[MS-RTASPF]:
RTP for Application Sharing Payload Format 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 Open Specification Promise or the Community Promise. 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
12/12/2008	1.0		Initial version
02/13/2009	1.01		Revised and edited the technical content
03/13/2009	1.02		Revised and edited the technical content
07/13/2009	1.03	Major	Revised and edited the technical content
08/28/2009	1.04	Editorial	Revised and edited the technical content
11/06/2009	1.05	Editorial	Revised and edited the technical content
02/19/2010	1.06	Editorial	Revised and edited the technical content
03/31/2010	1.07	Major	Updated and revised the technical content
04/30/2010	1.08	Editorial	Revised and edited the technical content
06/07/2010	1.09	Editorial	Revised and edited the technical content
06/29/2010	1.10	Editorial	Changed language and formatting in the technical content.
07/23/2010	1.10	No change	No changes to the meaning, language, or formatting of the technical content.
09/27/2010	2.0	Major	Significantly changed the technical content.
11/15/2010	2.0	No change	No changes to the meaning, language, or formatting of the technical content.
12/17/2010	2.0	No change	No changes to the meaning, language, or formatting of the technical content.
03/18/2011	2.0	No change	No changes to the meaning, language, or formatting of the technical content.
06/10/2011	2.0	No change	No changes to the meaning, language, or formatting of the technical content.
01/20/2012	3.0	Major	Significantly changed the technical content.
04/11/2012	3.0	No change	No changes to the meaning, language, or formatting of the technical content.
07/16/2012	3.0	No change	No changes to the meaning, language, or formatting of the technical content.
10/08/2012	3.0.1	Editorial	Changed language and formatting in the technical content.
02/11/2013	3.0.1	No change	No changes to the meaning, language, or formatting of the technical content.

Table of Contents

Release: February 11, 2013

1 Introduction

The RTP for Application Sharing Payload Format Extensions protocol specifies a set of proprietary extensions for [MS-RTP]. This protocol is designed to transfer application sharing data over the Real-Time Transport Protocol.

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]:

encryption
Remote Desktop Protocol (RDP)
Transmission Control Protocol (TCP)

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

Application Sharing Multipoint Control Unit (ASMCU)
Multipoint Control Unit (MCU)
Real-Time Transport Protocol (RTP)
RTP packet
RTP payload
Session Description Protocol (SDP)
Session Initiation Protocol (SIP)
Uniform Resource Identifier (URI)

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.

[MS-CONFAS] Microsoft Corporation, "Centralized Conference Control Protocol: Application Sharing Extensions".

[MS-RDPBCGR] Microsoft Corporation, "Remote Desktop Protocol: Basic Connectivity and Graphics Remoting".

[MS-RDPEMC] Microsoft Corporation, "Remote Desktop Protocol: Multiparty Virtual Channel Extension".

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

[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

[RFC3550] Schulzrinne, H., Casner, S., Frederick, R., and Jacobson, V., "RTP: A Transport Protocol for Real-Time Applications", STD 64, RFC 3550, July 2003, http://www.ietf.org/rfc/rfc3550.txt

1.2.2 Informative References

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

[MS-ICE2] Microsoft Corporation, "Interactive Connectivity Establishment (ICE) Extensions 2.0".

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

[MS-SRTP] Microsoft Corporation, "Secure Real-time Transport Protocol (SRTP) Extensions".

1.3 Overview

This protocol extends the **Real-Time Transport Protocol (RTP)** Extensions protocol, a set of proprietary extensions to the base RTP, as described in [RFC3550], to transfer the application sharing payload encoded in the graphics format described by [MS-RDPBCGR].

1.4 Relationship to Other Protocols

This protocol uses the Real-time Transport Protocol (RTP) Extensions protocol described in [MS-RTP] and the **Transmission Control Protocol (TCP)** described in [MS-RTP] as its local transport protocol. This protocol is the transport protocol for the Remote Desktop Protocol: Basic Connectivity and Graphics Remoting Specification described in [MS-RDPBCGR] and the Remote Desktop Protocol: Multiparty Virtual Channel Extension described in [MS-RDPEMC]. **Remote Desktop Protocol (RDP)** is a stream protocol with no boundaries, which means that RDP defines the packet length inside the RDP packet ([MS-RDPBCGR] section 2) and the next RDP packet can immediately follow the previous RDP packet.

