Scalability for Stateful NAT

The Scalability for Stateful NAT feature allows Stateful Network Address Translation (SNAT) to control the Hot Standby Router Protocol (HSRP) state change until the NAT information is completely exchanged. The ability to change the default TCP mode to User Datagram Protocol (UDP) mode, and the ability to disable asymmetric queuing have been added. When UDP mode is used, SNAT will send messages over UDP mode using a proprietary acknowledgement/retransmit mechanism.

History for the Scalability for Stateful NAT Feature

Release	Modification
12.4(3)	This feature was introduced.
12.4(4)T	This feature was integrated into Cisco IOS Release 12.4(4)T.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Contents

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Restrictions for the Scalability for Stateful NAT Feature

The Scalability for Stateful NAT feature is not available in Primary/Backup mode.

Information About Scalability for Stateful NAT

Before enabling the Scalability for Stateful NAT feature, be sure you understand the following concepts:

SNAT Feature Design

Two or more Network Address Translators function as a translation group. One member of the group handles traffic requiring translation of IP address information. It also informs the backup translator of active flows as they occur. The backup translator can then use information from the active translator to prepare duplicate translation table entries, and in the event that the active translator is hindered by a critical failure, the traffic can rapidly be switched to the backup. The traffic flow continues since the same network address translations are used, and the state of those translations has been previously defined.

Only sessions that are statically defined already receive the benefit of redundancy without the need for this feature. In the absence of SNAT, sessions that use dynamic NAT mappings would be severed in the event of a critical failure and would have to be reestablished. Stateful NAT enables continuous service for dynamically mapped NAT sessions.

SNAT can be configured to operate with HSRP to provide redundancy and the active and standby state changes are managed by HSRP.

Benefits of SNAT Scalability

This feature enables SNAT control of the HSRP state change until the NAT information is completely exchanged.

- The TCP default transport mode can be switched to UDP mode with acknowledgement/retransmit support.
- Queuing during asymmetric routing can be disabled to avoid delay in the data path for the creation of new entries and traffic on special ports (Application Layer Gateway (ALG) support).

How to Configure SNAT in HSRP Mode

This section contains the following procedure:

Configuring SNAT in HSRP Mode

Perform this task to configure an HSRP router with SNAT.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface ethernet** *interface-number port-number*
4. **standby delay minimum** *min-seconds* **reload** *reload-seconds*
5. **standby** [*group-number*] **ip** [*ip-address* [**secondary**]]
6. **standby** [*group-number*] **name** *group-name*
7. **standby** [*group-number*] **preempt** [**delay** {**minimum** *seconds* **reload** *seconds* **sync** *seconds*}]
8. **exit**
9. **ip nat stateful id** *id-number* **redundancy** *name* **mapping-id** *map-number* [**protocol udp**] [**as-queuing disable**]
10. **ip nat pool** *name start-ip end-ip* **prefix-length** *prefix-length*
11. **ip nat inside source route-map** *name* **pool** *pool-name* **mapping-id** *map-number* [**overload**]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables higher privilege levels, such as privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface ethernet** *interface-number port-number* **Example:** `Router(config)# interface ethernet 1/1`	Enters interface configuration mode.
Step 4	**standby delay minimum** *min-seconds* **reload** *reload-seconds* **Example:** `Router# standby delay minimum 30 reload 60`	Configures the delay period between the initialization of HSRP groups. • This command must be configured in order for SNAT to control HSRP state change until NAT information is completely exchanged.
Step 5	**standby** *group-name* **ip** [*ip-address* [**secondary**]] **Example:** `Router(config-if)# standby SNATHSRP ip 10.1.1.1`	Enables the HSRP protocol.

	Command or Action	Purpose
Step 6	**standby** [group-number] **name** *group-name* **Example:** `Router(config-if)# standby name SNATHSRP`	Configures the name of an HSRP group.
Step 7	**standby** *group-number* **preempt delay minimum** *seconds* **reload** *seconds* **sync** *seconds* **Example:** `Router(config-if)# standby 1 preempt delay minimum 60 reload 60 sync 60`	This command must be configured in order for SNAT to control HSRP state change until NAT information is completely exchanged.
Step 8	**exit** **Example:** `Router(config-if)# exit`	Returns to global configuration mode.
Step 9	**ip nat stateful id** *id-number* **redundancy** *name* **mapping-id** *map-number* [**protocol udp**] [**as-queuing disable**] **Example:** `Router(config)# ip nat stateful id 1 redundancy snathsrp mapping-id 10 protocol udp as-queuing disable`	Specifies SNAT on routers configured for HSRP. The optional UDP protocol and disabling of asymmetic queuing is also configured.
Step 10	**ip nat pool** *name start-ip end-ip* **prefix-length** *prefix-length* **Example:** `Router(config)# ip nat pool snatpool1 10.1.1.1 10.1.1.9 prefix-length 24`	Defines a pool of IP addresses.
Step 11	**ip nat inside source route-map** *name* **pool** *pool-name* **mapping-id** *map-number* [**overload**] **Example:** `Router(config)# ip nat inside source route-map rm-101 pool snatpool1 mapping-id 10 overload`	Enables stateful NAT for the HSRP translation group.

