If the message pattern requires multiple messages, this  
2045 binding defines that the [Encryption Token] used from initiator to recipient is also used from recipient to  
2046 initiator. Similarly, the [Signature Token] used from initiator to recipient is also use from recipient to  
2047 initiator. If a sp:ProtectionToken assertion is specified, the specified token populates both token  
2048 properties and is used as the basis for both encryption and signature in both directions. This assertion  
2049 SHOULD apply to [Endpoint Policy Subject]. This assertion MAY apply to [Operation Policy Subject].

### 2050 Syntax

```
2051 <sp:SymmetricBinding xmlns:sp="..." ... >  
2052   <wsp:Policy xmlns:wsp="...">  
2053     (  
2054       <sp:EncryptionToken ... >  
2055         <wsp:Policy> ... </wsp:Policy>  
2056       </sp:EncryptionToken>  
2057       <sp:SignatureToken ... >  
2058         <wsp:Policy> ... </wsp:Policy>  
2059       </sp:SignatureToken>  
2060     ) | (  
2061       <sp:ProtectionToken ... >  
2062         <wsp:Policy> ... </wsp:Policy>  
2063       </sp:ProtectionToken>  
2064     )  
2065     <sp:AlgorithmSuite ... > ... </sp:AlgorithmSuite>  
2066     <sp:Layout ... > ... </sp:Layout> ?  
2067     <sp:IncludeTimestamp ... /> ?  
2068     <sp:EncryptBeforeSigning ... /> ?  
2069     <sp:EncryptSignature ... /> ?  
2070     <sp:ProtectTokens ... /> ?  
2071     <sp:OnlySignEntireHeadersAndBody ... /> ?  
2072     ...  
2073   </wsp:Policy>  
2074   ...  
2075 </sp:SymmetricBinding>
```

2076

2077 The following describes the attributes and elements listed in the schema outlined above:

2078 /sp:SymmetricBinding  
2079 This identifies a SymmetricBinding assertion.

2080 /sp:SymmetricBinding/wsp:Policy  
2081 This indicates a nested wsp:Policy element that defines the behavior of the SymmetricBinding  
2082 assertion.

2083 /sp:SymmetricBinding/wsp:Policy/sp:EncryptionToken  
2084 This OPTIONAL element is a policy assertion that indicates a requirement for an Encryption  
2085 Token. The specified token populates the [Encryption Token] property and is used for encryption.  
2086 It is an error for both an sp:EncryptionToken and an sp:ProtectionToken assertion to be specified.

2087 /sp:SymmetricBinding/wsp:Policy/sp:EncryptionToken/wsp:Policy  
2088 The policy contained here MUST identify exactly one token to use for encryption.

2089 /sp:SymmetricBinding/wsp:Policy/sp:SignatureToken  
2090 This OPTIONAL element is a policy assertion that indicates a requirement for a Signature Token.  
2091 The specified token populates the [Signature Token] property and is used for the message  
2092 signature. It is an error for both an sp:SignatureToken and an sp:ProtectionToken assertion to be  
2093 specified.

2094 /sp:SymmetricBinding/wsp:Policy/sp:SignatureToken/wsp:Policy  
2095 The policy contained here MUST identify exactly one token to use for signatures.

2096 /sp:SymmetricBinding/wsp:Policy/sp:ProtectionToken  
2097 This OPTIONAL element is a policy assertion that indicates a requirement for a Protection Token.  
2098 The specified token populates the [Encryption Token] and [Signature Token properties] and is  
2099 used for the message signature and for encryption. It is an error for both an sp:ProtectionToken  
2100 assertion and either an sp:EncryptionToken assertion or an sp:SignatureToken assertion to be  
2101 specified.

2102 /sp:SymmetricBinding/wsp:Policy/sp:ProtectionToken/wsp:Policy  
2103 The policy contained here MUST identify exactly one token to use for protection.

2104 /sp:SymmetricBinding/wsp:Policy/sp:AlgorithmSuite  
2105 This REQUIRED element is a policy assertion that indicates a value that populates the [Algorithm  
2106 Suite] property. See Section 6.1 for more details.

2107 /sp:SymmetricBinding/wsp:Policy/sp:Layout  
2108 This OPTIONAL element is a policy assertion that indicates a value that populates the [Security  
2109 Header Layout] property. See Section 6.7 for more details.

2110 /sp:SymmetricBinding/wsp:Policy/sp:IncludeTimestamp  
2111 This OPTIONAL element is a policy assertion that indicates that the [Timestamp] property is set  
2112 to 'true'.

2113 /sp:SymmetricBinding/wsp:Policy/sp:EncryptBeforeSigning  
2114 This OPTIONAL element is a policy assertion that indicates that the [Protection Order] property is  
2115 set to 'EncryptBeforeSigning'.

2116 /sp:SymmetricBinding/wsp:Policy/sp:EncryptSignature  
2117 This OPTIONAL element is a policy assertion that indicates that the [Signature Protection]  
2118 property is set to 'true'.

2119 /sp:SymmetricBinding/wsp:Policy/sp:ProtectTokens  
2120 This OPTIONAL element is a policy assertion that indicates that the [Token Protection] property is  
2121 set to 'true'.

2122 /sp:SymmetricBinding/wsp:Policy/sp:OnlySignEntireHeadersAndBody  
2123 This OPTIONAL element is a policy assertion that indicates that the [Entire Header And Body  
2124 Signatures] property is set to 'true'.

## 2125 7.5 AsymmetricBinding Assertion

2126 The AsymmetricBinding assertion is used in scenarios in which message protection is provided by means  
2127 defined in WSS: SOAP Message Security using asymmetric key (Public Key) technology. Commonly  
2128 used asymmetric algorithms, such as RSA, allow the same key pair to be used for both encryption and  
2129 signature. However it is also common practice to use distinct keys for encryption and signature, because  
2130 of their different lifecycles.

2131  
2132 This binding enables either of these practices by means of four binding specific token properties: [Initiator  
2133 Signature Token], [Initiator Encryption Token], [Recipient Signature Token] and [Recipient Encryption  
2134 Token].

2135  
2136 If the same key pair is used for signature and encryption, then [Initiator Signature Token] and [Initiator  
2137 Encryption Token] will both refer to the same token. Likewise [Recipient Signature Token] and [Recipient  
2138 Encryption Token] will both refer to the same token.

2139  
2140 If distinct key pairs are used for signature and encryption then [Initiator Signature Token] and [Initiator  
2141 Encryption Token] will refer to different tokens. Likewise [Recipient Signature Token] and [Recipient  
2142 Encryption Token] will refer to different tokens.

2143  
2144 If the message pattern requires multiple messages, the [Initiator Signature Token] is used for the  
2145 message signature from initiator to the recipient. The [Initiator Encryption Token] is used for the response  
2146 message encryption from recipient to the initiator. The [Recipient Signature Token] is used for the  
2147 response message signature from recipient to the initiator. The [Recipient Encryption Token] is used for  
2148 the message encryption from initiator to the recipient. Note that in each case, the token is associated with  
2149 the party (initiator or recipient) who knows the secret.

2150 This assertion SHOULD apply to [Endpoint Policy Subject]. This assertion MAY apply to [Operation Policy  
2151 Subject].

### 2152 Syntax

```
2153 <sp:AsymmetricBinding xmlns:sp="..." ... >  
2154   <wsp:Policy xmlns:wsp="...">  
2155     (  
2156       <sp:InitiatorToken>  
2157         <wsp:Policy> ... </wsp:Policy>  
2158       </sp:InitiatorToken>  
2159     ) | (  
2160       <sp:InitiatorSignatureToken>  
2161         <wsp:Policy> ... </wsp:Policy>  
2162       </sp:InitiatorSignatureToken>  
2163       <sp:InitiatorEncryptionToken>  
2164         <wsp:Policy> ... </wsp:Policy>  
2165       </sp:InitiatorEncryptionToken>  
2166     )  
2167     (  
2168       <sp:RecipientToken>  
2169         <wsp:Policy> ... </wsp:Policy>  
2170       </sp:RecipientToken>  
2171     ) | (  
2172
```

```

2172     <sp:RecipientSignatureToken>
2173         <wsp:Policy> ... </wsp:Policy>
2174     </sp:RecipientSignatureToken>
2175     <sp:RecipientEncryptionToken>
2176         <wsp:Policy> ... </wsp:Policy>
2177     </sp:RecipientEncryptionToken>
2178 )
2179 <sp:AlgorithmSuite ... > ... </sp:AlgorithmSuite>
2180 <sp:Layout ... > ... </sp:Layout> ?
2181 <sp:IncludeTimestamp ... /> ?
2182 <sp:EncryptBeforeSigning ... /> ?
2183 <sp:EncryptSignature ... /> ?
2184 <sp:ProtectTokens ... /> ?
2185 <sp:OnlySignEntireHeadersAndBody ... /> ?
2186 ...
2187 </wsp:Policy>
2188 ...
2189 </sp:AsymmetricBinding>

```

2190  
2191 The following describes the attributes and elements listed in the schema outlined above:

2192 /sp:AsymmetricBinding

2193 This identifies a AsymmetricBinding assertion.

2194 /sp:AsymmetricBinding/wsp:Policy

2195 This indicates a nested wsp:Policy element that defines the behavior of the AsymmetricBinding  
2196 assertion.

2197 /sp:AsymmetricBinding/wsp:Policy/sp:InitiatorToken

2198 This OPTIONAL element is a policy assertion that indicates a requirement for an Initiator Token.  
2199 The specified token populates the [Initiator Signature Token] and [Initiator Encryption Token]  
2200 properties and is used for the message signature from initiator to recipient, and encryption from  
2201 recipient to initiator.

2202 /sp:AsymmetricBinding/wsp:Policy/sp:InitiatorToken/wsp:Policy

2203 The policy contained here MUST identify one or more token assertions.

2204 /sp:AsymmetricBinding/wsp:Policy/sp:InitiatorToken/wsp:Policy/sp:InitiatorSignatureToken

2205 This OPTIONAL element is a policy assertion that indicates a requirement for an Initiator  
2206 Signature Token. The specified token populates the [Initiator Signature Token] property and is  
2207 used for the message signature from initiator to recipient.

2208 /sp:AsymmetricBinding/wsp:Policy/sp:InitiatorToken/wsp:Policy/sp:InitiatorSignatureToken/wsp:Policy

2209 The policy contained here MUST identify one or more token assertions.

2210 /sp:AsymmetricBinding/wsp:Policy/sp:InitiatorToken/wsp:Policy/sp:InitiatorEncryptionToken

2211 This OPTIONAL element is a policy assertion that indicates a requirement for an Initiator  
2212 Encryption Token. The specified token populates the [Initiator Encryption Token] property and is  
2213 used for the message encryption from recipient to initiator.

2214 /sp:AsymmetricBinding/wsp:Policy/sp:InitiatorToken/wsp:Policy/sp:InitiatorEncryptionToken/wsp:Policy

2215 The policy contained here MUST identify one or more token assertions.

2216 /sp:AsymmetricBinding/wsp:Policy/sp:RecipientToken

2217 This OPTIONAL element is a policy assertion that indicates a requirement for a Recipient Token.  
2218 The specified token populates the [Recipient Signature Token] and [Recipient Encryption Token]  
2219 property and is used for encryption from initiator to recipient, and for the message signature from  
2220 recipient to initiator.

- 2221 /sp:AsymmetricBinding/wsp:Policy/sp:RecipientToken/wsp:Policy  
2222 The policy contained here MUST identify one or more token assertions.
- 2223 /sp:AsymmetricBinding/wsp:Policy/sp:RecipientToken/wsp:Policy/sp:RecipientSignatureToken  
2224 This OPTIONAL element is a policy assertion that indicates a requirement for a Recipient  
2225 Signature Token. The specified token populates the [Recipient Signature Token] property and is  
2226 used for the message signature from recipient to initiator.
- 2227 /sp:AsymmetricBinding/wsp:Policy/sp:RecipientToken/wsp:Policy/sp:RecipientSignatureToken/wsp:Policy  
2228 The policy contained here MUST identify one or more token assertions.
- 2229 /sp:AsymmetricBinding/wsp:Policy/sp:RecipientToken/wsp:Policy/sp:RecipientEncryptionToken  
2230 This OPTIONAL element is a policy assertion that indicates a requirement for a Recipient  
2231 Encryption Token. The specified token populates the [Recipient Encryption Token] property and  
2232 is used for the message encryption from initiator to recipient.
- 2233 /sp:AsymmetricBinding/wsp:Policy/sp:RecipientToken/wsp:Policy/sp:RecipientEncryptionToken/wsp:Policy  
2234 The policy contained here MUST identify one or more token assertions.
- 2235 /sp:AsymmetricBinding/wsp:Policy/sp:AlgorithmSuite  
2236 This REQUIRED element is a policy assertion that indicates a value that populates the [Algorithm  
2237 Suite] property. See Section 6.1 for more details.
- 2238 /sp:AsymmetricBinding/wsp:Policy/sp:Layout  
2239 This OPTIONAL element is a policy assertion that indicates a value that populates the [Security  
2240 Header Layout] property. See Section 6.7 for more details.
- 2241 /sp:AsymmetricBinding/wsp:Policy/sp:IncludeTimestamp  
2242 This OPTIONAL element is a policy assertion that indicates that the [Timestamp] property is set  
2243 to 'true'.
- 2244 /sp:AsymmetricBinding/wsp:Policy/sp:EncryptBeforeSigning  
2245 This OPTIONAL element is a policy assertion that indicates that the [Protection Order] property is  
2246 set to 'EncryptBeforeSigning'.
- 2247 /sp:AsymmetricBinding/wsp:Policy/sp:EncryptSignature  
2248 This OPTIONAL element is a policy assertion that indicates that the [Signature Protection]  
2249 property is set to 'true'.
- 2250 /sp:AsymmetricBinding/wsp:Policy/sp:ProtectTokens  
2251 This OPTIONAL element is a policy assertion that indicates that the [Token Protection] property is  
2252 set to 'true'.
- 2253 /sp:AsymmetricBinding/wsp:Policy/sp:OnlySignEntireHeadersAndBody  
2254 This OPTIONAL element is a policy assertion that indicates that the [Entire Header And Body  
2255 Signatures] property is set to 'true'.

2256

## 8 Supporting Tokens

2257 Security Bindings use tokens to secure the message exchange. The Security Binding will require one to  
2258 create a signature using the token identified in the Security Binding policy. This signature will here-to-fore  
2259 be referred to as the “message signature”. In case of Transport Binding the message is signed outside of  
2260 the message XML by the underlying transport protocol and the signature itself is not part of the message.  
2261 Additional tokens MAY be specified to augment the claims provided by the token associated with the  
2262 “message signature” provided by the Security Binding. This section defines seven properties related to  
2263 supporting token requirements which MAY be referenced by a Security Binding: [Supporting Tokens],  
2264 [Signed Supporting Tokens], [Endorsing Supporting Tokens], [Signed Endorsing Supporting Tokens],  
2265 [Signed Encrypted Supporting Tokens], [Endorsing Encrypted Supporting Tokens] and [Signed Endorsing  
2266 Encrypted Supporting Tokens]. Seven assertions are defined to populate those properties:  
2267 SupportingTokens, SignedSupportingTokens, EndorsingSupportingTokens,  
2268 SignedEndorsingSupportingTokens, SignedEncryptedSupportingTokens,  
2269 EndorsingEncryptedSupportingTokens and SignedEndorsingEncryptedSupportingTokens. These  
2270 assertions SHOULD apply to [Endpoint Policy Subject]. These assertions MAY apply to [Message Policy  
2271 Subject] or [Operation Policy Subject].

2272

2273 Supporting tokens MAY be specified at a different scope than the binding assertion which provides  
2274 support for securing the exchange. For instance, a binding is specified at the scope of an endpoint, while  
2275 the supporting tokens might be defined at the scope of a message. When assertions that populate this  
2276 property are defined in overlapping scopes, the sender SHOULD merge the requirements by including all  
2277 tokens from the outer scope and any additional tokens for a specific message from the inner scope.

2278

2279 In cases where multiple tokens are specified that sign and/or encrypt overlapping message parts, all the  
2280 tokens SHOULD sign and encrypt the various message parts. In such cases ordering of elements  
2281 (tokens, signatures, reference lists etc.) in the security header would be used to determine which order  
2282 signature and encryptions occurred in.

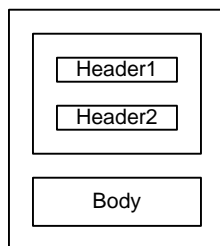
2283

2284 Policy authors need to ensure that the tokens they specify as supporting tokens can satisfy any additional  
2285 constraints defined by the supporting token assertion. For example, if the supporting token assertion  
2286 specifies message parts that need to be encrypted, the specified tokens need to be capable of  
2287 encryption.

2288

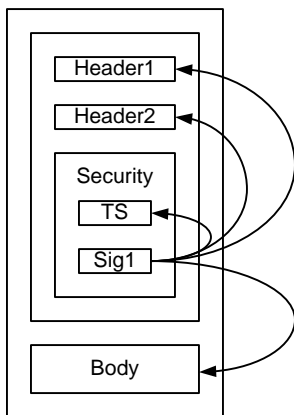
2289 To illustrate the different ways that supporting tokens MAY be bound to the message, let’s consider a  
2290 message with three components: Header1, Header2, and Body.

