[MS-H263PF]:
RTP Payload Format for H.263 Video Streams Extensions

Intellectual Property Rights Notice for Open Specifications Documentation

- **Technical Documentation.** Microsoft publishes Open Specifications documentation for protocols, file formats, languages, standards as well as overviews of the interaction among each of these technologies.
- **Copyrights.** This documentation is covered by Microsoft copyrights. Regardless of any other terms that are contained in the terms of use for the Microsoft website that hosts this documentation, you may make copies of it in order to develop implementations of the technologies described in the Open Specifications and may distribute portions of it in your implementations using these technologies or your documentation as necessary to properly document the implementation. You may also distribute in your implementation, with or without modification, any schema, IDL's, or code samples that are included in the documentation. This permission also applies to any documents that are referenced in the Open Specifications.
- **No Trade Secrets.** Microsoft does not claim any trade secret rights in this documentation.
- **Patents.** Microsoft has patents that may cover your implementations of the technologies described in the Open Specifications. Neither this notice nor Microsoft's delivery of the documentation grants any licenses under those or any other Microsoft patents. However, a given Open Specification may be covered by Microsoft's Open Specification Promise (available here: http://www.microsoft.com/interop/osp) or the Community Promise (available here: http://www.microsoft.com/interop/cp/default.mspx). If you would prefer a written license, or if the technologies described in the Open Specifications are not covered by the Open Specifications Promise or Community Promise, as applicable, patent licenses are available by contacting iplg@microsoft.com.
- **Trademarks.** The names of companies and products contained in this documentation may be covered by trademarks or similar intellectual property rights. This notice does not grant any licenses under those rights.
- **Fictitious Names.** The example companies, organizations, products, domain names, e-mail addresses, logos, people, places, and events depicted in this documentation are fictitious. No association with any real company, organization, product, domain name, email address, logo, person, place, or event is intended or should be inferred.

Reservation of Rights. All other rights are reserved, and this notice does not grant any rights other than specifically described above, whether by implication, estoppel, or otherwise.

Tools. The Open Specifications do not require the use of Microsoft programming tools or programming environments in order for you to develop an implementation. If you have access to Microsoft programming tools and environments you are free to take advantage of them. Certain Open Specifications are intended for use in conjunction with publicly available standard specifications and network programming art, and assumes that the reader either is familiar with the aforementioned material or has immediate access to it.

Revision Summary

Date	Revision History	Revision Class	Comments
04/04/2008	0.1		Initial version
04/25/2008	0.2		Revised and edited the technical content
06/27/2008	1.0		Revised and edited the technical content
08/15/2008	1.01		Revised and edited the technical content
12/12/2008	2.0		Revised and edited the technical content
03/13/2009	2.01		Revised and edited the technical content
03/13/2009	2.02		Edited the technical content
07/13/2009	2.03	Major	Revised and edited the technical content
08/28/2009	2.04	Editorial	Revised and edited the technical content
11/06/2009	2.05	Editorial	Revised and edited the technical content
02/19/2010	2.06	Editorial	Revised and edited the technical content
03/31/2010	2.07	Major	Updated and revised the technical content
04/30/2010	2.08	Editorial	Revised and edited the technical content
06/07/2010	2.09	Editorial	Revised and edited the technical content
06/29/2010	2.10	Editorial	Changed language and formatting in the technical content.
07/23/2010	2.10	No change	No changes to the meaning, language, or formatting of the technical content.
09/27/2010	3.0	Major	Significantly changed the technical content.
11/15/2010	3.0	No change	No changes to the meaning, language, or formatting of the technical content.
12/17/2010	3.0	No change	No changes to the meaning, language, or formatting of the technical content.

Table of Contents

1 Introduction

This document specifies the RTP Payload Format for H.263 Video Streams Extensions Protocol. It is a proprietary extension to the RTP Payload Format for H.263 Video Streams, as described in [RFC2190] section 1.

This protocol is used to transmit and receive video streams using the H.263 payload format in a two-party peer-to-peer call.

1.1 Glossary

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

network byte order

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

Common Intermediate Format (CIF)
PB-frame
Real-Time Transport Protocol (RTP)

The following terms are specific to this document:

A field: A 1-bit field in an H.263 Mode A payload header. It indicates whether the Advanced Prediction option is enabled for the current picture header, as described in [RFC2190].

M bit: A marker bit of a Real-Time Transport Protocol (RTP) fixed header. It is set to "1" when the current packet carries the end of the current frame. Otherwise, it is set to "0" (zero).