Configuration Examples for SNAT in HSRP Mode

This section provides the following configuration example:

Configuring SNAT in HSRP Mode: Example, page 4

Configuring SNAT in HSRP Mode: Example

The following example shows how to configure SNAT in HSRP mode with asymmetric queuing disabled and UDP enabled:

```
!
standby delay minimum 30 reload 60
standby 1 ip 10.1.1.1
standby 1 name SNATHSRP
standby 1 preempt delay minimum 60 reload 60 sync 60
!
ip nat Stateful id 1
redundancy SNATHSRP
mapping-id 10
as-queuing disable
protocol udp
ip nat pool SNATPOOL1 10.1.1.1 10.1.1.9 prefix-length 24
ip nat inside source route-map rm-101 pool SNATPOOL1 mapping-id 10 overload
ip classless
ip route 10.1.1.0 255.255.255.0 Null0
no ip http server
ip pim bidir-enable
```

Additional References

The following sections provide references related to the Scalability for Stateful NAT feature.

Related Documents

Related Topic	Document Title
Stateful NAT Phase 1 configuration tasks	*Stateful Failover of Network Address Translation (SNAT) Phase I*, Release 12.2(13)T
Stateful NAT Phase 2 configuration tasks	*NAT Stateful Failover for Asymmetric Outside-to-Inside ALG Support—Stateful NAT Phase 2*, Release 12.3(7)T
IP NAT commands: complete command syntax, command mode, command history, defaults, usage guidelines, and examples	*Cisco IOS IP Addressing Services Command Reference*, Release 12.4T
IP NAT configuration tasks	"NAT" section of the *Cisco IOS IP Addressing Services Configuration Guide*, Release 12.4

Standards

Standard	Title
None	—

MIBs

MIB	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
None	—

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

Command Reference

This section documents one modified command only.

- **ip nat stateful id**

ip nat stateful id

To designate the members of a translation group, use the **ip nat stateful id** command in global configuration mode. To disable the members of a translation group or reset default values, use the **no** form of this command.

ip nat stateful id *id-number* {**redundancy** *name* **mapping-id** *map-number* [**protocol** {**tcp** | **udp**}] [**as-queuing** {**disable** | **enable**}] | {**primary** *ip-address-primary* **backup** *ip-address-backup* **peer** *ip-address-peer* **mapping-id** *mapping-id-number*}

no ip nat stateful id *id-number*

Syntax Description

id-number	Unique number given to each router in the stateful translation group.
redundancy *name*	Establishes Hot Standby Routing Protocol (HSRP) as the method of redundancy.
mapping-id *map-number*	Specifies whether or not the local SNAT router will distribute a particular set of locally created entries to a peer SNAT router.
protocol	(Optional) Enables the HSRP UDP default to be changed to TCP.
tcp	(Optional) Establishes the Transmission Control Protocol.
udp	(Optional) Establishes the User Datagram Protocol.
as-queuing	(Optional) Enables asymmetric routing during queuing for HSRP to be disabled.
disable	(Optional) Disables asymmetric routing during queuing in HSRP mode.
enable	(Optional) Enables asymmetric routing during queuing in HSRP mode.
primary i*p-address-primary*	Manually establishes redundancy for the primary router.
backup i*p-address-backup*	Manually establishes redundancy for the backup router.
peer *ip-address-peer*	Specifies the IP address of the peer router in the translation group.

Command Modes

Global configuration

Command History

Release	Modification
12.2(13)T	This command was introduced.
12.4(3)	The **protocol** and **as-queuing** keywords were added.
12.4(4)T	This command was intregrated into Cisco IOS Release 12.4(4)T.

Usage Guidelines

This command has two forms: HSRP stateful NAT and manual stateful NAT. The form that uses the keyword **redundancy** establishes the HSRP redundancy method. When HSRP mode is set, the primary and backup NAT routers are elected according to the HSRP standby state. To enable stateful NAT manually, configure the primary router and backup router.

In HSRP mode, the default TCP can be changed to UDP by using the optional **protocol udp** keywords with the **redundancy** keyword.

To disable the queuing during asymmetric routing in HSRP mode, use the optional **as-queuing disable** keywords with the **redundancy** keyword.

Examples

The following example shows how to configure SNAT with HSRP:

```
!
standby SNATSRSP ip 10.1.1.1 secondary
standby delay reload 60
standby 1 preempt delay minimum 60 reload 60 sync 60
!
ip nat Stateful id 1
redundancy SNATHSRP
mapping-id 10
as-queuing disable
protocol udp
ip nat pool SNATPOOL1 10.1.1.1 10.1.1.9 prefix-length 24
ip nat inside source route-map rm-101 pool SNATPOOL1 mapping-id 10 overload
ip classless
ip route 10.1.1.0 255.255.255.0 Null0
no ip http server
ip pim bidir-enable
```

The following example shows how to manually configure SNAT:

```
ip nat stateful id 1
primary 10.88.194.17
peer 10.88.194.18
mapping-id 10

ip nat stateful id 2
backup 10.88.194.18
peer 10.88.194.17
mapping-id 10
```

Related Commands

Command	Description
ip nat	Designates that traffic originating from or destined for the interface is subject to NAT.
ip nat inside destination	Enables NAT of the inside destination address.
ip nat inside source	Enables NAT of the inside source address.
ip nat outside source	Enables NAT of the outside source address.
ip nat pool	Defines a pool of IP addresses for NAT.
ip nat service	Changes the amount of time after which NAT translations time out.
show ip nat statistics	Displays NAT statistics.
show ip nat translations	Displays active NAT translations.