2291

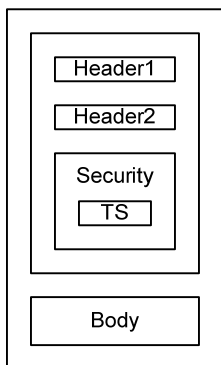


2292

2293 Even before any supporting tokens are added, each binding requires that the message is signed using a  
 2294 token satisfying the REQUIRED usage for that binding, and that the signature (Sig1) covers important  
 2295 parts of the message including the message timestamp (TS) facilitate replay detection. The signature is  
 2296 then included as part of the Security header as illustrated below:  
 2297



2298  
 2299 Note: if REQUIRED, the initiator may also include in the Security header the token used as the basis for  
 2300 the message signature (Sig1), not shown in the diagram.  
 2301 If transport security is used, only the message timestamp (TS) is included in the Security header as  
 2302 illustrated below. The “message signature” is provided by the underlying transport protocol and is not part  
 2303 of the message XML.



2304

## 2305 8.1 SupportingTokens Assertion

2306 Supporting tokens are included in the security header and MAY OPTIONALLY include additional  
 2307 message parts to sign and/or encrypt. The supporting tokens can be added to any SOAP message and  
 2308 do not require any protection (signature or encryption) to be applied to the message before they are  
 2309 added. More specifically there is no requirement on “message signature” being present before the  
 2310 supporting tokens are added. However it is RECOMMENDED to employ underlying protection  
 2311 mechanism to ensure that the supporting tokens are cryptographically bound to the message during the  
 2312 transmission.

### 2313 Syntax

```
2314 <sp:SupportingTokens xmlns:sp="..." ... >
2315   <wsp:Policy xmlns:wsp="...">
2316     [Token Assertion]+
2317     <sp:AlgorithmSuite ... > ... </sp:AlgorithmSuite> ?
2318     (
2319       <sp:SignedParts ... > ... </sp:SignedParts> |
```



2320  
2321  
2322  
2323  
2324  
2325  
2326  
2327

```
<sp:SignedElements ... > ... </sp:SignedElements> |  
<sp:EncryptedParts ... > ... </sp:EncryptedParts> |  
<sp:EncryptedElements ... > ... </sp:EncryptedElements> |  
  ) *  
  ...  
</wsp:Policy>  
  ...  
</sp:SupportingTokens>
```

2328

2329 The following describes the attributes and elements listed in the schema outlined above:

2330

/sp:SupportingTokens

2331

This identifies a SupportingTokens assertion. The specified tokens populate the [Supporting Tokens] property.

2332

2333

/sp:SupportingTokens/wsp:Policy

2334

This describes additional requirements for satisfying the SupportingTokens assertion.

2335

/sp:SupportingTokens/wsp:Policy/[Token Assertion]

2336

The policy MUST identify one or more token assertions.

2337

/sp:SupportingTokens/wsp:Policy/sp:AlgorithmSuite

2338

This OPTIONAL element is a policy assertion that follows the schema outlined in Section 7.1 and describes the algorithms to use for cryptographic operations performed with the tokens identified by this policy assertion.

2339

2340

2341

/sp:SupportingTokens/wsp:Policy/sp:SignedParts

2342

This OPTIONAL element is a policy assertion that follows the schema outlined in Section 4.1.1 and describes additional message parts that MUST be included in the signature generated with the token identified by this policy assertion.

2343

2344

2345

/sp:SupportingTokens/wsp:Policy/sp:SignedElements

2346

This OPTIONAL element is a policy assertion that follows the schema outlined in Section 4.1.2 and describes additional message elements that MUST be included in the signature generated with the token identified by this policy assertion.

2347

2348

2349

/sp:SupportingTokens/wsp:Policy/sp:EncryptedParts

2350

This OPTIONAL element is a policy assertion that follows the schema outlined in Section 4.2.1 and describes additional message parts that MUST be encrypted using the token identified by this policy assertion.

2351

2352

2353

/sp:SupportingTokens/wsp:Policy/sp:EncryptedElements

2354

This OPTIONAL element is a policy assertion that follows the schema outlined in Section 4.2.2 and describes additional message elements that MUST be encrypted using the token identified by this policy assertion.

2355

2356

## 2357 8.2 SignedSupportingTokens Assertion

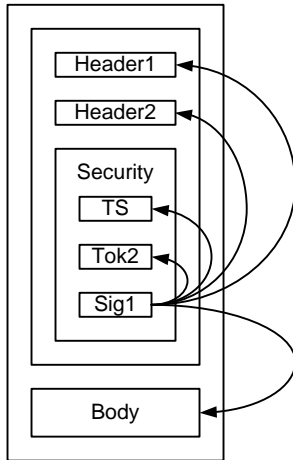
2358

Signed tokens are included in the “message signature” as defined above and MAY OPTIONALLY include additional message parts to sign and/or encrypt. The diagram below illustrates how the attached token (Tok2) is signed by the message signature (Sig1):

2359

2360

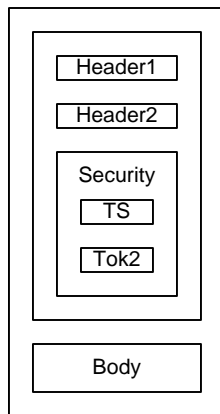
2361



2362

2363 If transport security is used, the token (Tok2) is included in the Security header as illustrated below:

2364



2365

2366 **Syntax**

```

2367 <sp:SignedSupportingTokens xmlns:sp="..." ... >
2368   <wsp:Policy xmlns:wsp="..." >
2369     [Token Assertion]+
2370     <sp:AlgorithmSuite ... > ... </sp:AlgorithmSuite> ?
2371     (
2372       <sp:SignedParts ... > ... </sp:SignedParts> |
2373       <sp:SignedElements ... > ... </sp:SignedElements> |
2374       <sp:EncryptedParts ... > ... </sp:EncryptedParts> |
2375       <sp:EncryptedElements ... > ... </sp:EncryptedElements>
2376     ) *
2377     ...
2378   </wsp:Policy>
2379   ...
2380 </sp:SignedSupportingTokens>

```

2381

2382 The following describes the attributes and elements listed in the schema outlined above:

2383 /sp:SignedSupportingTokens

2384 This identifies a SignedSupportingTokens assertion. The specified tokens populate the [Signed  
2385 Supporting Tokens] property.

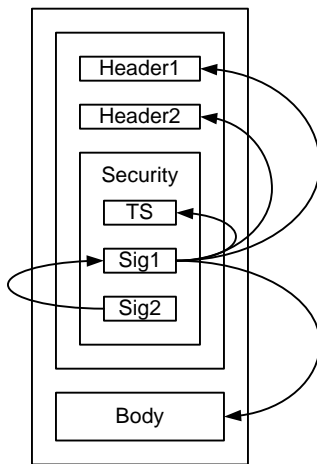
2386 /sp:SignedSupportingTokens/wsp:Policy

2387 This describes additional requirements for satisfying the SignedSupportingTokens assertion.

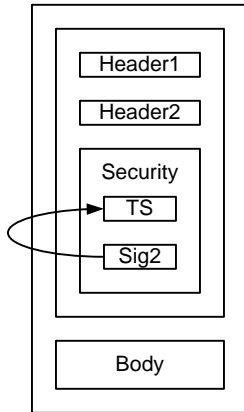
- 2388 /sp:SignedSupportingTokens/wsp:Policy/[Token Assertion]  
 2389 The policy MUST identify one or more token assertions.
- 2390 /sp:SignedSupportingTokens/wsp:Policy/sp:AlgorithmSuite  
 2391 This OPTIONAL element is a policy assertion that follows the schema outlined in Section 7.1 and  
 2392 describes the algorithms to use for cryptographic operations performed with the tokens identified  
 2393 by this policy assertion.
- 2394 /sp:SignedSupportingTokens/wsp:Policy/sp:SignedParts  
 2395 This OPTIONAL element is a policy assertion that follows the schema outlined in Section 4.1.1  
 2396 and describes additional message parts that MUST be included in the signature generated with  
 2397 the token identified by this policy assertion.
- 2398 /sp:SignedSupportingTokens/wsp:Policy/sp:SignedElements  
 2399 This OPTIONAL element is a policy assertion that follows the schema outlined in Section 4.1.2  
 2400 and describes additional message elements that MUST be included in the signature generated  
 2401 with the token identified by this policy assertion.
- 2402 /sp:SignedSupportingTokens/wsp:Policy/sp:EncryptedParts  
 2403 This OPTIONAL element is a policy assertion that follows the schema outlined in Section 4.2.1  
 2404 and describes additional message parts that MUST be encrypted using the token identified by  
 2405 this policy assertion.
- 2406 /sp:SignedSupportingTokens/wsp:Policy/sp:EncryptedElements  
 2407 This OPTIONAL element is a policy assertion that follows the schema outlined in Section 4.2.2  
 2408 and describes additional message elements that MUST be encrypted using the token identified  
 2409 by this policy assertion.

### 2410 8.3 EndorsingSupportingTokens Assertion

2411 Endorsing tokens sign the message signature, that is they sign the entire *ds:Signature* element  
 2412 produced from the message signature and MAY OPTIONALLY include additional message parts to sign  
 2413 and/or encrypt. The diagram below illustrates how the endorsing signature (Sig2) signs the message  
 2414 signature (Sig1):  
 2415



2416  
 2417 If transport security is used, the signature (Sig2) MUST cover the message timestamp as illustrated  
 2418 below:  
 2419



2420

2421 **Syntax**

```

2422 <sp:EndorsingSupportingTokens xmlns:sp="..." ... >
2423   <wsp:Policy xmlns:wsp="..." >
2424     [Token Assertion]+
2425     <sp:AlgorithmSuite ... > ... </sp:AlgorithmSuite> ?
2426     (
2427       <sp:SignedParts ... > ... </sp:SignedParts> |
2428       <sp:SignedElements ... > ... </sp:SignedElements> |
2429       <sp:EncryptedParts ... > ... </sp:EncryptedParts> |
2430       <sp:EncryptedElements ... > ... </sp:EncryptedElements>
2431     ) *
2432     ...
2433   </wsp:Policy>
2434   ...
2435 </sp:EndorsingSupportingTokens>

```

2436

2437 The following describes the attributes and elements listed in the schema outlined above:

2438 /sp:EndorsingSupportingTokens

2439 This identifies an EndorsingSupportingTokens assertion. The specified tokens populate the  
2440 [Endorsing Supporting Tokens] property.

2441 /sp:EndorsingSupportingTokens/wsp:Policy

2442 This describes additional requirements for satisfying the EndorsingSupportingTokens assertion.

2443 /sp:EndorsingSupportingTokens/wsp:Policy/[Token Assertion]

2444 The policy MUST identify one or more token assertions.

2445 /sp:EndorsingSupportingTokens/wsp:Policy/sp:AlgorithmSuite

2446 This OPTIONAL element is a policy assertion that follows the schema outlined in Section 7.1 and  
2447 describes the algorithms to use for cryptographic operations performed with the tokens identified  
2448 by this policy assertion.

2449 /sp:EndorsingSupportingTokens/wsp:Policy/sp:SignedParts

2450 This OPTIONAL element is a policy assertion that follows the schema outlined in Section 4.1.1  
2451 and describes additional message parts that MUST be included in the signature generated with  
2452 the token identified by this policy assertion.

2453 /sp:EndorsingSupportingTokens/wsp:Policy/sp:SignedElements

2454 This OPTIONAL element is a policy assertion that follows the schema outlined in Section 4.1.2  
2455 and describes additional message elements that MUST be included in the signature generated  
2456 with the token identified by this policy assertion.

2457 /sp:EndorsingSupportingTokens/wsp:Policy/sp:EncryptedParts

2458 This OPTIONAL element is a policy assertion that follows the schema outlined in Section 4.2.1  
2459 and describes additional message parts that MUST be encrypted using the token identified by  
2460 this policy assertion.

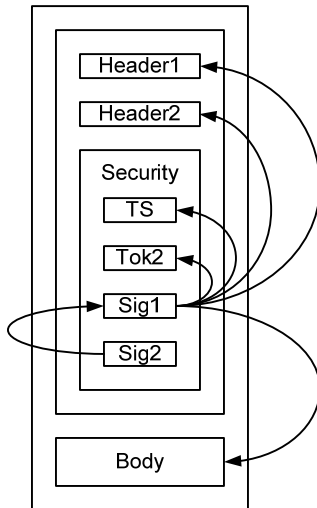
2461 /sp:EndorsingSupportingTokens/wsp:Policy/sp:EncryptedElements

2462 This OPTIONAL element is a policy assertion that follows the schema outlined in Section 4.2.2  
2463 and describes additional message elements that MUST be encrypted using the token identified  
2464 by this policy assertion.

## 2465 8.4 SignedEndorsingSupportingTokens Assertion

2466 Signed endorsing tokens sign the entire `ds:Signature` element produced from the message signature  
2467 and are themselves signed by that message signature, that is both tokens (the token used for the  
2468 message signature and the signed endorsing token) sign each other. This assertion MAY OPTIONALLY  
2469 include additional message parts to sign and/or encrypt. The diagram below illustrates how the signed  
2470 token (Tok2) is signed by the message signature (Sig1) and the endorsing signature (Sig2) signs the  
2471 message signature (Sig1):

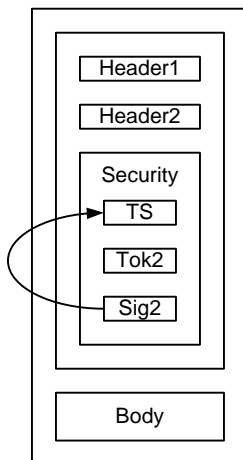
2472



2473

2474 If transport security is used, the token (Tok2) is included in the Security header and the signature (Sig2)  
2475 SHOULD cover the message timestamp as illustrated below:

2476



2477

2478 **Syntax**

```
2479 <sp:SignedEndorsingSupportingTokens xmlns:sp="..." ... >
2480 <wsp:Policy xmlns:wsp="...">
2481 [Token Assertion]+
2482 <sp:AlgorithmSuite ... > ... </sp:AlgorithmSuite> ?
2483 (
2484 <sp:SignedParts ... > ... </sp:SignedParts> |
2485 <sp:SignedElements ... > ... </sp:SignedElements> |
2486 <sp:EncryptedParts ... > ... </sp:EncryptedParts> |
2487 <sp:EncryptedElements ... > ... </sp:EncryptedElements>
2488 ) *
2489 ...
2490 </wsp:Policy>
2491 ...
2492 </sp:SignedEndorsingSupportingTokens>
```

2493

2494 The following describes the attributes and elements listed in the schema outlined above:

2495 /sp:SignedEndorsingSupportingTokens

2496 This identifies a SignedEndorsingSupportingTokens assertion. The specified tokens populate the  
2497 [Signed Endorsing Supporting Tokens] property.

2498 /sp:SignedEndorsingSupportingTokens/wsp:Policy

2499 This describes additional requirements for satisfying the EndorsingSupportingTokens assertion.

2500 /sp:SignedEndorsingSupportingTokens/wsp:Policy/[Token Assertion]

2501 The policy MUST identify one or more token assertions.

2502 /sp:SignedEndorsingSupportingTokens/wsp:Policy/sp:AlgorithmSuite

2503 This OPTIONAL element is a policy assertion that follows the schema outlined in Section 7.1 and  
2504 describes the algorithms to use for cryptographic operations performed with the tokens identified  
2505 by this policy assertion.

2506 /sp:SignedEndorsingSupportingTokens/wsp:Policy/sp:SignedParts

2507 This OPTIONAL element is a policy assertion that follows the schema outlined in Section 4.1.1  
2508 and describes additional message parts that MUST be included in the signature generated with  
2509 the token identified by this policy assertion.

2510 /sp:SignedEndorsingSupportingTokens/wsp:Policy/sp:SignedElements

2511 This OPTIONAL element follows the schema outlined in Section 4.1.2 and describes additional  
2512 message elements that MUST be included in the signature generated with the token identified by  
2513 this policy assertion.

2514 /sp:SignedEndorsingSupportingTokens/wsp:Policy/sp:EncryptedParts

2515 This OPTIONAL element is a policy assertion that follows the schema outlined in Section 4.2.1  
2516 and describes additional message parts that MUST be encrypted using the token identified by  
2517 this policy assertion.

2518 /sp:SignedEndorsingSupportingTokens/wsp:Policy/sp:EncryptedElements

2519 This OPTIONAL element is a policy assertion that follows the schema outlined in Section 4.2.2  
2520 and describes additional message elements that MUST be encrypted using the token identified  
2521 by this policy assertion.

## 2522 **8.5 SignedEncryptedSupportingTokens Assertion**

2523 Signed, encrypted supporting tokens are Signed supporting tokens (See section 8.2) that are also  
2524 encrypted when they appear in the wsse:SecurityHeader. Element Encryption SHOULD be used for  
2525 encrypting the supporting tokens.

