# [MS-XOPP]:
# XML-binary Optimized Packaging (XOP) Profile

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## Revision Summary

| Date | Revision History | Revision Class | Comments |
| --- | --- | --- | --- |
| 12/05/2008 | 0.1 | Major | Initial Availability |
| 01/16/2009 | 0.1.1 | Editorial | Revised and edited the technical content. |
| 02/27/2009 | 0.1.2 | Editorial | Revised and edited the technical content. |
| 04/10/2009 | 0.1.3 | Editorial | Revised and edited the technical content. |
| 05/22/2009 | 0.1.4 | Editorial | Revised and edited the technical content. |
| 07/02/2009 | 0.1.5 | Editorial | Revised and edited the technical content. |
| 08/14/2009 | 0.1.6 | Editorial | Revised and edited the technical content. |
| 09/25/2009 | 0.2 | Minor | Updated the technical content. |
| 11/06/2009 | 0.2.1 | Editorial | Revised and edited the technical content. |
| 12/18/2009 | 0.2.2 | Editorial | Revised and edited the technical content. |
| 01/29/2010 | 0.2.3 | Editorial | Revised and edited the technical content. |
| 03/12/2010 | 0.2.4 | Editorial | Revised and edited the technical content. |
| 04/23/2010 | 0.2.5 | Editorial | Revised and edited the technical content. |
| 06/04/2010 | 0.2.6 | Editorial | Revised and edited the technical content. |
| 07/16/2010 | 0.2.6 | No change | No changes to the meaning, language, or formatting of the technical content. |
| 08/27/2010 | 0.2.6 | No change | No changes to the meaning, language, or formatting of the technical content. |
| 10/08/2010 | 0.2.6 | No change | No changes to the meaning, language, or formatting of the technical content. |
| 11/19/2010 | 0.2.6 | No change | No changes to the meaning, language, or formatting of the technical content. |
| 01/07/2011 | 0.2.6 | No change | No changes to the meaning, language, or formatting of the technical content. |
| 02/11/2011 | 0.2.6 | No change | No changes to the meaning, language, or formatting of the technical content. |
| 03/25/2011 | 0.2.6 | No change | No changes to the meaning, language, or formatting of the technical content. |
| 05/06/2011 | 0.2.6 | No change | No changes to the meaning, language, or formatting of the technical content. |

| Date | Revision History | Revision Class | Comments |
|---|---|---|---|
| 06/17/2011 | 0.3 | Minor | Clarified the meaning of the technical content. |
| 09/23/2011 | 0.3 | No change | No changes to the meaning, language, or formatting of the technical content. |
| 12/16/2011 | 1.0 | Major | Significantly changed the technical content. |
| 03/30/2012 | 1.0 | No change | No changes to the meaning, language, or formatting of the technical content. |
| 07/12/2012 | 1.0 | No change | No changes to the meaning, language, or formatting of the technical content. |
| 10/25/2012 | 1.0 | No change | No changes to the meaning, language, or formatting of the technical content. |
| 01/31/2013 | 1.0 | No change | No changes to the meaning, language, or formatting of the technical content. |
| 08/08/2013 | 1.1 | Minor | Clarified the meaning of the technical content. |

# Contents

*Release: Monday, July 22, 2013*

# 1   Introduction

XML-binary Optimized Packaging (**XOP**), as specified in [XML-XOP], defines a method for the efficient serialization of **XML Infosets** that have certain types of content. The XML-binary Optimized Packaging (XOP) Profile extends XOP to allow for the creation of more efficient implementations that process XML Infosets. This document, [MS-XOPP], describes the serialization rules for XML Infosets as MIME Multipart/Related **XOP packages** but does not specify how these XML Infosets are transmitted between network nodes.

Sections 1.8, 2, and 3 of this specification are normative and can contain the terms MAY, SHOULD, MUST, MUST NOT, and SHOULD NOT as defined in RFC 2119. Sections 1.5 and 1.9 are also normative but cannot contain those terms. All other sections and examples in this specification are informative.

## 1.1   Glossary

The following terms are defined in [MS-GLOS]:

**SOAP message**

The following terms are specific to this document:

**MIME:** Multipurpose Internet Mail Extensions as defined in [RFC2045].

**optimized content:** Content that has been removed from an **XML Infoset** to provide a means of more efficient serialization of XML information, as described in [XML-XOP].

**streaming:** The act of processing a part of an **XML Infoset** without requiring that the entire **XML Infoset** be available.

**XML Information Set (XML Infoset):** An abstract data set that provides a consistent set of XML definitions for use in other specifications that need to refer to the information in a well-formed XML document [XML], as described in [XML-INFOSET].

**XOP:** XML-binary Optimized Packaging, as described in [XML-XOP].

**XOP document:** A serialization of the **XOP Infoset** using any W3C recommendation-level version of XML, as described in [XML-XOP].

