



Web Services Policy 1.5 - Attachment

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Abstract

This specification, Web Services Policy 1.5 - Attachment, defines two general-purpose mechanisms for associating policies, as defined in Web Services Policy 1.5 - Framework, with the subjects to which they apply. This specification also defines how these general-purpose mechanisms may be used to associate policies with WSDL and UDDI descriptions.

Status of this document

This section describes the status of this document at the time of its publication. Other documents may supersede this document. A list of current W3C publications and the latest revision of this technical report can be found in the [W3C technical reports index](#) at <http://www.w3.org/TR/>.

This is the [W3C Recommendation](#) of the Web Services Policy 1.5 - Attachment specification. It has been produced by the [Web Services Policy Working Group](#), which is part of the [W3C Web Services Activity](#).

This document has been reviewed by W3C Members, by software developers, and by other W3C groups and interested parties, and is endorsed by the Director as a W3C Recommendation. It is a stable document and may be used as reference material or cited from another document. W3C's role in making the Recommendation is to draw attention to the specification and to promote its widespread deployment. This enhances the functionality and interoperability of the Web.

The Working Group released a test suite along with an [implementation report](#). A [diff-marked version against the previous version of this document](#) is available.

The Working Group is tracking all comments via [Bugzilla](#) and highly prefers to receive comments via this system. If access to Bugzilla is not feasible, you may send your comments to the mailing list public-ws-policy-comments@w3.org mailing list ([public archive](#)). Each Bugzilla entry and email message should contain only one comment. All comments on this specification should be made following the [Description for Issues](#) of the Working Group.

This document was produced by a group operating under the [5 February 2004 W3C Patent Policy](#). W3C maintains a [public list of any patent disclosures](#) made in connection with the deliverables of the group; that page also includes instructions for disclosing a patent. An individual who has actual knowledge of a patent which the individual believes contains [Essential Claim\(s\)](#) must disclose the information in accordance with [section 6 of the W3C Patent Policy](#).

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1. Introduction

The Web Services Policy 1.5 - Framework [\[Web Services Policy Framework\]](#) specification defines an abstract model and an XML-based language for expressing of entities in a Web services-based system. This specification, Web Services Policy 1.5 - Attachment, defines two general-purpose mechanisms for associating policies with the to which they apply; the policies may be defined as part of existing metadata about the subject or the policies may be defined independently and associated through an external binding to the subject.

To enable Web Services Policy to be used with existing Web service technologies, this specification describes the use of these general-purpose mechanisms with WSDL [\[WSDL 1.1\]](#), [\[WSDL 2.0 Core Language\]](#) definitions and UDDI [\[UDDI API 2.0\]](#), [\[UDDI Data Structure 2.0\]](#), [\[UDDI 3.0\]](#).

2. Notations and Terminology

This section specifies the notations, namespaces, and terminology used in this specification.

2.1. Notational Conventions

This specification uses the following syntax within normative outlines:

- The syntax appears as an XML instance, but values in *italics* indicate data types instead of literal values.
- Characters are appended to elements and attributes to indicate cardinality:
 - "?" (0 or 1)
 - "*" (0 or more)
 - "+" (1 or more)
- The character "|" is used to indicate a choice between alternatives.
- The characters "(" and ")" are used to indicate that contained items are to be treated as a group with respect to cardinality or choice.
- This document relies on the XML Information Set [\[XML Information Set\]](#). Information items properties are indicated by the style *info:property*.
- XML namespace prefixes (see Prefixes and Namespaces used in this specification)PrefixXML NamespaceSpecification mtom <http://schemas.xmlsoap.org/ws/2004/09/policy/optimizedmimeserialization> [] rmp <http://docs.oasis-open.org/ws-rx/wsrmp/200702> [] sp <http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702> [] wsa <http://www.w3.org/2005/08/addressing> [] wsam <http://www.w3.org/2007/05/addressing/metadata> [] wsdl11 <http://schemas.xmlsoap.org/wsdl/> [] wsdl20 <http://www.w3.org/ns/wsdl> [] wsoap12 <http://schemas.xmlsoap.org/wsdl/soap12/> [] (none), wsp <http://www.w3.org/ns/ws-policy> This specification wsse <http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd> [] wsu <http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd> [] xs <http://www.w3.org/2001/XMLSchema> [] are used to indicate the namespace of the element or attribute being defined.
- The ellipses characters "..." are used to indicate a point of extensibility that allows other Element or Attribute Information Items.

Elements and Attributes defined by this specification are referred to in the text of this document using XPath 1.0 [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 <http://www.w3.org/ns/ws-policy> namespace.
- 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. namespace.

Normative text within this specification takes precedence over normative outlines, which in turn take precedence over the XML Schema [XML Schema Structures] descriptions.

2.2. XML Namespaces

This specification uses a number of namespace prefixes throughout; they are listed in Prefixes and Namespaces used in this specification. Prefix XML Namespace Specification mtom <http://schemas.xmlsoap.org/ws/2004/09/policy/optimizedmimeserialization> [] rmp <http://docs.oasis-open.org/ws-rx/wsrmp/200702> [] sp <http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702> [] wsa <http://www.w3.org/2005/08/addressing> [] wsam <http://www.w3.org/2007/05/addressing/metadata> [] wsdl11 <http://schemas.xmlsoap.org/wsdl/> [] wsdl20 <http://www.w3.org/ns/wsdl> [] wsoap12 <http://schemas.xmlsoap.org/wsdl/soap12/> [] (none), wsp <http://www.w3.org/ns/ws-policy> This specification wsse <http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd> [] wsu <http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd> [] xs <http://www.w3.org/2001/XMLSchema> []. Note that the choice of any namespace prefix is arbitrary and not semantically significant (see [XML Namespaces]).

Prefixes and Namespaces used in this specification

Prefix	XML Namespace	Specification
mtom	http://schemas.xmlsoap.org/ws/2004/09/policy/optimizedmimeserialization	[[WS-MTOMPolicy]]
rmp	http://docs.oasis-open.org/ws-rx/wsrmp/200702	[[WS-RM Policy]]
sp	http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702	[[WS-SecurityPolicy]]
wsa	http://www.w3.org/2005/08/addressing	[[WS-Addressing Core]]
wsam	http://www.w3.org/2007/05/addressing/metadata	[[WS-Addressing Metadata]]
wsdl11	http://schemas.xmlsoap.org/wsdl/	[[WSDL 1.1]]
wsdl20	http://www.w3.org/ns/wsdl	[[WSDL 2.0 Core Language]]
wsoap12	http://schemas.xmlsoap.org/wsdl/soap12/	[[WSDL 1.1 Binding for SOAP 1.2]]
(none), wsp	http://www.w3.org/ns/ws-policy	This specification
wsse	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd	[[WS-Security 2004]]
wsu	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd	[[WS-Security 2004]]
xs	http://www.w3.org/2001/XMLSchema	[[XML Schema Structures]]

All information items defined by this specification are identified by the XML namespace URI [[XML Namespaces]] <http://www.w3.org/ns/ws-policy>. A [normative XML Schema](#) [[XML Schema Structures], [XML Schema Datatypes]] document can be obtained indirectly by dereferencing the namespace document at the WS-Policy 1.5 namespace URI.

In this document reference is made to the `wsu:Id` attribute in a utility schema (<http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd>). The `wsu:Id` attribute was added to the utility schema with the intent that other specifications requiring such an `Id` could reference it (as is done here).

It is the intent of the W3C Web Services Policy Working Group that the Web Services Policy 1.5 - Framework and Web Services Policy 1.5 - Attachment XML namespace URI will not change arbitrarily with each subsequent revision of the corresponding XML Schema documents as the specifications transition through Candidate Recommendation, Proposed Recommendation and Recommendation status. However, should the specifications revert to Working Draft status, and a subsequent revision, published as a WD, CR or PR draft, results in non-backwardly compatible changes from a previously published WD, CR or PR draft of the specification, the namespace URI will be changed accordingly.

Under this policy, the following are examples of backwards compatible changes that would not result in assignment of a new XML namespace URI:

- Addition of new global element, attribute, `complexType` and `simpleType` definitions.
- Addition of new elements or attributes in locations covered by a previously specified wildcard.
- Modifications to the pattern facet of a type definition for which the value-space of the previous definition remains valid or for which the value-space of the preponderance of instance would remain valid.
- Modifications to the cardinality of elements for which the value-space of possible instance documents conformant to the previous revision of the schema would still be valid with regards to the revised cardinality rule.

2.3. Terminology

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

We introduce the following terms that are used throughout this document:

collection

The items in a *collection* in this specification are unordered and may contain duplicates.

effective policy

The *effective policy*, for a given , is the combination of relevant policies. The relevant policies are those attached to that contain the .

element policy

The *element policy* is the attached to the associated with the element information item that contains it.

ignorable policy assertion

An *ignorable policy assertion* is an assertion that may be ignored for purposes of determining the compatibility of alternatives in policy intersection in a lax mode (as defined in [4.5 Policy Intersection](#)).

merge

A *merge* consists of serializing each policy as a , replacing their `wsp:Policy` element with a `wsp>All` element, and placing each as children of a wrapper `wsp:Policy` element.

policy

A *policy* is a potentially empty collection of .

policy alternative

A *policy alternative* is a potentially empty of .

policy assertion

A *policy assertion* represents a requirement, a capability, or other property of a behavior.

policy attachment

A *policy attachment* is a mechanism for associating with one or more .

policy expression

A *policy expression* is an XML Infoset representation of a , either in a normal form or in an equivalent compact form.

policy scope

A *policy scope* is a collection of to which a policy may apply.

policy subject

A *policy subject* is an entity (e.g., an endpoint, message, resource, operation) with which a can be associated.

- collection
- ignorable_policy_assertion
- policy
- policy_alternative
- policy_assertion
- policy_expression
- policy_subject
- policy_scope
- policy_attachment

2.4. Example

This specification defines several mechanisms for associating policies (Web Services Policy 1.5 - Framework, [\[\[Web Services Policy Framework\]\]](#)) with various XML Web service entities. For brevity, we define two sample that the remainder of this document references.

Example RM Policy Expression.(01) `<wsp:Policy xmlns:rmp="http://docs.oasis-open.org/ws-rx/wsrmp/200702" xmlns:wsp="http://www.w3.org/ns/ws-policy" xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd" wsu:Id="RmPolicy" >` (02) `<rmp:RMAssertion>` (03) `<wsp:Policy/>` (04) `</rmp:RMAssertion>` (05) `</wsp:Policy>` indicates a for reliable messaging [\[\[WS-RM Policy\]\]](#). Example X509 Security Policy Expression.(01) `<wsp:Policy xmlns:sp="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702" xmlns:wsp="http://www.w3.org/ns/ws-policy" xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd" wsu:Id="X509EndpointPolicy" >` (02) `<sp:AsymmetricBinding>` (03) `<wsp:Policy>` (04) `<sp:RecipientToken>` (05) `<wsp:Policy>` (06) `<sp:X509Token sp:IncludeToken="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702/IncludeToken/Never">` (07) `<wsp:Policy>` (08) `<sp:WssX509V3Token10 />` (09) `</wsp:Policy>` (10) `</sp:X509Token>` (11) `</wsp:Policy>` (12) `</sp:RecipientToken>` (13) `<sp:InitiatorToken>` (14) `<wsp:Policy>` (15) `<sp:X509Token sp:IncludeToken="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702/IncludeToken/AlwaysToRecipient" >` (16) `<wsp:Policy>` (17) `<sp:WssX509V3Token10 />` (18) `</wsp:Policy>` (19) `</sp:X509Token>` (20) `</wsp:Policy>` (21) `</sp:InitiatorToken>` (22) `<sp:AlgorithmSuite>` (23) `<wsp:Policy>` (24) `<sp:Basic256Rsa15 />` (25) `</wsp:Policy>` (26) `</sp:AlgorithmSuite>` (27) `<sp:Layout>` (28) `<wsp:Policy>` (29) `<sp:Lax />` (30) `</wsp:Policy>` (31) `</sp:Layout>` (32) `<sp:IncludeTimestamp />` (33) `<sp:OnlySignEntire-HeadersAndBody />` (34) `</wsp:Policy>` (35) `</sp:AsymmetricBinding>` (36) `</wsp:Policy>` is a policy for securing messages using X509 certificates [\[\[WS-SecurityPolicy\]\]](#).