RTP is required to use TCP as its transport protocol when transporting payloads for this protocol. For details, see [MS-RTP] section 1.4 for other dependent protocols.

1.5 Prerequisites/Preconditions

This protocol requires all the prerequisites and preconditions of RTP, as described in [MS-RTP] section 1.5.

The RDP protocol is required to turn off **encryption** by setting the encryption level to "None" as described in [MS-RDPBCGR] section 5.3.6.

The RDP protocol is required to turn off Bulk Data Compression for the data between the Viewer and the **Multipoint Control Unit (MCU)**, and also to turn on Bulk Data Compression for the data between the Sharer and the MCU as described in [MS-RDPBCGR] section 3.1.8.

1.6   Applicability Statement

This protocol is used when the RDP payload is transferred over the RTP protocol. The protocol described in [MS-SRTP] is required to provide encryption for the transferred data.

1.7   Versioning and Capability Negotiation

This document covers versioning issues in the following areas:

- **Supported Transports:** This protocol only supports [MS-RTP] as its transport, as discussed in section 2.1 and [MS-ICE2] in TCP mode only.

- **Protocol Versions:** This protocol, as a payload format of RTP, does not provide versioning information within the scope of the protocol itself. However, as a part of the RTP payload, any versioning information about the RTP level applies.

  The current version is 0x00080004. The current RDP version number can be obtained as described in [MS-RDPBCGR] section 1.3.1.1.

- **Capability Negotiation**: Capability negotiation is done by non-RTP means, usually through a higher level application layer protocol such as **Session Initiation Protocol (SIP)** and **Session Description Protocol (SDP)**.

1.8   Vendor-Extensible Fields

None.

1.9   Standards Assignments

None.

2   Messages

2.1   Transport

This protocol is a payload for the [MS-RTP] transport protocol and therefore relies on RTP and TCP for providing means to transport its payload over the network.

2.2   Message Syntax

[MS-RTP] section 2.2.1 defines the **RTP packet** format and [MS-RDPBCGR] section 2 defines one **RTP payload** format for application sharing.

The total RTP packet size including the transport header, network header, link layer header, RTP header, and RTP payload MUST NOT exceed 1500 bytes, as specified in [MS-RTP] section 2.1; otherwise, the RTP connection will be disconnected. The RTP packets MUST be split so that this limit is not exceeded.

3   Protocol Details

3.1   Peer to Peer Details

The Peer to Peer scenario means that there are two participants in the application sharing session: one sharer and one viewer. As defined in [MS-RDPEMC] section 2.2.4.1, the **FriendlyName** that is sent on the Participant-Created PDU MUST be their local SIP **Uniform Resource Identifier (URI)**.

3.1.1   Abstract Data Model

None.

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

The RTP parameters for packet sequence number, RTP marker bit, CSRCCount, and SSRC MUST be set as specified in [MS-RTP] section 2.2.1 and [RFC3550] section 5.1. The RTP marker bit MUST be set to 0 for the message.

The RTP parameter for Payload Type MUST be set to 127 (0x7F) to denote an RDP payload.

When the RTP packets are received on the receiver side, the payload for each RTP packet MUST be assembled in ordered by the RTP sequence number, and the payload or assembled payloads are interpreted as specified in [MS-RDPBCGR] section 2.

The connection sequence specified in [MS-RDPBCGR] section 1.3.1.1 MUST omit the Security Exchange PDU defined in [MS-RDPBCGR] section 2.2.1.10.1.

3.1.6   Timer Events

None.

3.1.7   Other Local Events

When a packet loss event is detected from [MS-RTP], this protocol stops sending data.

The packet loss is specified in [MS-RTP] section 1.3.