2526 The syntax for the sp:SignedEncryptedSupportingTokens differs from the syntax of  
2527 sp:SignedSupportingTokens only in the name of the assertion itself. All nested policy is as per the  
2528 sp:SignedSupportingTokens assertion.

## 2529 **8.6 EncryptedSupportingTokens Assertion**

2530 Encrypted supporting tokens are supporting tokens (See section 8.1) that are included in  
2531 the security header and MUST be encrypted when they appear in the security header.  
2532 Element encryption SHOULD be used for encrypting these tokens. The encrypted supporting  
2533 tokens can be added to any SOAP message and do not require the “message signature”  
2534 being present before the encrypted supporting tokens are added.

2535 The syntax for the sp:EncryptedSupportingTokens differs from the syntax of  
2536 sp:SupportingTokens only in the name of the assertion itself. All nested policy is as per the  
2537 sp:SupportingTokens assertion.

2538 The encrypted supporting tokens SHOULD be used only when the sender cannot provide the  
2539 “message signature” and it is RECOMMENDED that the receiver employs some security  
2540 mechanisms external to the message to prevent the spoofing attacks. In all other cases it is  
2541 RECOMMENDED to use signed encrypted supporting tokens instead to ensure that the  
2542 encrypted tokens are cryptographically bound to the message (See section 8.5).

## 2543 **8.7 EndorsingEncryptedSupportingTokens Assertion**

2544 Endorsing, encrypted supporting tokens are Endorsing supporting tokens (See section 8.3) that are also  
2545 encrypted when they appear in the wsse:SecurityHeader. Element Encryption SHOULD be used for  
2546 encrypting the supporting tokens.

2547 The syntax for the sp:EndorsingEncryptedSupportingTokens differs from the syntax of  
2548 sp:EndorsingSupportingTokens only in the name of the assertion itself. All nested policy is as per the  
2549 sp:EndorsingSupportingTokens assertion.

## 2550 **8.8 SignedEndorsingEncryptedSupportingTokens Assertion**

2551 Signed, endorsing, encrypted supporting tokens are signed, endorsing supporting tokens (See section  
2552 8.4) that are also encrypted when they appear in the wsse:SecurityHeader. Element Encryption SHOULD  
2553 be used for encrypting the supporting tokens.

2554 The syntax for the sp:SignedEndorsingEncryptedSupportingTokens differs from the syntax of  
2555 sp:SignedEndorsingSupportingTokens only in the name of the assertion itself. All nested policy is as per  
2556 the sp:SignedEndorsingSupportingTokens assertion.

## 2557 **8.9 Interaction between [Token Protection] property and supporting 2558 token assertions**

2559 If [Token Protection] (see Section 6.5) is true, then each signature covers the token that generated that  
2560 signature and the following statements hold with respect to the various tokens that sign or are signed;

- 2561 • The message signature, generated from the [Initiator Token] in the Asymmetric Binding case or  
2562 the [Signature Token] in the Symmetric binding case, covers that token.
- 2563 • Endorsing signatures cover the main signature and the endorsing token.

- For signed, endorsing supporting tokens, the supporting token is signed twice, once by the message signature and once by the endorsing signature.

In addition, signed supporting tokens are covered by the message signature, although this is independent of [Token Protection].

## 8.10 Example

Example policy containing supporting token assertions:

```
<!-- Example Endpoint Policy -->
<wsp:Policy xmlns:wsp="...">
  <sp:SymmetricBinding xmlns:sp="...">
    <wsp:Policy>
      <sp:ProtectionToken>
        <sp:IssuedToken sp:IncludeToken=".../IncludeToken/Once" >
          <sp:Issuer>...</sp:Issuer>
          <sp:RequestSecurityTokenTemplate>
            ...
          </sp:RequestSecurityTokenTemplate>
        </sp:IssuedToken>
      </sp:ProtectionToken>
      <sp:AlgorithmSuite>
        <wsp:Policy>
          <sp:Basic256 />
        </wsp:Policy>
      </sp:AlgorithmSuite>
      ...
    </wsp:Policy>
  </sp:SymmetricBinding>
  ...
  <sp:SignedSupportingTokens>
    <wsp:Policy>
      <sp:UsernameToken sp:IncludeToken=".../IncludeToken/Once" />
    </wsp:Policy>
  </sp:SignedSupportingTokens>
  <sp:SignedEndorsingSupportingTokens>
    <wsp:Policy>
      <sp:X509Token sp:IncludeToken=".../IncludeToken/Once" >
        <wsp:Policy>
          <sp:WssX509v3Token10 />
        </wsp:Policy>
      </sp:X509Token>
    </wsp:Policy>
  </sp:SignedEndorsingSupportingTokens>
  ...
</wsp:Policy>
```

The `sp:SignedSupportingTokens` assertion in the above policy indicates that a Username Token must be included in the security header and covered by the message signature. The `sp:SignedEndorsingSupportingTokens` assertion indicates that an X509 certificate must be included in the security header and covered by the message signature. In addition, a signature over the message signature based on the key material associated with the X509 certificate must be included in the security header.



2613

---

## 9 WSS: SOAP Message Security Options

2614 There are several OPTIONAL aspects to the WSS: SOAP Message Security specification that are  
2615 independent of the trust and token taxonomies. This section describes another class of properties and  
2616 associated assertions that indicate the supported aspects of WSS: SOAP Message Security. The  
2617 assertions defined here MUST apply to [Endpoint Policy Subject].

2618 The properties and assertions dealing with token references defined in this section indicate whether the  
2619 initiator and recipient MUST be able to process a given reference mechanism, or whether the initiator and  
2620 recipient MAY send a fault if such references are encountered.

2621

2622 Note: This approach is chosen because:

2623 A) [WSS: SOAP Message Security] allows for multiple equivalent reference mechanisms to be used  
2624 in a single reference.

2625 B) In a multi-message exchange, a token MAY be referenced using different mechanisms depending  
2626 on which of a series of messages is being secured.

2627

2628 If a message sent to a recipient does not adhere to the recipient's policy the recipient MAY raise a  
2629 `wsse:InvalidSecurity` fault.

2630

### 2631 **WSS: SOAP Message Security 1.0 Properties**

#### 2632 **[Direct References]**

2633 This property indicates whether the initiator and recipient MUST be able to process direct token  
2634 references (by ID or URI reference). This property always has a value of 'true'. i.e. All implementations  
2635 MUST be able to process such references.

2636

#### 2637 **[Key Identifier References]**

2638 This boolean property indicates whether the initiator and recipient MUST be able to process key-specific  
2639 identifier token references. A value of 'true' indicates that the initiator and recipient MUST be able to  
2640 generate and process such references. A value of 'false' indicates that the initiator and recipient MUST  
2641 NOT generate such references and that the initiator and recipient MAY send a fault if such references are  
2642 encountered. This property has a default value of 'false'.

2643

#### 2644 **[Issuer Serial References]**

2645 This boolean property indicates whether the initiator and recipient MUST be able to process references  
2646 using the issuer and token serial number. A value of 'true' indicates that the initiator and recipient MUST  
2647 be able to process such references. A value of 'false' indicates that the initiator and recipient MUST NOT  
2648 generate such references and that the initiator and recipient MAY send a fault if such references are  
2649 encountered. This property has a default value of 'false'.

2650

#### 2651 **[External URI References]**

2652 This boolean property indicates whether the initiator and recipient MUST be able to process references to  
2653 tokens outside the message using URIs. A value of 'true' indicates that the initiator and recipient MUST  
2654 be able to process such references. A value of 'false' indicates that the initiator and recipient MUST NOT

2655 generate such references and that the initiator and recipient MAY send a fault if such references are  
2656 encountered. This property has a default value of 'false'.

### 2657 **[Embedded Token References]**

2658 This boolean property indicates whether the initiator and recipient MUST be able to process references  
2659 that contain embedded tokens. A value of 'true' indicates that the initiator and recipient MUST be able to  
2660 process such references. A value of 'false' indicates that the initiator and recipient MUST NOT generate  
2661 such references and that the initiator and recipient MAY send a fault if such references are encountered.  
2662 This property has a default value of 'false'.

2663

## 2664 **WSS: SOAP Message Security 1.1 Properties**

### 2665 **[Thumbprint References]**

2666 This boolean property indicates whether the initiator and recipient MUST be able to process references  
2667 using token thumbprints. A value of 'true' indicates that the initiator and recipient MUST be able to  
2668 process such references. A value of 'false' indicates that the initiator and recipient MUST NOT generate  
2669 such references and that the initiator and recipient MAY send a fault if such references are encountered.  
2670 This property has a default value of 'false'.

2671

### 2672 **[EncryptedKey References]**

2673 This boolean property indicates whether the initiator and recipient MUST be able to process references  
2674 using EncryptedKey references. A value of 'true' indicates that the initiator and recipient MUST be able to  
2675 process such references. A value of 'false' indicates that the initiator and recipient MUST NOT generate  
2676 such references and that the initiator and recipient MAY send a fault if such references are encountered.  
2677 This property has a default value of 'false'.

2678

### 2679 **[Signature Confirmation]**

2680 This boolean property specifies whether `wss11:SignatureConfirmation` elements SHOULD be  
2681 used as defined in WSS: Soap Message Security 1.1. If the value is 'true',  
2682 `wss11:SignatureConfirmation` elements MUST be used and signed by the message signature. If  
2683 the value is 'false', signature confirmation elements MUST NOT be used. The value of this property  
2684 applies to all signatures that are included in the security header. This property has a default value of  
2685 'false'. This value of this property does not affect the message parts protected by the message signature  
2686 (see the `sp:SignedParts` and `sp:SignedElements` assertions)

## 2687 **9.1 Wss10 Assertion**

2688 The Wss10 assertion allows you to specify which WSS: SOAP Message Security 1.0 options are  
2689 supported.

### 2690 **Syntax**

```
2691 <sp:Wss10 xmlns:sp="..." ... >  
2692   <wsp:Policy xmlns:wsp="...">  
2693     <sp:MustSupportRefKeyIdentifier ... /> ?  
2694     <sp:MustSupportRefIssuerSerial ... /> ?  
2695     <sp:MustSupportRefExternalURI ... /> ?  
2696     <sp:MustSupportRefEmbeddedToken ... /> ?  
2697     ...  
2698   </wsp:Policy>  
2699   ...  
2700 </sp:Wss10>
```

2701

2702 The following describes the attributes and elements listed in the schema outlined above:

2703 /sp:Wss10

2704 This identifies a WSS10 assertion.

2705 /sp:Wss10/wsp:Policy

2706 This indicates a policy that controls WSS: SOAP Message Security 1.0 options.

2707 /sp:Wss10/wsp:Policy/sp:MustSupportRefKeyIdentifier

2708 This OPTIONAL element is a policy assertion indicates that the [Key Identifier References]

2709 property is set to 'true'.

2710 /sp:Wss10/wsp:Policy/sp:MustSupportRefIssuerSerial

2711 This OPTIONAL element is a policy assertion indicates that the [Issuer Serial References]

2712 property is set to 'true'.

2713 /sp:Wss10/wsp:Policy/sp:MustSupportRefExternalURI

2714 This OPTIONAL element is a policy assertion indicates that the [External URI References]

2715 property is set to 'true'.

2716 /sp:Wss10/wsp:Policy/sp:MustSupportRefEmbeddedToken

2717 This OPTIONAL element is a policy assertion indicates that the [Embedded Token References]

2718 property is set to 'true'.

## 2719 9.2 Wss11 Assertion

2720 The Wss11 assertion allows you to specify which WSS: SOAP Message Security 1.1 options are

2721 supported.

### 2722 Syntax

```

2723 <sp:Wss11 xmlns:sp="..." ... >
2724   <wsp:Policy xmlns:wsp="...">
2725     <sp:MustSupportRefKeyIdentifier ... /> ?
2726     <sp:MustSupportRefIssuerSerial ... /> ?
2727     <sp:MustSupportRefExternalURI ... /> ?
2728     <sp:MustSupportRefEmbeddedToken ... /> ?
2729     <sp:MustSupportRefThumbprint ... /> ?
2730     <sp:MustSupportRefEncryptedKey ... /> ?
2731     <sp:RequireSignatureConfirmation ... /> ?
2732     ...
2733   </wsp:Policy>
2734 </sp:Wss11>

```

2735

2736 The following describes the attributes and elements listed in the schema outlined above:

2737 /sp:Wss11

2738 This identifies an WSS11 assertion.

2739 /sp:Wss11/wsp:Policy

2740 This indicates a policy that controls WSS: SOAP Message Security 1.1 options.

2741 /sp:Wss11/wsp:Policy/sp:MustSupportRefKeyIdentifier

2742 This OPTIONAL element is a policy assertion indicates that the [Key Identifier References]

2743 property is set to 'true'.

2744 /sp:Wss11/wsp:Policy/sp:MustSupportRefIssuerSerial

2745 This OPTIONAL element is a policy assertion indicates that the [Issuer Serial References]

2746 property is set to 'true'.

2747 /sp:Wss11/wsp:Policy/sp:MustSupportRefExternalURI  
2748 This OPTIONAL element is a policy assertion indicates that the [External URI References]  
2749 property is set to 'true'.

2750 /sp:Wss11/wsp:Policy/sp:MustSupportRefEmbeddedToken  
2751 This OPTIONAL element is a policy assertion indicates that the [Embedded Token References]  
2752 property is set to 'true'.

2753 /sp:Wss11/wsp:Policy/sp:MustSupportRefThumbprint  
2754 This OPTIONAL element is a policy assertion indicates that the [Thumbprint References] property  
2755 is set to 'true'.

2756 /sp:Wss11/wsp:Policy/sp:MustSupportRefEncryptedKey  
2757 This OPTIONAL element is a policy assertion indicates that the [EncryptedKey References]  
2758 property is set to 'true'.

2759 /sp:Wss11/wsp:Policy/sp:RequireSignatureConfirmation  
2760 This OPTIONAL element is a policy assertion indicates that the [Signature Confirmation] property  
2761 is set to 'true'.

---

## 2762 10 WS-Trust Options

2763 This section defines the various policy assertions related to exchanges based on WS-Trust, specifically  
2764 with client and server challenges and entropy behaviors. These assertions relate to interactions with a  
2765 Security Token Service and MAY augment the behaviors defined by the Binding Property Assertions  
2766 defined in Section 6. The assertions defined here MUST apply to [Endpoint Policy Subject].

2767

### 2768 **WS-Trust Properties**

#### 2769 **[Client Challenge]**

2770 This boolean property indicates whether client challenges are supported. A value of 'true' indicates that a  
2771 `wst:SignChallenge` element is supported inside of an RST sent by the client to the server. A value of  
2772 'false' indicates that a `wst:SignChallenge` is not supported. There is no change in the number of  
2773 messages exchanged by the client and service in satisfying the RST. This property has a default value of  
2774 'false'.

2775

#### 2776 **[Server Challenge]**

2777 This boolean property indicates whether server challenges are supported. A value of 'true' indicates that a  
2778 `wst:SignChallenge` element is supported inside of an RSTR sent by the server to the client. A value of  
2779 'false' indicates that a `wst:SignChallenge` is not supported. A challenge issued by the server MAY  
2780 increase the number of messages exchanged by the client and service in order to accommodate the  
2781 `wst:SignChallengeResponse` element sent by the client to the server in response to the  
2782 `wst:SignChallenge` element. A final RSTR containing the issued token will follow subsequent to the  
2783 server receiving the `wst:SignChallengeResponse` element. This property has a default value of 'false'.

2784

#### 2785 **[Client Entropy]**

2786 This boolean property indicates whether client entropy is REQUIRED to be used as key material for a  
2787 requested proof token. A value of 'true' indicates that client entropy is REQUIRED. A value of 'false'  
2788 indicates that client entropy is NOT REQUIRED. This property has a default value of 'false'.

2789

#### 2790 **[Server Entropy]**

2791 This boolean property indicates whether server entropy is REQUIRED to be used as key material for a  
2792 requested proof token. A value of 'true' indicates that server entropy is REQUIRED. A value of 'false'  
2793 indicates that server entropy is NOT REQUIRED. This property has a default value of 'false'.

2794 Note: If both the [Client Entropy] and [Server Entropy] properties are set to true, Client and server entropy  
2795 are combined to produce a computed key using the Computed Key algorithm defined by the [Algorithm  
2796 Suite] property.

2797

#### 2798 **[Issued Tokens]**

2799 This boolean property indicates whether the `wst:IssuedTokens` header is supported as described in  
2800 WS-Trust. A value of 'true' indicates that the `wst:IssuedTokens` header is supported. A value of 'false'  
2801 indicates that the `wst:IssuedTokens` header is not supported. This property has a default value of  
2802 'false'.

#### 2803 **[Collection]**

2804 This boolean property specifies whether a wst:RequestSecurityTokenCollection element is present. A  
2805 value of 'true' indicates that the wst:RequestSecurityTokenCollection element MUST be present and  
2806 MUST be integrity protected either by transport or message level security. A value of 'false' indicates that  
2807 the wst:RequestSecurityTokenCollection element MUST NOT be present. This property has a default  
2808 value of 'false'.