Example RM Policy Expression.

```
(01) <wsp:Policy
      xmlns:rmp="http://docs.oasis-open.org/ws-rx/wsrmp/200702"
      xmlns:wsp="http://www.w3.org/ns/ws-policy"
```

```
      xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd"
      wsu:Id="RmPolicy" >
```

```
(02) <rmp:RMAssertion>
(03) <wsp:Policy/>
(04) </rmp:RMAssertion>
(05) </wsp:Policy>
```

Example X509 Security Policy Expression.

```
(01) <wsp:Policy
      xmlns:sp="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702"
      xmlns:wsp="http://www.w3.org/ns/ws-policy"
```

```
      xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd"
      wsu:Id="X509EndpointPolicy" >
```

```
(02) <sp:AsymmetricBinding>
(03) <wsp:Policy>
(04) <sp:RecipientToken>
(05) <wsp:Policy>
(06) <sp:X509Token
```

```
sp:IncludeToken="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702/IncludeToken/Never">
```

```

(07)         <wsp:Policy>
(08)             <sp:WssX509V3Token10 />
(09)         </wsp:Policy>
(10)     </sp:X509Token>
(11) </wsp:Policy>
(12) </sp:RecipientToken>
(13) <sp:InitiatorToken>
(14)     <wsp:Policy>
(15)         <sp:X509Token
sp:IncludeToken="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702/IncludeToken/AlwaysToRecipient"
>
(16)         <wsp:Policy>
(17)             <sp:WssX509V3Token10 />
(18)         </wsp:Policy>
(19)     </sp:X509Token>
(20) </wsp:Policy>
(21) </sp:InitiatorToken>
(22) <sp:AlgorithmSuite>
(23)     <wsp:Policy>
(24)         <sp:Basic256Rsa15 />
(25)     </wsp:Policy>
(26) </sp:AlgorithmSuite>
(27) <sp:Layout>
(28)     <wsp:Policy>
(29)         <sp:Lax />
(30)     </wsp:Policy>
(31) </sp:Layout>
(32) <sp:IncludeTimestamp />
(33) <sp:OnlySignEntireHeadersAndBody />
(34) </wsp:Policy>
(35) </sp:AsymmetricBinding>
(36) </wsp:Policy>

```

The document containing both of these policy expressions is assumed to be located at <http://www.example.com/policies>. Per Section [3.2 Policy Identification](#) of Web Services Policy 1.5 - Framework [[[Web Services Policy Framework](#)]], the IRIs used for these in the remainder of this document are <http://www.example.com/policies#RmPolicy> and <http://www.example.com/policies#X509EndpointPolicy>, for the examples in Example RM Policy Expression.(01)

```

<wsp:Policy
  xmlns:rmp="http://docs.oasis-open.org/ws-rx/wsrmp/200702"
  xmlns:wsp="http://www.w3.org/ns/ws-policy"
  xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd"
  wsu:Id="RmPolicy" > (02)
  <rmp:RMAssertion> (03) <wsp:Policy/> (04) </rmp:RMAssertion> (05) </wsp:Policy> and Example
X509 Security Policy Expression.(01) <wsp:Policy
  xmlns:sp="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702"
  xmlns:wsp="http://www.w3.org/ns/ws-policy"
  xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd"
  wsu:Id="X509EndpointPolicy" > (02) <sp:AsymmetricBinding> (03) <wsp:Policy> (04)
  <sp:RecipientToken> (05) <wsp:Policy> (06) <sp:X509Token sp:IncludeTo

```

```

ken="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702/IncludeToken/Never"> (07)
<wsp:Policy> (08)           <sp:WssX509V3Token10 /> (09)           </wsp:Policy> (10)
</sp:X509Token> (11)       </wsp:Policy> (12)       </sp:RecipientToken> (13)   <sp:InitiatorToken>
(14)       <wsp:Policy> (15)           <sp:X509Token sp:IncludeToken="http://docs.oasis-open.org/ws-
sx/ws-securitypolicy/200702/IncludeToken/AlwaysToRecipient" > (16)       <wsp:Policy> (17)
<sp:WssX509V3Token10 /> (18)           </wsp:Policy> (19)           </sp:X509Token> (20)
</wsp:Policy> (21)       </sp:InitiatorToken> (22)   <sp:AlgorithmSuite> (23)       <wsp:Policy> (24)
<sp:Basic256Rsa15 /> (25)       </wsp:Policy> (26)       </sp:AlgorithmSuite> (27)   <sp:Layout>
(28)       <wsp:Policy> (29)           <sp:Lax /> (30)           </wsp:Policy> (31)       </sp:Layout> (32)
<sp:IncludeTimestamp /> (33)   <sp:OnlySignEntireHeadersAndBody /> (34) </wsp:Policy> (35)
</sp:AsymmetricBinding> (36) </wsp:Policy>, respectively.

```

3. Policy Attachment

This section defines two general-purpose mechanisms for associating with one or more . The first allows XML-based descriptions of resources (represented as XML elements) to associate policy as part of their intrinsic definition. The second allows policies to be associated with arbitrary policy subjects independently from their definition.

In addition it defines the processing rules for scenarios where multiple policies are attached to a policy subject.

3.1. Effective Policy

will often be associated with a particular using multiple . For example, there may be attachments at different points in a WSDL description that apply to one policy subject, and other attachments may be made by UDDI and other mechanisms.

When multiple attachments are made, their relevant policies can be combined. The *effective policy*, for a given , is the combination of relevant policies. The relevant policies are those attached to that contain the .

This combination can be achieved through a merge. A *merge* consists of serializing each policy as a , replacing their `wsp:Policy` element with a `wsp:All` element, and placing each as children of a wrapper `wsp:Policy` element. The resulting policy expression is considered to represent the combined policy of all of the attachments to that policy subject.

Such calculated policy expressions have no meaningful IRI of their own.

3.2. Policy Attachment Mechanisms

This section defines two general-purpose mechanisms for associating policies [[[Web Services Policy Framework](#)]] with one or more . The first allows XML-based descriptions of resources to associate as part of their intrinsic definition. The second allows policies to be associated with arbitrary policy subjects independently from their definition.

The of an attachment is specific to the Mechanism using it. Accordingly, any mechanism **MUST** define the of the attachment.

3.3. XML Element Attachment

It is often desirable to associate with Web services represented as XML elements (i.e., WSDL 1.1 elements - Section § 4 – Attaching Policies Using WSDL 1.1 on page 12 for the specific details of WSDL attachment).

Since are strongly typed by the authors, the precise semantics of how element policy is to be processed once discovered is domain-specific; however, implementations are likely to follow the precedent specified in the section below on WSDL [[WSDL 1.1]] and Policy.

This specification defines a global attribute that allows to be attached to an arbitrary XML element. The following is the schema definition for the `wsp:PolicyURIs` attribute:

```
(01) <xs:schema>
(02)   <xs:attribute name="PolicyURIs">
(03)     <xs:simpleType>
(04)       <xs:list itemType="xs:anyURI" />
(05)     </xs:simpleType>
(06)   </xs:attribute>
(07) </xs:schema>
```

The namespace URI [[XML Namespaces]] for this attribute is `http://www.w3.org/ns/ws-policy`.

The `wsp:PolicyURIs` attribute contains a white space-separated list of one or more IRIs [[IETF RFC 3987]]. When this attribute is used, each of the values identifies a as defined by [[Web Services Policy Framework]]. If more than one IRI is specified, the individual referenced need to be merged together to form a single element . The resultant is then associated with the element information item's `element policy` property. The *element policy* is the attached to the associated with the element information item that contains it.

An example of `element policy` through the use of this global attribute is given below using the sample policies stated in Section § 2.4 – Example on page 4.

If the referenced by the following XML element

```
(01) <MyElement wsp:PolicyURIs="
(02)   http://www.example.com/policies#RmPolicy
(03)   http://www.example.com/policies#X509EndpointPolicy" />
```

have been processed and merged, it would result in an `element policy` whose XML 1.0 representation is listed in Example Merged Policy Expression. (01) <wsp:Policy xmlns:rmp="http://docs.oasis-open.org/ws-rx/wsrmp/200702" xmlns:sp="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702" xmlns:wsp="http://www.w3.org/ns/ws-policy" > (02) <wsp:All> (03) <rmp:RMAssertion> (04) <wsp:Policy/> (05) </rmp:RMAssertion> (06) </wsp:All> (07) <wsp:All> (08) <sp:AsymmetricBinding> (09) <wsp:Policy> (10) <!-- Details omitted for readability --> (11) <sp:IncludeTimestamp /> (12) <sp:OnlySignEntireHeadersAndBody /> (13) </wsp:Policy> (14) </sp:AsymmetricBinding> (15) </wsp:All> (16) </wsp:Policy>:

Example Merged Policy Expression.

```
(01) <wsp:Policy
      xmlns:rmp="http://docs.oasis-open.org/ws-rx/wsrmp/200702"
      xmlns:sp="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702"
      xmlns:wsp="http://www.w3.org/ns/ws-policy" >
(02)   <wsp:All>
```

```

(03)     <rm:RMAssertion>
(04)         <wsp:Policy/>
(05)     </rm:RMAssertion>
(06) </wsp:All>
(07) <wsp:All>
(08)     <sp:AsymmetricBinding>
(09)         <wsp:Policy>
(10)             <!-- Details omitted for readability -->
(11)             <sp:IncludeTimestamp />
(12)             <sp:OnlySignEntireHeadersAndBody />
(13)         </wsp:Policy>
(14)     </sp:AsymmetricBinding>
(15) </wsp:All>
(16) </wsp:Policy>

```

Note that this [element policy](#) has no meaningful IRI.

The presence of the `wsp:PolicyURIs` attribute does not prohibit implementations from using additional mechanisms for associating with XML-based constructs.

Alternatively, rather than using the global attribute, XML elements MAY use the `wsp:Policy` or `wsp:PolicyReference` elements directly as children, in order to support [element policy](#) (Per Section [4.3.4 Policy References](#) of Web Services Policy 1.5 - Framework [\[\[Web Services Policy Framework\]\]](#)), and the semantics for this are the same as for the use of the global attribute. For example, an alternative way of attaching the policies in the above example, using child elements, would be as follows:

```

(01) <MyElement>
(02)     <wsp:PolicyReference
(03)         URI="http://www.example.com/policies#RmPolicy" />
(04)     <wsp:PolicyReference
(05)         URI="http://www.example.com/policies#X509EndpointPolicy" />
(06) </MyElement/>

```

3.4. External Policy Attachment

This mechanism allows to be associated with a independent of that subject's definition and/or representation through the use of a `wsp:PolicyAttachment` element.

This element has three components: the of the attachment, the being bound, and optional security information. The of the attachment is defined using one or more extensible domain expressions that identify , typically using IRIs.

Domain expressions identify the domain of the association. That is, the set of that will be considered for inclusion in the scope using an extensible domain expression model. Domain expressions identify to be included within the . Domain expressions yield an unordered set of for consideration.

