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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication procedures

Gateway control protocol: IP NAPT traversal package

ITU-T Recommendation H.248.37

ITU-T H-SERIES RECOMMENDATIONS

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Gateway control protocol: IP NAPT traversal package

Summary

Session Border Controllers (SBCs) are becoming an important part of the Internet infrastructure. Some of these Session Border Controllers are being split into Media Gateway Controller (MGC) and Media Gateway (MG) components. One important function of a SBC is to perform Network Address and Port Translation (NAPT). This Recommendation allows the MGC to instruct an MG to latch to an address provided by an incoming Internet Protocol (IP) application data stream rather than the address provided by the call/bearer control. This enables the MG to open a pinhole for data flow.

FOREWORD

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

CONTENTS

ITU-T Recommendation H.248.37

Gateway control protocol: IP NAPT traversal package

1   Scope

This Recommendation allows a Media Gateway Controller to control Internet Protocol (IP) Network Address and Port Translation (NAPT) traversal. The use of IP NAPT traversal is especially useful in Session Border Controllers (SBCs) where media traversal is required.

The mechanism defined in this Recommendation is applicable to any IP data stream. It can be used for any type of UDP or TCP-based application level framing protocol, for example: RTP/RTCP, T.38, MSRP, HTTP.

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

2.1   Normative references

– ITU-T Recommendation H.248.1 (2005), *Gateway control protocol: Version 3*.

– ITU-T Recommendation H.323 (2003), *Packet-based multimedia communications system*.

– ITU-T Recommendation Q.1970 (2001), *BICC IP Bearer control protocol*.

2.2   Informative references

– IETF RFC 2327 (1998), *SDP: Session Description Protocol*.

– IETF RFC 2663 (1999), *IP Network Address Translator (NAT) Terminology and Considerations*.

– IETF RFC 3261 (2002), *SIP: Session Initiation Protocol*.

– IETF RFC 3489 (2003), *STUN – Simple Traversal of User Datagram Protocol (UDP) Through Network Address Translators (NATs)*.

– IETF RFC 3704 (2004), *Ingress Filtering for Multihomed Networks*.

3   Terms and definitions

This Recommendation defines the following terms:

3.1   latching: Describes the process of an IP application endpoint (e.g., RTP) ignoring the Remote IP Address and Port received from application session (endpoint) signalling (e.g., SIP/SDP, H.248/SDP, Q.1970, H.323) and returning the IP application data to the source IP Address and Port from the incoming data.

3.2   Network Address Translation: Is defined in IETF RFC 2663.

3.3   pinhole: A configuration of two associated H.248 IP Terminations within the same context, which allows/prohibits unidirectional forwarding of IP packets under specified conditions (e.g., address tuple).

NOTE – A pinhole may also be referred to as a "gate".

3.4   symmetric NAT: Operation is described in IETF RFC 3489.

3.5   source filtering or ingress filtering: Is defined in IETF RFC 3704.

4   Abbreviations

This Recommendation uses the following abbreviations:

CPE   Customer Premises Equipment

HTTP   Hypertext Transfer Protocol

IP   Internet Protocol

MG   Media Gateway

MSRP   Message Session Relay Protocol

NAPT   Network Address and Port Translation

NAT   Network Address Translation

RTCP   RTP Control Protocol

RTP   Real-Time Protocol

SBC   Session Border Controller

SDP   Session Description Protocol

TCP   Transmission Control Protocol

UDP   User Datagram Protocol

5   IP NAPT traversal package

Package Name: IP NAT Traversal Package

PackageID: ipnapt, <0x0099>

Description:

         This package enables the MGC to instruct the MG to perform latching on a H.248 Termination/Stream for the purposes of IP NAPT traversal.

Version: 1

Extends: None

5.1   Properties

None.

5.2   Events

None.

5.3 Signals

5.3.1 Latch

Signal Name: Latching

SignalID: latch, (0x0001)

Description:

    This signal orders NAPT Traversal processing.

Signal Type: Brief

Duration: Not Applicable

5.3.1.1 Additional parameters

5.3.1.1.1 NAT processing

Parameter Name: NAPT Traversal Processing

ParameterID: napt, (0x0001)

Description:

    Instructs the MG to apply latching to the application data flows association with the Termination/Stream. In cases where multiple IP ports are associated with a flow (e.g., RTP and RTCP), the property is applied to all ports. The way of indicating multi-port usage is out of the scope of this package.