2809

### 2810 **[Scope Policy 1.5]**

2811 This boolean property indicates whether the wsp:AppliesTo element in the [WS-Policy] 1.5 namespace is  
2812 supported as described in [WS-Trust]. A value of 'true' indicates that the wsp:AppliesTo element in the  
2813 [WS-Policy] 1.5 namespace is supported. A value of 'false' indicates that the wsp:AppliesTo element in  
2814 the [WS-Policy] 1.5 namespace is not supported, the [WS-Policy] 1.2 namespace is used instead in this  
2815 case. This property has a default value of 'false'.

2816

### 2817 **[Interactive Challenge]**

2818 This boolean property indicates whether interactive challenges are supported. A value of 'true' indicates  
2819 that a wst14:InteractiveChallenge element is supported inside of an RSTR sent by the server to the client.  
2820 A value of 'false' indicates that wst14:InteractiveChallenge is not supported. A challenge issued by the  
2821 server may increase the number of messages exchanged by the client and service in order to  
2822 accommodate the wst14:InteractiveChallengeResponse element sent by the client to the server in  
2823 response to the wst14:InteractiveChallenge element. There is an optimization in which a client MAY send  
2824 the wst14:InteractiveChallengeResponse element in an initial RST to the server. A final RSTR containing  
2825 the issued token will follow subsequent to the server receiving the wst14:InteractiveChallengeResponse  
2826 element. This property has a default value of 'false'.

2827

## 2828 **10.1 Trust13 Assertion**

2829 The Trust13 assertion allows you to specify which WS-Trust 1.3 options are supported.

### 2830 **Syntax**

```
2831 <sp:Trust13 xmlns:sp="..." ... >  
2832   <wsp:Policy xmlns:wsp="...">  
2833     <sp:MustSupportClientChallenge ... />?  
2834     <sp:MustSupportServerChallenge ... />?  
2835     <sp:RequireClientEntropy ... />?  
2836     <sp:RequireServerEntropy ... />?  
2837     <sp:MustSupportIssuedTokens ... />?  
2838     <sp:RequireRequestSecurityTokenCollection />?  
2839     <sp:RequireAppliesTo />?  
2840     <sp13:ScopePolicy15 />?  
2841     <sp13:MustSupportInteractiveChallenge />?  
2842     ...  
2843   </wsp:Policy>  
2844   ...  
2845 </sp:Trust13 ... >
```

2846

2847 The following describes the attributes and elements listed in the schema outlined above:

2848 /sp:Trust13

2849       This identifies a Trust13 assertion.

2850 /sp:Trust13/wsp:Policy

2851       This indicates a policy that controls WS-Trust 1.3 options.

2852 /sp:Trust13/wsp:Policy/sp:MustSupportClientChallenge  
2853           This OPTIONAL element is a policy assertion indicates that the [Client Challenge] property is set  
2854           to 'true'.

2855 /sp:Trust13/wsp:Policy/sp:MustSupportServerChallenge  
2856           This OPTIONAL element is a policy assertion indicates that the [Server Challenge] property is set  
2857           to 'true'.

2858 /sp:Trust13/wsp:Policy/sp:RequireClientEntropy  
2859           This OPTIONAL element is a policy assertion indicates that the [Client Entropy] property is set to  
2860           'true'.

2861 /sp:Trust13/wsp:Policy/sp:RequireServerEntropy  
2862           This OPTIONAL element is a policy assertion indicates that the [Server Entropy] property is set to  
2863           'true'.

2864 /sp:Trust13/wsp:Policy/sp:MustSupportIssuedTokens  
2865           This OPTIONAL element is a policy assertion indicates that the [Issued Tokens] property is set to  
2866           'true'.

2867 /sp:Trust13/wsp:Policy/sp:RequireRequestSecurityTokenCollection  
2868           This OPTIONAL element is a policy assertion that indicates that the [Collection] property is set to  
2869           'true'.

2870 /sp:Trust13/wsp:Policy/sp:RequireAppliesTo  
2871           This OPTIONAL element is a policy assertion that indicates that the STS requires the requestor  
2872           to specify the scope for the issued token using wsp:AppliesTo in the RST.

2873 /sp:Trust13/wsp:Policy/sp13:ScopePolicy15  
2874           This OPTIONAL element is a policy assertion that indicates that the [Scope Policy 1.5]  
2875           property is set to 'true'.

2876 /sp:Trust13/wsp:Policy/sp13:MustSupportInteractiveChallenge  
2877           This optional element is a policy assertion indicates that the [Interactive Challenge]  
2878           property is set to 'true'.

---

# 2879 11 Guidance on creating new assertions and assertion 2880 extensibility

2881 This non-normative appendix provides guidance for designers of new assertions intended for use with this  
2882 specification.

## 2883 11.1 General Design Points

- 2884 • Prefer Distinct Qnames
- 2885 • Parameterize using nested policy where possible.
- 2886 • Parameterize using attributes and/or child elements where necessary.

## 2887 11.2 Detailed Design Guidance

2888 Assertions in WS-SP are XML elements that are identified by their QName. Matching of assertions per  
2889 WS-Policy is performed by matching element Qnames. Matching does not take into account attributes  
2890 that are present on the assertion element. Nor does it take into account child elements except for  
2891 `wsp:Policy` elements. If a `wsp:Policy` element is present, then matching occurs against the assertions  
2892 nested inside that `wsp:Policy` element recursively (see [Policy Assertion Nesting \[WS-Policy\]](#)).

2893  
2894 When designing new assertions for use with WS-SP, the above matching behaviour needs to be taken  
2895 into account. In general, multiple assertions with distinct Qnames are preferably to a single assertion that  
2896 uses attributes and/or content to distinguish different cases. For example, given two possible assertion  
2897 designs;

```
2898  
2899 Design 1  
2900  
2901 <A1/>  
2902 <A2/>  
2903 <A3/>  
2904  
2905 Design 2.  
2906  
2907 <A Parameter='1' />  
2908 <A Parameter='2' />  
2909 <A Parameter='3' />  
2910
```

2911 then design 1. Would generally be preferred because it allows the policy matching logic to provide more  
2912 accurate matches between policies.

2913  
2914 A good example of design 1 is the token assertions defined in Section 5. The section defines 10 distinct  
2915 token assertions, rather than a single `sp:Token` assertion with, for example, a `TokenType` attribute. These  
2916 distinct token assertions make policy matching much more useful as less false positives are generated  
2917 when performing policy matching.

2918  
2919 There are cases where using attributes or child elements as parameters in assertion design is  
2920 reasonable. Examples include cases when implementations are expected to understand all the values for  
2921 a given parameter and when encoding the parameter information into the assertion QName would result  
2922 in an unmanageable number of assertions. A good example is the `sp:IncludeToken` attribute that appears



2923 on the various token assertions. Five possible values are currently specified for the sp:IncludeToken  
2924 attribute and implementations are expected to understand the meaning of all 5 values. If this information  
2925 was encoded into the assertion Qnames, each existing token assertion would require five variants, one  
2926 for each Uri value which would result in 45 assertions just for the tokens defined in Section 5.

2927

2928 Nested policy is ideal for encoding parameters that can be usefully matched using policy matching. For  
2929 example, the token version assertions defined in Section 5 use such an approach. The overall token type  
2930 assertion is parameterized by the nested token version assertions. Policy matching can use these  
2931 parameters to find matches between policies where the broad token type is support by both parties but  
2932 they might not support the same specific versions.

2933

2934 Note, when designing assertions for new token types such assertions SHOULD allow the  
2935 sp:IncludeToken attribute and SHOULD allow nested policy.

2936

---

## 2937 12 Security Considerations

- 2938 It is strongly recommended that policies and assertions be signed to prevent tampering.
- 2939 It is recommended that policies should not be accepted unless they are signed and have an associated  
2940 security token to specify the signer has proper claims for the given policy. That is, a party shouldn't rely  
2941 on a policy unless the policy is signed and presented with sufficient claims. It is further recommended that  
2942 the entire policy exchange mechanism be protected to prevent man-in-the-middle downgrade attacks.
- 2943
- 2944 It should be noted that the mechanisms described in this document could be secured as part of a SOAP  
2945 message using WSS: SOAP Message Security [[WSS10](#), [WSS11](#)] or embedded within other objects using  
2946 object-specific security mechanisms.
- 2947
- 2948 It is recommended that policies not specify two (or more) SignedSupportingTokens or  
2949 SignedEndorsingSupportingTokens of the same token type. Messages conforming to such policies are  
2950 subject to modification which may be undetectable.
- 2951
- 2952 It is recommended that policies specify the OnlySignEntireHeadersAndBody assertion along with the rest  
2953 of the policy in order to combat certain XML substitution attacks.
- 2954

---

2955

## 13 Conformance

2956 An implementation conforms to this specification if it satisfies all of the MUST or REQUIRED level  
2957 requirements defined within this specification. A SOAP Node MUST NOT use the XML namespace  
2958 identifier for this specification (listed in Section 1.2) within SOAP Envelopes unless it is compliant with this  
2959 specification.

2960

2961 This specification references a number of other specifications (see the table above). In order to comply  
2962 with this specification, an implementation MUST implement the portions of referenced specifications  
2963 necessary to comply with the required provisions of this specification. Additionally, the implementation of  
2964 the portions of the referenced specifications that are specifically cited in this specification MUST comply  
2965 with the rules for those portions as established in the referenced specification.

2966 Additionally normative text within this specification takes precedence over normative outlines (as  
2967 described in section 1.4.1), which in turn take precedence over the XML Schema [XML Schema Part 1,  
2968 Part 2] and WSDL [WSDL 1.1] descriptions. That is, the normative text in this specification further  
2969 constrains the schemas and/or WSDL that are part of this specification; and this specification contains  
2970 further constraints on the elements defined in referenced schemas.

2971 This specification defines a number of extensions; compliant services are NOT REQUIRED to implement  
2972 OPTIONAL features defined in this specification. However, if a service implements an aspect of the  
2973 specification, it MUST comply with the requirements specified (e.g. related "MUST" statements). If an  
2974 OPTIONAL message is not supported, then the implementation SHOULD Fault just as it would for any  
2975 other unrecognized/unsupported message. If an OPTIONAL message is supported, then the  
2976 implementation MUST satisfy all of the MUST and REQUIRED sections of the message.

2977

---

## 2978 **A. Assertions and WS-PolicyAttachment**

2979 This non-normative appendix classifies assertions according to their suggested scope in WSDL 1.1 per  
2980 Section 4 of [WS-PolicyAttachment]. See Figure 1 in Section 4.1 of [WS-PolicyAttachment] for a graphical  
2981 representation of the relationship between policy scope and WSDL. Unless otherwise noted above, any  
2982 assertion that is listed under multiple [Policy Subjects] below MUST only apply to only one [Policy  
2983 Subject] in a WSDL 1.1 hierarchy for calculating an Effective Policy.

### 2984 **A.1 Endpoint Policy Subject Assertions**

#### 2985 **A.1.1 Security Binding Assertions**

2986 [TransportBinding Assertion](#) (Section 7.3)  
2987 [SymmetricBinding Assertion](#) (Section 7.4)  
2988 [AsymmetricBinding Assertion](#) (Section 7.5)

#### 2989 **A.1.2 Token Assertions**

2990 [SupportingTokens Assertion](#) (Section 8.1)  
2991 [SignedSupportingTokens Assertion](#) (Section 8.2)  
2992 [EndorsingSupportingTokens Assertion](#) (Section 8.3)  
2993 [SignedEndorsingSupportingTokens Assertion](#) (Section 8.4)  
2994 [SignedEncryptedSupportingTokens Assertion](#) (Section 8.5)  
2995 [EndorsingEncryptedSupportingTokens Assertion](#) (Section 8.6)  
2996 [SignedEndorsingEncryptedSupportingTokens Assertion](#) (Section 8.7)

#### 2997 **A.1.3 WSS: SOAP Message Security 1.0 Assertions**

2998 [Wss10 Assertion](#) (Section 9.1)

#### 2999 **A.1.4 WSS: SOAP Message Security 1.1 Assertions**

3000 [Wss11 Assertion](#) (Section 9.2)

#### 3001 **A.1.5 Trust 1.0 Assertions**

3002 [Trust13 Assertion](#) (Section 10.1)

### 3003 **A.2 Operation Policy Subject Assertions**

#### 3004 **A.2.1 Security Binding Assertions**

3005 [SymmetricBinding Assertion](#) (Section 7.4)  
3006 [AsymmetricBinding Assertion](#) (Section 7.5)

#### 3007 **A.2.2 Supporting Token Assertions**

3008 [SupportingTokens Assertion](#) (Section 8.1)  
3009 [SignedSupportingTokens Assertion](#) (Section 8.2)

3010	<a href="#">EndorsingSupportingTokens Assertion</a>	(Section 8.3)
3011	<a href="#">SignedEndorsingSupportingTokens Assertion</a>	(Section 8.4)
3012	<a href="#">SignedEncryptedSupportingTokens Assertion</a>	(Section 8.5)
3013	<a href="#">EndorsingEncryptedSupportingTokens Assertion</a>	(Section 8.6)
3014	<a href="#">SignedEndorsingEncryptedSupportingTokens Assertion</a>	(Section 8.7)

## 3015 **A.3 Message Policy Subject Assertions**

### 3016 **A.3.1 Supporting Token Assertions**

3017	<a href="#">SupportingTokens Assertion</a>	(Section 8.1)
3018	<a href="#">SignedSupportingTokens Assertion</a>	(Section 8.2)
3019	<a href="#">EndorsingSupportingTokens Assertion</a>	(Section 8.3)
3020	<a href="#">SignedEndorsingSupportingTokens Assertion</a>	(Section 8.4)
3021	<a href="#">SignedEncryptedSupportingTokens Assertion</a>	(Section 8.5)
3022	<a href="#">EndorsingEncryptedSupportingTokens Assertion</a>	(Section 8.6)
3023	<a href="#">SignedEndorsingEncryptedSupportingTokens Assertion</a>	(Section 8.7)

### 3024 **A.3.2 Protection Assertions**

3025	<a href="#">SignedParts Assertion</a>	(Section 4.1.1)
3026	<a href="#">SignedElements Assertion</a>	(Section 4.1.2)
3027	<a href="#">EncryptedParts Assertion</a>	(Section 4.2.1)
3028	<a href="#">EncryptedElements Assertion</a>	(Section 4.2.2)
3029	<a href="#">ContentEncryptedElements Assertion</a>	(Section 4.2.3)
3030	<a href="#">RequiredElements Assertion</a>	(Section 4.3.1)
3031	<a href="#">RequiredParts Assertion</a>	(Section 4.3.2)

## 3032 **A.4 Assertions With Undefined Policy Subject**

3033 The assertions listed in this section do not have a defined policy subject because they appear nested  
 3034 inside some other assertion which does have a defined policy subject. This list is derived from nested  
 3035 assertions in the specification that have independent sections. It is not a complete list of nested  
 3036 assertions. Many of the assertions previously listed in this appendix as well as the ones below have  
 3037 additional nested assertions.

### 3038 **A.4.1 General Assertions**

3039	<a href="#">AlgorithmSuite Assertion</a>	(Section 7.1)
3040	<a href="#">Layout Assertion</a>	(Section 7.2)

### 3041 **A.4.2 Token Usage Assertions**

3042 See the nested assertions under the [TransportBinding](#), [SymmetricBinding](#) and [AssymetricBinding](#)  
 3043 assertions.