For the purposes of attaching to a through this mechanism, any contained inside of the `wsp:AppliesTo` element MUST NOT be considered in scope. For example, an Endpoint Reference may be used as a domain expression, and it may contain within it, but this are not considered in scope with respect to the `wsp:PolicyAttachment` element using it.

The following is the pseudo-schema for the `wsp:PolicyAttachment` element:

```
(01) <wsp:PolicyAttachment ... >
(02)   <wsp:AppliesTo>
(03)     <x:DomainExpression/> +
(04)   </wsp:AppliesTo>
(05)   ( <wsp:Policy>...</wsp:Policy> |
(06)     <wsp:PolicyReference>...</wsp:PolicyReference> ) +
(07)   <wsse:Security>...</wsse:Security> ?
(08)   ...
(09) </wsp:PolicyAttachment>
```

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

/wsp:PolicyAttachment

This describes an external .

/wsp:PolicyAttachment/wsp:AppliesTo

This required element's children describe the .

/wsp:PolicyAttachment/wsp:AppliesTo/{any}

These child elements MUST specify and/or refine the domain expression(s) that define the . They MUST NOT contradict the semantics of their root element; if an element is not recognized, it SHOULD be ignored. Domain expressions are XML elements that describe within a . When more than one domain expression is present, the contains the union of the identified by each expression.

/wsp:PolicyAttachment/wsp:Policy

This element is a representing a that is attached to the within the .

/wsp:PolicyAttachment/wsp:PolicyReference

This element references a to be attached to the that are in the . Refer to Web Services Policy 1.5 - Framework [[[Web Services Policy Framework](#)]] for additional details.

/wsp:PolicyAttachment/wsse:Security

This element is of type `wsse:Security` and allows security information such as signatures to be included. The syntax of this element is described in WS-Security [[[WS-Security 2004](#)]].

/wsp:PolicyAttachment/@{any}

Additional attributes MAY be specified but MUST NOT contradict the semantics of the *owner element*; if an attribute is not recognized, it SHOULD be ignored.

/wsp:PolicyAttachment/{any}

Other child elements for binding constructs MAY be specified but MUST NOT contradict the semantics of the parent element; if an element is not recognized, it SHOULD be ignored.

Domain expressions are used to identify entities such as endpoints, messages or resources with which a policy can be associated. For example, domain expressions may be used to refer to WSDL 1.1 definitions, WSDL 2.0 components, endpoint references, etc.

The following example illustrates the use of this mechanism with an `EndpointReference` domain expression for a deployed endpoint as defined in Web Services Addressing [[[WS-Addressing Core](#)]]:

```

(01) <wsp:PolicyAttachment>
(02)   <wsp:AppliesTo>
(03)     <wsa:EndpointReference>
(04)       <wsa:Address>http://www.example.com/acct</wsa:Address>
(05)     </wsa:EndpointReference>
(06)   </wsp:AppliesTo>
(07)   <wsp:PolicyReference
(08)     URI="http://www.example.com/policies#RmPolicy" />
(09) </wsp:PolicyAttachment>

```

In this example, the at `http://www.example.com/policies#RmPolicy` applies to all interactions with the endpoint at `http://www.example.com/acct`.

3.4.1. URI Domain Expression

This section defines a domain expression for identifying resources as for the external attachment mechanism. The following is a pseudo-schema for the URI domain expression:

```

(01) <wsp:PolicyAttachment ... >
(02)   <wsp:AppliesTo>
(03)     <wsp:URI ... >xs:anyURI</wsp:URI> *
(04)   </wsp:AppliesTo>
(05)   ...
(06) </wsp:PolicyAttachment>

```

The following describes the URI domain expression element listed in the pseudo-schema outlined above:

/wsp:PolicyAttachment/wsp:AppliesTo/wsp:URI

This element is an IRI that references a resource as a . There is no requirement that the IRI be resolvable; retrieval mechanisms are beyond the scope of this specification.

/wsp:PolicyReference/wsp:AppliesTo/wsp:URI/@{any}

Additional attributes MAY be specified but MUST NOT contradict the semantics of the *owner element*; if an attribute is not recognized, it SHOULD be ignored.

URI domain expressions are used to identify resources that are identified using IRI or IRI References (such as endpoint, message or operation definitions) with which can be associated. For example, URI domain expressions can be used to identify WSDL 1.1 definitions, WSDL 2.0 components, etc. When a URI domain expression identifies multiple resources, i.e. WSDL 1.1 supports multiple operations with the same name (sometimes called operation name overloading), the Policy applies to all the resources that are identified.

IRI References for WSDL 2.0 components are defined in Appendix C of the Web Services Description Language (WSDL) Version 2.0 Part 1: Core Language [\[\[WSDL 2.0 Core Language\]\]](#). The following example illustrates the use of URI domain expression with a WSDL 2.0 IRI Reference:

```

(01) <wsp:PolicyAttachment>
(02)   <wsp:AppliesTo>
(03)     <wsp:URI>http://example.org/TicketAgent.wsdl20#wsdl.endpoint(TicketAgentService/Endpoint)</wsp:URI>
(04)   </wsp:AppliesTo>

```

```
(05)   <wsp:PolicyReference URI="http://www.example.com/policies#RmPolicy" />
(06) </wsp:PolicyAttachment>
```

In this example, the `http://www.example.com/policies#RmPolicy` applies to all interactions with the endpoint at `http://example.org/TicketAgent.wsdl20#wsdl.endpoint(TicketAgentService/Endpoint)`.

IRI References for WSDL 1.1 elements are defined in WSDL 1.1 Element Identifiers [\[\[WSDL11 Elements\]\]](#).

The scope of URI domain expressions for WSDL 2.0 components or WSDL 1.1 elements is limited to the subjects defined in Section [§ 5 – WS-Policy Attachment for WSDL 2.0](#) on page 19 and [§ 4 – Attaching Policies Using WSDL 1.1](#) on page 12.

3.5. Use of IRIs in Policy Attachment

Policy attachment mechanisms use IRIs for some identifiers. This document does not define a base URI but relies on the mechanisms defined in XML Base [\[\[XML BASE\]\]](#) and RFCs 3023 [\[\[IETF RFC 3023\]\]](#), 3986 [\[\[IETF RFC 3986\]\]](#) and 3987 [\[\[IETF RFC 3987\]\]](#) for establishing a base URI against which relative IRIs can be made absolute.

4. Attaching Policies Using WSDL 1.1

This section describes a mechanism for associating policy expressions with Web service constructs in WSDL 1.1 [\[\[WSDL 1.1\]\]](#). The mechanism consists of:

- A model for attaching policies to WSDL 1.1 constructs. The model defines:
 - A partitioning of WSDL constructs into service, endpoint, operation and message policy subjects.
 - The semantics of attaching a to each
 - How to combine policies attached to more than one WSDL construct within a single policy subject.
- An XML representation of policy expressions attached to WSDL 1.1 constructs.
- The annotation of such policy expressions as required extensions using the WSDL-defined extensibility flag `@wsdl:required`.

WSDL 1.1 disallows the use of extensibility elements on certain elements and the use of extensibility attributes on others. However, the WS-I Basic Profile 1.1 [\[\[BP 1.1\]\]](#) overrules this restriction and allows element extensibility everywhere. Therefore, when attaching a reference directly to the WSDL element the policy reference SHOULD be attached using `wsp:PolicyReference` as child element unless it is absolutely necessary to maintain the original WSDL 1.1 restriction, in which case the `@wsp:PolicyURIs` attribute MAY be used for the following WSDL elements:

- `wsdl11:portType`
- `wsdl11:portType/wsdl11:operation/wsdl11:input`
- `wsdl11:portType/wsdl11:operation/wsdl11:output`
- `wsdl11:portType/wsdl11:operation/wsdl11:fault`

If it is necessary to include the actual within the WSDL description itself, it is RECOMMENDED that their `wsp:Policy` elements be included as children of the `wsdl11:definition` element, and referenced using the mechanisms just described. Alternatively, the MAY be made available through some other means, such as WS-MetadataExchange [[[WS-MetadataExchange](#)]].

To ensure that consumers of policy-annotated WSDL elements are capable of processing such , attachments using `wsp:PolicyReference` SHOULD be marked as a mandatory extension (e.g., with a `@wsdl11:required="true"` attribute).

The rest of this section defines how to interpret the when they appear within a WSDL description.

4.1. Calculating Effective Policy in WSDL 1.1

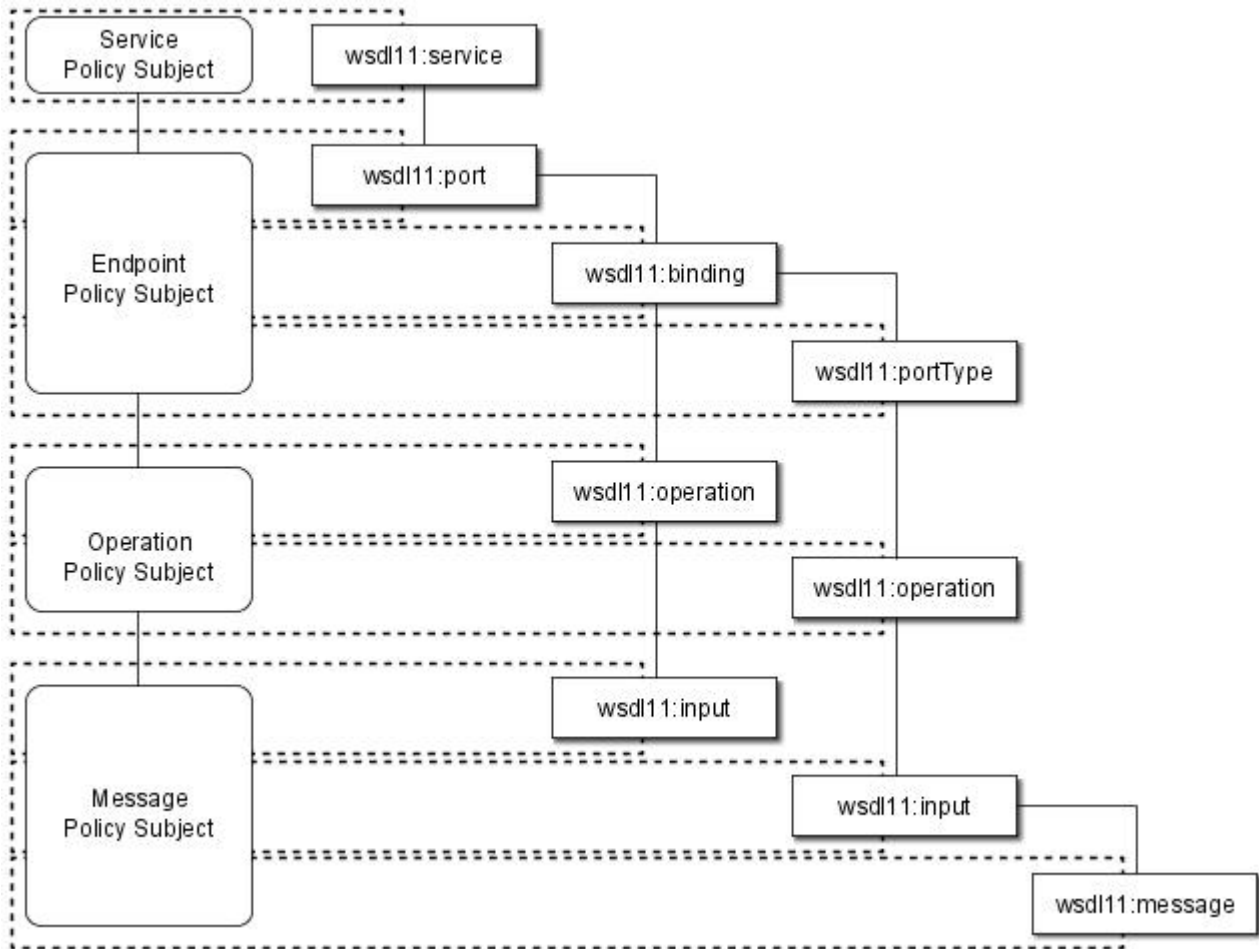
in WSDL 1.1 can be used to associate with four different types of , identified as the service policy subject, the endpoint policy subject, the operation policy subject, and the message policy subject. These policy subjects should be considered as nested, due to the hierarchical nature of WSDL.

