



Stateful Failover of Network Address Translation (SNAT) Phase 1

There is an increasing need to provide highly resilient IP networks where application connectivity continues unaffected by potential failures to links and routers at the NAT border. The Stateful Fail-over of Network Address Translation (SNAT) Phase 1 feature introduces support for two or more network address translators to function as a translation group. A backup router running NAT provides translation services in the event of failure of the active translator. Protocols that do not need payload translations, such as HTTP and telnet, are supported by SNAT.

Feature Specifications for the NAT Stateful Failover of Network Address Translation Feature

Feature History

Release	Modification
12.2(13)T	This feature was introduced.

Supported Platforms

For platforms supported in Cisco IOS Release 12.2(13)T, consult Cisco Feature Navigator.

Determining Platform Support Through Cisco Feature Navigator

Cisco IOS software is packaged in feature sets that are supported on specific platforms. To obtain updated information about platform support for this feature, access Cisco Feature Navigator. Cisco Feature Navigator dynamically updates the list of supported platforms as new platform support is added for the feature.

Cisco Feature Navigator is a web-based tool that enables you to determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or release. In the release section, you can compare releases side by side to display both the features unique to each software release and the features that releases have in common.

To access Cisco Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions at <http://www.cisco.com/register>.

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

<http://www.cisco.com/go/fn>

Availability of Cisco IOS Software Images

Platform support for particular Cisco IOS software releases is dependent on the availability of the software images for those platforms. Software images for some platforms may be deferred, delayed, or changed without prior notice. For updated information about platform support and availability of software images for each Cisco IOS software release, refer to the online release notes or, if supported, Cisco Feature Navigator.

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Restrictions for Stateful Fail-over of Network Address Translation (SNAT) Phase 1

The following applications and protocols are not supported in Phase I.

- Application Level Gateway (ALG)
- FTP
- NetMeeting Directory (ILS)
- RAS
- SIP
- Skinny
- TFTP
- Asymmetrical routing

Information About Stateful Fail-over of Network Address Translation (SNAT) Phase 1

Before you configure SNAT, you should understand the following concepts:

- [SNAT Feature Design, page 3](#)
- [Interaction with HSRP, page 3](#)
- [How to Configure SNAT, page 3](#)

SNAT Feature Design

Stateful NAT applies a more global context to the task of forwarding a particular datagram. Consideration is given to understanding the application state along with forwarding. Devices can take action to avoid potential failures that will have less impact on the flow and to the application that is transmitting data. Multiple NAT routers that share stateful context can work cooperatively and thus increase service availability.

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.

Interaction with HSRP

SNAT can be configured to operate with the Hot Standby Routing Protocol (HSRP) to provide redundancy. Active and Standby state changes are managed by HSRP.

How to Configure SNAT

This section contains the following procedures:

- [Configuring SNAT with HSRP, page 3](#) (optional)
- [Configuring SNAT Primary/Backup, page 5](#) (optional)
- [Verifying SNAT Configuration, page 5](#) (optional)

Configuring SNAT with HSRP

To configure your HSRP router with SNAT, use the following commands:

SUMMARY STEPS

1. **enable**
2. **configure** { **terminal** | **memory** | **network** }
3. **interface** *interface-number port-number*
4. **standby** [*group-name ip ip-address* [**secondary**]]
5. **exit**
6. **ip nat stateful id** *ip-address* **redundancy** *group-name* **mapping-id** *map-number*
7. **ip nat pool** *name start-ip end-ip* **prefix-length** *prefix-length*

8. 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 memory network } Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface serial <i>interface-number</i> <i>port-number</i> Example: Router(config)# interface serial 4/0	Enters interface configuration mode.
Step 4	standby <i>group-name</i> ip [<i>ip-address</i> [secondary]] Example: Router(config-if)# standby SNATHSRP ip 11.1.1.1 secondary	Enables the HSRP protocol.
Step 5	exit Example: Router(config-if)# exit	Returns to global configuration mode.
Step 6	ip nat stateful id <i>ip-address</i> redundancy <i>group-name</i> mapping-id <i>map-number</i> Example: Router(config)# ip snat stateful id 1 redundancy snathsrp mapping-id 10	Specifies SNAT on routers configured for HSRP.
Step 7	ip nat pool <i>name</i> <i>start-ip</i> <i>end-ip</i> { prefix-length <i>prefix-length</i> } Example: Router(config)# ip nat pool snatpool1 11.1.1.1 11.1.1.9 prefix-length 24	Defines a pool of IP addresses.
Step 8	ip nat inside source route-map <i>name</i> pool <i>pool-name</i> mapping-id <i>map-number</i> [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.