### 3044 **A.4.3 Token Assertions**

3045	<a href="#">UsernameToken Assertion</a>	(Section 5.3.1)
------	---	-----------------

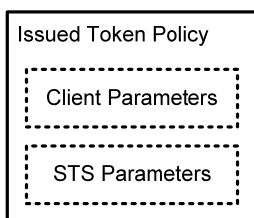
3046	<a href="#">IssuedToken Assertion</a>	(Section 5.3.2)
3047	<a href="#">X509Token Assertion</a>	(Section 5.3.3)
3048	<a href="#">KerberosToken Assertion</a>	(Section 5.3.4)
3049	<a href="#">SpnegoContextToken Assertion</a>	(Section 5.3.5)
3050	<a href="#">SecurityContextToken Assertion</a>	(Section 5.3.6)
3051	<a href="#">SecureConversationToken Assertion</a>	(Section 5.3.7)
3052	<a href="#">SamlToken Assertion</a>	(Section 5.3.8)
3053	<a href="#">RelToken Assertion</a>	(Section 5.3.9)
3054	<a href="#">HttpsToken Assertion</a>	(Section 5.3.10)

## 3055 B. Issued Token Policy

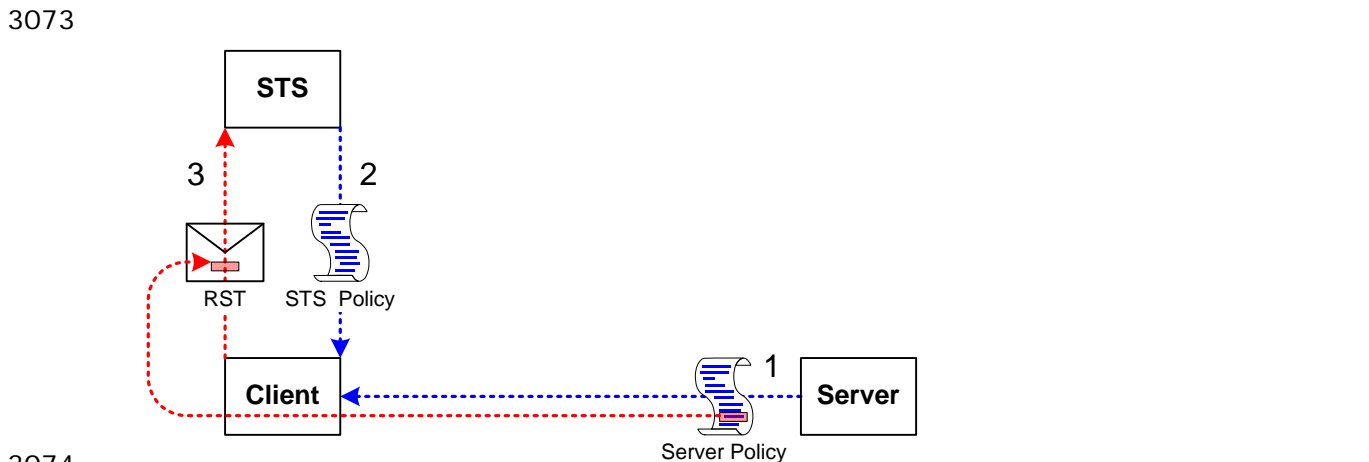
3056 The section provides further detail about behavior associated with the IssuedToken assertion in section  
3057 5.3.2.

3058  
3059 The issued token security model involves a three-party setup. There's a target Server, a Client, and a  
3060 trusted third party called a Security Token Service or STS. Policy flows from Server to Client, and from  
3061 STS to Client. Policy MAY be embedded inside an Issued Token assertion, or acquired out-of-band.  
3062 There MAY be an explicit trust relationship between the Server and the STS. There MUST be a trust  
3063 relationship between the Client and the STS.

3064  
3065 The Issued Token policy assertion includes two parts: 1) client-specific parameters that MUST be  
3066 understood and processed by the client and 2) STS specific parameters which are to be processed by the  
3067 STS. The format of the Issued Token policy assertion is illustrated in the figure below.



3068  
3069 The client-specific parameters of the Issued Token policy assertion along with the remainder of the server  
3070 policy are consumed by the client. The STS specific parameters of the Issued Token policy assertion are  
3071 passed on to the STS by copying the parameters directly into the `wst:SecondaryParameters` of the  
3072 RST request sent by the Client to the STS as illustrated in the figure below.



3074  
3075 Before the Client sends the RST to the STS, it will need to obtain the policy for the STS. This will help to  
3076 formulate the RST request and will include any security-specific requirements of the STS.

3077  
3078 The Client MAY augment or replace the contents of the RST made to the STS based on the Client-  
3079 specific parameters received from the Issued Token policy assertion contained in the Server policy, from  
3080 policy it received for the STS, or any other local parameters.

3082 The Issued Token Policy Assertion contains elements which MUST be understood by the Client. The  
3083 assertion contains one element which contains a list of arbitrary elements which SHOULD be sent along  
3084 to the STS by copying the elements as-is directly into the `wst:SecondaryParameters` of the RST  
3085 request sent by the Client to the STS following the protocol defined in WS-Trust.

3086  
3087 Elements inside the `sp:RequestSecurityTokenTemplate` element MUST conform to WS-Trust [[WS-](#)  
3088 [Trust](#)]. All items are OPTIONAL, since the Server and STS may already have a pre-arranged relationship  
3089 which specifies some or all of the conditions and constraints for issued tokens.



---

## 3090 C. Strict Security Header Layout Examples

3091 The following sections describe the security header layout for specific bindings when applying the 'Strict'  
3092 layout rules defined in Section 6.7.

### 3093 C.1 Transport Binding

3094 This section describes how the 'Strict' security header layout rules apply to the Transport Binding.

#### 3095 C.1.1 Policy

3096 The following example shows a policy indicating a Transport Binding, an Https Token as the Transport  
3097 Token, an algorithm suite, a requirement to include tokens in the supporting signatures, a username  
3098 token attached to the message, and finally an X509 token attached to the message and endorsing the  
3099 message signature. No message protection requirements are described since the transport covers all  
3100 message parts.

```
3101 <wsp:Policy xmlns:wsp="..." xmlns:sp="...">  
3102   <sp:TransportBinding>  
3103     <wsp:Policy>  
3104       <sp:TransportToken>  
3105         <wsp:Policy>  
3106           <sp:HttpsToken />  
3107         </wsp:Policy>  
3108       </sp:TransportToken>  
3109       <sp:AlgorithmSuite>  
3110         <wsp:Policy>  
3111           <sp:Basic256 />  
3112         </wsp:Policy>  
3113       </sp:AlgorithmSuite>  
3114       <sp:Layout>  
3115         <wsp:Policy>  
3116           <sp:Strict />  
3117         </wsp:Policy>  
3118       </sp:Layout>  
3119       <sp:IncludeTimestamp />  
3120     </wsp:Policy>  
3121   </sp:TransportBinding>  
3122   <sp:SignedSupportingTokens>  
3123     <wsp:Policy>  
3124       <sp:UsernameToken sp:IncludeToken=".../IncludeToken/Once" />  
3125     </wsp:Policy>  
3126   </sp:SignedSupportingTokens>  
3127   <sp:SignedEndorsingSupportingTokens>  
3128     <wsp:Policy>  
3129       <sp:X509Token sp:IncludeToken=".../IncludeToken/Once">  
3130         <wsp:Policy>  
3131           <sp:WssX509v3Token10 />  
3132         </wsp:Policy>  
3133       </sp:X509Token>  
3134     </wsp:Policy>  
3135   </sp:SignedEndorsingSupportingTokens>  
3136   <sp:Wss11>  
3137     <sp:RequireSignatureConfirmation />  
3138   </sp:Wss11>  
3139 </wsp:Policy>
```

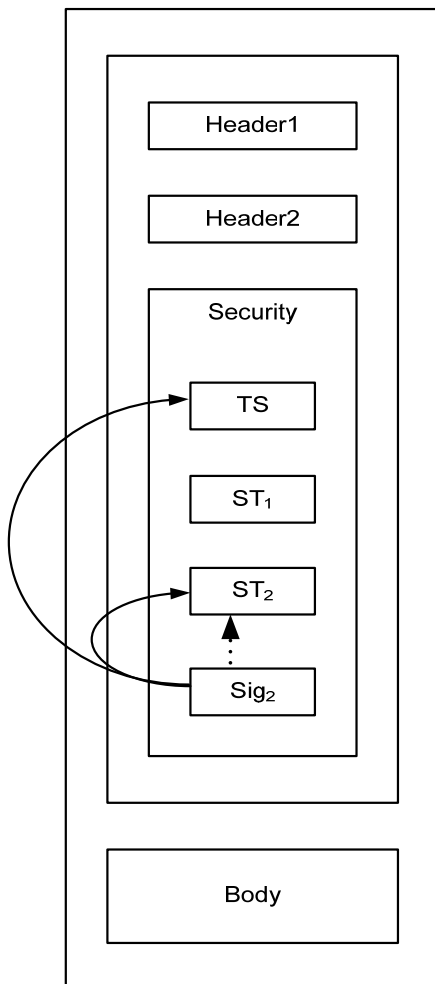
3140 This policy is used as the basis for the examples shown in the subsequent section describing the security  
3141 header layout for this binding.

3142 **C.1.2 Initiator to Recipient Messages**

3143 Messages sent from initiator to recipient have the following layout for the security header:

- 3144 1. A `wsu:Timestamp` element.
- 3145 2. Any tokens contained in the [Signed Supporting Tokens] property.
- 3146 3. Any tokens contained in the [Signed Endorsing Supporting Tokens] property each followed by the  
3147 corresponding signature. Each signature **MUST** cover the `wsu:Timestamp` element from 1  
3148 above and **SHOULD** cover any other unique identifier for the message in order to prevent  
3149 replays. If [Token Protection] is 'true', the signature **MUST** also cover the supporting token. If  
3150 [Derived Keys] is 'true' and the supporting token is associated with a symmetric key, then a  
3151 Derived Key Token, based on the supporting token, appears between the supporting token and  
3152 the signature.
- 3153 4. Any signatures for tokens contained in the [Endorsing Supporting Tokens] property. Each  
3154 signature **MUST** cover the `wsu:Timestamp` element from 1 above and **SHOULD** cover at least  
3155 some other unique identifier for the message in order to prevent replays. If [Token Protection] is  
3156 'true', the signature **MUST** also cover the supporting token. If [Derived Keys] is 'true' and the  
3157 supporting token is associated with a symmetric key, then a Derived Key Token, based on the  
3158 supporting token, appears before the signature.

3159 The following diagram illustrates the security header layout for the initiator to recipient message:



3160

3161 The outer box shows that the entire message is protected (signed and encrypted) by the transport. The  
3162 arrows on the left from the box labeled Sig<sub>2</sub> indicate the parts signed by the supporting token labeled ST<sub>2</sub>,  
3163 namely the message timestamp labeled TS and the token used as the basis for the signature labeled ST<sub>2</sub>.  
3164 The dotted arrow indicates the token that was used as the basis for the signature. In general, the ordering  
3165 of the items in the security header follows the most optimal layout for a receiver to process its contents.

3166 *Example:*

3167 Initiator to recipient message

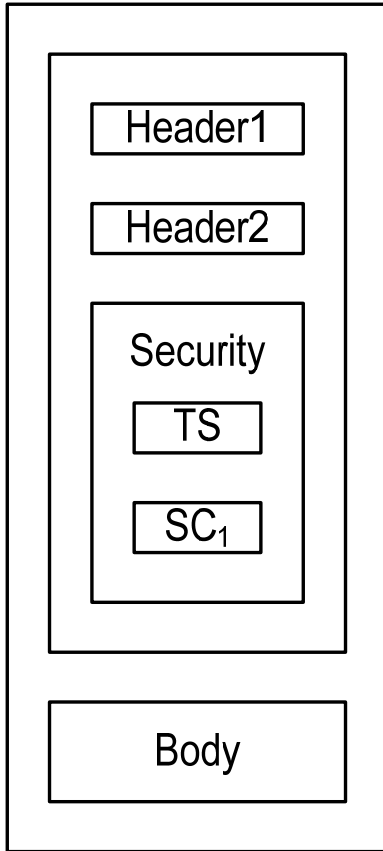
```
3168 <S:Envelope xmlns:S="..." xmlns:wsse="..." xmlns:wsu="..." xmlns:ds="...">  
3169   <S:Header>  
3170     ...  
3171     <wsse:Security>  
3172       <wsu:Timestamp wsu:Id="timestamp">  
3173         <wsu:Created>[datetime]</wsu:Created>  
3174         <wsu:Expires>[datetime]</wsu:Expires>  
3175       </wsu:Timestamp>  
3176       <wsse:UsernameToken wsu:Id='SomeSignedToken' >  
3177         ...  
3178       </wsse:UsernameToken>  
3179       <wsse:BinarySecurityToken wsu:Id="SomeSignedEndorsingToken" >  
3180         ...  
3181       </wsse:BinarySecurityToken>  
3182       <ds:Signature>  
3183         <ds:SignedInfo>  
3184           <ds:References>  
3185             <ds:Reference URI="#timestamp" />  
3186             <ds:Reference URI="#SomeSignedEndorsingToken" />  
3187           </ds:References>  
3188         </ds:SignedInfo>  
3189         <ds:SignatureValue>...</ds:SignatureValue>  
3190         <ds:KeyInfo>  
3191           <wsse:SecurityTokenReference>  
3192             <wsse:Reference URI="#SomeSignedEndorsingToken" />  
3193           </wsse:SecurityTokenReference>  
3194         </ds:KeyInfo>  
3195       </ds:Signature>  
3196     ...  
3197   </wsse:Security>  
3198   ...  
3199 </S:Header>  
3200 <S:Body>  
3201   ...  
3202 </S:Body>  
3203 </S:Envelope>
```

### 3204 C.1.3 Recipient to Initiator Messages

3205 Messages sent from recipient to initiator have the following layout for the security header:

- 3206 1. A `wsu:Timestamp` element.
- 3207 2. If the [Signature Confirmation] property has a value of 'true', then a  
3208 `wsse11:SignatureConfirmation` element for each signature in the corresponding message  
3209 sent from initiator to recipient. If there are no signatures in the corresponding message from the  
3210 initiator to the recipient, then a `wsse11:SignatureConfirmation` element with no `Value`  
3211 attribute.

3212 The following diagram illustrates the security header layout for the recipient to initiator message:



3213

3214 The outer box shows that the entire message is protected (signed and encrypted) by the transport. One  
 3215 `wsse11:SignatureConfirmation` element labeled `SC1` corresponding to the signature in the initial  
 3216 message illustrated previously is included. In general, the ordering of the items in the security header  
 3217 follows the most optimal layout for a receiver to process its contents.

3218 *Example:*

3219 Recipient to initiator message

```

3220 <S:Envelope xmlns:S="..." xmlns:wsse="..." xmlns:wsu="..." xmlns:wsse11="...">
3221   <S:Header>
3222     ...
3223     <wsse:Security>
3224       <wsu:Timestamp wsu:Id="timestamp">
3225         <wsu:Created>[datetime]</wsu:Created>
3226         <wsu:Expires>[datetime]</wsu:Expires>
3227       </wsu:Timestamp>
3228       <wsse11:SignatureConfirmation Value="..." />
3229     ...
3230   </wsse:Security>
3231   ...
3232 </S:Header>
3233 <S:Body>
3234   ...
3235 </S:Body>
3236 </S:Envelope>
  
```

## 3237 C.2 Symmetric Binding

3238 This section describes how the 'Strict' security header layout rules apply to the Symmetric Binding.

## 3239 C.2.1 Policy

3240 The following example shows a policy indicating a Symmetric Binding, a symmetric key based  
3241 IssuedToken provided as the Protection Token, an algorithm suite, a requirement to encrypt the message  
3242 parts before signing, a requirement to encrypt the message signature, a requirement to include tokens in  
3243 the message signature and the supporting signatures, a username token attached to the message, and  
3244 finally an X509 token attached to the message and endorsing the message signature. Minimum message  
3245 protection requirements are described as well.

```
3246 <!-- Example Endpoint Policy -->
3247 <wsp:Policy xmlns:wsp="..." xmlns:sp="...">
3248   <sp:SymmetricBinding>
3249     <wsp:Policy>
3250       <sp:ProtectionToken>
3251         <sp:IssuedToken sp:IncludeToken=".../IncludeToken/Once" >
3252           <sp:Issuer>...</sp:Issuer>
3253           <sp:RequestSecurityTokenTemplate>
3254             ...
3255           </sp:RequestSecurityTokenTemplate>
3256         </sp:IssuedToken>
3257       </sp:ProtectionToken>
3258       <sp:AlgorithmSuite>
3259         <wsp:Policy>
3260           <sp:Basic256 />
3261         </wsp:Policy>
3262       </sp:AlgorithmSuite>
3263       <sp:Layout>
3264         <wsp:Policy>
3265           <sp:Strict />
3266         </wsp:Policy>
3267       </sp:Layout>
3268       <sp:IncludeTimestamp />
3269       <sp:EncryptBeforeSigning />
3270       <sp:EncryptSignature />
3271       <sp:ProtectTokens />
3272     </wsp:Policy>
3273   </sp:SymmetricBinding>
3274   <sp:SignedSupportingTokens>
3275     <wsp:Policy>
3276       <sp:UsernameToken sp:IncludeToken=".../IncludeToken/Once" />
3277     </wsp:Policy>
3278   </sp:SignedSupportingTokens>
3279   <sp:SignedEndorsingSupportingTokens>
3280     <wsp:Policy>
3281       <sp:X509Token sp:IncludeToken=".../IncludeToken/Once">
3282         <wsp:Policy>
3283           <sp:WssX509v3Token10 />
3284         </wsp:Policy>
3285       </sp:X509Token>
3286     </wsp:Policy>
3287   </sp:SignedEndorsingSupportingTokens>
3288   <sp:Wss11>
3289     <wsp:Policy>
3290       <sp:RequireSignatureConfirmation />
3291     </wsp:Policy>
3292   </sp:Wss11>
3293 </wsp:Policy>
3294
```

```

3295
3296 <!-- Example Message Policy -->
3297 <wsp:Policy xmlns:wsp="..." xmlns:sp="...">
3298   <sp:SignedParts>
3299     <sp:Header Name="Header1" Namespace="..." />
3300     <sp:Header Name="Header2" Namespace="..." />
3301     <sp:Body/>
3302   </sp:SignedParts>
3303   <sp:EncryptedParts>
3304     <sp:Header Name="Header2" Namespace="..." />
3305     <sp:Body/>
3306   </sp:EncryptedParts>
3307 </wsp:Policy>

```

3308 This policy is used as the basis for the examples shown in the subsequent section describing the security  
3309 header layout for this binding.