**XOP Information Set (XOP Infoset):** An **XML Infoset** in which **optimized content** has been removed and replaced by <xop:Include> SOAP element information items, as described in [XML-XOP].

**XOP package:** A package that offers an alternate serialization of an **XML Infoset** and that contains the **XOP document** and any **optimized content** from the original **XML Infoset**, as described in [XML-XOP].

**MAY, SHOULD, MUST, SHOULD NOT, MUST NOT:** These terms (in all caps) are used as described in [RFC2119]. All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

## 1.2  References

References to Microsoft Open Specifications documentation do not include a publishing year because links are to the latest version of the documents, which are updated frequently. References to other documents include a publishing year when one is available.

A reference marked "(Archived)" means that the reference document was either retired and is no longer being maintained or was replaced with a new document that provides current implementation details. We archive our documents online [Windows Protocol].

### 1.2.1  Normative References

We conduct frequent surveys of the normative references to assure their continued availability. If you have any issue with finding a normative reference, please contact dochelp@microsoft.com. We will assist you in finding the relevant information. Please check the archive site, http://msdn2.microsoft.com/en-us/library/E4BD6494-06AD-4aed-9823-445E921C9624, as an additional source.

[RFC2045] Freed, N., and Borenstein, N., "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies", RFC 2045, November 1996, http://ietf.org/rfc/rfc2045.txt

[RFC2387] Levinson, E., "The MIME Multipart/Related Content-type", RFC 2387, August 1998, http://ietf.org/rfc/rfc2387.txt

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, http://www.rfc-editor.org/rfc/rfc2119.txt

[XML-XOP] Gudgin, M., Mendelsohn, N., Nottingham, M., and Ruellan, H., "XML-binary Optimized Packaging", January 25, 2005, http://www.w3.org/TR/2005/REC-xop10-20050125

### 1.2.2  Informative References

[MS-GLOS] Microsoft Corporation, "Windows Protocols Master Glossary".

[SOAP-MTOM] Gudgin, M., Medelsohn, N., Nottingham, M., and Ruellan, H., "SOAP Message Transmission Optimization Mechanism", W3C Recommendation, 25 January 2005, http://www.w3.org/TR/2005/REC-soap12-mtom-20050125/

[XML] World Wide Web Consortium, "Extensible Markup Language (XML) 1.0 (Fourth Edition)", W3C Recommendation, August 2006, http://www.w3.org/TR/2006/REC-xml-20060816/

[XML-INFOSET] Cowan, John, and Tobin, Richard, "XML Information Set (Second Edition)", W3C Recommendation, February 2004, http://www.w3.org/TR/2004/REC-xml-infoset-20040204

## 1.3  Overview

The XML-binary Optimized Packaging (XOP) Profile provides extensions that enable more efficient implementations of [XML-XOP] to be built by requiring certain ordering of the **MIME** parts in the XOP package.

### 1.3.1  MIME Parts Ordering in Multipart/Related XOP Package Extension

The standard XOP implementation, as specified in [XML-XOP] section 4.1, is not allowed to consider the ordering of MIME parts to be significant to XOP processing or to the construction of the **XOP Infoset** for MIME Multipart/Related packaging. The XML-binary Optimized Packaging (XOP) Profile extends the MIME Multipart/Related packaging mechanism specified in [XML-XOP] to allow for the

ordering of the MIME parts, as described in section 2.2.1. These extensions enable the creation of more efficient implementations for processing an XML Infoset packaged in MIME Multipart/Related XOP packages when **streaming**.

## 1.4   Relationship to Other Protocols

The XML-binary Optimized Packaging (XOP) Profile is an extension of [XML-XOP]. The extensions specified in this document [MS-XOPP] do not introduce any new protocol relationships beyond those specified in [XML-XOP] Appendix A.

## 1.5   Prerequisites/Preconditions

There are no prerequisites or preconditions beyond those specified in [XML-XOP] Appendix A.

## 1.6   Applicability Statement

The MIME Parts Ordering in Multipart/Related XOP Package Extension specified in section 1.3.1 is applicable when an XOP Infoset packaged in a MIME Multipart/Related XOP package is processed in streaming fashion.

These extensions are not applicable to XOP packaging mechanisms other than MIME and those that do not specify their own packaging mechanism.

If broad interoperability with implementations strictly compliant with [XML-XOP] is desired, these extensions may not be a suitable choice.

## 1.7   Versioning and Capability Negotiation

There is no versioning or capability negotiation beyond that specified in [XML-XOP].

## 1.8   Vendor-Extensible Fields

There are no vendor-extensible fields beyond those specified in [XML-XOP].

## 1.9   Standards Assignments

There are no standards assignments beyond those specified in [XML-XOP].

# 2 Messages

## 2.1 Transport

This specification defines only serialization rules for XOP packages and does not define how XOP packages are transmitted on the network. As such, it does not have a transport.