Configuring SNAT Primary/Backup

To manually configure your primary and backup SNAT router, use the following commands:

SUMMARY STEPS

1. **enable**
2. **configure** {terminal | memory | network}
3. **ip nat stateful id** {primary | back-up} **ip-address peer** *ip-address* **mapping-id** *map-number*}
4. **ip nat pool** *name* *start-ip* *end-ip* {**prefix-length** *prefix-length*}
5. **in 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 memory network} Example: Router# configure terminal	Enters global configuration mode.
Step 3	ip nat stateful id <i>id-number</i> {{ primary backup } ip-address peer <i>ip-address</i> mapping-id <i>map-number</i> } Example: Router(config)# ip nat stateful id 1 primary 1.1.1.1 peer 2.2.2.2 mapping-id 10	Specifies stateful NAT on the primary router.
Step 4	ip nat pool <i>name</i> <i>start-ip</i> <i>end-ip</i> prefix-length <i>prefix-length</i> } Example: Router(config)# ip nat pool SNATPOOL1 11.1.1.1 11.1.1.9 prefix-length 24	Defines a pool of IP addresses.
Step 5	ip nat inside source route-map <i>name</i> pool <i>pool-name</i> mapping-id <i>mapping-number</i> [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.

Verifying SNAT Configuration

To verify your configuration, perform the following optional step:

SUMMARY STEPS

1. enable
2. show ip snat distributed verbose

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	show ip snat distributed verbose Example: Router# show ip snat distributed verbose	Displays active stateful NAT translations.

Configuration Examples for SNAT

This section provides the following configuration example:

[Configuring SNAT with HSRP, page 3](#)

[Configuring SNAT Primary/Backup, page 5](#)

Configuring SNAT with HSRP

```
!
ip nat Stateful id 1
redundancy SNATHSRP
mapping-id 10
ip nat pool SNATPOOL1 11.1.1.1 11.1.1.9 prefix-length 24
ip nat inside source route-map rm-101 pool SNATPOOL1 mapping-id 10 overload
ip classless
ip route 11.1.1.0 255.255.255.0 Null0
no ip http server
ip pim bidir-enable
```

Configuring SNAT Primary/Backup

```
!
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

Additional References

For additional information related to Network Address Translation and HSRP, refer to the following references:

Related Documents

Related Topic	Document Title
Additional NAT configuration tasks.	The chapter “Configuring IP Addressing” in the <i>Cisco IOS IP Configuration Guide</i> , Release 12.2
Additional NAT commands	The chapter “IP Addressing Commands” in the <i>Cisco IOS IP Command Reference, Volume 1 of 3: Addressing and Services</i> , Release 12.2
Additional HSRP configuration tasks	The chapter “Configuring IP Services” in the <i>Cisco IOS IP Configuration Guide</i> , Release 12.2
Additional HSRP commands	The chapter “IP Services Commands” in the <i>Cisco IOS IP Command Reference, Volume 1 of 3: Addressing and Services</i> , Release 12.2

Standards

Standards ¹	Title
None	—

1. Not all supported standards are listed.

MIBs

MIBs ¹	MIBs Link
None	To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

1. Not all supported MIBs are listed.

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

<http://tools.cisco.com/ITDIT/MIBS/servlet/index>

If Cisco MIB Locator does not support the MIB information that you need, you can also obtain a list of supported MIBs and download MIBs from the Cisco MIBs page at the following URL:

<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

<http://www.cisco.com/register>

RFCs

RFCs ¹	Title
None	

1. Not all supported RFCs are listed.

Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, tools, and lots more. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/public/support/tac/home.shtml

Command Reference

This section documents new and modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.2 command reference publications.

New Commands

- **clear ip snat sessions**
- **clear ip snat translation distributed**
- **clear ip snat translation peer**
- **debug ip snat**
- **ip nat stateful id**
- **show ip snat**

Modified Commands

- **ip nat inside source**
- **ip nat outside source**

clear ip snat sessions

To clear dynamic Stateful Network Address Translation (SNAT) sessions from the translation table, use the `clear ip snat sessions EXEC` command.

