

# MTOM Serialization Policy Assertion (WS-MTOMPolicy)

## Version 1.0

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## Abstract

This specification describes a domain-specific policy assertion that indicates endpoint support of the optimized MIME multipart/related serialization of SOAP messages defined in section 3 of the SOAP Message Transmission Optimization Mechanism [[MTOM](#)] specification. This policy assertion can be specified within a policy alternative as defined in WS-Policy Framework [[WS-Policy](#)] and attached to a WSDL description as defined in WS-PolicyAttachment [[WS-PolicyAttachment](#)].

## Composable Architecture

The Web service specifications (WS-\*) are designed to be composed with each other to provide a rich set of tools for the Web services environment. This specification relies on other Web service specifications to provide secure, reliable, and/or transacted message delivery and to express Web service metadata.

## Status

This specification is a public draft release and is provided for review and evaluation only. The authors hope to solicit your contributions and suggestions in the near future. The authors make no warranties or representations regarding the specifications in any manner whatsoever.

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## 1. Introduction

This specification describes a domain-specific policy assertion for the SOAP Message Transmission Optimization Mechanism [[MTOM](#)] that can be specified within a policy alternative as defined in WS-Policy Framework [[WS-Policy](#)].

## 1.1 Requirements

This specification intends to meet the following requirements:

- Indicate that messages are encoded as described in section 3 of the SOAP Message Transmission Optimization Mechanism [[MTOM](#)] using MIME multipart/related [[RFC2387](#)] and XML-binary Optimized Packaging [[XOP](#)].
- Indicate the use of MTOM independent of transport.
- Provide attribute extensibility for more sophisticated and/or currently unanticipated scenarios.
- Support a variety of encoding formats including both SOAP 1.1 [[SOAP 1.1](#)] and SOAP 1.2 [[SOAP 1.2](#)] Envelopes.

## 1.2 Example

Table 1 lists an example use of the Optimized Mime Serialization policy assertion.

**Table 1: Example WSDL 1.1 description with MTOM policy assertion.**

```
(01) <wsdl:definitions
(02)   targetNamespace="example.com"
(03)   xmlns:tns="example.com"
(04)   xmlns:wsd1="http://schemas.xmlsoap.org/wsdl/"
(05)   xmlns:wsp="http://schemas.xmlsoap.org/ws/2004/09/policy"
(06)   xmlns:wsoma="http://schemas.xmlsoap.org/ws/2004/09/policy/optimiz
      edmimeserialization"
(07)   xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-
      wss-wssecurity-utility-1.0.xsd" >
(08)
(09)   <wsp:Policy wsu:Id="MyPolicy" >
(10)     <wsoma:OptimizedMimeSerialization />
(11)     <!-- omitted assertions -->
(12)
(13)   </wsp:Policy>
(14)
(15)   <!-- omitted elements -->
(16)
(17)   <wsdl:binding name="MyBinding" type="tns:MyPortType" >
(18)     <wsp:PolicyReference
(19)       URI="#MyPolicy"
(20)       wsdl:required="true" />
(21)     <!-- omitted elements -->
(22)   </wsdl:binding>
(23)
(24) </wsdl:definitions>
(25)
```

Lines (09-13) in Table 1 are a policy expression that includes an Optimized Mime Serialization policy assertion (Line 10) to indicate that the SOAP Message Transmission Optimization Mechanism [[MTOM](#)] may be used.

Lines (17-22) are a WSDL [[WSDL 1.1](#)] binding. Lines (18-20) indicate that the policy in Lines (09-13) applies to this binding, specifically indicating that MTOM encodings

must be accepted over all the messages in the binding. Line (20) indicates policy is a required extension.

## 2. Terminology and Notation

### 2.1 Terminology

#### Policy

A collection of policy alternatives; typically one alternative is selected.

#### Policy Alternative

A collection of policy assertions; typically all assertions in an alternative are honored.

#### Policy Assertion

An individual, domain-specific requirement, capability, or other property of a behavior.

#### Policy Expression

An XML Infoset representation of a policy, either in a normal form or in an equivalent compact form.

#### Policy Subject

An entity (e.g., an endpoint, message, resource, interaction) with which a policy can be associated.

