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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Supplementary
services for multimedia

Traversal of ITU-T H.323 media across network address translators and firewalls

Recommendation ITU-T H.460.19

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Recommendation ITU-T H.460.19

Traversal of ITU-T H.323 media across network address translators and firewalls

Summary

Recommendation ITU-T H.460.19 extends Recommendation ITU-T H.323 by defining the NAT/FW traversal mechanism for media. Together with an appropriate mechanism for signalling traversal, such as ITU-T H.460.18, it may be used as a solution for the NAT/FW traversal problem by ITU-T H.323.

This revised version introduces a number of clarifications to the previous version by incorporating the technical and editorial corrections from the ITU-T H.323-series Implementers Guide (03/2011).

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T H.460.19	2005-09-13	16
2.0	ITU-T H.460.19	2013-03-16	16

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

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As of the date of approval of this Recommendation, ITU had received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at <http://www.itu.int/ITU-T/ipr/>.

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Recommendation ITU-T H.460.19

Traversal of ITU-T H.323 media across network address translators and firewalls

1 Scope

This Recommendation defines a mechanism for media communication between two ITU-T H.323 entities, separated by one or more NAT/FW devices.

This Recommendation addresses NAT/FW traversal for RTP, for RTP encrypted using ITU-T H.235 and for SRTP media streams.

NAT/FW traversal for media transported by other protocols is for further study.

It also defines a mechanism to use the same transport address for several media channels, which permits reduction of the number of "pinholes" opened in the NAT/FW device and reduces the number of Media Channel and Media Control Channel transport addresses used by ITU-T H.323 entities.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T H.225.0] Recommendation ITU-T H.225.0 (2009), *Call signalling protocols and media stream packetization for packet-based multimedia communication systems*.
- [ITU-T H.245] Recommendation ITU-T H.245 (2011), *Control protocol for multimedia communication*.
- [ITU-T H.323] Recommendation ITU-T H.323 (2009), *Packet-based multimedia communications systems*.
- [ITU-T H.460.1] Recommendation ITU-T H.460.1 (2013), *Guidelines for the use of the generic extensible framework*.
- [ITU-T H.460.18] Recommendation ITU-T H.460.18 (2013), *Traversal of ITU-T H.323 signalling across network address translators and firewalls*.
- [IETF RFC 3550] IETF RFC 3550 (2003), *RTP: A Transport Protocol for Real-Time Applications*.
- [IETF RFC 3711] IETF RFC 3711 (2004), *The Secure Real-time Transport Protocol (SRTP)*.

3 Definitions

This Recommendation defines the following terms:

3.1 apparent source address: The source IP address received in the IP packet header, combined with the source port number received in the UDP or TCP header of the same packet. The presence of NAT may cause this to differ from the sender's source address and source port number.

3.2 client: An endpoint compliant with ITU-T H.460.19 specifications and performing ITU-T H.460.19 client functionality. An ITU-T H.460.19 client is normally located on the internal network.

3.3 demilitarized zone: A network that sits between an organization's internal network and an external network, usually the Internet. Connections from the internal and the external network to the DMZ are permitted, whereas connections from the DMZ are only permitted to the external network.

3.4 endpoint: An ITU-T H.323 terminal, gateway or MCU. An endpoint can call and be called. It generates and/or terminates information streams.

3.5 external network: A network connected to the firewall through the firewall's public interface. Typically, but not limited to, the Internet.

3.6 ITU-T H.460.19 entity: A client or server.

3.7 internal network: A network connected to the NAT/FW through the NAT/FW's private interface.

3.8 media channel: An RTP or an SRTP channel.

3.9 media control channel: An RTCP or SRTCP channel.

3.10 multiplexed media mode: A mechanism which enables managing multiple RTP/RTCP or SRTP/SRTCP sessions on a single pair of transport addresses as described in clause 7.2. Receivers choose whether or not to multiplex.

3.11 OLC request: Any one of:

- the **openLogicalChannel** message;
- the **openLogicalChannel** Fast Connect proposal message for transmission from caller to callee;
- the **openLogicalChannel** Fast Connect proposal accept message for transmission from callee to caller.

3.12 OLC response: Any one of:

- the **openLogicalChannelAck** message;
- the **openLogicalChannel** Fast Connect proposal accept message for transmission from caller to callee;
- the **openLogicalChannel** Fast Connect proposal message for transmission from callee to caller.

NOTE – An OLC request message is the message that contains information relevant to the OLC for the media stream that is received by the addressee of this OLC request message, while an OLC response message is the message that contains information relevant to the OLC for the media stream that is sent by the addressee of this OLC response message.

3.13 peer: An ITU-T H.460.19 entity with which a particular ITU-T H.460.19 entity is communicating.

3.14 pinhole: A temporary binding of an internal and an external transport address in the NAT/FW which allows the bidirectional passage of packets between those addresses.

3.15 server: An ITU-T H.323 entity compliant with ITU-T H.460.19 specifications and performing ITU-T H.460.19 server functionality.

3.16 transport address: IP address and UDP/TCP port number.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

LC	Logical Channel
NAT/FW	Network Address Translator and/or Firewall
OID	Object Identifier
OLC	Open Logical Channel
RTCP	Real-time Transport Control Protocol
RTP	Real-time Transport Protocol
SRTCP	Secure Real-time Transport Control Protocol
SRTP	Secure Real-time Transport Protocol
SSRC	Synchronization Source
TCP	Transmission Control Protocol
TPKT	Transport Protocol Data Unit Packet

5 Conventions

In this Recommendation the following conventions are used:

"**Shall**" indicates a mandatory requirement.

"**Should**" indicates a suggested but optional course of action.

"**May**" indicates an optional course of action rather than a recommendation that something take place.

6 Architecture

This Recommendation addresses a network which is divided into an internal and external network by a NAT/FW (see Figure 1). Typically, the internal network will be a private network. The external network will typically be a public network such as the Internet, but may alternatively be another private network.

Figures 1, 2 and 3 show possible ways in which this Recommendation may be deployed. Items in bold text: ITU-T H.323 Endpoint with ITU-T H.460.19 Client, ITU-T H.460.19 Client Proxy and ITU-T H.460.19 Server are referred to in this Recommendation. Other devices are shown for completeness.

The internal network contains an ITU-T H.323 endpoint (the ITU-T H.460.19 client) and the external network contains an ITU-T H.460.19 server. These ITU-T H.323 endpoints may be terminals, gateways or MCUs. Extensions to ITU-T H.323 defined in this Recommendation provide modes that permit media streams to traverse NAT/FW devices.