```
clear ip snat sessions [* | ip-address-peer]
```

Syntax Description		
	*	(Optional) Clears all dynamic translations.
	<i>ip-address-peer</i>	(Optional) Clears SNAT sessions of the peer translator.

Command Modes	
	EXEC

Command History	Release	Modification
	12.2(13)T	This command was introduced.

Usage Guidelines	
	Use this command to clear entries from the translation table before they time out.

Examples	
	The following example shows the SNAT entries before and after using the <code>clear ip snat sessions</code> command.

```
Router# show ip snat distributed
SNAT:Mode PRIMARY
      :State READY
      :Local Address 192.168.123.2
      :Local NAT id 100
      :Peer Address 192.168.123.3
      :Peer NAT id 200
      :Mapping List 10

Router# clear ip snat sessions *
Closing TCP session to peer:192.168.123.3
Router# show ip snat distributed
```

clear ip snat translation distributed

To clear dynamic Stateful Network Address Translation (SNAT) translations from the translation table, use the clear ip nat translation EXEC command.

clear ip snat translation distributed *

Syntax Description	* Clears all dynamic SNAT translations.
---------------------------	-----------------------------------------

Command Modes	EXEC
----------------------	------

Command History	Release	Modification
	12.2(13)T	This command was introduced.

Usage Guidelines	Use this command to clear entries from the translation table before they time out.
-------------------------	------------------------------------------------------------------------------------

Examples	Router# <code>clear ip snat translations distributed</code>
-----------------	-------------------------------------------------------------

clear ip snat translation peer

To clear peer Stateful Network Address Translation (SNAT) translations from the translation table, use the **clear ip snat translation peer** EXEC command.

```
clear ip snat translation peer ip-address-peer [refresh]
```

Syntax Description	<i>ip-address-peer</i>	Clears all dynamic SNAT translations of the peer translator.
---------------------------	------------------------	--------------------------------------------------------------

Command Modes	EXEC
----------------------	------

Command History	Release	Modification
	12.2(13)T	This command was introduced.

Usage Guidelines	Use this command to clear peer entries from the translation table before they time out.
-------------------------	-----------------------------------------------------------------------------------------

Examples The following examples shows the SNAT entries before and after the peer entry is cleared.

```
Router# show ip snat peer

Pro Inside global      Inside local      Outside local      Outside global
--- 192.168.25.20      192.168.122.20    ---                ---
tcp 192.168.25.20:33528 192.168.122.20:33528 192.168.24.2:21 192.168.24.2:21

Router# clear ip snat translation peer

Router# show ip snat peer 192.168.123.3

Pro Inside global      Inside local      Outside local      Outside global
Router#
```

debug ip snat

Use the debug ip snat privileged EXEC command to display information about IP packets translated by the IP stateful network address translation (SNAT) feature. The no form of this command disables debugging output.

debug ip snat [detailed]

no debug ip snat [detailed]

Syntax Description	detailed (Optional) Displays debug information in a detailed format.				
Defaults	Disabled				
Command Modes	Privileged EXEC				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>12.2(13)T</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	12.2(13)T	This command was introduced.
Release	Modification				
12.2(13)T	This command was introduced.				

Usage Guidelines

The SNAT feature allows two or more network address translators to function as a translation group. One member of the translation group handles traffic requiring translation of IP address information. It 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 enabling the backup translator to become the active translator in the event of a critical failure. Traffic continues to flow without interruption since the same network address translations are used and the state of those translation has been previously defined.



Caution

Because the debug ip snat command generates a significant amount of output, use it only when traffic on the IP network is low, so other activity on the system is not adversely affected.

Examples

The following is sample output from the **debug ip snat** command.