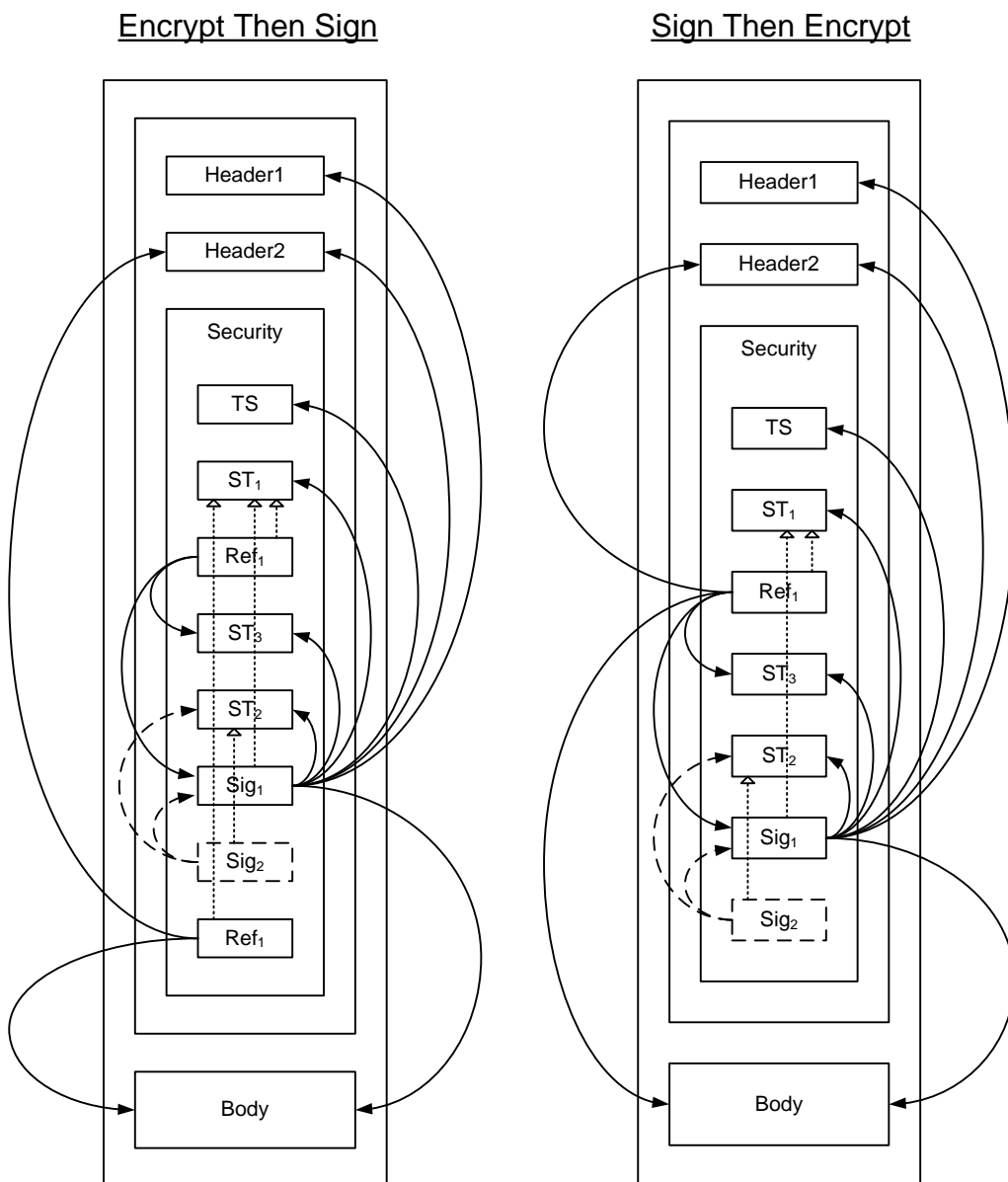
## 3310 C.2.2 Initiator to Recipient Messages

3311 Messages sent from initiator to recipient have the following layout for the security header:

- 3312 1. A `wsu:Timestamp` element if [Timestamp] is 'true'.
- 3313 2. If the `sp:IncludeToken` attribute on the [Encryption Token] is `.../IncludeToken/Once` or  
3314 `.../IncludeToken/Always`, then the [Encryption Token].
- 3315 3. If [Derived Keys] is 'true', then a Derived Key Token, based on the [Encryption Token]. This  
3316 Derived Key Token is used for encryption.
- 3317 4. A reference list including references to encrypted items. If [Signature Protection] is 'true', then the  
3318 reference list MUST include a reference to the message signature. If [Protection Order] is  
3319 'SignBeforeEncrypting', then the reference list MUST include a reference to all the message parts  
3320 specified in the EncryptedParts assertions in the policy. If [Derived Keys] is 'true', then the key in  
3321 the token from 3 above MUST be used, otherwise the key in the [Encryption Token].
- 3322 5. Any tokens from the [Signed Supporting Tokens] and [Signed Endorsing Supporting Tokens]  
3323 properties whose `sp:IncludeToken` attribute is `.../IncludeToken/Once` or  
3324 `.../IncludeToken/Always`.
- 3325 6. If the [Signature Token] is not the same as the [Encryption Token], and the `sp:IncludeToken`  
3326 attribute on the [Signature Token] is `.../IncludeToken/Once` or `.../IncludeToken/Always`, then the  
3327 [Signature Token].
- 3328 7. If [Derived Keys] is 'true', then a Derived Key Token based on the [Signature Token]. This  
3329 Derived Key Token is used for signature.
- 3330 8. A signature over the `wsu:Timestamp` from 1 above, any tokens from 5 above regardless of  
3331 whether they are included in the message, and any message parts specified in SignedParts  
3332 assertions in the policy. If [Token Protection] is 'true', the signature MUST cover the [Signature  
3333 Token] regardless of whether it is included in the message. If [Derived Keys] is 'true', the key in  
3334 the token from 7 above MUST be used, otherwise the key in the [Signature Token] from 6 above.
- 3335 9. Signatures covering the main signature from 8 above for any tokens from the [Endorsing  
3336 Supporting Tokens] and [Signed Endorsing Supporting Tokens] properties. If [Token Protection]  
3337 is 'true', the signature MUST also cover the endorsing token. If [Derived Keys] is 'true' and the  
3338 endorsing token is associated with a symmetric key, then a Derived Key Token, based on the  
3339 endorsing token, appears before the signature.
- 3340 10. If [Protection Order] is 'EncryptBeforeSigning', then a reference list referencing all the message  
3341 parts specified in EncryptedParts assertions in the policy. If [Derived Keys] is 'true', then the key  
3342 in the token from 3 above MUST be used, otherwise the key in the [Encryption Token] from 2  
3343 above.

3344

3345 The following diagram illustrates the security header layout for the initiator to recipient message:



3346

3347 The arrows on the right indicate parts that were signed as part of the message signature labeled Sig<sub>1</sub>.  
3348 The dashed arrows on the left from the box labeled Sig<sub>2</sub> indicate the parts signed by the supporting token  
3349 labeled ST<sub>2</sub>, namely the message signature labeled Sig<sub>1</sub> and the token used as the basis for the  
3350 signature labeled ST<sub>2</sub>. The arrows on the left from boxes labeled Ref<sub>1</sub> indicate references to parts  
3351 encrypted using a key based on the Shared Secret Token labeled ST<sub>1</sub>. The dotted arrows inside the box  
3352 labeled Security indicate the token that was used as the basis for each cryptographic operation. In  
3353 general, the ordering of the items in the security header follows the most optimal layout for a receiver to  
3354 process its contents.

3355 *Example:*

3356 Initiator to recipient message using EncryptBeforeSigning:

```
3357 <S:Envelope xmlns:S="..." xmlns:x="..." xmlns:wsu="..."
3358   xmlns:wssell="..." xmlns:wsse="..." xmlns:saml="..."
3359   xmlns:xenc="..." xmlns:ds="...">
3360   <S:Header>
3361     <x:Header1 wsu:Id="Header1" >
3362       ...
3363     </x:Header1>
3364
```



```

3365 <wsse1:EncryptedHeader wsu:Id="enc_Header2">
3366   <!-- Plaintext Header2
3367   <x:Header2 wsu:Id="Header2" >
3368     ...
3369   </x:Header2>
3370   -->
3371   ...
3372 </wsse1:EncryptedHeader>
3373 ...
3374 <wsse:Security>
3375   <wsu:Timestamp wsu:Id="Timestamp">
3376     <wsu:Created>...</wsu:Created>
3377     <wsu:Expires>...</wsu:Expires>
3378   </wsu:Timestamp>
3379   <saml:Assertion AssertionId="_SharedSecretToken" ...>
3380     ...
3381   </saml:Assertion>
3382   <xenc:ReferenceList>
3383     <xenc:DataReference URI="#enc_Signature" />
3384     <xenc:DataReference URI="#enc_SomeUsernameToken" />
3385     ...
3386   </xenc:ReferenceList>
3387   <xenc:EncryptedData ID="enc_SomeUsernameToken" >
3388     <!-- Plaintext UsernameToken
3389     <wsse:UsernameToken wsu:Id="SomeUsernameToken" >
3390       ...
3391     </wsse:UsernameToken>
3392     -->
3393     ...
3394     <ds:KeyInfo>
3395       <wsse:SecurityTokenReference>
3396         <wsse:Reference URI="#_SharedSecretToken" />
3397       </wsse:SecurityTokenReference>
3398     </ds:KeyInfo>
3399   </xenc:EncryptedData>
3400   <wsse:BinarySecurityToken wsu:Id="SomeSupportingToken" >
3401     ...
3402   </wsse:BinarySecurityToken>
3403   <xenc:EncryptedData ID="enc_Signature">
3404     <!-- Plaintext Signature
3405     <ds:Signature Id="Signature">
3406       <ds:SignedInfo>
3407         <ds:References>
3408           <ds:Reference URI="#Timestamp" >...</ds:Reference>
3409           <ds:Reference URI="#SomeUsernameToken" >...</ds:Reference>
3410           <ds:Reference URI="#SomeSupportingToken" >...</ds:Reference>
3411           <ds:Reference URI="#_SharedSecretToken" >...</ds:Reference>
3412           <ds:Reference URI="#Header1" >...</ds:Reference>
3413           <ds:Reference URI="#Header2" >...</ds:Reference>
3414           <ds:Reference URI="#Body" >...</ds:Reference>
3415         </ds:References>
3416       </ds:SignedInfo>
3417     <ds:SignatureValue>...</ds:SignatureValue>
3418     <ds:KeyInfo>
3419       <wsse:SecurityTokenReference>
3420         <wsse:Reference URI="#_SharedSecretToken" />
3421       </wsse:SecurityTokenReference>
3422     </ds:KeyInfo>
3423   </ds:Signature>
3424   -->
3425   ...
3426   <ds:KeyInfo>
3427     <wsse:SecurityTokenReference>
3428     <wsse:Reference URI="#_SharedSecretToken" />

```

```

3429     </wsse:SecurityTokenReference>
3430     </ds:KeyInfo>
3431 </xenc:EncryptedData>
3432 <ds:Signature>
3433   <ds:SignedInfo>
3434     <ds:References>
3435       <ds:Reference URI="#Signature" >...</ds:Reference>
3436       <ds:Reference URI="#SomeSupportingToken" >...</ds:Reference>
3437     </ds:References>
3438   </ds:SignedInfo>
3439 <ds:SignatureValue>...</ds:SignatureValue>
3440 <ds:KeyInfo>
3441   <wsse:SecurityTokenReference>
3442     <wsse:Reference URI="#SomeSupportingToken" />
3443   </wsse:SecurityTokenReference>
3444 </ds:KeyInfo>
3445 </ds:Signature>
3446 <xenc:ReferenceList>
3447   <xenc:DataReference URI="#enc_Body" />
3448   <xenc:DataReference URI="#enc_Header2" />
3449   ...
3450 </xenc:ReferenceList>
3451 </wsse:Security>
3452 </S:Header>
3453 <S:Body wsu:Id="Body">
3454   <xenc:EncryptedData Id="enc_Body">
3455     ...
3456   <ds:KeyInfo>
3457     <wsse:SecurityTokenReference>
3458       <wsse:Reference URI="#_SharedSecretToken" />
3459     </wsse:SecurityTokenReference>
3460   </ds:KeyInfo>
3461 </xenc:EncryptedData>
3462 </S:Body>
3463 </S:Envelope>

```

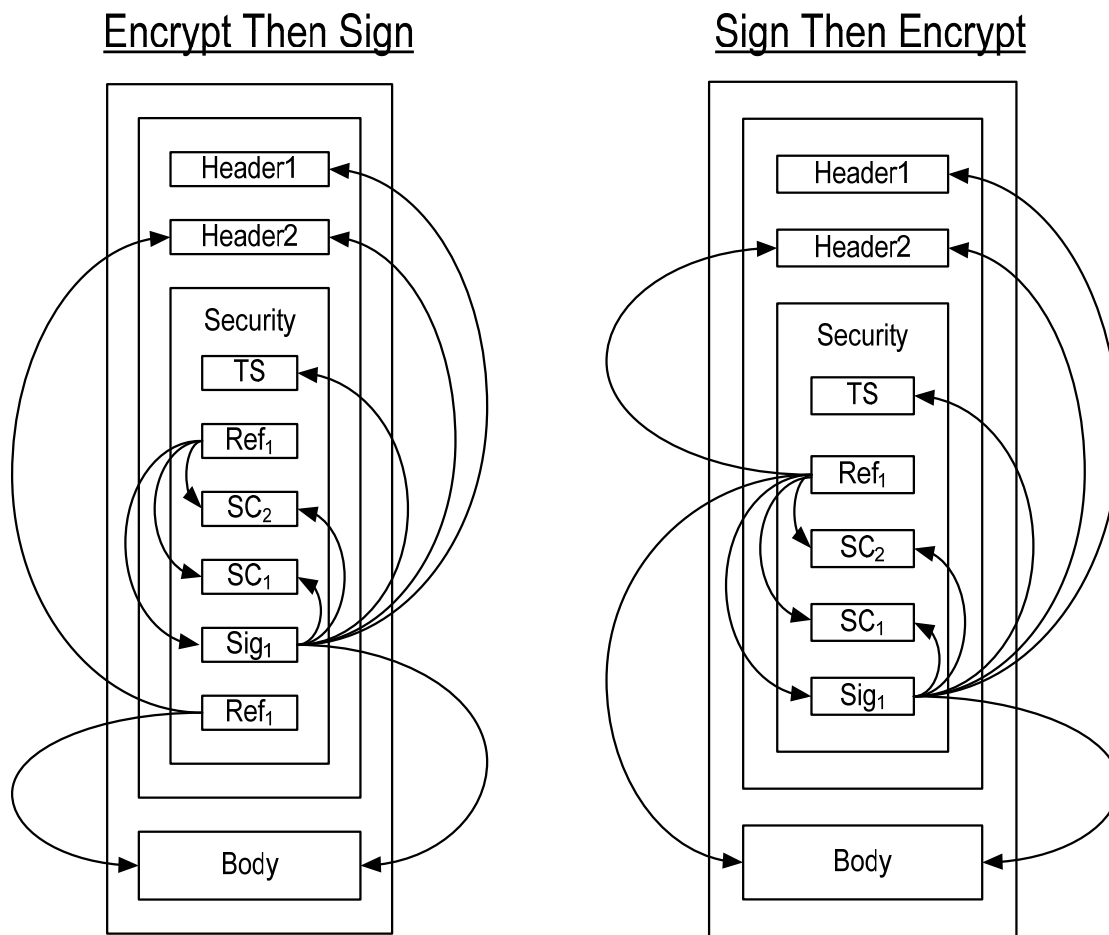
### 3464 C.2.3 Recipient to Initiator Messages

3465 Messages send from recipient to initiator have the following layout for the security header:

- 3466 1. A `wsu:Timestamp` element if [Timestamp] is 'true'.
- 3467 2. If the `sp:IncludeToken` attribute on the [Encryption Token] is `.../IncludeToken/Always`, then the  
3468 [Encryption Token].
- 3469 3. If [Derived Keys] is 'true', then a Derived Key Token, based on the [Encryption Token]. This  
3470 Derived Key Token is used for encryption.
- 3471 4. A reference list including references to encrypted items. If [Signature Protection] is 'true', then the  
3472 reference list MUST include a reference to the message signature from 6 below, and the  
3473 `wsse11:SignatureConfirmation` elements from 5 below if any. If [Protection Order] is  
3474 'SignBeforeEncrypting', then the reference list MUST include a reference to all the message parts  
3475 specified in the EncryptedParts assertions in the policy. If [Derived Keys] is 'true', then the key in  
3476 the token from 2 above MUST be used, otherwise the key in the [Encryption Token] from 2  
3477 above.
- 3478 5. If [Signature Confirmation] is 'true' then a `wsse11:SignatureConfirmation` element for each  
3479 signature in the corresponding message sent from initiator to recipient. If there are no signatures  
3480 in the corresponding message from the initiator to the recipient, then a  
3481 `wsse11:SignatureConfirmation` element with no Value attribute.
- 3482 6. If the [Signature Token] is not the same as the [Encryption Token], and the `sp:IncludeToken`  
3483 attribute on the [Signature Token] is `.../IncludeToken/Always`, then the [Signature Token].