Mode A: One of three defined modes for the H.263 payload header. Mode A uses a 4-byte, H.263 payload header and it supports fragmentation at Group of Block boundaries.

Mode B: One of the three defined modes for the H.263 payload header. Mode B uses an 8-byte, H.263 payload header and it starts each packet at Macroblock boundaries without a PB-frames option.

Mode C: One of the three defined modes for the H.263 payload header. Mode C uses a 12-byte, H.263 payload header and it supports fragmentation at Macroblock boundaries for frames that are coded with the PB-frames option.

P field: A field in an H.263 payload header. It defines the optional PB-frames mode. Zero (0) implies a normal I- or P-frame. One (1) implies a PB-frame.

Quarter Common Intermediate Format (QCIF): A picture format that is supported by H.263, as described in [MS-H263PF].

S field: A field in an H.263 payload header. It specifies whether the syntax-based arithmetic coding option is used.

SRC field: A field in an H.263 payload header that specifies the resolution of the current picture.

U field: A field in an H.263 payload header that specifies whether the unrestricted motion vector option is used.

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

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.

[MS-RTP] Microsoft Corporation, "Real-time Transport Protocol (RTP) Extensions", June 2008.

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

[RFC2190] Zhu, C., "RTP Payload Format for H.263 Video Streams", RFC 2190, September 1997, http://www.ietf.org/rfc/rfc2190.txt

1.2.2 Informative References

[ITUH.263] ITU-T, "H.263: Video Coding for Low Bit Rate Communication", Recommendation H.263, January 2005, http://www.itu.int/rec/T-REC-H.263-200501-I/en

[MS-GLOS] Microsoft Corporation, "Windows Protocols Master Glossary", March 2007.

[MS-OFCGLOS] Microsoft Corporation, "Microsoft Office Master Glossary", June 2008.

1.3 Protocol Overview (Synopsis)

This protocol specifies extensions to the payload format described in [RFC2190] section 1 for encapsulating an H.263 bitstream in the **Real-Time Transport Protocol (RTP)** and the modes supported for the H.263 payload headers.

This protocol supports only **Mode A** and **Mode B**, as described in [RFC2190] section 4.2.

1.4 Relationship to Other Protocols

This protocol extends the base protocol for the H.263 payload format described in [RFC2190] section 1. It carries a payload consisting of an H.263 bitstream in the format described in [ITUH.263] section 4.1, and in turn it is carried as a payload of the RTP extensions protocol described in [MS-RTP] section 1.

1.5 Prerequisites/Preconditions

This protocol specifies only the payload format for H.263 video streams. It requires the establishment of an RTP stream, a mechanism for obtaining H.263 video frames for it to convert to packets, and a mechanism for rendering H.263 video frames that are converted to packets.

1.6 Applicability Statement

This protocol can be used only to transform H.263 video frames into packets.

1.7 Versioning and Capability Negotiation

None.

1.8 Vendor-Extensible Fields

None.

1.9 Standards Assignments

None.

2 Messages

2.1 Transport

This protocol is carried as a payload in RTP, as specified in [MS-RTP] section 1, and therefore relies on RTP for providing the means to transport its payload over the network.

2.2 Message Syntax

2.2.1 H.263 Payload Header

The payload header format for this protocol is as defined in [RFC2190] section 5.

In addition, this protocol imposes the following constraints on the payload header for Modes A and B:

- The **SRC field** MUST be either 2 for **Quarter Common Intermediate Format (QCIF)**, or 3 for **Common Intermediate Format (CIF)**.
- The **U field** MUST be 0.
- The **S field** MUST be 0.
- The **A field** MUST be 0.

The RTP Payload Format for H.263 Video Streams Extensions protocol does not support **PB-frame**s. As a result, the **P field** in the payload MUST be 0. The sender MUST NOT send the **Mode C** payload header or the Mode A payload header with the P field set to 1.

In addition, the payload header format SHOULD follow the constraints described in footnote.<1>

3 Protocol Details

3.1 Common Details

This protocol does not have any role-specific behavior, such as for client or server roles. All behavior described here applies to both client and server roles.

3.1.1 Abstract Data Model

This section describes a conceptual model of possible data organization that an implementation maintains to participate in this protocol. The described organization is provided to facilitate the explanation of how the protocol behaves. This document does not mandate that implementations adhere to this model as long as their external behavior is consistent with that described in this document.

An H.263 video frame is fragmented and converted to packets using the same mechanism specified in [RFC2190] section 1 and in this document.

An H.263 video frame is constructed by concatenating all H.263 video payload data of all RTP packets for the video frame.