```
Router# debug ip snat detailed

2w6d:SNAT:Establish TCP peers for PRIMARY
2w6d:SNAT (Send):Enqueuing SYNC Message for Router-Id 100
2w6d:SNAT(write2net):192.168.123.2 <---> 192.168.123.3 send message
2w6d:SNAT(write2net):ver 2, id 100, opcode 1, len 68
2w6d:SNAT (Send):Enqueuing DUMP-REQUEST Message for Router-Id 100
2w6d:SNAT(write2net):192.168.123.2 <---> 192.168.123.3 send message
2w6d:SNAT(write2net):ver 2, id 100, opcode 6, len 68
2w6d:SNAT (readfromnet):Enqueuing SYNC Message msg to readQ
2w6d:SNAT (Receive):Processed SYNC Message from Router-Id:0 for Router-Id:200's
entry/entries
2w6d:SNAT (readfromnet):Enqueuing DUMP-REQUEST Message msg to readQ
```

```

2w6d:SNAT (Receive):Processed DUMP-REQUEST Message from Router-Id:200 for Router-Id:200's
entry/entries
2w6d:SNAT(sense):Send SYNC message
2w6d:SNAT (Send):Enqueuing SYNC Message for Router-Id 100
2w6d:SNAT(write2net):192.168.123.2 <---> 192.168.123.3 send message
2w6d:SNAT(write2net):ver 2, id 100, opcode 1, len 68
2w6d:SNAT (readfromnet):Enqueuing SYNC Message msg to readQ
2w6d:SNAT (Receive):Processed SYNC Message from Router-Id:200 for Router-Id:200's
entry/entries

```

Table 1 describes the significant fields shown in the display.

Table 1 *debug ip snat Field Descriptions*

Field	Description
SNAT:	Indicates that the packet is being translated by the SNAT feature.
DUMP-REQUEST Message	Requests for entries after the SNAT router is active.

ip nat inside source

To enable Network Address Translation (NAT) of the inside source address, use the **ip nat inside source** command in global configuration mode. To remove the static translation or remove the dynamic association to a pool, use the **no** form of this command.

```
ip nat inside source {list {access-list-number | access-list-number} | route-map name} {interface
type-number | pool pool-name} [mapping-id map-number] [overload]
```

```
no ip nat inside source {list {access-list-number | access-list-number} | route-map name}
{interface type-number | pool pool-name} [mapping-id map-number] [overload]
```

Static NAT

```
ip nat inside source {static {local-ip global-ip} [extendable] [no-alias] [no-payload]
[route-map] [redundancy group-name]}
```

```
no ip nat inside source {static {local-ip global-ip} [extendable] [no-alias] [no-payload]
[route-map] [redundancy group-name]}
```

Port Static NAT

```
ip nat inside source {static {tcp | udp local-ip local-port global-ip global-port} [extendable]
[no-alias] [no-payload]}
```

```
no ip nat inside source {static {tcp | udp local-ip local-port global-ip global-port} [extendable]
[no-alias] [no-payload]}
```

Network Static NAT

```
ip nat inside source {static {network local-network global-network mask} [extendable]
[no-alias] [no-payload]}
```

