

WS-Policy Attachments: Message Content Filters 1.1

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Abstract

[[WS-PolicyAttachment](#)] defines general purposes mechanisms for associating policies, as defined in [[WS-Policy](#)], with the subjects to which they apply. The policy attachment specification, as a framework, allows for extensibility through the definition and application of domain-specific policy subjects.

WS-MessageContentFilters defines an expression syntax for scoping policies to specific consumers using the extensibility of the [[WS-PolicyAttachment](#)] syntax and therefore enabling a policy subject to represent a consumer-provider relationship.

Status of this Document

This document is an IBM specification that has been adopted by IBM products for integration. Here are the document's [Terms of use](#).

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1. Introduction

[\[WS-PolicyAttachment\]](#) defines a way to associate a policy with a Web service entity, and thus to define the constraints and requirements under which consumers are to interact with a service. For instance this can be used to associate with a service a policy for securing messages.

However, using typical WS-PolicyAttachment policy subject standards (for example WSDL 1.1 Element Identifiers or WS-Addressing) one is restricted to associate with a service a policy that applies to all consumers indiscriminately. WS-PolicyAttachment alone does not address cases where one needs the policy associated with a service to vary depending on the consumer involved. Service Level Agreements (SLA) are such a case.

This specification extends WS-PolicyAttachments by defining a way to associate different policies to different consumers by using Message Content Filters. This specification defines the message content filters syntax and semantics.

1.1 Notational Conventions

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

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

- 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.
- The characters "[" and "]" are used to call out references and property names.
- Ellipses (i.e., "...") indicate points of extensibility.
- XML namespace prefixes (see below table) are used to indicate the namespace of the element being defined.

This specification can be used in terms of XML Information Set (Infoset) [\[XML Infoset\]](#), even though the specification uses XML 1.0 terminology. Valid Infoset for this specification is the one serializable in XML 1.0, hence the use of XML 1.0.

1.2 Namespaces

The XML namespace that MUST be used by implementers of this specification is:

<http://www.ibm.com/xmlns/stdwip/2011/02/ws-message-content-filters>

The table below lists XML namespaces that are used in this specification. The choice of any namespace prefix is arbitrary and not semantically significant.

Prefix	XML Namespaces	Specification(s)
wsmcf	http://www.ibm.com/xmlns/stdwip/2011/02/ws-message-content-filters	This specification
s	(Either SOAP 1.1 or 1.2)	(Either SOAP 1.1 or 1.2)
s11	http://schemas.xmlsoap.org/soap/envelope/	[SOAP11]
s12	http://www.w3.org/2003/05/soap-envelope	[SOAP12]
wsa	http://www.w3.org/2005/08/addressing	[WS-Addressing]
wsp	http://www.w3.org/ns/ws-policy	[WS-Policy]
xs	http://www.w3.org/2001/XMLSchema	[XMLSchema - Part 1]

1.3 Example

The WS-PolicyAttachment document below describes a Service Level Agreement between a service provider and service consumer by associating the agreement's policy with the intersection of the service provider (using URI) and consumer (using Message Content Filters). The message content filters syntax and semantics (lines [06] to [20]) are defined in this document.

```
(01) <wsp:PolicyAttachment>
(02)   <wsp:AppliesTo>
(03)     <wsp:URI>
(04)       http://example.org/AccountProvider.wsdl11#service(AccountManagement)
(05)     </wsp:URI>
(06)   <wsmcf:MessageContent Name="WebBanking 'Gold' Filter">
(07)     <wsmcf:Filter Name="ConsumerId">
(08)       <wsmcf:Value>WebBankingApp</wsmcf:Value>
(09)       <wsmcf:Location Type="http://www.w3.org/TR/1999/REC-xpath-19991116">
(10)         //http://acme.enterprise.com:ConsumerId
(11)       </wsmcf:Location>
(12)     </wsmcf:Filter>
(13)   <wsmcf:Filter Name="ContextId">
```

```

(14)     <wsmcf:Value>GoldTier</wsmcf:Value>
(15)     <wsmcf:Location Type="http://www.w3.org/TR/1999/REC-xpath-19991116">
(16)         //http://acme.enterprise.com:ContextId
(17)     </wsmcf:Location>
(18) </wsmcf:Filter>
(19) </wsmcf:MessageContent>
(20) </wsp:AppliesTo>
(21)   <wsp:PolicyReference URI="..." />
(22) </wsp:PolicyAttachment>

```

In the example above, lines [02] to [21] define the subject to which the policy on line [21] applies. The policy reference is omitted for brevity.