3.2   Multiparty Details

The multiparty scenario means that there are more than two participants in the application sharing session: one sharer and multiple viewers. The sharer and viewers connect to the **Application Sharing Multipoint Control Unit (ASMCU)** using this protocol. For details, see [MS-CONFAS].

3.2.1 Abstract Data Model

None.

3.2.2 Timers

None.

3.2.3 Initialization

None.

3.2.4 Higher-Layer Triggered Events

None.

3.2.5 Message Processing Events and Sequencing Rules

The RTP parameters for packet sequence number, RTP marker bit, CSRCCount, and SSRC MUST be set according to [MS-RTP] section 2.2.1 and [RFC3550] section 5.1.

When the RTP packets are received on the receiver side, the payload for each RTP packet MUST be assembled in ordered by the RTP sequence number, and the payload or assembled payloads are interpreted as specified in [MS-RDPBCGR] section 2.

The connection sequence specified in [MS-RDPBCGR] section 1.3.1.1 MUST omit the Security Exchange PDU specified in [MS-RDPBCGR] section 2.2.1.10.1.

3.2.6 Timer Events

None.

3.2.7 Other Local Events

When a packet loss is detected, this protocol stops sending data.

The packet loss is specified in [MS-RTP] section 1.3.

4   Protocol Examples

The following RTP Marker is the Payload Type of 127 (0x7F) which is described in [MS-RTP] section 2.2.1.

The following data is an example of one RTP packet that has an RDP payload:

Byte offset	Content	Comments
00	80	RTP Version: 2; Padding: 0; Extension: 0; CSRCCount: 0
01	7F	RTP Marker: 0; RTP payload type: 0x7F
02~03	49 14	RTP Sequence Number: 0x4914
04~07	6E 5D FB A0	RTP Timestamp: 0x6e5dfba0
08~0B	0F 3E 6B 58	RTP SSRC: 0x0F3E6B58
0C~	…	RTP payload (RDP packet)

5   Security

5.1   Security Considerations for Implementers

This protocol has no additional security considerations beyond what is described in [MS-RTP] and [MS-SRTP].

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 Communications Server 2007 R2

- Microsoft Office Communicator 2007 R2

- Microsoft Lync Server 2010

- Microsoft Lync 2010

- Microsoft Lync Server 2013

- Microsoft Lync 2013

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.

7 Change Tracking

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

Release: February 11, 2013

8 Index

A

Abstract data model
  multiparty 10
  peer to peer 9
Applicability 7

C

Capability negotiation 7
Change tracking 14

D

Data model - abstract
  multiparty 10
  peer to peer 9

E

Examples 11

F

Fields - vendor-extensible 7

G

Glossary 5

H

Higher-layer triggered events
  multiparty 10
  peer to peer 9

I

Implementer - security considerations 12
Index of security parameters 12
Informative references 6
Initialization
  multiparty 10
  peer to peer 9
Introduction 5

L

Local events
  multiparty 10
  peer to peer 9

M

Message processing
  multiparty 10
Message processing – peer to peer (section 3.1.5 9,
  section 3.2.5 10)
Messages

  syntax 8
  transport 8
Multiparty
  abstract data model 10
  higher-layer triggered events 10
  initialization 10
  local events 10
  message processing 10
  overview 9
  sequencing rules 10
  timer events 10
  timers 10

N

Normative references 5

O

Overview (synopsis) 6

P

Parameters - security index 12
Peer to peer
  abstract data model 9
  higher-layer triggered events 9
  initialization 9
  local events 9
  overview 9
  timer events 9
  timers 9
Peer to peer – message processing (section 3.1.5 9,
  section 3.2.5 10)
Peer to peer – sequencing rules (section 3.1.5 9,
  section 3.2.5 10)
Preconditions 6
Prerequisites 6
Product behavior 13

R

References 5
  informative 6
  normative 5
Relationship to other protocols 6

S

Security
  implementer considerations 12
  parameter index 12
Sequencing rules
  multiparty 10
Sequencing rules – peer to peer (section 3.1.5 9,
  section 3.2.5 10)
Standards assignments 7
Syntax 8

T

V