```
no ip nat inside source {static {network local-network global-network mask} [extendable]
[no-alias] [no-payload]}
```

Syntax Description

list <i>access-list-number</i>	Standard IP access list number. Packets with source addresses that pass the access list are dynamically translated using global addresses from the named pool.
list <i>access-list-name</i>	Name of a standard IP access list. Packets with source addresses that pass the access list are dynamically translated using global addresses from the named pool.
route-map <i>name</i>	Specifies the named route map.
interface <i>type</i>	Specifies the interface type for the global address.
interface <i>number</i>	Specifies the interface number for the global address.
pool <i>pool-name</i>	Specifies the name of the pool from which global IP addresses are allocated dynamically.
mapping-id <i>map-number</i>	(Optional) Specifies whether or not the local SNAT router will distribute a particular set of locally created entries to a peer SNAT router.

overload	(Optional) Enables the router to use one global address for many local addresses. When overloading is configured, the TCP or User Datagram Protocol (UDP) port number of each inside host distinguishes between the multiple conversations
Static <i>local-ip</i>	Sets up a single static translation. The argument establishes the local IP address assigned to a host on the inside network. The address could be randomly chosen, allocated from RFC 1918, or obsolete.
<i>local-port</i>	Sets the local TCP/UDP port in a range from 1-65535.
static <i>global-ip</i>	Sets up a single static translation. The argument establishes the globally unique IP address of an inside host as it appears to the outside world.
<i>global-port</i>	Sets the global TCP/UDP port in a range from 1-65535.
extendable	(Optional) Extends the translation.
no-alias	(Optional) Prohibits an alias from being created for the global address.
no-payload	(Optional) Prohibits the translation of an embedded address or port in the payload.
redundancy <i>group-name</i>	(Optional) Establishes NAT redundancy.
tcp	Establishes the Transmission Control Protocol.
udp	Establishes the User Datagram Protocol.
network <i>local-network</i>	Specifies the local subnet translation.
network <i>global-network</i>	Specifies the global subnet translation.
<i>mask</i>	Establishes the IP Network mask to be with subnet translations.

Defaults

No NAT translation of inside source addresses occurs.

Command Modes

Global configuration

Command History

Release	Modification
11.2	This command was introduced.
12.2(4)T	This command was modified to include the ability to use route maps with static translations, and the route-map <i>name</i> keyword and argument combination was added. This command was modified to include static translation with Hot Standby Routing Protocol (HSRP), and the redundancy <i>redundancy-name</i> keyword and argument combination was added. This command was modified to enable the translation of the IP header address only, and the no-payload keyword was added.
12.2(13)T	The keyword mapping-id and the argument <i>map-number</i> were added.

Related Commands**Usage Guidelines**

This command has two forms: dynamic and static address translation. The form with an access list establishes dynamic translation. Packets from addresses that match the standard access list are translated using global addresses allocated from the pool named with the **ip nat pool** command.

Packets that enter the router through the inside interface and packets sourced from the router are checked against the access list for possible NAT candidates. The access list is used to specify which traffic is to be translated.

Alternatively, the syntax form with the **static** keyword establishes a single static translation.

Examples

The following example translates between inside hosts addressed from either the 192.168.1.0 or the 192.168.2.0 network to the globally unique 171.69.233.208/28 network:

```
ip nat pool net-208 171.69.233.208 171.69.233.223 prefix-length 28
ip nat inside source list 1 pool net-208
!
interface ethernet 0
 ip address 171.69.232.182 255.255.255.240
 ip nat outside
!
interface ethernet 1
 ip address 192.168.1.94 255.255.255.0
 ip nat inside
!
access-list 1 permit 192.168.1.0 0.0.0.255
access-list 1 permit 192.168.2.0 0.0.0.255
```

Related Commands

Command	Description
clear ip nat translation	Clears dynamic NAT translations from the translation table.
ip nat	Designates that traffic originating from or destined for the interface is subject to NAT.
ip nat pool	Defines a pool of IP addresses for NAT.
ip nat service	Enables a port other than the default port.
show ip nat statistics	Displays NAT statistics.
show ip nat translations	Displays active NAT translations.

ip nat outside source

To enable Network Address Translation (NAT) of the outside source address, use the **ip nat outside source** command in global configuration mode. To remove the static entry or the dynamic association, use the **no** form of this command.