The first part of the subject definition defines the service provider to which the policy applies as the AccountManagement service (lines [03] to [05]).

The policy subject is further qualified by lines [06] to [19] which define the policy application to messages targeted at the AccountManagement service that adhere to two filter conditions (lines [08] to [11] and lines [13] to [18]).

The first filter condition identifies messages with a SOAP header `http://acme.enterprise.com:ConsumerId` with the value "WebBankingApp".

The second filter condition identifies messages with a SOAP header `http://acme.enterprise.com:ContextId` with the value "GoldTier".

The following is an example of a SOAP message to which the policy defined on line [21] would be applied if the message was targeted at the AccountManagement Service.

```

(01) <s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
(02)         xmlns:wsa="http://www.w3.org/2005/08/addressing"
(03)         xmlns:ae="http://acme.enterprise.com">
(04)   <s:Header>
(05)     <wsa:MessageID>
(06)       http://example.com/6B29FC40-CA47-1067-B31D-00DD010662DA
(07)     </wsa:MessageID>
(08)     <wsa:To>
(09)       http://acme.enterprise.com/AccountProvider
(10)     </wsa:To>
(11)     <wsa:Action>
(12)       http://acme.enterprise.com/AccountProvider/OpenAccount
(13)     </wsa:Action>
(14)     <ae:ConsumerId>WebBankingApp</ae:ConsumerId>
(15)     <ae:ContextId>GoldTier</ae:ContextId>
(16)   </s:Header>
(17)   <s:Body>
(18)     ...
(19)   </s:Body>
(20) </s:Envelope>

```

2. Message Content Filter

The outline for the Message Content Filter is:

```
<wsmcf:MessageContent Name="xs:string"?>
  (<wsmcf:Filter Name="xs:string">
    <wsmcf:Value>
      xs:string
    </wsmcf:Value>
    <wsmcf:Location Type="xs:anyURI"?>
      xs:string
    </wsmcf:Location>
  </wsmcf:Filter> *
  |
  <wsmcf:Anonymous/?>)
  xs:any*
</wsmcf:MessageContent>
```

The following describes additional constraints on the outline listed above:

/wsmcf:MessageContent

This element describes the consumers to which the policy applies using one or more `wsmcf:Filter` elements or a `wsmcf:Anonymous` element.

If more than one `wsmcf:Filter` is specified they must all be adhered to in order for the policy to apply.

If a `wsmcf:Anonymous` element is specified, no other policies must be associated with the subject for the policy to apply.

If no `wsmcf:Filters` or `wsmcf:Anonymous` are specified, the policy applies to all messages independently of the consumer.

/wsmcf:MessageContent@Name

When present this OPTIONAL attribute provides the name of the policy.

/wsmcf:MessageContent/wsmcf:Filter

This optionally repeating OPTIONAL element defines a filter condition refining the consumers to which the policy applies. Each filter defines a

`wsmcf:Location` and `wsmcf:Value` pair. The filter applies when the value found in a message at the `wsmcf:Location` matches the `wsmcf:Value`.

When `wsmcf:Location` points to several locations in a message the filter applies if any of the values found at these locations matches the `wsmcf:Value`.

/wsmcf:MessageContent/wsmcf:Filter@Name

This OPTIONAL attribute specifies the name of the Filter.

/wsmcf:MessageContent/wsmcf:Filter/wsmcf:Value

This REQUIRED element defines the value to be found at the `wsmcf:Location` for this filter to apply.

/wsmcf:MessageContent/wsmcf:Filter/wsmcf:Location

This REQUIRED element defines the Location of the value in the message that is to be tested for this filter.

/wsmcf:MessageContent/wsmcf:Filter/wsmcf:Location@Type

This OPTIONAL attribute defines the syntax of the `wsmcf:Location` element. If it is not specified, it defaults to: “<http://www.w3.org/TR/1999/REC-xpath-19991116>”.

The following table lists the values for `wsmcf:Location@Type` defined by this specification. The short value is an alias that can be used as an alternative to the long one.

Value of Type attribute	Short Value of Type attribute	Location Semantics
http://www.w3.org/TR/1999/REC-xpath-19991116	xpath10	The <code>wsmcf:Location</code> is in the XML message content and defined in XPath 1.0 expression format. This is the default value.
http://www.ietf.org/rfc/rfc2616	http11header	The <code>wsmcf:Location</code> is a HTTP Header definition defined by the HTTP/1.1 Header Field Definition format.

