[MS-MCI]:
MCI Compression and Decompression

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Revision Summary

Date	Revision History	Revision Class	Comments
04/04/2008	0.1		Initial Availability.
06/27/2008	1.0		Initial Release.
08/06/2008	1.01		Revised and edited technical content.
09/03/2008	1.02		Revised and edited technical content.
12/03/2008	1.03		Revised and edited technical content.
03/04/2009	1.04		Revised and edited technical content.
04/10/2009	2.0		Updated technical content and applicable product releases.
07/15/2009	3.0	Major	Revised and edited for technical content.
11/04/2009	3.1.0	Minor	Updated the technical content.
02/10/2010	3.1.0	None	Version 3.1.0 release
05/05/2010	4.0.0	Major	Updated and revised the technical content.
08/04/2010	4.1	Minor	Clarified the meaning of the technical content.
11/03/2010	4.1	No change	No changes to the meaning, language, or formatting of the technical content.
03/18/2011	5.0	Major	Significantly changed the technical content.
08/05/2011	5.0	No change	No changes to the meaning, language, or formatting of the technical content.
10/07/2011	5.0	No change	No changes to the meaning, language, or formatting of the technical content.
01/20/2012	6.0	Major	Significantly changed the technical content.
04/27/2012	7.0	Major	Significantly changed the technical content.
07/16/2012	7.0	No change	No changes to the meaning, language, or formatting of the technical content.
10/08/2012	7.1	Minor	Clarified the meaning of the technical content.

Table of Contents

1   Introduction

MCI compression and decompression and the MSZIP structure enable anyone to encode or decode MSZIP compressed data.

Sections 1.7 and 2 of this specification are normative and can contain the terms MAY, SHOULD, MUST, MUST NOT, and SHOULD NOT as defined in RFC 2119. All other sections and examples in this specification are informative.

1.1   Glossary

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

stream

The following terms are specific to this document:

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 technical documents, which are updated frequently. References to other documents include a publishing year when one is available.

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.

[RFC1951] Deutsch, P., "DEFLATE Compressed Data Format Specification version 1.3", RFC 1951, May 1996, http://www.ietf.org/rfc/rfc1951.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

1.2.2   Informative References

[MS-OXGLOS] Microsoft Corporation, "Exchange Server Protocols Master Glossary".

[MS-OXPROTO] Microsoft Corporation, "Exchange Server Protocols System Overview".

1.3   Overview

MSZIP compression is a derivative of Phil Katz's DEFLATE Compressed Data Format. For more information about the DEFLATE Compressed Data Format, see [RFC1951]. MSZIP uses only the three basic modes of deflate: no compression, compressed with fixed Huffman codes, and compressed with dynamic Huffman codes.

1.4 Relationship to Protocols and Other Structures

None.

For conceptual background information and overviews of the relationships and interactions between this and other protocols, see [MS-OXPROTO].

1.5 Applicability Statement

The MSZIP structure is applicable to protocols or structures that are designed to use [RFC1951] to compress or decompress data.

1.6 Versioning and Localization

None.

## 1.7 Vendor-Extensible Fields

None.

2   Structures

Each MSZIP block MUST consist of a 2-byte MSZIP signature and one or more RFC 1951 blocks. The 2-byte MSZIP signature MUST consist of the bytes 0x43 and 0x4B. The MSZIP signature MUST be the first 2 bytes in the MSZIP block. The MSZIP signature is shown in the following packet diagram.

0	1	2	3	4	5	6	7	8	9	1 0	1	2	3	4	5	6	7	8	9	2 0	1	2	3	4	5	6	7	8	9	3 0	1
Byte 0								Byte 1																							
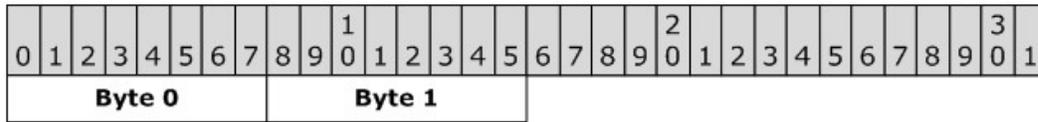
MSZIP signature **Byte 0 (1 byte)**: The first byte of the MSZIP signature MUST be 0x43.

MSZIP signature **Byte 1 (1 byte)**: The second byte of the MSZIP signature MUST be 0x4B.

Each MSZIP block is the result of a single deflate compression operation, as defined in [RFC1951]. The compressor that performs the compression operation MUST generate one or more RFC 1951 blocks, as defined in [RFC1951]. The number, deflation mode, and type of RFC 1951 blocks in each MSZIP block is determined by the compressor, as defined in [RFC1951]. The last RFC 1951 block in each MSZIP block MUST be marked as the "end" of the **stream (1)**, as defined by [RFC1951] section 3.2.3. Decoding trees MUST be discarded after each RFC 1951 block, but the history buffer MUST be maintained. Each MSZIP block MUST represent no more than 32 KB of uncompressed data.

The maximum compressed size of each MSZIP block is 32 KB + 12 bytes. This enables the MSZIP block to contain 32 KB of data split between two noncompressed RFC 1951 blocks, each of which has a value of BTYPE=00.

3   Structure Examples

The MSZIP block structure shown in the following diagram contains a single compressed RFC 1951 block.

<=(32 KB + 12 bytes)	
0x43 | 0x4B	Generated by single "deflate" compression operation
2-Byte MSZIP Signature	RFC 1951 Block

The MSZIP block structure shown in the following diagram contains two RFC 1951 blocks.

<=(32 KB + 12 bytes)		
0x43 | 0x4B	Generated by single "deflate" compression operation	
2-Byte MSZIP Signature	RFC 1951 Block	RFC 1951 Block

4   Security

4.1   Security Considerations for Implementers

None.

4.2   Index of Security Parameters

None.

5 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:

- Microsoft® Exchange Server 2003

- Microsoft® Exchange Server 2007

- Microsoft® Exchange Server 2010

- Microsoft® Office Outlook® 2003

- Microsoft® Office Outlook® 2007

- Microsoft® Outlook® 2010

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.

6 Change Tracking

This section identifies changes that were made to the [MS-MCI] protocol document between the July 2012 and October 2012 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
1.2.2 Informative References	Added the reference [MS-OXPROTO].	N	Content updated.
1.4 Relationship to Protocols and Other Structures	Added informative reference information for overview of relationships between this and other protocols.	N	Content updated.

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