```
ip nat outside source {list {access-list-number | access-list-name} | route-map name} pool
pool-name [add-route] [mapping-id map-number]
```

```
no ip nat outside source {list {access-list-number | access-list-name} | route-map name} pool
pool-name [add-route] [mapping-id map-number]
```

Static NAT

```
ip nat outside source static {global-ip local-ip} [add-route] [extendable] [no-alias] [no-payload]
[redundancy group-name]
```

```
no ip nat outside source static {global-ip local-ip} [add-route] [extendable] [no-alias]
[no-payload] [redundancy group-name]
```

Port Static NAT

```
ip nat outside source static {tcp | udp global-ip global-port local-ip local-port} [add-route]
[extendable] [no-alias] [no-payload]
```

```
no ip nat outside source static {tcp | udp global-ip global-port local-ip local-port} [add-route]
[extendable] [no-alias] [no-payload]
```

Network Static NAT

```
ip nat outside source {static network global-network local-network mask} [add-route]
[extendable] [no-alias] [no-payload]
```

```
no ip nat outside source {static network global-network local-network mask} [add-route]
[extendable] [no-alias] [no-payload]
```

Syntax Description

list <i>access-list-number</i>	Standard IP access list number. Packets with source addresses that pass the access list are translated using global addresses from the named pool.
list <i>access-list-name</i>	Name of a standard IP access list. Packets with source addresses that pass the access list are translated using global addresses from the named pool.
route-map <i>name</i>	Specifies a named route map.
pool <i>pool-name</i>	Specifies the name of the pool from which global IP addresses are allocated.
mapping-id <i>map-number</i>	Specifies whether or not the local SNAT router will distribute a particular set of locally created entries to a peer SNAT router.
add-route	(Optional) Adds a static route for the outside local address.
static <i>global-ip</i>	Sets up a single static translation. The argument establishes the globally unique IP address assigned to a host on the outside network by its owner. It was allocated from globally routable network space.

static <i>local-ip</i>	Sets up a single static translation. The argument establishes the local IP address of an outside host as it appears to the inside world. The address was allocated from address space routable on the inside (RFC 1918, <i>Address Allocation for Private Internets</i>).
extendable	(Optional) Extends the transmission.
no-alias	(Optional) Prohibits an alias from being created for the global address.
no-payload	(Optional) Prohibits the translation of embedded address or port in the payload.
redundancy <i>group-name</i>	(Optional) Enables the NAT redundancy operation.
tcp	Transmission Control Protocol
udp	User Datagram Protocol

Defaults

No translation of source addresses coming from the outside to the inside network occurs.

Command Modes

Global configuration

Command History

Release	Modification
11.2	This command was introduced.
12.2(4)T	This command was modified to include static translation with Hot Standby Routing Protocol (HSRP), and the redundancy <i>group-name</i> keyword and argument combination was added. This command was modified to enable the translation of the IP header address only, and the no-payload keyword was added.
12.2(13)T	The keyword mapping-id and the argument <i>map-number</i> were added.

Usage Guidelines

You might have IP addresses that are not legal, officially assigned IP addresses. Perhaps you chose IP addresses that officially belong to another network. The case of an address used illegally and legally is called *overlapping*. You can use NAT to translate inside addresses that overlap with outside addresses. Use this feature if your IP addresses in the stub network happen to be legitimate IP addresses belonging to another network, and you need to communicate with those hosts or routers.

This command has two forms: dynamic and static address translation. The form with an access list establishes dynamic translation. Packets from addresses that match the standard access list are translated using global addresses allocated from the pool named with the **ip nat pool** command.

Alternatively, the syntax form with the **static** keyword establishes a single static translation.

Examples

The following example translates between inside hosts addressed from the 9.114.11.0 network to the globally unique 171.69.233.208/28 network. Further packets from outside hosts addressed from the 9.114.11.0 network (the true 9.114.11.0 network) are translated to appear to be from the 10.0.1.0/24 network.

```
ip nat pool net-208 171.69.233.208 171.69.233.223 prefix-length 28
ip nat pool net-10 10.0.1.0 10.0.1.255 prefix-length 24
ip nat inside source list 1 pool net-208
```

```

ip nat outside source list 1 pool net-10
!
interface ethernet 0
 ip address 171.69.232.182 255.255.255.240
 ip nat outside
!
interface ethernet 1
 ip address 9.114.11.39 255.255.255.0
 ip nat inside
access-list 1 permit 9.114.11.0 0.0.0.255

```

The following example shows NAT configured on the PE with a static route to the shared service for the gold and silver VPNs. NAT is configured as inside source static 1 to 1 translations.

