



NAT Virtual Interface

The NAT Virtual Interface (NVI) feature removes the requirement to configure an interface as either Network Address Translation (NAT) inside or NAT outside. An interface can be configured to use NAT or not use NAT.

NVI allows traffic between overlapped VPN routing/forwarding (VRFs) in the same Provider Edge (PE) router, and traffic from inside to inside between overlapping networks.

History for the NAT Virtual Interface Feature

Release	Modification
12.3(14)T	This feature was introduced.

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

- [Restrictions for NAT Virtual Interface, page 2](#)
- [Information About NAT Virtual Interface, page 2](#)
- [How to Configure NAT Virtual Interface, page 3](#)
- [Configuration Examples for NAT Virtual Interface, page 5](#)
- [Additional References, page 6](#)
- [Command Reference, page 7](#)



Restrictions for NAT Virtual Interface

- Routemaps are not supported.
- Stateful Network Address Translation (SNAT) is not supported.

Information About NAT Virtual Interface

Before you configure the NAT Virtual Interface feature, you should understand the following concepts:

- [NAT Virtual Interface Feature Design, page 2](#)

NAT Virtual Interface Feature Design

The NAT Virtual Interface feature allows all NAT traffic flows on the virtual interface, eliminating the need to specify inside and outside domains. When a domain is specified, the translation rules are applied either before or after route decisions depending on the traffic flow from inside to outside or outside to inside. The translation rules are applied only after the route decision for an NVI.

When a NAT pool is shared for translating packets from multiple networks connected to a NAT router, an NVI is created and a static route is configured that forwards all packets addressed to the NAT pool to the NVI. The standard interfaces connected to various networks will be configured to identify that the traffic originating and receiving on the interfaces needs to be translated.

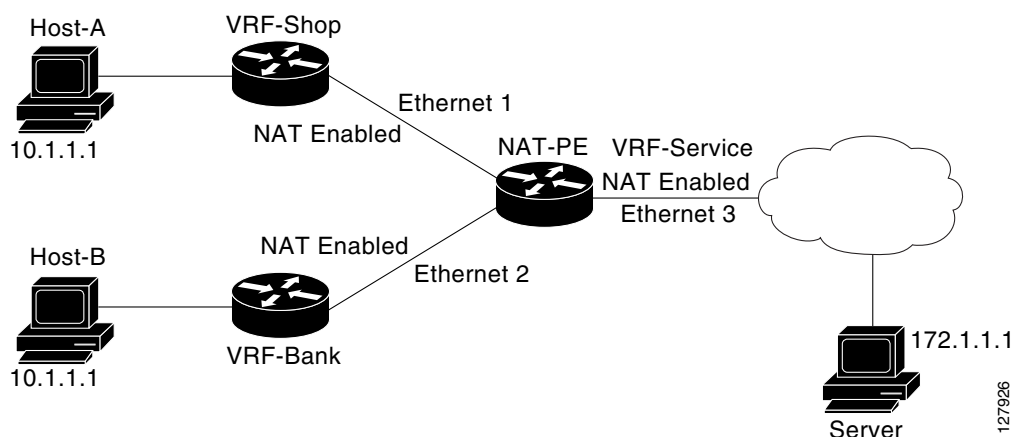


Note

NVI is not a new way of doing NAT; it's a new feature to resolve NAT restriction.

Figure 1 shows a typical NAT virtual interface configuration.

Figure 1 NAT Virtual Interface Typical Configuration



127926

How to Configure NAT Virtual Interface

This section contains the following procedures:

- [Enabling a Dynamic NAT Virtual Interface, page 3](#)
- [Enabling a Static NAT Virtual Interface, page 4](#)

Enabling a Dynamic NAT Virtual Interface

Perform this task to enable a dynamic NAT virtual interface.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **ip nat enable**
5. **exit**
6. **ip nat pool** *name start-ip end-ip netmask netmask add-route*
7. **ip nat source list** *access-list- number pool name vrf name*
8. **ip nat source list** *access-list- number pool name vrf name*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">• Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface <i>type number</i> Example: Router(config)# interface FastEthernet 1	Configures an interface type and enters interface configuration mode.
Step 4	ip nat enable Example: Router(config-if)# ip nat enable	Configures an interface connecting VPNs and the Internet for NAT translation.
Step 5	exit Example: Router(config-if)# exit	Returns to global configuration mode.

	Command or Action	Purpose
Step 6	<pre>ip nat pool name start-ip end-ip netmask netmask add-route</pre> <p>Example: Router(config)# ip nat pool pool1 10.1.1.1 10.1.1.20 netmask 255.255.255.0 add-route </p>	Configures a NAT pool and associated mappings. <ul style="list-style-type: none"> • add-route—Specifies that a route has been added to the NVI interface for the global address.
Step 7	<pre>ip nat source list access-list-number pool name vrf name</pre> <p>Example: Router(config)# ip nat source list 1 pool pool1 vrf vrf1 </p>	Configures a NAT virtual interface without inside or outside specification for VPN customer vrf1. <ul style="list-style-type: none"> • list access-list-number—Number 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. • vrf—Associates the NAT translation rule with a particular VPN routing and forwarding (VRF) instance.
Step 8	<pre>ip nat source list access-list-number pool name vrf name overload</pre> <p>Example: Router(config)# ip nat source list 1 pool pool1 vrf vrf2 overload </p>	Configures a NAT virtual interface without inside or outside specification for VPN customer vrf2. <ul style="list-style-type: none"> • overload—Enables the router to use one global address for many local addresses. When overloading is configured, the TCP or UDP port number of each inside host distinguishes between the multiple conversations using the same local IP address.