### 2.2 XML Namespaces

The XML Namespace URI that MUST be used by implementations of this specification is:

`http://schemas.xmlsoap.org/ws/2004/09/policy/optimizedmimeserialization`

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

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

Prefix	XML Namespace	Specification(s)
wSDL	<code>http://schemas.xmlsoap.org/wSDL/</code>	[ <a href="#">WSDL 1.1</a> ]
wsp	<code>http://schemas.xmlsoap.org/ws/2004/09/policy</code>	[ <a href="#">WS-Policy</a> , <a href="#">WS-PolicyAttachment</a> ]
wsoma	<code>http://schemas.xmlsoap.org/ws/2004/09/policy/optimizedmimeserialization</code>	This specification

### 2.3 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. Additional children and/or attributes MAY be added at the indicated extension points but MUST NOT contradict the semantics of the parent and/or owner, respectively. By default, if a receiver does not recognize an extension, the receiver SHOULD ignore the extension; exceptions to this processing rule, if any, are clearly indicated below.
- XML namespace prefixes (see Table 2) are used to indicate the namespace of the element being defined.

## 2.4 Compliance

An endpoint MAY implement more than one of the roles defined herein. An endpoint is not compliant with this specification if it fails to satisfy one or more of the MUST or REQUIRED level requirements defined herein for the roles it implements.

Normative text within this specification takes precedence over outlines, which in turn take precedence over the XML Schema [[XML Schema Part 1](#), [Part 2](#)] and WSDL [[WSDL 1.1](#)] descriptions, which in turn take precedence over examples.

## 3. Optimized Mime Serialization Policy Assertion

The WS-Policy Framework [[WS-Policy](#)] and WS-PolicyAttachment [[WS-PolicyAttachment](#)] specifications collectively define a framework, model and grammar for expressing the requirements and general characteristics of entities in an XML Web services-based system. To enable an endpoint to describe its ability to use the SOAP Message Transmission Optimization Mechanism [[MTOM](#)], or MTOM with SOAP 1.1 [[MTOMS11](#)], this specification defines a single policy assertion that leverages the WS-Policy framework and attachment model for WSDL.

### 3.1 Assertion Model

The Optimized Mime Serialization policy assertion defines a behavior in which an endpoint requires and generates messages serialized as specified in section 3 of the SOAP Message Transmission Optimization Mechanism [[MTOM](#)], or MTOM with SOAP 1.1 [[MTOMS11](#)] specifications.

### 3.2 Assertion Syntax

The normative outline for the Optimized Mime Serialization policy assertion is:

```
<wsoma:OptimizedMimeSerialization ... />
```

The following describes additional constraints on the outline listed above:

```
/wsoma:OptimizedMimeSerialization
```

A policy assertion that specifies that MTOM [[MTOM](#)] MUST be used in messages sent to the Web service. It also specifies that responses from the Web service MUST be optimized using MTOM [[MTOM](#)], i.e. that the messages must be sent using the application/xop+xml mime type.

```
/wsoma:OptimizedMimeSerialization/@wsp:Optional="true"
```

Per WS-Policy [[WS-Policy](#)], this is compact notation for two policy alternatives, one with and one without the assertion. This indicates that the behavior indicated by the assertion is optional, specifically that non-MTOM-encoded exchanges are also supported by the endpoint.

```
/wsoma:OptimizedMimeSerialization/@any
```

This is an extensibility mechanism to allow additional attributes to be added to the element.

### 3.3 Assertion Attachment

Because the Optimized Mime Serialization policy assertion indicates behavior over all messages in a binding, the assertion has Endpoint Policy Subject [[WS-PolicyAttachment](#)].

WS-PolicyAttachment defines three WSDL [[WSDL 1.1](#)] policy attachment points with Endpoint Policy Subject:

- wsdl:portType
- wsdl:binding
- wsdl:port

A policy expression containing the Optimized Mime Serialization policy assertion MUST NOT be attached to a wsdl:portType; the Optimized Mime Serialization policy assertion specifies a concrete behavior whereas the wsdl:portType is an abstract construct.

A policy expression containing the Optimized Mime Serialization policy assertion MUST, if present be attached to either a wsdl:binding or wsdl:port.

When attached to either a wsdl:binding or wsdl:port representing a SOAP 1.2 binding, the assertion indicates that the mechanism described in SOAP Message Transmission Optimization Mechanism [[MTOM](#)] applies for the designated endpoint. When attached to either a wsdl:binding or wsdl:port representing a SOAP 1.1 binding, the assertion indicates that the mechanism described in MTOM with SOAP 1.1 [[MTOMS11](#)] applies for the designated endpoint.

## 4. Security

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

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

It should be noted that the mechanisms described in this document could be secured as part of a SOAP message using WS-Security [[WS-Security 2004](#)] or embedded within other objects using object-specific security mechanisms.