## 2.2 Message Syntax

Except as specified in section 2.2.1, the syntax used for specifying MIME Multipart/Related XOP packaging is as specified in [XML-XOP] section 3, [XML-XOP] section 4.1, and [RFC2387].

### 2.2.1 Ordering of the MIME Parts in XOP Packages

The extensions provided by the XML–binary Optimized Packaging (XOP) Profile override the following text located in [XML-XOP] section 4.1:

"Except for purposes of determining the root MIME part, as specified by [RFC2387], ordering of MIME parts MUST NOT be considered significant to XOP processing or to the construction of the XOP Infoset."

In streaming mode negotiated through a process that is out of band to this protocol, the root MIME part MUST appear first in a MIME Multipart/Related XOP package, and the subsequent MIME parts MUST appear in the order which they appear in the corresponding XML Infoset.<1>

# 3 Protocol Details

The XML-binary Optimized Packaging (XOP) Profile does not introduce any new protocol roles or change any existing protocol roles that are defined in [XML-XOP].

# 4   Protocol Examples

## 4.1   MIME Multipart/Related XOP Package Ordering

The XML-binary Optimized Packaging (XOP) Profile does not introduce any new protocol roles or change any existing protocol roles that are defined in [XML-XOP]. Examples of how MIME Multipart/Related XOP packages are ordered are provided in [XML-XOP] section 1.2.

# 5   Security

## 5.1   Security Considerations for Implementers

Security considerations are the same as those specified in [XML-XOP] section 6.

## 5.2   Index of Security Parameters

None.

# 6   Appendix A: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include released service packs:

- Windows XP operating system Service Pack 2 (SP2)

- Windows Server 2003 operating system with Service Pack 1 (SP1)

- Windows Vista operating system

- Windows Server 2008 operating system

- Windows 7 operating system

- Windows Server 2008 R2 operating system

- Windows 8 operating system

- Windows Server 2012 operating system

- Windows 8.1 operating system

- Windows Server 2012 R2 operating system

Exceptions, if any, are noted below. If a service pack or Quick Fix Engineering (QFE) number appears with the product version, behavior changed in that service pack or QFE. The new behavior also applies to subsequent service packs of the product unless otherwise specified. If a product edition appears with the product version, behavior is different in that product edition.

Unless otherwise specified, any statement of optional behavior in this specification that is prescribed using the terms SHOULD or SHOULD NOT implies product behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies that the product does not follow the prescription.

<1> Section 2.2.1: The Windows Web Services API element provides a buffered and streaming programming model for exchanging and processing **SOAP messages** encoded as specified in [SOAP-MTOM] between network nodes. When the Windows Web Services API's streaming programming model is used to create SOAP messages, it follows the MIME parts ordering requirements specified in section 2.2.1.

# 7 Change Tracking

This section identifies changes that were made to the [MS-XOPP] protocol document between the January 2013 and August 2013 releases. Changes are classified as New, Major, Minor, Editorial, or No change.

The revision class **New** means that a new document is being released.

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

- A document revision that incorporates changes to interoperability requirements or functionality.

- An extensive rewrite, addition, or deletion of major portions of content.

- The removal of a document from the documentation set.

- Changes made for template compliance.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

The revision class **Editorial** means that the language and formatting in the technical content was changed.  Editorial changes apply to grammatical, formatting, and style issues.

The revision class **No change** means that no new technical or language changes were introduced. The technical content of the document is identical to the last released version, but minor editorial and formatting changes, as well as updates to the header and footer information, and to the revision summary, may have been made.

Major and minor changes can be described further using the following change types:

- New content added.

- Content updated.

- Content removed.

- New product behavior note added.

- Product behavior note updated.

- Product behavior note removed.

- New protocol syntax added.

- Protocol syntax updated.

- Protocol syntax removed.

- New content added due to protocol revision.

- Content updated due to protocol revision.

- Content removed due to protocol revision.

- New protocol syntax added due to protocol revision.

- Protocol syntax updated due to protocol revision.

- Protocol syntax removed due to protocol revision.

- New content added for template compliance.

- Content updated for template compliance.

- Content removed for template compliance.

- Obsolete document removed.

Editorial changes are always classified with the change type **Editorially updated.**

Some important terms used in the change type descriptions are defined as follows:

- **Protocol syntax** refers to data elements (such as packets, structures, enumerations, and methods) as well as interfaces.

- **Protocol revision** refers to changes made to a protocol that affect the bits that are sent over the wire.

The changes made to this document are listed in the following table. For more information, please contact protocol@microsoft.com.

| Section | Tracking number (if applicable) and description | Major change (Y or N) | Change type |
|---|---|---|---|
| 6<br>Appendix A:<br>Product Behavior | Added Windows 8.1 operating system and Windows Server 2012 R2 operating system to applicability list. | N | Content updated. |

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