



IP NAPT Traversal and Address Reporting

The need for IP address translation arises when the internal IP addresses of a network cannot be used outside of that network, either because they are invalid for use outside, or for privacy reasons. The DBE now supports the IP NAPT Traversal package (defined in H.248.37) in addition to its existing support of Network Address Translation (NAT) Traversal package (NTR) (defined in ETSI TS 102 333). NAPT is a variation of NAT and represents a method of mapping IP addresses from one realm to another to provide transparent routing to hosts.

NAT devices connect an isolated address realm with private unregistered addresses to an external realm with globally unique registered addresses. In other words, NAT converts an IP address from a private address to a public address in real time, allowing multiple users to share a single public IP address.

The Address Reporting (ADR) package can be used only in conjunction with the IP NAPT package. The ADR package extends the existing IP NAPT package, adding a new remote source address change (RSAC) event with two parameters:

- NRSA - new remote source address
- NRSP - new remote source port

The media gateway controller (MGC) has to subscribe for the ADR event (this function can be enabled per termination). When media is sent to the termination and the termination latches to this new remote address, the ADR event is generated by the Media Gateway. The ADR event reports the learnt remote address and port. The RSAC event is generated in both LATCH and RELATCH scenarios. DBE reports the event subscription with audit response when (MGC) audits the packages.

Feature History for IP NAPT Traversal Support

Release	Modification
Release 3.5.0	The IP NAPT traversal feature introduced.
Release 3.5.1	The address reporting feature added.
Release 3.6.0	No modification.

Contents

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Restrictions for IP NAPT Traversal Support

- A termination may not be programmed using *both* the NAT traversal package (NTR) and IP NAPT packages simultaneously. A vDBE only supports either the NTR package or the IP NAPT package for all terminations.
- The DBE does not generate the notifyComplete signal when the latch or relatch signal completes.
- If the NAT package is IP NAPT, the DBE does not automatically relatch on receipt of a Megaco request that modifies the *gm/sam* Remote Source Address Mask. The MGC must explicitly signal if a relatch is required. In addition, you cannot remove the previously latched remote address without also signaling a relatch from the Remote Source Address Mask. This restriction follows Megaco specifications.
- The DBE rejects the Megaco requests that cancel the latch or relatch signal without providing a full address and port in the remote descriptor for the termination.

Information About IP NAPT Traversal Support

IP NAPT operates with two signals, latch and relatch, that control how the DBE should learn remote addresses for endpoints behind a NAT. The H.248.37 standard allows a media gateway controller (MGC) to instruct a media gateway (MG) to latch to an address provided by an incoming 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.

A pinhole is a configuration of two associated H.248 IP terminations within the same context that allows or prohibits unidirectional forwarding of IP packets under specified conditions.

NAPT support can be signal requests on Megaco add or modify requests. While the relatch request is outstanding, an MGC can audit the NAPT state of the termination, and the DBE returns a SignalRequest in the audit response, indicating that a relatch is outstanding. After the relatch takes place, the signal completes and it no longer appears in an audit response.

Turning Off NAPT Support

You may turn off NAPT by entering a NAPT OFF request or by omitting the signal entirely, as required by the package definition. An audit response never returns a signal indicating the NAPT OFF state, because the signal completes immediately after acceptance of the NAPT OFF request.

When issuing a Megaco **modify** request to update a previously latched termination, you must include the latch signal, assuming that you do not want to either change the remote address and port, or request a relatch. Including the latch signal indicates that the remote address and port to which the termination was previously latched should continue to be used.

The DBE automatically attempts to relearn remote addresses and ports, following any Megaco operation that modifies a termination whose endpoint is behind a NAT, even with the NAT Traversal package (NTR) in use. Relearning is, however, timed out if no packets from a new remote source address and port arrive within a suitable period.

When the IP NAPT Traversal package is used, the DBE does not try to relearn remote addresses and ports unless the MGC explicitly signals a relatch. Relatching is then never timed out.

Address Reporting Package

The address reporting (ADR) package is defined in ITU-T document TD-27 “Draft H.248.37 Amendment 1”. The ADR package can be used only in conjunction with the IP NAPT package. The ADR package extends the existing IP NAPT package, adding a new remote source address change (RSAC) event.