To avoid breaking signatures, intermediaries MUST NOT change the XML representations defined herein. Specifically, intermediaries MUST NOT rewrite XML namespace prefix mappings. Similarly, intermediaries MUST NOT remove XML content that explicitly indicates otherwise-implied content, and intermediaries MUST NOT insert XML content to make implied values explicit. For instance, if a @wsp:Optional attribute is present with a value of "false" an intermediary MUST NOT remove it; similarly, if there is no @wsp:Optional attribute, an intermediary MUST NOT add one.

## 5. Acknowledgements

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## 6. References

### [RFC 2119]

S. Bradner, "Key words for use in RFCs to Indicate Requirement Levels," RFC 2119, Harvard University, March 1997. (See <http://www.ietf.org/rfc/rfc2119.txt>.)

### [RFC 2387]

E. Levinson, "The MIME Multipart/Related Content-type," RFC 2387, August 1998. (See <http://www.ietf.org/rfc/rfc2387.txt>.)

### [SOAP 1.1]

D. Box, et al, "Simple Object Access Protocol (SOAP) 1.1," May 2000. (See <http://www.w3.org/TR/2000/NOTE-SOAP-20000508/>.)

### [SOAP 1.2]

M. Gudgin, et al, "SOAP Version 1.2 Part 1: Messaging Framework," June 2003. (See <http://www.w3.org/TR/2003/REC-soap12-part1-20030624/>.)

### [MTOM]

M. Gudgin, et al, "SOAP Message Transmission Optimization Mechanism," January 2005. (See <http://www.w3.org/TR/2005/REC-soap12-mtom-20050125/>.)

### [MTOMS11]

J. Marsh, et al, "MTOM with SOAP 1.1," April 2006. (See <http://www.w3.org/Submission/soap11mtom10/>.)

### [XOP]

M. Gudgin, et al, "XML-binary Optimized Packaging," January 2005. (See <http://www.w3.org/TR/2005/REC-xop10-20050125/>.)

### [WSDL 1.1]

E. Christensen, et al, "Web Services Description Language (WSDL) 1.1," March 2001. (See <http://www.w3.org/TR/2001/NOTE-wsdl-20010315/>.)

### [WS-Policy]

S. Bajaj, et al, "Web Services Policy Framework (WS-Policy)," 25 April 2006. (See <http://www.w3.org/Submission/WS-Policy/>.)

### [WS-PolicyAttachment]

S. Bajaj, et al, "Web Services Policy Attachment (WS-PolicyAttachment)," 25 April 2006. (See <http://www.w3.org/Submission/WS-PolicyAttachment/>.)

### [WS-Security 2004]

A. Nadalin, et al, "Web Services Security: SOAP Message Security 1.0," March 2004. (See <http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0.pdf>.)

### [XML Schema, Part 1]

H. Thompson, et al, "XML Schema Part 1: Structures," October 2004. (See <http://www.w3.org/TR/2004/REC-xmlschema-1-20041028/>.)

### [XML Schema, Part 2]

P. Biron, et al, "XML Schema Part 2: Datatypes," October 2004. (See <http://www.w3.org/TR/2004/REC-xmlschema-2-20041028/>.)

## Appendix I – XML Schema

A normative copy of the XML Schema [[XML Schema Part 1](#), [Part 2](#)] description for this specification can be retrieved from the following address:

```
http://schemas.xmlsoap.org/ws/2004/09/policy/optimizedmimeserialization/optimizedmimeserialization-policy.xsd
```

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

```
<xs:schema
  targetNamespace="http://schemas.xmlsoap.org/ws/2004/09/policy/opt
imizedmimeserialization"
  xmlns:tns="http://schemas.xmlsoap.org/ws/2004/09/policy/optimized
mimeserialization"
  xmlns:wsp="http://schemas.xmlsoap.org/ws/2004/09/policy"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified" >

  <xs:import
    namespace="http://schemas.xmlsoap.org/ws/2004/09/policy"

    schemaLocation="http://schemas.xmlsoap.org/ws/2004/09/policy/ws-
policy.xsd" />

  <xs:element
    name="OptimizedMimeSerialization"
    type="tns:OptimizedMimeSerializationType" />

  <xs:complexType name="OptimizedMimeSerializationType" >
    <xs:attribute ref="wsp:Optional" />
    <xs:anyAttribute namespace="##any" processContents="lax" />
  </xs:complexType>

</xs:schema>
```