When attaching a to a WSDL element, a is implied for that attachment. The only contains the associated with that element and not those associated with the children of that element. Therefore, it is RECOMMENDED that each contained within a WSDL element's **element policy** should have the correct semantic such that the policy subject for that assertion is that WSDL element. For example, assertions that describe behaviours regarding the manipulation of messages should only be contained within policies attached to WSDL message elements.

Figure 1 represents how the **effective policies**, with regard to WSDL, are calculated for each of these . In the diagram, the dashed boxes represent s implied by WSDL elements. For a particular , the **effective policy** MUST *merge* the **element policy** of each element with a that contains the .

For abstract WSDL definitions, the **element policy** is considered an intrinsic part of the definition and applies to all uses of that definition. In particular, it MUST be **merged** into the **effective policy** of every implementation of that abstract WSDL definition.

Policies that are attached to a deployed resource (e.g., services or ports) are only considered in the **effective policy** of that deployed resource itself.



(This graphic is also available in SVG format [here](#).)

When attaching policies at different levels of the WSDL hierarchy, care must be taken. A message exchange with an endpoint **MAY** be described by the **effective policies** in all four subject types simultaneously.

For example, in , for a particular input message to a deployed endpoint, there are four involved, each with their own **effective policy**. There is an **effective policy** for the message, as well as an **effective policy** for the parent operation of that message, an **effective policy** for the deployed endpoint, and the **effective policy** for the service as a whole. All four **effective policies** are applicable in relation to that specific input message.

It is **RECOMMENDED** that, where specific associated with one are only compatible with specific on another in the same hierarchical chain, the policies containing these assertions should be attached within a single WSDL binding hierarchy.

For any given port, the for each type **SHOULD** be compatible with each of the at each of the parent and child , such that choices between at each level are independent of each other.

The rest of this section describes these types, and how the **effective policy** for each is calculated.

4.1.1. Service Policy Subject

The following WSDL 1.1 element is considered as the service policy subject:

- wsd11:service

This element MAY have [element policy](#) as per Section § 3 – [Policy Attachment](#) on page 7, and if present MUST be [merged](#) into the [effective policy](#) of the WSDL service policy subject.

A policy associated with a service policy subject applies to any message exchange using any of the endpoints offered by that service.

4.1.2. Endpoint Policy Subject

The following WSDL 1.1 elements collectively describe an endpoint:

- wsdl11:port
- wsdl11:portType
- wsdl11:binding

These elements MAY have [element policy](#) as per Section § 3 – [Policy Attachment](#) on page 7. The implied by each of these elements contains the endpoint policy subject representing the deployed endpoint.

Since the wsdl11:portType may be used by more than one binding, it is RECOMMENDED that only policies containing abstract (i.e., binding independent) assertions should be attached to this type of element.

Policies associated with an endpoint policy subject apply to any message exchange made using that endpoint.

The [effective policy](#) for a WSDL endpoint policy subject includes the [element policy](#) of the wsdl11:port element that defines the endpoint [merged](#) with the [element policy](#) of the referenced wsdl11:binding element and the [element policy](#) of the referenced wsdl11:portType element that defines the interface of the endpoint.

4.1.3. Operation Policy Subject

The following WSDL 1.1 elements collectively describe an operation:

- wsdl11:portType/wsdl11:operation
- wsdl11:binding/wsdl11:operation

These elements MAY have [element policy](#) as per Section § 3 – [Policy Attachment](#) on page 7.

The implied by each of these elements contains the operation policy subject representing the specific operation of the endpoint policy subject.

Since the wsdl11:portType/wsdl11:operation may be used by more than one binding, it is RECOMMENDED that only policies containing abstract (i.e., binding independent) assertions should be attached to this type of element.

Policies associated with an operation policy subject apply to the message exchange described by that operation.

The [effective policy](#) for a WSDL operation policy subject is calculated in relation to a specific port, and includes the [element policy](#) of the wsdl11:portType/wsdl11:operation element that defines the operation [merged](#) with that of the corresponding wsdl11:binding/wsdl11:operation element.

4.1.4. Message Policy Subject

The following WSDL 1.1 elements are used to describe messages:

- wsdl11:message
- wsdl11:portType/wsdl11:operation/wsdl11:input

- wsdl11:portType/wsdl11:operation/wsdl11:output
- wsdl11:portType/wsdl11:operation/wsdl11:fault
- wsdl11:binding/wsdl11:operation/wsdl11:input
- wsdl11:binding/wsdl11:operation/wsdl11:output
- wsdl11:binding/wsdl11:operation/wsdl11:fault

These elements MAY have [element policy](#) as per Section § 3 – Policy Attachment on page 7.

The implied by these elements contains the message policy subject representing the specific input, output, or fault message in relation to the operation policy subject.

Policies associated with a message policy subject apply to that message (i.e. input, output or fault message).

The [effective policy](#) for a specific WSDL message (i.e., input, output, or fault message) is calculated in relation to a specific port, and includes the [element policy](#) of the wsdl11:message element that defines the message's type merged with the [element policy](#) of the wsdl11:binding and wsdl11:portType message definitions that describe that message.

For example, the [effective policy](#) of a specific input message for a specific port would be the *merge* of the wsdl11:message element defining the message type, the wsdl11:portType/wsdl11:operation/wsdl11:input element, and the corresponding wsdl11:binding/wsdl11:operation/wsdl11:input element for that message.

Since a wsdl11:message may be used by more than one wsdl11:portType, it is RECOMMENDED that only policies containing abstract (i.e., binding independent) assertions should be attached to this type of element.

Since wsdl11:input, wsdl11:output, and wsdl11:fault elements in a wsdl11:portType/wsdl11:operation may be used by more than one binding, it is RECOMMENDED that only policies containing abstract (i.e., binding independent) assertions should be attached to these types of elements.

Care should be taken when attaching policies to outbound messages as the result may not be what is expected. For example, expressing a choice on a service's outbound message without a mechanism for a requester of that service to communicate its choice to the service before the outbound message is sent may not result in the desired behaviours. It is therefore RECOMMENDED that on outbound messages SHOULD be avoided without the use of some form of mutual exchange between the parties involved.

4.1.5. Example

As an example of the combination of these and [effective policy](#) calculation, consider the WSDL type definition in Example Policy Attached to WSDL.(01) <wsdl11:definitions name="StockQuote" targetNamespace="http://www.example.com/stock/binding" xmlns:tns="http://www.example.com/stock/binding" xmlns:fab="http://www.example.com/stock" xmlns:rmp="http://docs.oasis-open.org/ws-rx/wsrmp/200702" xmlns:sp="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702" xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/" xmlns:wsoap12="http://schemas.xmlsoap.org/wsdl/soap12/" xmlns:wsp="http://www.w3.org/ns/ws-policy" xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd" > (02) <wsp:Policy wsu:Id="RmPolicy" > (03) <rmp:RMAssertion> (04) <wsp:Policy/> (05) </rmp:RMAssertion> (06) </wsp:Policy> (07) <wsp:Policy wsu:Id="X509EndpointPolicy" > (08) <sp:AsymmetricBinding> (09) <wsp:Policy> <!-- Details omitted for readability --> (10) <sp:IncludeTimestamp /> (11) <sp:OnlySignEntireHeadersAndBody /> (12) </wsp:Policy> (13) </sp:AsymmetricBinding> (14) </wsp:Policy> (15) <wsp:Policy wsu:Id="SecureMessagePolicy" > (16) <sp:SignedParts> (17) <sp:Body /> (18) </sp:SignedParts> (19)

```

<sp:EncryptedParts> (20)    <sp:Body /> (21)    </sp:EncryptedParts> (22)    </wsp:Policy> (23)
<wsdl11:import namespace="http://www.example.com/stock"          location="http://www.example.com/stock/stock.wsdl" /> (24)
<wsdl11:binding name="StockQuoteSoapBinding" type="fab:Quote" > (25)
<wsoap12:binding style="document" (26)    transport="http://schemas.xmlsoap.org/soap/http" /> (27)
<wsp:PolicyReference URI="#RmPolicy" wsdl11:required="true" /> (28)    <wsp:PolicyReference URI="#X509EndpointPolicy" wsdl11:required="true" /> (29)
<wsdl11:operation name="GetLastTradePrice" > (30)
<wsoap12:operation soapAction="http://www.example.com/stock/Quote/GetLastTradePriceRequest" /> (31)
<wsdl11:input> (32)    <wsoap12:body use="literal" /> (33)
    <wsp:PolicyReference URI="#SecureMessagePolicy"          wsdl11:required="true" /> (34)
</wsdl11:input> (35)    <wsdl11:output> (36)    <wsoap12:body use="literal" /> (37)
    <wsp:PolicyReference URI="#SecureMessagePolicy" (38)
wsdl11:required="true" /> (39)    </wsdl11:output> (40)    </wsdl11:operation> (41)
</wsdl11:binding> (42) </wsdl11:definitions> that references policies.

```

Example Policy Attached to WSDL.

```

(01) <wsdl11:definitions name="StockQuote"
    targetNamespace="http://www.example.com/stock/binding"
    xmlns:tns="http://www.example.com/stock/binding"
    xmlns:fab="http://www.example.com/stock"
    xmlns:rmp="http://docs.oasis-open.org/ws-rx/wsrmp/200702"
    xmlns:sp="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702"
    xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
    xmlns:wsoap12="http://schemas.xmlsoap.org/wsdl/soap12/"
    xmlns:wsp="http://www.w3.org/ns/ws-policy"

xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd"
>
(02)   <wsp:Policy wsu:Id="RmPolicy" >
(03)     <rmp:RMAssertion>
(04)       <wsp:Policy/>
(05)     </rmp:RMAssertion>
(06)   </wsp:Policy>
(07)   <wsp:Policy wsu:Id="X509EndpointPolicy" >
(08)     <sp:AsymmetricBinding>
(09)       <wsp:Policy>
(10)         <!-- Details omitted for readability -->
(11)         <sp:IncludeTimestamp />
(12)         <sp:OnlySignEntireHeadersAndBody />
(13)       </wsp:Policy>
(14)     </sp:AsymmetricBinding>
(15)   </wsp:Policy>
(16)   <wsp:Policy wsu:Id="SecureMessagePolicy" >
(17)     <sp:SignedParts>
(18)       <sp:Body />
(19)     </sp:SignedParts>
(20)   <sp:EncryptedParts>