/wsmcf:MessageContent/wsmcf:Anonymous

When present this non repeating OPTIONAL element specifies that the policy applies to anonymous consumers **only**.

This is considered a new and global type of policy subject. An attachment document which uses this subject is semantically different from an attachment document with no `wsmcf:MessageContent` element at all. Policies that are attached using this element are applied to messages which have no other associated policies using an explicit Message Content Filter policy subject.

This element effectively provides a way of defining a default policy which applies to consumers for which no other policy applies, and only those consumers. If a different policy is attached to a consumer via another message content filter the default policy does not apply to that consumer.

The default policy applies to anonymous consumers as a whole. If, for instance, the default policy limits the number of transactions to 500 messages per second, that limit applies to the totality of messages from anonymous consumers, rather than to the number of messages from each anonymous consumer.

/wsmcf:MessageContent/[xs:any](#)

This is an extensibility point.

Appendices

A. Normative References

WS-Policy

[W3C Recommendation, "Web Services Policy \(WS-Policy\) 1.5 - Framework"](#), A. Vedamuthu, et al., Editors. World Wide Web Consortium (W3C), 4 September 2007. Available at <http://www.w3.org/TR/ws-policy/>.

WS-PolicyAttachment

[W3C Recommendation, "Web Services Policy \(WS-Policy\) 1.5 - Attachment"](#), A. Vedamuthu, et al., Editors. World Wide Web Consortium (W3C), 4 September 2007. Available at <http://www.w3.org/TR/ws-policy-attach/>.

XMLSchema - Part 1

[W3C Recommendation, "XML Schema Part 1: Structures \(Second Edition\)"](#), H. Thompson, et al., Editors. World Wide Web Consortium (W3C), 28 October 2004. Available at <http://www.w3.org/TR/xmlschema-1/>.

XMLSchema - Part 2

[W3C Recommendation, "XML Schema Part 2: Datatypes \(Second Edition\)"](#), P. Biron, A. Malhotra, Editors. World Wide Web Consortium (W3C), 28 October 2004. Available at <http://www.w3.org/TR/xmlschema-2/>.

PCRE

["Perl Compatible Regular Expression"](#). Available at <http://pcre.org>.

URI

[RFC3986, "Uniform Resource Identifier \(URI\): Generic Syntax"](#), January 2005. Available at <http://www.gbiv.com/protocols/uri/rfc/rfc3986.html>.

B. XML Schema

A non-normative copy of the XML schema is listed below for convenience.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
targetNamespace="http://www.ibm.com/xmlns/stdwip/2011/01/ws-message-
content-filters"
elementFormDefault="qualified"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns="http://www.ibm.com/xmlns/stdwip/2011/01/ws-message-content-
filters">

  <xs:element name="MessageContent">
    <xs:complexType>
      <xs:sequence>
        <!-- Left out to avoid non-deterministic content model
            and provide for extensibility
        <xs:choice>
```



```

    <xs:element ref="Filter" maxOccurs="unbounded" minOccurs="0">
    </xs:element>
  </xs:element>
  <xs:element ref="Anonymous" maxOccurs="1" minOccurs="0">
  </xs:element>
</xs:choice> -->
  <xs:any maxOccurs="unbounded" minOccurs="0"
    processContents="lax"/>
</xs:sequence>
  <xs:attribute name="Name" type="xs:string" use="optional"/>
</xs:complexType>
</xs:element>

<xs:element name="Filter">
  <xs:complexType>
    <xs:sequence>
      <xs:element minOccurs="1" maxOccurs="1" ref="Value"/>
      <xs:element minOccurs="1" maxOccurs="1" ref="Location"/>
    </xs:sequence>
    <xs:attribute name="Name" type="xs:string"/>
  </xs:complexType>
</xs:element>

<xs:element name="Value" type="xs:string" />

<xs:element name="Location">
  <xs:complexType>
    <xs:simpleContent>
      <xs:extension base="xs:string">
        <xs:attribute name="Type" type="xs:anyURI" use="optional"/>
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>
</xs:element>

<xs:element name="Anonymous">
  <xs:complexType></xs:complexType>
</xs:element>
</xs:schema>

```

C. Acknowledgments (Non-Normative)

This specification was developed with input from several people over a period of time. This includes Robert Laird, Arnaud J Le Hors, Heather Kreger, Katy Warr, Mario De Armas, Mark Weatherill, and Steve Groeger.

D. Change Log

Data	Author	Description
2011/11/11	IBM	Document finalized.