This event occurs when the remote source address for the termination has changed. Its parameter is the newly detected (latched) remote address information given by the new remote source address (NRSA) and new remote source port (NRSP). MGC must explicitly subscribe for the event. This event is generated by the MG when a media stream latches, and is used to report the new remote source address and port. The event is generated in both LATCH and RELATCH scenarios. DBE reports the event subscription with audit response when MGC audits the packages.

The NRSA and NRSP values are represented in octet-string format, which essentially reverses the order of bits in every octet. Hexadecimal octet coding serves to represent a string of octets as a string of hexadecimal digits, with two digits representing each octet. This octet encoding should be used to encode octet strings in the text version of the protocol. For each octet, the 8-bit sequence is encoded as two hexadecimal digits. Bit 0 is the first transmitted; bit 7 is the last one. Bits 7-4 are encoded as the first hexadecimal digit, with Bit 7 as MSB and Bit 4 as LSB. Bits 3-0 are encoded as the second hexadecimal digit, with Bit 3 as MSB and Bit 0 as LSB.

For example, if NRSA=26AEF813, the first octet is 26 which is 00100110. Reversing this order gives us 01100100, which is decimal 100. The other bytes follow similar logic.

Implementing IP NAPT Traversal Support

A new IP NAPT Traversal support command, **h248-napt-package**, defines which H.248 package (either NAPT or NTR) the DBE should use for signaling NAT features:

SUMMARY STEPS

1. **configure**
2. **sbc *service-name***
3. **dbe**
4. **vdbe**
5. **h248-napt-package [napt | ntr]**
6. **commit**
7. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure Example: RP/0/0/CPU0:router# configure	Enables the global configuration mode.
Step 2	sbc service-name Example: RP/0/0/CPU0:router(config)# sbc mysbc	Enters the mode of an SBC service. <ul style="list-style-type: none"> Use the <i>service-name</i> argument to define the name of the SBC.
Step 3	dbe Example: RP/0/0/CPU0:router(config-sbc)# dbe	Enters the mode of the data border element (DBE) function of the SBC.
Step 4	vdbe Example: RP/0/0/CPU0:router(config-sbc-dbe)# vdbe	Enters the mode for configuring virtual DBE (vDBE) parameters.
Step 5	h248-napt-package [napt ntr] Example: RP/0/0/CPU0:router(config-sbc-dbe-vdbe)# h248-napt-package napt	Defines which H.248 package a vDBE should use for signaling NAT features. The default is <i>ntr</i> <ul style="list-style-type: none"> <i>napt</i>—Uses the IP NAPT package, defined in H.248.37. <i>ntr</i>—Uses the NAT package, defined in ETSI TS 102 333. <p>In the example, the command configures the vDBE to use the IP NAPT package and to reject attempts to program terminations using the NAT package when the ROOT termination is audited.</p>
Step 6	commit Example: RP/0/0/CPU0:router(config-sbc-dbe-vdbe)# commit	Saves configuration changes. Use the commit command to save the configuration changes to the running configuration file and remain within the configuration session.
Step 7	exit Example: RP/0/0/CPU0:router(config-sbc-dbe-vdbe)# exit	Exits the media address mode to the DBE mode.

Additional References

The following sections provide references related to IP NAPT Traversal support.

Related Documents

Related Topic	Document Title
Cisco IOS XR master command reference	Cisco IOS XR Master Commands List
Cisco IOS XR SBC interface configuration commands	<i>Cisco IOS XR Session Border Controller Command Reference</i>
Initial system bootup and configuration information for a router using the Cisco IOS XR Software	<i>Cisco IOS XR Getting Started Guide</i>
Cisco IOS XR command modes	<i>Cisco IOS XR Command Mode Reference</i>

Standards

Standards	Title
ETSI TS102333 V1.1.2	Network Address Translation (NAT) Traversal Package (NTR)
H248.37	IP NAT Traversal Package

MIBs

MIBs	MIBs Link
—	To locate and download MIBs using Cisco IOS XR software, use the Cisco MIB Locator found at the following URL and choose a platform under the Cisco Access Products menu: http://cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

RFCs

RFCs	Title
RFC 2663	<i>IP Network Address Translator (NAT) Terminology and Considerations</i>
RFC 3489	<i>STUN - Simple Traversal of User Datagram Protocol (UDP) Through Network Address Translators (NATs).</i>

Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/techsupport