```

```

(20)     <sp:Body />
(21)     </sp:EncryptedParts>
(22) </wsp:Policy>
(23) <wsdl11:import namespace="http://www.example.com/stock"
      location="http://www.example.com/stock/stock.wsdl" />
(24) <wsdl11:binding name="StockQuoteSoapBinding" type="fab:Quote" >
(25)   <wsoap12:binding style="document"
(26)     transport="http://schemas.xmlsoap.org/soap/http" />
(27)   <wsp:PolicyReference URI="#RmPolicy" wsdl11:required="true" />
(28)   <wsp:PolicyReference URI="#X509EndpointPolicy" wsdl11:required="true" />
(29)   <wsdl11:operation name="GetLastTradePrice" >
(30)     <wsoap12:operation
soapAction="http://www.example.com/stock/Quote/GetLastTradePriceRequest" />
(31)       <wsdl11:input>
(32)         <wsoap12:body use="literal" />
(33)         <wsp:PolicyReference URI="#SecureMessagePolicy"
              wsdl11:required="true" />
(34)       </wsdl11:input>
(35)       <wsdl11:output>
(36)         <wsoap12:body use="literal" />
(37)         <wsp:PolicyReference URI="#SecureMessagePolicy"
              wsdl11:required="true" />
(38)       </wsdl11:output>
(39)     </wsdl11:operation>
(40)   </wsdl11:binding>
(41) </wsdl11:definitions>
(42)

```

For endpoints bound to `StockQuoteSoapBinding`, the [effective policy](#) of the endpoint is listed in [Example Merged Policy Expression](#).(01) `<wsp:Policy xmlns:rmp="http://docs.oasis-open.org/ws-rx/wsrmp/200702" xmlns:sp="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702" xmlns:wsp="http://www.w3.org/ns/ws-policy" >` (02) `<wsp:All>` (03) `<rmp:RMAssertion>` (04) `<wsp:Policy/>` (05) `</rmp:RMAssertion>` (06) `</wsp:All>` (07) `<wsp:All>` (08) `<sp:AsymmetricBinding>` (09) `<wsp:Policy>` (10) `<!-- Details omitted for readability -->` (11) `<sp:IncludeTimestamp />` (12) `<sp:OnlySignEntireHeadersAndBody />` (13) `</wsp:Policy>` (14) `</sp:AsymmetricBinding>` (15) `</wsp:All>` (16) `</wsp:Policy>` (above). For the `GetLastTradePrice` operation, an additional message-level [effective policy](#) is in effect for the input message, whose XML 1.0 representation is listed in [Example Message Security Policy Expression](#).(01) `<wsp:Policy xmlns:sp="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702" xmlns:wsp="http://www.w3.org/ns/ws-policy" xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd" wsu:Id="SecureMessagePolicy" >` (02) `<sp:SignedParts>` (03) `<sp:Body />` (04) `</sp:SignedParts>` (05) `<sp:EncryptedParts>` (06) `<sp:Body />` (07) `</sp:EncryptedParts>` (08) `</wsp:Policy>`.

Example Message Security Policy Expression.

```

(01) <wsp:Policy
      xmlns:sp="http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702"
      xmlns:wsp="http://www.w3.org/ns/ws-policy"

```

```

xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd"
    wsu:Id="SecureMessagePolicy" >
(02)  <sp:SignedParts>
(03)    <sp:Body />
(04)  </sp:SignedParts>
(05)  <sp:EncryptedParts>
(06)    <sp:Body />
(07)  </sp:EncryptedParts>
(08) </wsp:Policy>

```

5. WS-Policy Attachment for WSDL 2.0

This section describes a mechanism for associating policy expressions with Web service constructs in WSDL 2.0. The mechanism consists of:

- A model for attaching policies to WSDL 2.0 constructs. The model defines:
 - A partitioning of WSDL constructs into service, endpoint, operation and message policy subjects.
 - The semantics of attaching a policy to each policy subject.
 - How to combine policies attached to more than one WSDL component within a single policy subject.
- An XML representation of policy expressions attached to WSDL 2.0 constructs.
- The annotation of such policy expressions as required extensions using the WSDL-defined extensibility flag `@wsdl20:required`.

§ 2.2 – XML Namespaces on page 2 lists all the XML Namespaces that are used in this section. (XML elements without a namespace prefix are from the Web Services Policy XML Namespace.)

5.1. Example

The example below illustrates the use of WS-Policy Attachment for WSDL 2.0:

Example Policy Attached to WSDL 2.0

```

(01) <wsdl20:description>
(02) ...
(03)  <wsp:Policy wsu:Id="common">
(04)    <mtom:OptimizedMimeSerialization wsp:Optional="true"/>
(05)    <wsam:Addressing>...</wsam:Addressing>
(06)  </wsp:Policy>

(07)  <wsp:Policy wsu:Id="secure">
(08)    <wsp:ExactlyOne>
(09)      <sp:TransportBinding>...</sp:TransportBinding>
(10)      <sp:AsymmetricBinding>...</sp:AsymmetricBinding >
(11)    </wsp:ExactlyOne>
(12)  </wsp:Policy>

```

```

(13) <wsdl20:binding name="SecureBinding"
(14)     interface="tns:RealTimeDataInterface" >
(15)     <wsp:PolicyReference URI="#secure" />
(16)     <wsdl20:operation name="GetRealQuote" >...</wsdl20:operation>
(17)     ...
(18) </wsdl20:binding>

(19) <wsdl20:service name="RealTimeDataService"
(20)     interface="tns:RealTimeDataInterface" >
(21)     <wsdl20:endpoint name="RealTimeDataPort"
(22)         binding="tns:SecureBinding">
(23)         <wsp:PolicyReference URI="#common" />
(24)         ...
(25)     </wsdl20:endpoint>
(26) </wsdl20:service>
(27) ...
(28) </wsdl20:description>

```

The `SecureBinding` WSDL binding description describes a binding for an interface that provides real-time quotes and book information on securities. (The prefixes `wsdl20` and `tns` are used here to denote the Web Services Description Language 2.0 XML Namespace and the target namespace of this WSDL document respectively.) To require the use of security for these offerings, a that requires the use of either transport-level or message-level security is attached to the binding description. The applies to any message exchange associated with any endpoint that supports this binding description.

The `RealTimeDataPort` WSDL endpoint description describes an endpoint that supports the `SecureBinding` WSDL binding description. To require the use of addressing and allow the use of optimization (Optimized MIME Serialization as defined in the MTOM specification [\[\[MTOM\]\]](#)), a that represents the addressing requirement and optimization capability is attached to the endpoint description. The applies to any message exchange associated with the `RealTimeDataPort` endpoint.

In the above example, the `#secure` and `#common` attached to the `SecureBinding` WSDL binding and `RealTimeDataPort` WSDL endpoint descriptions collectively apply to any message exchange associated with the `RealTimeDataPort` endpoint. The example below represents the combination of these two , that is, the [effective policy](#) for the `RealTimeDataPort` endpoint.

Effective Policy for the `RealTimeDataPort` endpoint

```

(01) <wsp:Policy>
(02)   <wsp:All>
(03)     <wsp:Policy>
(04)       <mtom:OptimizedMimeSerialization wsp:Optional="true"/>
(05)       <wsam:Addressing>...</wsam:Addressing>
(06)     </wsp:Policy>
(07)   <wsp:Policy>
(08)     <wsp:ExactlyOne>
(09)       <sp:TransportBinding>...</sp:TransportBinding>
(10)       <sp:AsymmetricBinding>...</sp:AsymmetricBinding >

```



```
(11)         </wsp:ExactlyOne>
(12)     </wsp:Policy>
(13) </wsp>All>
(14) </wsp:Policy>
```

5.2. Attaching Policy Expressions

Policy attachment points in a WSDL 2.0 document are:

- `wSDL20:service`
- `wSDL20:endpoint`
- `wSDL20:binding`
- `wSDL20:binding/wSDL20:operation`
- `wSDL20:binding/wSDL20:fault`
- `wSDL20:binding/wSDL20:operation/wSDL20:input`
- `wSDL20:binding/wSDL20:operation/wSDL20:output`
- `wSDL20:binding/wSDL20:operation/wSDL20:inFault`
- `wSDL20:binding/wSDL20:operation/wSDL20:outFault`
- `wSDL20:interface`
- `wSDL20:interface/wSDL20:operation`
- `wSDL20:interface/wSDL20:fault`
- `wSDL20:interface/wSDL20:operation/wSDL20:input`
- `wSDL20:interface/wSDL20:operation/wSDL20:output`
- `wSDL20:interface/wSDL20:operation/wSDL20:inFault` and
- `wSDL20:interface/wSDL20:operation/wSDL20:outFault`.

Any of these elements MAY have one or more `wsp:Policy` or `wsp:PolicyReference` child elements.

Policy attachment points in a WSDL document are associated with specific as described in the table below. There are four in WSDL: the service policy subject, the endpoint policy subject, the operation policy subject and the message policy subject. When a is attached to a in a WSDL document, capabilities and requirements represented by the apply to any message exchange or message associated with (or described by) the .

Association of Policy Attachment Points with Policy Subjects

Policy Attachment Point in a WSDL document	WSDL Component	Policy Subject
<code>wSDL20:service</code>	Service	Service
<code>wSDL20:endpoint</code>	Endpoint	Endpoint
<code>wSDL20:binding</code>	Binding	
<code>wSDL20:interface</code>	Interface	

Policy Attachment Point in a WSDL document	WSDL Component	Policy Subject
wsdl20:binding/wsdl20:operation	Binding Operation	Operation
wsdl20:interface/wsdl20:operation	Interface Operation	
wsdl20:binding/wsdl20:operation/ wsdl20:input	Binding Message Reference	Message for an input message
wsdl20:interface/wsdl20:operation/ wsdl20:input	Interface Message Reference whose {direction} property is 'in'	
wsdl20:binding/wsdl20:operation/ wsdl20:output	Binding Message Reference	Message for an output message
wsdl20:interface/wsdl20:operation/ wsdl20:output	Interface Message Reference whose {direction} property is 'out'	
wsdl20:binding/wsdl20:fault	Binding Fault	Message for an input fault mes- sage
wsdl20:binding/wsdl20:operation/ wsdl20:infault	Binding Fault Reference	
wsdl20:interface/wsdl20:fault	Interface Fault	
wsdl20:interface/wsdl20:operation/ wsdl20:infault	Interface Fault Reference whose {direction} property is 'in'	
wsdl20:binding/wsdl20:fault	Binding Fault	Message for an output fault mes- sage
wsdl20:binding/wsdl20:operation/wsdl20:out- fault	Binding Fault Reference	
wsdl20:interface/wsdl20:fault	Interface Fault	
wsdl20:interface/wsdl20:operation/ wsdl20:outfault	Interface Fault Reference whose {direction} property is 'out'	

For a WSDL component, the attached (extension to the WSDL component model is described in § 5.3 – [Extension to WSDL Component Model](#) on page 23) is considered an intrinsic part of the WSDL component definition and applies to all uses of that definition. For example, when attached to a WSDL Interface component, capabilities and requirements represented by a apply to all the use of this WSDL Interface description. When attached to a WSDL Binding component, capabilities and requirements represented by a apply to all the Endpoints that support this binding description.

A associated with a service policy subject applies to any message exchange (that is explicitly described by the Interface component in the Service component's {interface} property) using any of the endpoints offered by that service.

associated with an endpoint policy subject apply to any message exchange (that is explicitly described by the Interface component in the Service component's {interface} property of the Endpoint component's {parent} property) made using that endpoint. Given that a WSDL Interface component may be used by one or more binding descriptions, it is RECOMMENDED that only a containing that apply to any possible binding description should be attached.

associated with an operation policy subject apply to the message exchange described by that operation. Given that a WSDL Interface Operation component may be used by one or more binding descriptions, it is RECOMMENDED that only a containing that apply to any possible binding description should be attached.

associated with a message policy subject apply to that message (input, output or fault). Given that a WSDL Interface Message Reference, Interface Fault, Interface Fault Reference components may be used by one or more binding descriptions, it is RECOMMENDED that only a containing that apply to any possible binding should be attached.