RTP sequence numbers: An H263 video packet MUST contain RTP sequence numbers that are sequential.

M bit: An H.263 video packet that is the last video packet MUST have an RTP M bit that is set to 1. For the definition of the M (marker) bit, see [RFC2190] section 4.1.

3.1.2 Timers

None.

3.1.3 Initialization

None.

3.1.4 Higher-Layer Triggered Events

None.

3.1.5 Message Processing Events and Sequencing Rules

None.

3.1.6 Timer Events

None.

3.1.7 Other Local Events

None.

4 Protocol Examples

4.1 Mode A, Intra-frame

Payload header bytes in **network byte order**:

0x05, 0x60, 0x00, 0x00<2>

The payload header contains fields of the following values:

F=0, P=0, SBIT=0, EBIT=5,

SRC= 3(CIF), I=0 (Intra frame), U=0, S=0, A=0, R=0, DBQ=0, TRB=0,

TR=0<3>

4.2 Mode A, Inter-frame

Payload header bytes in network byte order:

0x02, 0x70, 0x00, 0x00<4>

The payload header contains fields of the following values:

F=0, P=0, SBIT=0, EBIT=2,

SRC= 3(CIF), I=1 (Inter-frame), U=0, S=0, A=0, R=0, DBQ=0, TRB=0,

TR=0<5>

4.3 Mode B, Intra-frame

Payload header bytes in network byte order:

0xBD, 0x67, 0x00, 0x14, 0x00, 0x00, 0x00, 0x00

The payload header contains fields of the following values:

F=1, P=0, SBIT=7, EBIT=5,

SRC= 3(CIF), QUANT=7,

GOBN=0, MBA=5, R=0,

I=0 (Intra-frame), U=0, S=0, A=0,

HMV1=0, VMV1=0, HMV2=0, VMV2=0<6>

4.4 Mode B, Inter-frame

Payload header bytes in network byte order:

0xA1, 0x67, 0x00, 0x18, 0x8F, 0x00, 0x80, 0x00

The payload header contains fields of the following values:

F=1, P=0, SBIT=4, EBIT=1,

SRC= 3(CIF), QUANT=7,

GOBN=0, MBA=6, R=0,

I=1(Inter-frame), U=0, S=0, A=0,

HMV1=120, VMV1=2, HMV2=0, VMV2=0<7>

5 Security

5.1 Security Considerations for Implementers

None.

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:

- Microsoft® Office Communicator 2007
- Microsoft® Office Communicator 2007 R2
- Microsoft® Lync™ 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.

<1> Section 2.2.1: For Office Communications Server 2007, Office Communicator 2007 only:

The TR field MUST be ignored.

The I field has a different meaning than that specified in [RFC2190] section 5.1. 0 MUST be used for the inter-coded frame. 1 MUST be used for the intra-coded frame.

<2> Section 4.1: Office Communications Server 2007, Office Communicator 2007:

The TR field MUST be ignored.

The I field has a different meaning than that specified in [RFC2190] section 5.1. 0 MUST be used for the inter-coded frame. 1 MUST be used for the intra-coded frame.

<3> Section 4.1: Office Communications Server 2007, Office Communicator 2007:

The TR field MUST be ignored.

The I field has a different meaning than that specified in [RFC2190] section 5.1. 0 MUST be used for the inter-coded frame. 1 MUST be used for the intra-coded frame.

<4> Section 4.2: Office Communications Server 2007, Office Communicator 2007:

The TR field MUST be ignored.

The I field has a different meaning than that specified in [RFC2190] section 5.1. 0 MUST be used for the inter-coded frame. 1 MUST be used for the intra-coded frame.

<5> Section 4.2: Office Communications Server 2007, Office Communicator 2007:

The TR field MUST be ignored.

The I field has a different meaning than that specified in [RFC2190] section 5.1. 0 MUST be used for the inter-coded frame. 1 MUST be used for the intra-coded frame.

<6> Section 4.3: Office Communications Server 2007, Office Communicator 2007:

The TR field MUST be ignored.

The I field has a different meaning than that specified in [RFC2190] section 5.1. 0 MUST be used for the inter-coded frame. 1 MUST be used for the intra-coded frame.

<7> Section 4.4: Office Communications Server 2007, Office Communicator 2007:

The TR field MUST be ignored.

The I field has a different meaning than that specified in [RFC2190] section 5.1. 0 MUST be used for the inter-coded frame. 1 MUST be used for the intra-coded frame.

7 Change Tracking

No table of changes is available. The document is either new or has had no changes since its last release.

8 Index