```

ip nat pool outside 4.4.4.1 4.4.4.254 netmask 255.255.255.0
ip nat outside source list 1 pool mypool
access-list 1 permit 168.58.18.0 0.0.0.255
ip nat inside source static 192.168.121.33 2.2.2.1 vrf gold
ip nat inside source static 192.169.121.33 2.2.2.2 vrf silver

```

Related Commands

Command	Description
clear ip nat translation	Clears dynamic NAT translations from the translation table.
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 pool	Defines a pool of IP addresses for NAT.
ip nat service	Enables a port other than the default port.
show ip nat statistics	Displays NAT statistics.
show ip nat translations	Displays active NAT translations.

ip nat stateful id

To designate the members of a translation group, use the **ip nat stateful id** command in global configuration mode.

```
ip nat stateful id id-number {redundancy name | {primary ip-address-primary} {backup
ip-address-backup} peer ip-address-peer} mapping-id map-number}
```

```
no ip nat stateful id id-number {redundancy name | {primary ip-address-primary} {backup
ip-address-backup} peer ip-address-peer} mapping-id map-number}
```

Syntax Description	<i>id-number</i>	Unique number given to each router in the stateful translation group.
	redundancy <i>name</i>	Establishes Hot Standby Routing Protocol (HSRP) as the method of Redundancy.
	mapping-id <i>map-number</i>	Specifies whether or not the local SNAT router will distribute a particular set of locally created entries to a peer SNAT router.
	primary <i>ip-address-primary</i>	Manually establishes redundancy for the primary router.
	backup <i>ip-address-backup</i>	Manually establishes redundancy for the backup router.
	peer <i>ip-address-peer</i>	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.

Usage Guidelines This command has two forms: HSRP stateful NAT translation and manual stateful NAT translation. 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.

Examples The following example show how to configure SNAT with HSRP:

```
Router# ip nat stateful id 1
redundancy SNATHSRP
mapping-id 10
!
ip nat stateful id 2
redundancy SNATHSRP
mapping-id 10
```

The following example show how to manually configure SNAT:

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

```
Router# ip nat stateful id 2  
backup 10-88-194.18  
peer 10.88.194.17  
mapping-id 10
```

show ip snat

To display active Stateful Network Address Translation (SNAT) translations, use the **show ip snat** command in EXEC mode.

show ip snat [**distributed** [**verbose**] | **peer** *ip-address*]

Syntax Description	distributed	(Optional) Displays information about the distributed NAT including its peers and status.
	verbose	(Optional) Displays additional information for each translation table entry, including how long ago the entry was created and used.
	peer <i>ip-address</i>	(Optional) Displays TCP connection information between peer routers.

Command Modes EXEC

Command History	Release	Modification
	12.2(13)T	This command was introduced.

Examples

The following is sample output from the **show ip snat distributed** for stateful NAT connected peers command.

```
Router# show ip snat distributed
Stateful NAT Connected Peers

SNAT: Mode PRIMARY
:State READY
:Local Address 192.168.123.2
:Local NAT id 100
:Peer Address 192.168.123.3
:Peer NAT id 200
:Mapping List 10
```

The following is sample output from the **show ip snat distributed verbose** command for stateful NAT connected peers.

```
SNAT: Mode PRIMARY
Stateful NAT Connected Peers

:State READY
:Local Address 192.168.123.2
:Local NAT id 100
:Peer Address 192.168.123.3
:Peer NAT id 200
:Mapping List 10
:InMsgs 7, OutMsgs 7, tcb 0x63EBA408, listener 0x0
```

Glossary

Active—active HSRP router

Backup—NAT router that acts as the Primary when the Primary router fails

Distributed—shared responsibilities among routers in a stateful group

Peer—NAT router participating in exchange of NAT entries in a distributed environment

Primary—NAT router that creates translations for a flow

SNAT—stateful NAT

Standby—standby HSRP router

**Note**

Refer to the [Internetworking Terms and Acronyms](#) for terms not included in this glossary.