MAY be attached at different levels of the WSDL component hierarchy. A message exchange with an endpoint MAY be described by the in all four simultaneously.

The common mechanism of associating a with a is to attach a reference to the to the . As described in the WS-Policy specification [[[Web Services Policy Framework](#)]], a reference to a is represented using the `wsp:PolicyReference` element. A policy attachment to a WSDL element is represented by attaching a `wsp:PolicyReference` element as a child element of the WSDL element.

can be included within a WSDL document or may reside external to a WSDL document. If including with a WSDL document is the chosen approach, it is RECOMMENDED that the `wsp:Policy` elements are included as children of the `wsdl20:description` element after the `wsdl20:types` element and referenced using the `wsp:PolicyReference` elements.

To mandate the processing of a attached to a policy attachment point in a WSDL document, the expression MUST be marked as required using the `@wsdl20:required` flag.

If the `wsp:Policy` elements are included as children of the `wsdl20:description` element, these Policy elements MUST NOT be marked as required using the `@wsdl20:required`. (Note: these may be included as children of the `wsdl20:description` element and may not be attached to any policy attachment point in a WSDL document.)

5.3. Extension to WSDL Component Model

This document adds an optional `{policy}` property to the following WSDL components:

- Service
- Endpoint
- Binding
- Binding Operation
- Binding Fault
- Binding Message Reference
- Binding Fault Reference
- Interface
- Interface Operation
- Interface Fault
- Interface Message Reference
- Interface Fault Reference

The `{policy}` property, when present, represents the capabilities and requirements as a . The value of the `{policy}` property is a as defined by Section 3 - Policy Model in the WS-Policy specification [[[Web Services Policy Framework](#)]]. The following table describes the mapping from XML representation to the `{policy}` property.

Mapping from XML representation to the {policy} property

Component	Value
Service	A corresponding to the merge of <code>wsp:Policy</code> or <code>wsp:PolicyReference</code> elements, if any, in the [children] of the <code>wsdl20:service</code> element.
Endpoint	A corresponding to the merge of <code>wsp:Policy</code> or <code>wsp:PolicyReference</code> elements, if any, in the [children] of the <code>wsdl20:endpoint</code> element.
Binding	A corresponding to the merge of <code>wsp:Policy</code> or <code>wsp:PolicyReference</code> elements, if any, in the [children] of the <code>wsdl20:binding</code> element.
Binding Operation	A corresponding to the merge of <code>wsp:Policy</code> or <code>wsp:PolicyReference</code> elements, if any, in the [children] of the <code>wsdl20:binding/wsdl20:operation</code> element.
Binding Fault	A corresponding to the merge of <code>wsp:Policy</code> or <code>wsp:PolicyReference</code> elements, if any, in the [children] of the <code>wsdl20:binding/wsdl20:fault</code> element.
Binding Message Reference	A corresponding to the merge of <code>wsp:Policy</code> or <code>wsp:PolicyReference</code> elements, if any, in the [children] of the <code>wsdl20:binding/wsdl20:operation/wsdl20:input</code> or <code>wsdl20:binding/wsdl20:operation/wsdl20:output</code> element.
Binding Fault Reference	A corresponding to the merge of <code>wsp:Policy</code> or <code>wsp:PolicyReference</code> elements, if any, in the [children] of the <code>wsdl20:binding/wsdl20:operation/wsdl20:infault</code> or <code>wsdl20:binding/wsdl20:operation/wsdl20:outfault</code> element.
Interface	A corresponding to the merge of <code>wsp:Policy</code> or <code>wsp:PolicyReference</code> elements, if any, in the [children] of the <code>wsdl20:interface</code> element.
Interface Operation	A corresponding to the merge of <code>wsp:Policy</code> or <code>wsp:PolicyReference</code> elements, if any, in the [children] of the <code>wsdl20:interface/wsdl20:operation</code> element, if any.
Interface Fault	A corresponding to the merge of <code>wsp:Policy</code> or <code>wsp:PolicyReference</code> elements, if any, in the [children] of the <code>wsdl20:interface/wsdl20:fault</code> element.
Interface Message Reference	A corresponding to the merge of <code>wsp:Policy</code> or <code>wsp:PolicyReference</code> elements, if any, in the [children] of the <code>wsdl20:interface/wsdl20:operation/wsdl20:input</code> or <code>wsdl20:interface/wsdl20:operation/wsdl20:output</code> element.
Interface Fault Reference	A corresponding to the merge of <code>wsp:Policy</code> or <code>wsp:PolicyReference</code> elements, if any, in the [children] of the <code>wsdl20:interface/wsdl20:operation/wsdl20:infault</code> or <code>wsdl20:interface/wsdl20:operation/wsdl20:outfault</code> element.

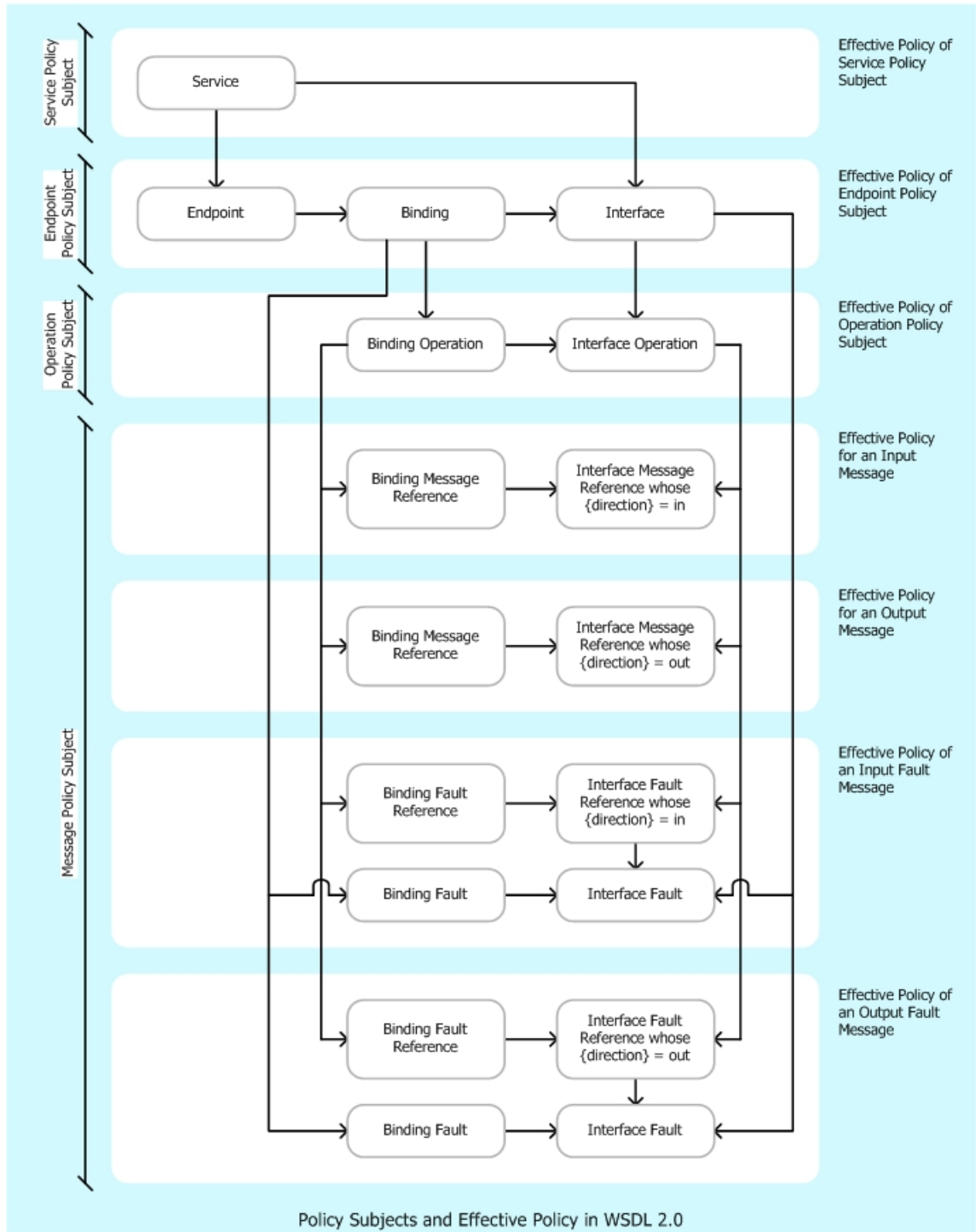
Two {policy} properties are equivalent when they represent policies that contain the same number of , and each in the first policy is equivalent to some in the second policy, and conversely.

Two are equivalent when each in the first is equivalent to some in the second , and conversely. If either contains multiple of the same type, equality is dependent on the semantics of that assertion type.

Two are equivalent if they have the same QName, if either policy assertion is an , both assertions must be and, if either has a nested policy, both assertions must have a nested policy and the nested policies must be equal. If either assertion contains policy assertion parameters, then the policy assertion parameters SHOULD be compared for equality. Comparing policy assertion parameters for equality is not defined by this document, but equality may be further refined by the corresponding specification.

5.4. Effective Policy

The following diagram illustrates the four in WSDL and how the [effective policy](#) is calculated for each of these .



If multiple are attached to WSDL components that collectively represent a then the **effective policy** of these applies. (For example, there is a attached to an Endpoint component that describes the component and there is a attached to the Binding component in the Endpoint component's {binding} property.) The **effective policy** is the **merge** of the that are attached to the same . The rest of this section describes how the **effective policy** is calculated for each of these .

5.4.1. Service Policy Subject

The **effective policy** of a service policy subject is the in the {policy} property of a Service component that describes the service.

5.4.2. Endpoint Policy Subject

The **effective policy** of an endpoint policy subject is the **merge** of in the {policy} properties of:

- An Endpoint component that describes the endpoint,
- The Binding component in the Endpoint component's {binding} property,
- The Interface component in the Service component's {interface} property of the Endpoint component's {parent} property and
- The Interface components in the {extended interfaces} property of the Interface component in the Service component's {interface} property of the Endpoint component's {parent} property.

5.4.3. Operation Policy Subject

If the Binding component has an Interface component in the {interface} property, then the **effective policy** of an operation policy subject MAY be calculated by **merging** the in the {policy} properties of:

- The Interface Operation component that describes the operation and
- The Binding Operation component (if any) whose {interface operation} property has the Interface Operation component.

If the Binding component does not have an Interface component in the {interface} property, then the **effective policy** of an operation policy subject MUST be calculated in relation to a specific endpoint, and is the in the {policy} property of the Interface Operation component that describes the operation.

5.4.4. Message Policy Subject (input message)

If the Binding component has an Interface component in the {interface} property, then the **effective policy** of an input message MAY be calculated by **merging** the in the {policy} properties of:

- The Interface Message Reference component that describes the input message and
- The Binding Message Reference component whose {interface message reference} property has the Interface Message Reference component.

If the Binding component does not have an Interface component in the {interface} property, then the **effective policy** of an input message MUST be calculated in relation to a specific endpoint, and is the in the {policy} property of the Interface Message Reference component that describes the input message.

5.4.5. Message Policy Subject (output message)

If the Binding component has an Interface component in the {interface} property, then the **effective policy** of an output message MAY be calculated by **merging** the in the {policy} properties of:

- The Interface Message Reference component that describes the output message and
- The Binding Message Reference component whose {interface message reference} property has the Interface Message Reference component.

If the Binding component does not have an Interface component in the {interface} property, then the effective policy of an output message MUST be calculated in relation to a specific endpoint, and is the in the {policy} property of the Interface Message Reference component that describes the output message.