- 3484 7. If [Derived Keys] is 'true', then a Derived Key Token, based on the [Signature Token]. This  
 3485 Derived Key Token is used for signature.
- 3486 8. A signature over the wsu:Timestamp from 1 above, any wssell:SignatureConfirmation  
 3487 elements from 5 above, and all the message parts specified in SignedParts assertions in the  
 3488 policy. If [Token Protection] is 'true', the signature MUST also cover the [Signature Token]  
 3489 regardless of whether it is included in the message. If [Derived Keys] is 'true', the key in the token  
 3490 from 6 above MUST be used, otherwise the key in the [Signature Token].
- 3491 9. If [Protection Order] is 'EncryptBeforeSigning' then a reference list referencing all the message  
 3492 parts specified in EncryptedParts assertions in the policy. If [Derived Keys] is 'true', then the key  
 3493 in the Derived Key Token from 3 above MUST be used, otherwise the key in the [Encryption  
 3494 Token].

3495 The following diagram illustrates the security header layout for the recipient to initiator message:



3496

3497 The arrows on the right indicate parts that were signed as part of the message signature labeled Sig<sub>1</sub>.  
 3498 The arrows on the left from boxes labeled Ref<sub>1</sub> indicate references to parts encrypted using a key based  
 3499 on the [SharedSecret Token] (not shown in these diagrams as it is referenced as an external token). Two  
 3500 wssell:SignatureConfirmation elements labeled SC<sub>1</sub> and SC<sub>2</sub> corresponding to the two signatures  
 3501 in the initial message illustrated previously is included. In general, the ordering of the items in the security  
 3502 header follows the most optimal layout for a receiver to process its contents. The rules used to determine  
 3503 this ordering are described in Appendix C.

3504 *Example:*

3505 Recipient to initiator message using EncryptBeforeSigning:

```
3506 <S:Envelope>
3507   <S:Header>
3508     <x:Header1 wsu:Id="Header1" >
3509       ...
3510     </x:Header1>
3511     <wssell:EncryptedHeader wsu:Id="enc_Header2">
3512       <!-- Plaintext Header2
3513       <x:Header2 wsu:Id="Header2" >
3514         ...
3515       </x:Header2>
3516       -->
3517       ...
3518     </wssell:EncryptedHeader>
3519     ...
3520   <wsse:Security>
3521     <wsu:Timestamp wsu:Id="Timestamp">
3522       <wsu:Created>...</wsu:Created>
3523       <wsu:Expires>...</wsu:Expires>
3524     </wsu:Timestamp>
3525     <xenc:ReferenceList>
3526       <xenc:DataReference URI="#enc_Signature" />
3527       <xenc:DataReference URI="#enc_SigConf1" />
3528       <xenc:DataReference URI="#enc_SigConf2" />
3529       ...
3530     </xenc:ReferenceList>
3531     <xenc:EncryptedData ID="enc_SigConf1" >
3532       <!-- Plaintext SignatureConfirmation
3533       <wssell:SignatureConfirmation wsu:Id="SigConf1" >
3534         ...
3535       </wssell:SignatureConfirmation>
3536       -->
3537       ...
3538     </xenc:EncryptedData>
3539     <xenc:EncryptedData ID="enc_SigConf2" >
3540       <!-- Plaintext SignatureConfirmation
3541       <wssell:SignatureConfirmation wsu:Id="SigConf2" >
3542         ...
3543       </wssell:SignatureConfirmation>
3544       -->
3545       ...
3546     </xenc:EncryptedData>
```

```

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3581
3582
3583
3584
3585
3586
3587
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3595
<xenc:EncryptedData Id="enc_Signature">
  <!-- Plaintext Signature
  <ds:Signature Id="Signature">
    <ds:SignedInfo>
      <ds:References>
        <ds:Reference URI="#Timestamp" >...</ds:Reference>
        <ds:Reference URI="#SigConf1" >...</ds:Reference>
        <ds:Reference URI="#SigConf2" >...</ds:Reference>
        <ds:Reference URI="#Header1" >...</ds:Reference>
        <ds:Reference URI="#Header2" >...</ds:Reference>
        <ds:Reference URI="#Body" >...</ds:Reference>
      </ds:References>
    </ds:SignedInfo>
    <ds:SignatureValue>...</ds:SignatureValue>
    <ds:KeyInfo>
      <wsse:SecurityTokenReference>
        <wsse:Reference URI="#_SomeIssuedToken" />
      </wsse:SecurityTokenReference>
    </ds:KeyInfo>
  </ds:Signature>
-->
</xenc:EncryptedData>
...
<ds:KeyInfo>
  <wsse:SecurityTokenReference>
    <wsse:Reference URI="#_SomeIssuedToken" />
  </wsse:SecurityTokenReference>
</ds:KeyInfo>
<xenc:EncryptedData>
<xenc:ReferenceList>
  <xenc:DataReference URI="#enc_Body" />
  <xenc:DataReference URI="#enc_Header2" />
  ...
</xenc:ReferenceList>
</xenc:EncryptedData>
</wsse:Security>
</S:Header>
<S:Body wsu:Id="Body">
  <xenc:EncryptedData Id="enc_Body">
    ...
    <ds:KeyInfo>
      <wsse:SecurityTokenReference>
        <wsse:Reference URI="#_SomeIssuedToken" />
      </wsse:SecurityTokenReference>
    </ds:KeyInfo>
  </xenc:EncryptedData>
</S:Body>
</S:Envelope>

```

## 3596 C.3 Asymmetric Binding

3597 This section describes how the 'Strict' security header layout rules apply to the Asymmetric Binding.

### 3598 C.3.1 Policy

3599 The following example shows a policy indicating an Asymmetric Binding, an X509 token as the [Initiator  
3600 Token], an X509 token as the [Recipient Token], an algorithm suite, a requirement to encrypt the  
3601 message parts before signing, a requirement to encrypt the message signature, a requirement to include  
3602 tokens in the message signature and the supporting signatures, a requirement to include  
3603 `wsse11:SignatureConfirmation` elements, a username token attached to the message, and finally

3604 an X509 token attached to the message and endorsing the message signature. Minimum message  
3605 protection requirements are described as well.

```
3606 <!-- Example Endpoint Policy -->
3607 <wsp:Policy xmlns:wsp="..." xmlns:sp="...">
3608   <sp:AsymmetricBinding>
3609     <wsp:Policy>
3610       <sp:RecipientToken>
3611         <wsp:Policy>
3612           <sp:X509Token sp:IncludeToken=".../IncludeToken/Always" />
3613         </wsp:Policy>
3614       </sp:RecipientToken>
3615       <sp:InitiatorToken>
3616         <wsp:Policy>
3617           <sp:X509Token sp:IncludeToken=".../IncludeToken/Always" />
3618         </wsp:Policy>
3619       </sp:InitiatorToken>
3620       <sp:AlgorithmSuite>
3621         <wsp:Policy>
3622           <sp:Basic256 />
3623         </wsp:Policy>
3624       </sp:AlgorithmSuite>
3625       <sp:Layout>
3626         <wsp:Policy>
3627           <sp:Strict />
3628         </wsp:Policy>
3629       </sp:Layout>
3630       <sp:IncludeTimestamp />
3631       <sp:EncryptBeforeSigning />
3632       <sp:EncryptSignature />
3633       <sp:ProtectTokens />
3634     </wsp:Policy>
3635   </sp:AsymmetricBinding>
3636   <sp:SignedEncryptedSupportingTokens>
3637     <wsp:Policy>
3638       <sp:UsernameToken sp:IncludeToken=".../IncludeToken/Once" />
3639     </wsp:Policy>
3640   </sp:SignedEncryptedSupportingTokens>
3641   <sp:SignedEndorsingSupportingTokens>
3642     <wsp:Policy>
3643       <sp:X509Token sp:IncludeToken=".../IncludeToken/Once">
3644         <wsp:Policy>
3645           <sp:WssX509v3Token10 />
3646         </wsp:Policy>
3647       </sp:X509Token>
3648     </wsp:Policy>
3649   </sp:SignedEndorsingSupportingTokens>
3650   <sp:Wss11>
3651     <wsp:Policy>
3652       <sp:RequireSignatureConfirmation />
3653     </wsp:Policy>
3654   </sp:Wss11>
3655 </wsp:Policy>
3656
```

3657

```
3658 <!-- Example Message Policy -->
3659 <wsp:All xmlns:wsp="..." xmlns:sp="...">
3660   <sp:SignedParts>
3661     <sp:Header Name="Header1" Namespace="..." />
3662     <sp:Header Name="Header2" Namespace="..." />
3663     <sp:Body/>
3664   </sp:SignedParts>
3665   <sp:EncryptedParts>
3666     <sp:Header Name="Header2" Namespace="..." />
3667     <sp:Body/>
3668   </sp:EncryptedParts>
3669 </wsp:All>
```

3670

3671 This policy is used as the basis for the examples shown in the subsequent section describing the security  
3672 header layout for this binding.

### 3673 **C.3.2 Initiator to Recipient Messages**

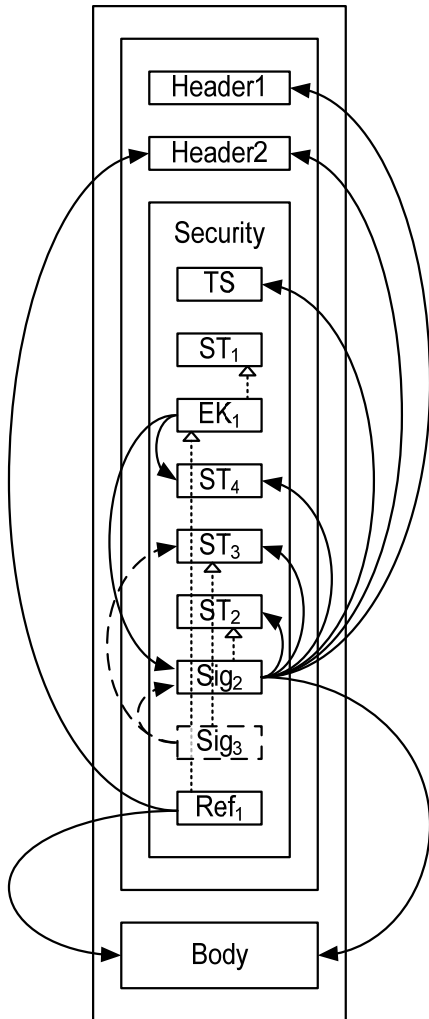
3674 Messages sent from initiator to recipient have the following layout:

- 3675 1. A `wsu:Timestamp` element if `[Timestamp]` is 'true'.
- 3676 2. If a `[Recipient Token]` is specified, and the associated `sp:IncludeToken` attribute is  
3677 `.../IncludeToken/Once` or `.../IncludeToken/Always`, then the `[Recipient Token]`.
- 3678 3. If a `[Recipient Token]` is specified and `[Protection Order]` is 'SignBeforeEncrypting' or  
3679 `[SignatureProtection]` is 'true' then an `xenc:EncryptedKey` element, containing a key encrypted for  
3680 the recipient. The `xenc:EncryptedKey` element MUST include an `xenc:ReferenceList` containing a  
3681 reference to all the message parts specified in `EncryptedParts` assertions in the policy. If  
3682 `[Signature Protection]` is 'true' then the reference list MUST contain a reference to the message  
3683 signature from 6 below. It is an error if `[Signature Protection]` is 'true' and there is not a message  
3684 signature.
- 3685 4. Any tokens from the supporting tokens properties (as defined in section 8) whose  
3686 `sp:IncludeToken` attribute is `.../IncludeToken/Once` or `.../IncludeToken/Always`.
- 3687 5. If an `[Initiator Token]` is specified, and the associated `sp:IncludeToken` attribute is  
3688 `.../IncludeToken/Once` or `.../IncludeToken/Always`, then the `[Initiator Token]`.
- 3689 6. A signature based on the key in the `[Initiator Token]` if specified, over the `wsu:Timestamp` from  
3690 1 above, any tokens from 4 above regardless of whether they are included in the message, and  
3691 any message parts specified in `SignedParts` assertions in the policy. If `[Token Protection]` is 'true',  
3692 the signature MUST also cover the `[Initiator Token]` regardless of whether it is included in the  
3693 message.
- 3694 7. Signatures for tokens from the `[Endorsing Supporting Tokens]` and `[Signed Endorsing Supporting`  
3695 `Tokens]` properties. If `[Derived Keys]` is 'true' and the supporting token is associated with a  
3696 symmetric key, then a `Derived Key Token`, based on the supporting token, appears before the  
3697 signature. If `[Token Protection]` is 'true', the signature MUST also cover the supporting token  
3698 regardless of whether it is included in the message.
- 3699 8. If a `[Recipient Token]` is specified and `[Protection Order]` is 'EncryptBeforeSigning' then if  
3700 `[Signature Protection]` is 'false' then an `xenc:EncryptedKey` element, containing a key encrypted  
3701 for the recipient and a reference list, else if `[Signature Protection]` is 'true', a reference list. The  
3702 reference list includes a reference to all the message parts specified in `EncryptedParts` assertions  
3703 in the policy. The encrypted parts MUST reference the key contained in the `xenc:EncryptedKey`  
3704 element from 3 above.

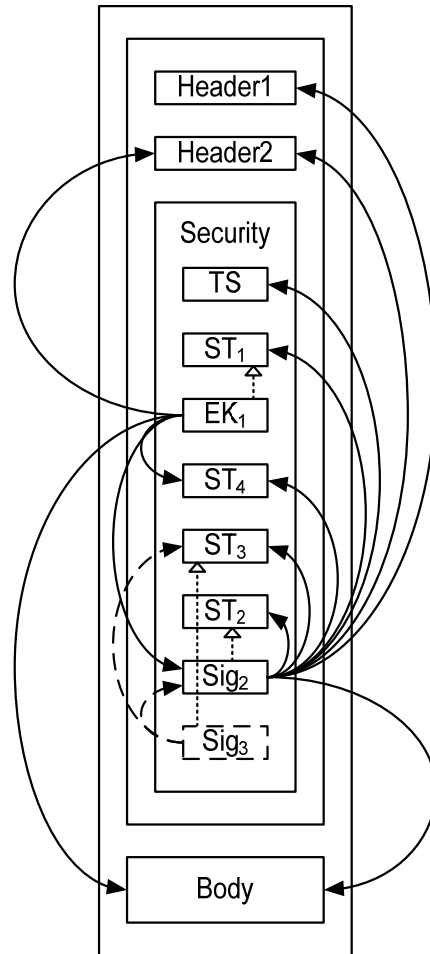
3705

3706 The following diagram illustrates the security header layout for the initiator to recipient messages:

### Encrypt Then Sign



### Sign Then Encrypt



3707

3708 The arrows on the right indicate parts that were signed as part of the message signature labeled Sig<sub>2</sub>  
 3709 using the [Initiator Token] labeled ST<sub>2</sub>. The dashed arrows on the left from the box labeled Sig<sub>3</sub> indicate  
 3710 the parts signed by the supporting token ST<sub>3</sub>, namely the message signature Sig<sub>2</sub> and the token used as  
 3711 the basis for the signature labeled ST<sub>3</sub>. The arrows on the left from boxes labeled EK<sub>1</sub> indicate references  
 3712 to parts encrypted using a key encrypted for the [Recipient Token] labeled ST<sub>1</sub>. The arrows on the left  
 3713 from boxes labeled Ref<sub>1</sub> indicate additional references to parts encrypted using the key contained in the  
 3714 encrypted key labeled EK<sub>1</sub>. The dotted arrows inside the box labeled Security indicate the token used as  
 3715 the basis for each cryptographic operation. In general, the ordering of the items in the security header  
 3716 follows the most optimal layout for a receiver to process its contents. The rules used to determine this  
 3717 ordering are described in Appendix C.

3718

3719 Note: In most typical scenarios, the recipient key is not included in the message, but rather the encrypted  
 3720 key contains an external reference to the token containing the encryption key. The diagram illustrates  
 3721 how one might attach a security token related to the encrypted key for completeness. One possible use-



3722 case for this approach might be a stack which does not support the STR Dereferencing Transform, but  
3723 wishes to include the encryption token in the message signature.