Type: Enumeration

Optional: No

Possible values: OFF

                    LATCH

                    RELATCH

Default: OFF

5.4 Statistics

None.

5.5 Error codes

None.

5.6 Procedures

The NAT Traversal Processing signal allows the MG to be configured to support media flows that have passed through an unknown number of CPE or network-based NAT devices.

When the NAPT Processing signal (ipnapt/latch) with parameter (napt) sent to a termination/stream is set to OFF, or the signal is NOT sent, then as per default H.248.1 behaviour the MG will use the IP address and port defined in the RemoteDescriptor for that termination/stream for the sent application data streams. Figure 1 illustrates this behaviour.
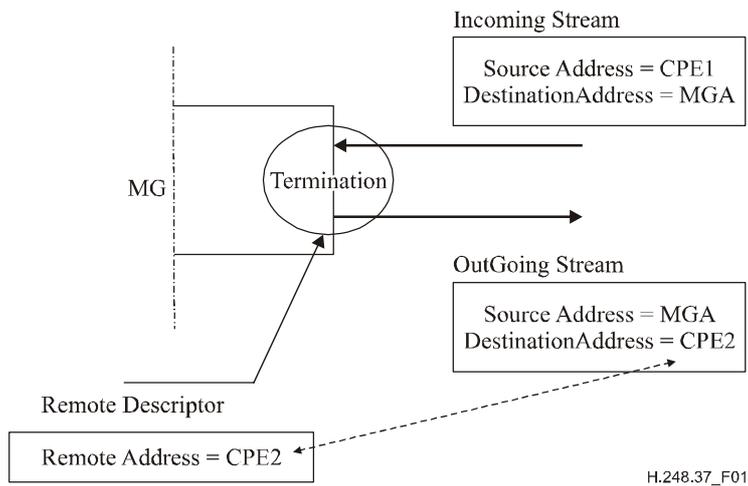
Figure 1/H.248.37 – NAT traversal processing OFF behaviour

When the NAPT processing signal with the NAPT parameter on a termination/stream is set to LATCH, then this results in the MG ignoring the addresses received in the RemoteDescriptor. Instead the MG will use the source address and source port from the incoming media stream (i.e., from the other terminations) as the destination address and destination port of the outgoing application data. Figure 2 illustrates this behaviour.
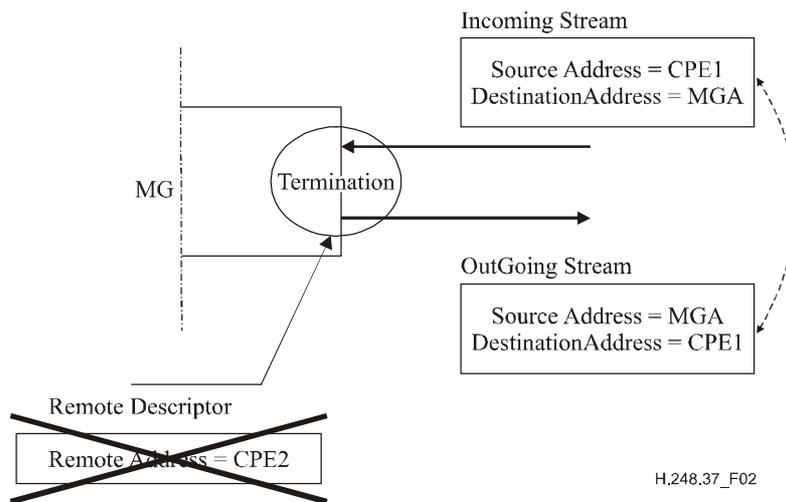
Figure 2/H.248.37 – NAT traversal processing LATCH behaviour

When the NAT traversal processing signal with parameter NAPT on a termination/stream is set to RELATCH, then the MG will perform a similar process to the latching process described above. The difference is that the MG will check for a change of source IP address/port on the incoming media stream. If/when a new source IP address and/or port are detected, then they will be used as the destination address and port for future outgoing packets. After re-latching, any packets received on the old source address and port combination will be considered as malicious and will be treated accordingly (discarded and counted).

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Series A	Organization of the work of ITU-T
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	**Audiovisual and multimedia systems**
Series I	Integrated services digital network
Series J	Cable networks and transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	Telecommunication management, including TMN and network maintenance
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks, open system communications and security
Series Y	Global information infrastructure, Internet protocol aspects and next-generation networks
Series Z	Languages and general software aspects for telecommunication systems