5.4.6. Message Policy Subject (input fault message)

If the Binding component has an Interface component in the {interface} property, then the [effective policy](#) of an input fault message MAY be calculated by [merging](#) the in the {policy} properties of:

- The Interface Fault Reference component that describes the input fault message,
- The Interface Fault component in the Interface Fault Reference component's {interface fault} property,
- The Binding Fault Reference component whose {interface fault reference} property has the Interface Fault Reference component and
- The Binding Fault component whose {interface fault} property has the Interface Fault component in the Interface Fault Reference component's {interface fault} property.

If the Binding component does not have an Interface component in the {interface} property, then the [effective policy](#) of an input fault message MUST be calculated in relation to a specific endpoint, and is the [merge](#) of in the {policy} properties of:

- The Interface Fault Reference component that describes the input fault message and
- The Interface Fault component in the Interface Fault Reference component's {interface fault} property.

5.4.7. Message Policy Subject (output fault message)

If the Binding component has an Interface component in the {interface} property, then the [effective policy](#) of an output fault message MAY be calculated by [merging](#) the in the {policy} properties of:

- The Interface Fault Reference component that describes the output fault message,
- The Interface Fault component in the Interface Fault Reference component's {interface fault} property,
- The Binding Fault Reference component whose {interface fault reference} property has the Interface Fault Reference component and
- The Binding Fault component whose {interface fault} property has the Interface Fault component in the Interface Fault Reference component's {interface fault} property for the endpoint.

If the Binding component does not have an Interface component in the {interface} property, then the [effective policy](#) of an output fault message MUST be calculated in relation to a specific endpoint, and is the [merge](#) of in the {policy} properties of:

- The Interface Fault Reference component that describes the output fault message and
- The Interface Fault component in the Interface Fault Reference component's {interface fault} property.

6. Attaching Policies Using UDDI

This section defines a mechanism for associating policies with through the use of UDDI. It defines a minimum level of support for associating with entities in a UDDI registry. The calculation of [effective policy](#) for UDDI entities is described in Section § 6.1 – [Calculating Effective Policy and Element Policy in UDDI](#) on page 28. While the general concept for associating with UDDI entities, which is specified in

Sections § 6.2 – Referencing Remote Policy Expressions on page 29 and § 6.3 – Registering Reusable Policy Expressions on page 30, is based on UDDI Version 2 [[UDDI API 2.0], [UDDI Data Structure 2.0]], the necessary changes with respect to UDDI Version 3 [[UDDI 3.0]] are explained in Section § 6.4 – Registering Policies in UDDI Version 3 on page 32.

There are essentially two approaches for registering policies in UDDI. One approach is to directly reference remotely accessible in UDDI entities, the other is to register as distinct tModels and then reference these tModels in each UDDI entity that is using the . While the former approach (see Section § 6.2 – Referencing Remote Policy Expressions on page 29) is expected to be used for that are mainly unique for a given Web service, the latter approach (see Section § 6.3 – Registering Reusable Policy Expressions on page 30) is expected to be used for more modular and reusable .

6.1. Calculating Effective Policy and Element Policy in UDDI

When attaching a to a UDDI entity a is implied for that attachment. The only contains the associated with that entity, and not those associated with the children of that entity. This is the entity's **element policy**.

Each contained within a UDDI entity's **element policy** should have the correct semantic such that the policy subject for that assertion is that UDDI entity. For example, assertions that describe behaviours regarding a service provider should only be contained within policies attached to a businessEntity structure.

For UDDI tModels that represent Web service types, the **element policy** is considered an intrinsic part of the tModel and applies to all uses of that tModel. In particular, it **MUST** be **merged** into the **effective policy** of every bindingTemplate that references that tModel.

Policies that apply to deployed Web services (bindingTemplates) are only considered in the **effective policy** of that deployed resource itself.

Each of these entities **MAY** have an **element policy** per Section § 3 – Policy Attachment on page 7. The remainder of this section defines how that **element policy** is interpreted to calculate the **effective policy**.

6.1.1. Service Provider Policy Subject

The following UDDI element is considered as the service provider policy subject:

- uddi:businessEntity

This element **MAY** have **element policy** as per Section § 3 – Policy Attachment on page 7, and if present **MUST** be **merged** into the **effective policy** of the UDDI businessEntity Subject.

Policy attached to the service provider policy subject applies to behaviors or aspects of the service provider as a whole, irrespective of interactions over any particular service. This includes — but is not limited to — acting as a service consumer or a service provider in general.

6.1.2. Service Policy Subject

The following UDDI element is considered as the service policy subject:

- uddi:businessService

This element **MAY** have **element policy** as per Section § 3 – Policy Attachment on page 7, and if present **MUST** be **merged** into the **effective policy** of the UDDI businessService Subject.

Policy attached to the service policy subject applies to behaviors or aspects of the service as a whole, irrespective of interactions over any particular endpoint. This includes — but is not limited to — acting as a consumer or a provider of the service.

6.1.3. Endpoint Policy Subject

The following UDDI elements collectively describe an endpoint:

- uddi:bindingTemplate
- uddi:tModel

These elements MAY have [element policy](#) as per Section § 3 – [Policy Attachment](#) on page 7. The implied by each of these elements contains the endpoint policy subject representing the deployed endpoint.

An endpoint policy subject applies to behaviours associated with an entire endpoint of the service, irrespective of any message exchange made. This includes — but is not limited to — aspects of communicating with or instantiating the endpoint.

The [effective policy](#) for a UDDI endpoint includes the [element policy](#) of the uddi:bindingTemplate element that defines the endpoint merged with the [element policy](#) of those uddi:tModel elements that are referenced in contained uddi:tModelInstanceInfo elements.

6.2. Referencing Remote Policy Expressions

UDDI tModels provide a generic mechanism for associating arbitrary metadata with services and other entities in a UDDI registry. To properly integrate Web Services Policy into the UDDI model, Web Services Policy 1.5 - Attachment pre-defines one tModel that is used to associate a remotely accessible with an entity in a UDDI registry.

This new tModel is called the remote policy reference category system and is defined in [Appendix B.1 – Remote Policy Reference Category System](#) on page 39.

UDDI registries MUST use the (UDDI V2 [\[\[UDDI Data Structure 2.0\]\]](#)) tModelKey uuid:2ea5f9d3-9b84-39f9-b334-e9d5f535b4c1 to uniquely identify this tModel so that UDDI registry users can expect the same behavior across different UDDI registries.

The tModel's valid values are those IRIs that identify external ; that is, when referencing this category system in a categoryBag, the corresponding keyValue of the keyedReference is the IRI of the .

Using the remote policy reference category system, one can then associate a with a businessEntity, a businessService, and a tModel using the entity's categoryBag. For example, associating the that is identified by the IRI <http://www.example.com/myservice/policy> with a businessService is done as follows:

```
(01) <businessService serviceKey="..." >
(02)   <name>...</name>
(03)   <description>...</description>
(04)   <bindingTemplates>...</bindingTemplates>
(05)   <categoryBag>
(06)     <keyedReference
(07)       keyName="Policy Expression for example's Web services"
(08)       keyValue="http://www.example.com/myservice/policy"
(09)       tModelKey="uuid:2ea5f9d3-9b84-39f9-b334-e9d5f535b4c1" />
(10)   </categoryBag>
(11) </businessService>
```

The `tModelKey` of the `keyedReference` MUST match the fixed `tModelKey` from the remote policy reference category system. The `keyValue` MUST be the IRI that identifies the .

A different approach has to be taken to associate a with a `bindingTemplate`, since `bindingTemplates` do not contain a `categoryBag` in UDDI Version 2. Therefore, the `bindingTemplate`'s `tModelInstanceInfo` and `instanceParms` MUST be used as follows:

```
(01) <bindingTemplate bindingKey="..." >
(02)   <accessPoint>...</accessPoint>
(03)   <tModelInstanceDetails>
(04)     <tModelInstanceInfo
(05)       tModelKey="uuid:2ea5f9d3-9b84-39f9-b334-e9d5f535b4c1" >
(06)       <instanceDetails>
(07)         <instanceParms>
(08)           http://www.example.com/myservice/policy
(09)         </instanceParms>
(10)       </instanceDetails>
(11)     </tModelInstanceInfo>
(12)   </tModelInstanceDetails>
(13) </bindingTemplate>
```

The `tModelKey` of the `tModelInstanceInfo` MUST match the fixed `tModelKey` from the remote policy reference category system as defined above. The `instanceParms` MUST be the IRI that identifies the .

6.3. Registering Reusable Policy Expressions

In addition to using the approach outlined in the section above, publishers may register a specific in a UDDI registry as a distinct `tModel`. To properly categorize `tModels` as , Web Services Policy 1.5 - Attachment pre-defines the Web Services Policy Types category system as a `tModel`. This `tModel` is defined in Appendix [Appendix B.2 – Web Services Policy Types Category System](#) on page 39.

The following illustrates a `tModel` for the identified by the IRI `http://www.example.com/myservice/policy`.

```
(01) <tModel tModelKey="uuid:04cfa...">
(02)   <name>...</name>
(03)   <description xml:lang="EN">
(04)     Policy Expression for example's Web services
(05)   </description>
(06)   <overviewDoc>
(07)     <description xml:lang="EN">Web Services Policy Expression</description>
(08)     <overviewURL>http://www.example.com/myservice/policy</overviewURL>
(09)   </overviewDoc>
(10)   <categoryBag>
(11)     <keyedReference
(12)       keyName="Reusable policy Expression"
(13)       keyValue="policy"
(14)       tModelKey="uuid:90eda65e-ffd7-33df-965f-98ebb1c2a941" />
(15)   </keyedReference>
```

```

(16)         keyName="Policy Expression for example's Web services"
(17)         keyValue="http://www.example.com/myservice/policy"
(18)         tModelKey="uuid:2ea5f9d3-9b84-39f9-b334-e9d5f535b4c1" />
(19)     </categoryBag>
(20) </tModel>

```

The first keyedReference specifies that the tModel represents a — rather than only being associated with one — by using the Web Services Policy Types category system's built-in category "policy", which is its single valid value. This is necessary in order to enable UDDI inquiries for in general. The second keyedReference designates the the tModel represents by using the approach from the section above. This is necessary in order to enable UDDI inquiries for particular based on their IRI.

Note that the IRI is also specified in the tModel's overview URL to indicate that it is a resolvable URL to actually retrieve the .

Web Services Policy 1.5 - Attachment pre-defines another tModel that is used to associate such a pre-registered, locally available with an entity in a UDDI registry

This new tModel is called the local policy reference category system and is defined in [Appendix B.3 – Local Policy Reference Category System](#) on page 40.

UDDI registries MUST use the tModelKey `uuid:5da4fc61-a302-35ad-91d3-775150429035` to uniquely identify this tModel so that UDDI registry users can expect the same behavior across different UDDI registries.

The local policy reference category system is based on tModelKeys. The valid values of this category system are those tModelKeys identifying tModels that

- exist in the same UDDI registry
- and are categorized as "policy" using the Web Services Policy Types category system.

That is, when referencing this category system in a category bag, the corresponding keyValue of the keyedReference is the tModelKey of the tModel that represents the .