3724 Initiator to recipient message *Example*

3725 `<S:Envelope xmlns:S="..." xmlns:x="..." xmlns:wsu="..."`

```

3726     xmlns:wssell1="..." xmlns:wsse="..." xmlns:xenc="..." xmlns:ds="...">
3727 <S:Header>
3728   <x:Header1 wsu:Id="Header1" >
3729     ...
3730   </x:Header1>
3731   <wssell1:EncryptedHeader wsu:Id="enc_Header2">
3732     <!-- Plaintext Header2
3733     <x:Header2 wsu:Id="Header2" >
3734       ...
3735     </x:Header2>
3736     -->
3737     ...
3738   </wssell1:EncryptedHeader>
3739   ...
3740   <wsse:Security>
3741     <wsu:Timestamp wsu:Id="Timestamp">
3742       <wsu:Created>...</wsu:Created>
3743       <wsu:Expires>...</wsu:Expires>
3744     </wsu:Timestamp>
3745     <wsse:BinarySecurityToken wsu:Id="RecipientToken" >
3746       ...
3747     </wsse:BinarySecurityToken>
3748     <xenc:EncryptedKey wsu:Id="RecipientEncryptedKey" >
3749       ...
3750     <xenc:ReferenceList>
3751       <xenc:DataReference URI="#enc_Signature" />
3752       <xenc:DataReference URI="#enc_SomeUsernameToken" />
3753       ...
3754     </xenc:ReferenceList>
3755   </xenc:EncryptedKey>
3756   <xenc:EncryptedData ID="enc_SomeUsernameToken" >
3757     <!-- Plaintext UsernameToken
3758     <wsse:UsernameToken wsu:Id="SomeUsernameToken" >
3759       ...
3760     </wsse:UsernameToken>
3761     -->
3762     ...
3763   </xenc:EncryptedData>
3764   <wsse:BinarySecurityToken wsu:Id="SomeSupportingToken" >
3765     ...
3766   </wsse:BinarySecurityToken>
3767   <wsse:BinarySecurityToken wsu:Id="InitiatorToken" >
3768     ...
3769   </wsse:BinarySecurityToken>
3770   <xenc:EncryptedData ID="enc_Signature">
3771     <!-- Plaintext Signature
3772     <ds:Signature Id="Signature">
3773       <ds:SignedInfo>
3774         <ds:References>
3775           <ds:Reference URI="#Timestamp" >...</ds:Reference>
3776           <ds:Reference URI="#SomeUsernameToken" >...</ds:Reference>
3777           <ds:Reference URI="#SomeSupportingToken" >...</ds:Reference>
3778           <ds:Reference URI="#InitiatorToken" >...</ds:Reference>
3779           <ds:Reference URI="#Header1" >...</ds:Reference>
3780           <ds:Reference URI="#Header2" >...</ds:Reference>
3781           <ds:Reference URI="#Body" >...</ds:Reference>
3782         </ds:References>
3783       </ds:SignedInfo>
3784     <ds:SignatureValue>...</ds:SignatureValue>
3785     <ds:KeyInfo>
3786       <wsse:SecurityTokenReference>
3787         <wsse:Reference URI="#InitiatorToken" />
3788       </wsse:SecurityTokenReference>
3789     </ds:KeyInfo>

```

```

3790     </ds:Signature>
3791     -->
3792     ...
3793 </xenc:EncryptedData>
3794 <ds:Signature>
3795   <ds:SignedInfo>
3796     <ds:References>
3797       <ds:Reference URI="#Signature" >...</ds:Reference>
3798       <ds:Reference URI="#SomeSupportingToken" >...</ds:Reference>
3799     </ds:References>
3800   </ds:SignedInfo>
3801   <ds:SignatureValue>...</ds:SignatureValue>
3802   <ds:KeyInfo>
3803     <wsse:SecurityTokenReference>
3804       <wsse:Reference URI="#SomeSupportingToken" />
3805     </wsse:SecurityTokenReference>
3806   </ds:KeyInfo>
3807 </ds:Signature>
3808 <xenc:ReferenceList>
3809   <xenc:DataReference URI="#enc_Body" />
3810   <xenc:DataReference URI="#enc_Header2" />
3811   ...
3812 </xenc:ReferenceList>
3813 </wsse:Security>
3814 </S:Header>
3815 <S:Body wsu:Id="Body">
3816   <xenc:EncryptedData Id="enc_Body">
3817     ...
3818   <ds:KeyInfo>
3819     <wsse:SecurityTokenReference>
3820       <wsse:Reference URI="#RecipientEncryptedKey" />
3821     </wsse:SecurityTokenReference>
3822   </ds:KeyInfo>
3823   </xenc:EncryptedData>
3824 </S:Body>
3825 </S:Envelope>

```

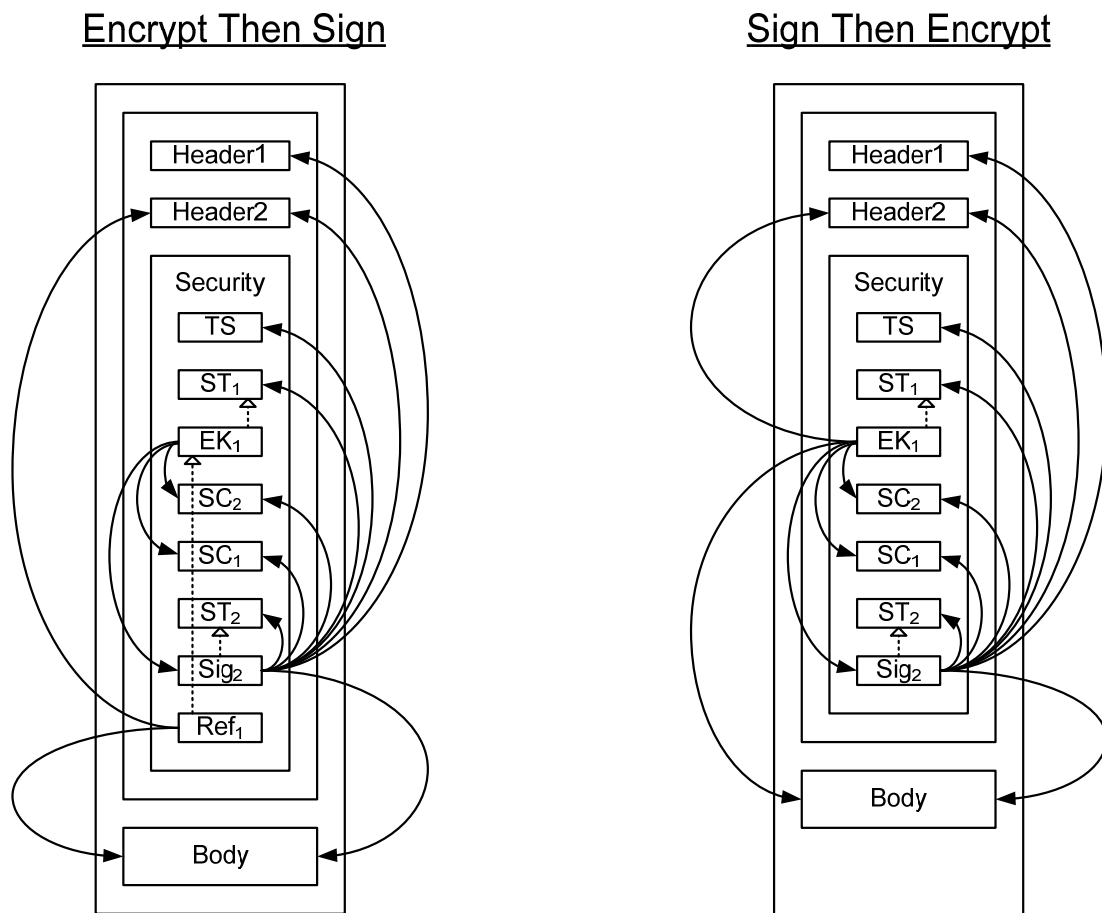
### 3826 C.3.3 Recipient to Initiator Messages

3827 Messages sent from recipient to initiator have the following layout:

- 3828 1. A `wsu:Timestamp` element if [Timestamp] is 'true'.
- 3829 2. If an [Initiator Token] is specified, and the associated `sp:IncludeToken` attribute is  
3830 `.../IncludeToken/Always`, then the [Initiator Token].
- 3831 3. If an [Initiator Token] is specified and [Protection Order] is 'SignBeforeEncrypting' or  
3832 [SignatureProtection] is 'true' then an `xenc:EncryptedKey` element, containing a key encrypted for  
3833 the initiator. The `xenc:EncryptedKey` element MUST include an `xenc:ReferenceList` containing a  
3834 reference to all the message parts specified in EncryptedParts assertions in the policy. If  
3835 [Signature Protection] is 'true' then the reference list MUST also contain a reference to the  
3836 message signature from 6 below, if any and references to the  
3837 `wss11:SignatureConfirmation` elements from 4 below, if any.
- 3838 4. If [Signature Confirmation] is 'true', then a `wss11:SignatureConfirmation` element for each  
3839 signature in the corresponding message sent from initiator to recipient. If there are no signatures  
3840 in the corresponding message from the initiator to the recipient, then a  
3841 `wss11:SignatureConfirmation` element with no Value attribute.
- 3842 5. If a [Recipient Token] is specified, and the associated `sp:IncludeToken` attribute is  
3843 `.../IncludeToken/Always`, then the [Recipient Token].

- 3844 6. If a [Recipient Token] is specified, then a signature based on the key in the [Recipient Token],  
 3845 over the `wsu:Timestamp` from 1 above, the `wssell:SignatureConfirmation` elements  
 3846 from 4 above, and any message parts specified in SignedParts assertions in the policy. If [Token  
 3847 Protection] is 'true' then the signature MUST also cover the [Recipient Token].
- 3848 7. If an [Initiator Token] is specified and [Protection Order] is 'EncryptBeforeSigning' then if  
 3849 [Signature Protection] is 'false' then an `xenc:EncryptedKey` element, containing a key encrypted  
 3850 for the recipient and a reference list, else if [Signature Protection] is 'true', a reference list. The  
 3851 reference list includes a reference to all the message parts specified in EncryptedParts assertions  
 3852 in the policy. The encrypted parts MUST reference the key contained in the `xenc:EncryptedKey`  
 3853 element from 3 above.

3854  
 3855 The following diagram illustrates the security header layout for the recipient to initiator messages:



3856  
 3857 The arrows on the right indicate parts that were signed as part of the message signature labeled Sig<sub>2</sub>  
 3858 using the [Recipient Token] labeled ST<sub>2</sub>. The arrows on the left from boxes labeled EK<sub>1</sub> indicate  
 3859 references to parts encrypted using a key encrypted for the [Recipient Token] labeled ST<sub>1</sub>. The arrows on  
 3860 the left from boxes labeled Ref<sub>1</sub> indicate additional references to parts encrypted using the key contained  
 3861 in the encrypted key labeled EK<sub>1</sub>. The dotted arrows inside the box labeled Security indicate the token  
 3862 used as the basis for each cryptographic operation. Two `wssell:SignatureConfirmation` elements  
 3863 labeled SC<sub>1</sub> and SC<sub>2</sub> corresponding to the two signatures in the initial message illustrated previously is  
 3864 included. In general, the ordering of the items in the security header follows the most optimal layout for a  
 3865 receiver to process its contents. The rules used to determine this ordering are described in Appendix C.  
 3866 Recipient to initiator message *Example*:

```

3867 <S:Envelope xmlns:S="..." xmlns:x="..." xmlns:wsu="..."
3868     xmlns:wssell="..." xmlns:wsse="..."
3869     xmlns:xenc="..." xmlns:ds="...">
3870 <S:Header>
3871     <x:Header1 wsu:Id="Header1" >
3872         ...
3873     </x:Header1>
3874     <wssell:EncryptedHeader wsu:Id="enc_Header2">
3875         <!-- Plaintext Header2
3876         <x:Header2 wsu:Id="Header2" >
3877             ...
3878         </x:Header2>
3879         -->
3880         ...
3881     </wssell:EncryptedHeader>
3882     ...
3883     <wsse:Security>
3884         <wsu:Timestamp wsu:Id="Timestamp">
3885             <wsu:Created>...</wsu:Created>
3886             <wsu:Expires>...</wsu:Expires>
3887         </wsu:Timestamp>
3888         <wsse:BinarySecurityToken wsu:Id="InitiatorToken" >
3889             ...
3890         </wsse:BinarySecurityToken>
3891         <xenc:EncryptedKey wsu:Id="InitiatorEncryptedKey" >
3892             ...
3893             <xenc:ReferenceList>
3894                 <xenc:DataReference URI="#enc_Signature" />
3895                 <xenc:DataReference URI="#enc_SigConf1" />
3896                 <xenc:DataReference URI="#enc_SigConf2" />
3897                 ...
3898             </xenc:ReferenceList>
3899         </xenc:EncryptedKey>
3900         <xenc:EncryptedData ID="enc_SigConf2" >
3901             <!-- Plaintext SignatureConfirmation
3902             <wssell:SignatureConfirmation wsu:Id="SigConf2" ...>
3903                 ...
3904             </wssell:SignatureConfirmation>
3905             -->
3906             ...
3907         </xenc:EncryptedData>
3908         <xenc:EncryptedData ID="enc_SigConf1" >
3909             <!-- Plaintext SignatureConfirmation
3910             <wssell:SignatureConfirmation wsu:Id="SigConf1" ...>
3911                 ...
3912             </wssell:SignatureConfirmation>
3913             -->
3914             ...
3915         </xenc:EncryptedData>
3916         <wsse:BinarySecurityToken wsu:Id="RecipientToken" >
3917             ...
3918         </wsse:BinarySecurityToken>
3919

```

```

3920 <xenc:EncryptedData ID="enc_Signature">
3921 <!-- Plaintext Signature
3922 <ds:Signature Id="Signature">
3923 <ds:SignedInfo>
3924 <ds:References>
3925 <ds:Reference URI="#Timestamp" >...</ds:Reference>
3926 <ds:Reference URI="#SigConf1" >...</ds:Reference>
3927 <ds:Reference URI="#SigConf2" >...</ds:Reference>
3928 <ds:Reference URI="#RecipientToken" >...</ds:Reference>
3929 <ds:Reference URI="#Header1" >...</ds:Reference>
3930 <ds:Reference URI="#Header2" >...</ds:Reference>
3931 <ds:Reference URI="#Body" >...</ds:Reference>
3932 </ds:References>
3933 </ds:SignedInfo>
3934 <ds:SignatureValue>...</ds:SignatureValue>
3935 <ds:KeyInfo>
3936 <wsse:SecurityTokenReference>
3937 <wsse:Reference URI="#RecipientToken" />
3938 </wsse:SecurityTokenReference>
3939 </ds:KeyInfo>
3940 </ds:Signature>
3941 -->
3942 ...
3943 </xenc:EncryptedData>
3944 <xenc:ReferenceList>
3945 <xenc:DataReference URI="#enc_Body" />
3946 <xenc:DataReference URI="#enc_Header2" />
3947 ...
3948 </xenc:ReferenceList>
3949 </wsse:Security>
3950 </S:Header>
3951 <S:Body wsu:Id="Body">
3952 <xenc:EncryptedData Id="enc_Body">
3953 ...
3954 <ds:KeyInfo>
3955 <wsse:SecurityTokenReference>
3956 <wsse:Reference URI="#InitiatorEncryptedKey" />
3957 </wsse:SecurityTokenReference>
3958 </ds:KeyInfo>
3959 </xenc:EncryptedData>
3960 </S:Body>
3961 </S:Envelope>

```

3962  
3963

---

## D. Signed and Encrypted Elements in the Security Header

3964  
3965  
3966  
3967  
3968

This section lists the criteria for when various child elements of the Security header are signed and/or encrypted at the message level including whether they are signed by the message signature or a supporting signature. It assumes that there are no `sp:SignedElements` and no `sp:EncryptedElements` assertions in the policy. If such assertions are present in the policy then additional child elements of the security header might be signed and/or encrypted.

3969

### D.1 Elements signed by the message signature

3970  
3971  
3972  
3973  
3974  
3975  
3976

1. The `wsu:Timestamp` element (Section 6.2).
2. All `wssell:SignatureConfirmation` elements (Section 9).
3. Security Tokens corresponding to [Initiator Signature Token],[Recipient Signature Token], [Initiator Encryption Token], [Recipient Encryption Token], [Signature Token] or [Encryption Token] when [Token Protection] has a value of 'true' (Section 6.5).
4. Security Tokens corresponding to [Signed Supporting Tokens] (see Section 8.2) or [Signed Endorsing Supporting Tokens] (Section 8.5).

3977

### D.2 Elements signed by all endorsing signatures

3978  
3979

1. The `ds:Signature` element that forms the message signature (Section 8.3).
2. The `wsu:Timestamp` element in the case of a transport binding (Section 8.3).

3980

### D.3 Elements signed by a specific endorsing signature

3981  
3982

1. Security Tokens corresponding to [Endorsing Supporting Tokens] or [Signed Endorsing Supporting Tokens] when [Token Protection] has a value of 'true' (Section 8.8).

3983

### D.4 Elements that are encrypted

3984  
3985  
3986  
3987  
3988  
3989  
3990

1. The `ds:Signature` element that forms the message signature when [Signature Protection] has a value of 'true' (Section 6.4).
2. All `wssell:SignatureConfirmation` elements when [Signature Protection] has a value of 'true' (Section 6.4).
3. A `wsse:UsernameToken` MAY be encrypted when a transport binding is not being used (Section 5.3.1).

3991

---

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