Given the local policy reference category system, one can then associate a tModel with a businessEntity, a businessService, and a tModel using the entity's categoryBag. For example, associating the tModel with the tModelKey "uuid:04cfa..." from above with a businessService is done as follows:

```

(01) <businessService serviceKey="..." >
(02)     <name>...</name>
(03)     <description>...</description>
(04)     <bindingTemplates>...</bindingTemplates>
(05)     <categoryBag>
(06)         <keyedReference
(07)             keyName="Policy Expression for example's Web services"
(08)             keyValue="uuid:04cfa..."
(09)             tModelKey="uuid:5da4fc61-a302-35ad-91d3-775150429035" />
(10)     </categoryBag>
(11) </businessService>

```

The tModelKey of the keyedReference MUST match the fixed tModelKey from the local policy reference category system. The keyValue MUST be the tModelKey of the that is registered with the UDDI registry.

A different approach has to be taken to associate a with a bindingTemplate, since bindingTemplates do not contain a categoryBag in UDDI Version 2. Therefore, the bindingTemplate's tModelInstanceInfo and instanceParms MUST be used as follows:

```
(01) <bindingTemplate bindingKey="..." >
(02)   <accessPoint>...</accessPoint>
(03)   <tModelInstanceDetails>
(04)     <tModelInstanceInfo
(05)       tModelKey="uuid:5da4fc61-a302-35ad-91d3-775150429035" >
(06)       <instanceDetails>
(07)         <instanceParms>uuid:04cfa...</instanceParms>
(08)       </instanceDetails>
(09)     </tModelInstanceInfo>
(10)   </tModelInstanceDetails>
(11) </bindingTemplate>
```

The tModelKey of the tModelInstanceInfo MUST match the fixed tModelKey from the local policy reference category system. The instanceParms MUST be the tModelKey of the that is registered with the UDDI registry.

6.4. Registering Policies in UDDI Version 3

UDDI Version 3 [[UDDI 3.0]] provides a number of enhancements in the areas of modeling and entity keying. Special considerations for UDDI multi-version support are outlined in chapter 10 of [[UDDI 3.0]]. The changes with respect to the previous sections are as follows.

First, the tModelKeys of the pre-defined tModels are migrated to domain-based keys. The migration is unique since the Version 2 keys introduced in this specification are already programmatically derived from the Version 3 keys given below.

The tModelKey for the remote policy reference tModel changes from "uuid:2ea5f9d3-9b84-39f9-b334-e9d5f535b4c1" to "uddi:w3.org:ws-policy:v1.5:attachment:remotepolicyreference".

The tModelKey for the Web Services Policy Types tModel changes from "uuid:90eda65e-ffd7-33df-965f-98ebb1c2a941" to "uddi:w3.org:ws-policy:v1.5:attachment:policytypes".

The tModelKey for the local policy reference tModel changes from "uuid:5da4fc61-a302-35ad-91d3-775150429035" to "uddi:w3.org:ws-policy:v1.5:attachment:localpolicyreference".

Second, rather than putting references in a bindingTemplate's tModelInstanceInfo, they are added to the bindingTemplate's categoryBag, analogous to the mechanism described for other UDDI entities. For example, the example bindingTemplate from section § 6.1 – Calculating Effective Policy and Element Policy in UDDI on page 28 would be changed as follows:

```
(01) <bindingTemplate bindingKey="..." >
(02)   <accessPoint>...</accessPoint>
(03)   <tModelInstanceDetails>...</tModelInstanceDetails>
(04)   <categoryBag>
(05)     <keyedReference
```

```
(06)         keyName="Policy Expression for example's Web services"
(07)         keyValue="http://www.example.com/myservice/policy"
(08)         tModelKey="uddi:w3.org:ws-policy:v1.5:attachment:remotepolicyreference"
(09)     />
(10) </categoryBag>
(11) </bindingTemplate>
```

Third, inquiries for reusable tModels described in Section § 6.3 – [Registering Reusable Policy Expressions](#) on page 30 and UDDI tModel entities that are associated with remote is enhanced by the wildcard mechanism for keyValues in keyedReferences. For example, searching for all tModels whose IRI starts with `http://www.example.com/`, the following `find_tModel` API call can be used:

```
(01) <find_tModel
      xmlns="urn:uddi-org:api_v3" >
(02)   <categoryBag>
(03)     <keyedReference
(04)       keyValue="http://www.example.com/"
(05)       tModelKey="uddi:w3.org:ws-policy:v1.5:attachment:remotepolicyreference"
(06)     />
(07)   </categoryBag>
(08)   <findQualifiers>
(09)     <findQualifier>approximateMatch</findQualifier>
(10)   </findQualifiers>
(11) </find_tModel>
```

Fourth, all UDDI entities may be digitally signed using XML digital signatures [\[\[XML-Signature\]\]](#). Publishers who want to digitally sign their tModels or references in UDDI MUST use the Schema-centric canonicalization algorithm [\[\[SCC14N\]\]](#).

7. Security Considerations

It is RECOMMENDED that be integrity protected to permit the detection of tampering. This can be done using a technology such as XML DSig [\[\[XML-Signature\]\]](#), SSL/TLS [\[\[IETF RFC 2246\]\]](#), or WS-Security 2004 [\[\[WS-Security 2004\]\]](#). This also provides a mechanism for authenticating by determining if the signer has the right to "speak for" the scope of the .

Policies SHOULD NOT be accepted unless they are signed and have an associated security token to specify the signer has the right to "speak for" the scope containing the .

A more complete discussion of security considerations can be found in the Security Considerations section of the Web Services Policy 1.5 - Framework document [\[\[Web Services Policy Framework\]\]](#).

8. Conformance

8.1. External Policy Attachment Conformance

An element information item whose namespace name is "http://www.w3.org/ns/ws-policy" and whose local part is PolicyAttachment conforms to this specification if it is valid according to the XML Schema

[[XML Schema Structures]] for that element as defined by this specification (<http://www.w3.org/2007/02/ws-policy.xsd>) and additionally adheres to all the constraints contained in Section § 3.4 – External Policy Attachment on page 9 of this specification. Such a conformant element information item constitutes an external policy attachment.

8.2. WSDL 1.1 Attachment Conformance

A WSDL 1.1 [[WSDL 1.1]] description conforms to this specification when it incorporates one or more element policies and additionally adheres to all the constraints contained in section § 4 – Attaching Policies Using WSDL 1.1 on page 12

8.3. WSDL 2.0 Attachment Conformance

A WSDL 2.0 [[WSDL 2.0 Core Language]] description conforms to this specification when it incorporates one or more element policies and additionally adheres to all the constraints contained in section § 5 – WS-Policy Attachment for WSDL 2.0 on page 19

Appendix A. References

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Appendix B. UDDI tModel Definitions

This section contains the UDDI tModel definitions for the canonical tModels used in Section § 6 – [Attaching Policies Using UDDI](#) on page 27. The tModelKeys shown in the tModel structure sections are valid UDDI Version 3 keys. When using UDDI Version 2, the corresponding derived UDDI Version 2 keys must be used.

B.1. Remote Policy Reference Category System

B.1.1. Design Goals

This tModel is used to attach a to a UDDI entity by referencing the policy's IRI.

B.1.2. tModel Definition

Name:	http://www.w3.org/ns/ws-policy/remotepolicyreference
Description:	Category system used for UDDI entities to point to an external Web services policy attachment policy that describes their characteristics. See Web Services Policy 1.5 - Attachment specification for further details.
UDDI Key (V3):	uddi:w3.org:ws-policy:v1.5:attachment:remotepolicyreference
UDDI V1,V2 format key:	uuid:2ea5f9d3-9b84-39f9-b334-e9d5f535b4c1
Categorization:	categorization
Checked:	No

B.1.3. tModel Structure

```
(01) <tModel tModelKey="uuid:2ea5f9d3-9b84-39f9-b334-e9d5f535b4c1" >
(02)   <name>http://www.w3.org/ns/ws-policy/remotepolicyreference</name>
(03)   <description xml:lang="EN">Category system used for UDDI entities to point
to an external
(04)   Web Services Policy Attachment policy expression that describes their
characteristics.
(05)   See Web Services Policy 1.5 - Attachment specification for further
details.</description>
(06)   <categoryBag>
(07)     <keyedReference
(08)       keyName="uddi-org:types:categorization"
(09)       keyValue="categorization"
(10)       tModelKey="uuid:c1acf26d-9672-4404-9d70-39b756e62ab4" />
(11)   </categoryBag>
(12) </tModel>
```

B.2. Web Services Policy Types Category System

B.2.1. Design Goals

This tModel is used to categorize tModels as representing . There is only one valid value, namely "policy", that indicates this very fact. It is RECOMMENDED that tModels categorized as representing reference no more and no less than this very using the remote policy reference category system.

B.2.2. tModel Definition

Name:	http://www.w3.org/ns/ws-policy/policytypes
--------------	---

Description:	Web services policy types category system used for UDDI tModels to characterize them as Web services policy-based .
UDDI Key (V3):	uddi:w3.org:ws-policy:v1.5:attachment:policytypes
UDDI V1,V2 format key:	uuid:90eda65e-ffd7-33df-965f-98ebb1c2a941
Categorization:	categorization
Checked:	No

B.2.3. tModel Structure

```

(01) <tModel tModelKey="uuid:90eda65e-ffd7-33df-965f-98ebb1c2a941" >
(02)   <name>http://www.w3.org/ns/ws-policy/policytypes</name>
(03)   <description xml:lang="EN">Web Services Policy Types category system used for
(04)     to characterize them as Web Services Policy - based policy
(05)     expressions.</description>
(06)   <categoryBag>
(07)     <keyedReference
(08)       keyName="uddi-org:types:categorization"
(09)       keyValue="categorization"
(10)       tModelKey="uuid:c1acf26d-9672-4404-9d70-39b756e62ab4" />
(11)   </categoryBag>
(12) </tModel>

```

B.3. Local Policy Reference Category System

B.3.1. Design Goals

This tModel is used to attach a to a UDDI entity by referencing the UDDI entity that represents this . The local policy reference category system is based on tModelKeys. It is expected that referenced tModels are registered with the same UDDI registry and are categorized as representing using the Web services policy types category system.

B.3.2. tModel Definition

Name:	http://www.w3.org/ns/ws-policy/localpolicyreference
Description:	Category system used for UDDI entities to point to a Web services policy tModel that describes their characteristics. See Web Services Policy 1.5 - Attachment specification for further details.
UDDI Key (V3):	uddi:w3.org:ws-policy:v1.5:attachment:localpolicyreference
UDDI V1,V2 format key:	uuid:5da4fc61-a302-35ad-91d3-775150429035
Categorization:	categorization
Checked:	Yes

B.3.3. tModel Structure

```
(01) <tModel tModelKey="uuid:5da4fc61-a302-35ad-91d3-775150429035" >
(02)   <name>http://www.w3.org/ns/ws-policy/localpolicyreference</name>
(03)   <description xml:lang="en">Category system used for UDDI entities to point
to a
(04)     Web Services Policy policy expression tModel that describes their
characteristics.
(05)     See Web Services Policy 1.5 - Attachment specification for further
details.</description>
(06)   <categoryBag>
(07)     <keyedReference
(08)       keyName="uddi-org:types:categorization"
(09)       keyValue="categorization"
(10)       tModelKey="uuid:c1acf26d-9672-4404-9d70-39b756e62aB4" />
(11)     <keyedReference
(12)       keyName="uddi-org:types:checked"
(13)       keyValue="checked"
(14)       tModelKey="uuid:c1acf26d-9672-4404-9d70-39b756e62aB4" />
(15)     <keyedReference
(16)       keyName="uddi-org:entityKeyValues"
(17)       keyValue="tModelKey"
(18)       tModelKey="uuid:916b87bf-0756-3919-8eae-97dfa325e5a4" />
(19)   </categoryBag>
(20) </tModel>
```

Appendix C. Acknowledgements (Non-Normative)

This document is the work of the [W3C Web Services Policy Working Group](#).

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