Enabling a Static NAT Virtual Interface

Perform this task to enable a static NAT virtual interface.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **ip nat enable**
5. **exit**
6. **ip nat source static** *local-ip global-ip vrf name*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface <i>type number</i> Example: Router(config)# interface FastEthernet 1	Configures an interface type and enters interface configuration mode.
Step 4	ip nat enable Example: Router(config-if)# ip nat enable	Configures an interface connecting VPNs and the Internet for NAT translation.
Step 5	exit Example: Router(config-if)# exit	Returns to global configuration mode.
Step 6	ip nat source static <i>local-ip global-ip vrf name</i> Example: Router(config)# ip nat source static 192.168.123.1 192.168.125.10 vrf bank	Configures a static NVI.

Configuration Examples for NAT Virtual Interface

This section provides the following configuration example:

- [Enabling NAT Virtual Interface: Example, page 5](#)

Enabling NAT Virtual Interface: Example

The following example shows how to configure NAT virtual interfaces without the use of inside or outside source addresses.

```
interface Ethernet0/0
 ip vrf forwarding bank
 ip address 192.168.122.1 255.255.255.0
 ip nat enable
!
interface Ethernet1/0
 ip vrf forwarding park
 ip address 192.168.122.2 255.255.255.0
```

```

ip nat enable
!
interface Serial2/0
 ip vrf forwarding services
 ip address 192.168.123.2 255.255.255.0
ip nat enable
!
ip nat pool NAT 192.168.25.20 192.168.25.30 netmask 255.255.255.0 add-route
ip nat source list 1 pool NAT vrf bank overload
ip nat source list 1 pool NAT vrf park overload
ip nat source static 192.168.123.1 192.168.125.10 vrf services
!
access-list 1 permit 192.168.122.20
access-list 1 permit 192.168.122.0 0.0.0.255
!

```

Additional References

The following sections provide references related to the NAT Virtual Interface feature.

Related Documents

Related Topic	Document Title
IP NAT commands: complete command syntax, command mode, command history, defaults, usage guidelines, and examples	Cisco IOS IP Command Reference, Volume 1 of 4: Addressing and Services , Release 12.3T
IP NAT configuration tasks	“Configuring Network Address Translation” section of Part 1 of the Cisco IOS IP Configuration Guide , Release 12.3

Standards

Standards	Title
No new or modified standards are supported by this feature.	—

MIBs

MIBs	MIBs Link
No new or modified MIBs are supported by this feature.	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

RFCs	Title
No new or modified RFCs are supported by this feature.	—

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Command Reference

This section documents new and modified commands only.

- **ip nat enable**
- **ip nat pool**
- **ip nat source**

ip nat enable

To configure an interface connecting VPNs and the Internet for Network Address Translation (NAT), use the **ip nat enable** command in interface configuration mode. To remove the interface configuration, use the **no** form of this command.

ip nat enable

no ip nat enable

Syntax Description This command has no arguments or keywords.

Command Modes Interface configuration

Command History	Release	Modification
	12.3(14)T	This command was introduced.

Examples The following example show how to configure an interface connecting VPNs and the Internet for NAT translation:

```
interface Ethernet0/0
 ip vrf forwarding bank
 ip address 192.168.122.1 255.255.255.0
 ip nat enable
```

Related Commands	Command	Description
	ip nat pool	Defines a pool of IP addresses for Network Address Translation.
	ip nat source	Enables Network Address Translation on a virtual interface without inside or outside specification.

ip nat pool

To define a pool of IP addresses for Network Address Translation (NAT), use the **ip nat pool** command in global configuration mode. To remove one or more addresses from the pool, use the **no** form of this command.

```
ip nat pool name start-ip end-ip {netmask netmask | prefix-length prefix-length} [add-route]
[type {match-host | rotary}] [accounting list-name]
```

```
no ip nat pool name start-ip end-ip {netmask netmask | prefix-length prefix-length} [add-route]
[type {match-host | rotary}] [accounting list-name]
```

Syntax Description

<i>name</i>	Name of the pool.
<i>start-ip</i>	Starting IP address that defines the range of addresses in the address pool.
<i>end-ip</i>	Ending IP address that defines the range of addresses in the address pool.
netmask <i>netmask</i>	Network mask that indicates which address bits belong to the network and subnetwork fields and which bits belong to the host field. Specify the netmask of the network to which the pool addresses belong.
prefix-length <i>prefix-length</i>	Number that indicates how many bits of the netmask are ones (how many bits of the address indicate network). Specify the netmask of the network to which the pool addresses belong.
add-route	(Optional) Specifies that a route has been added to the NVI interface for the global address.
type	(Optional) Indicates the type of pool.
match-host	(Optional) Specifies that the host number is to remain the same after translation.
rotary	(Optional) Indicates that the range of addresses in the address pool identifies real, inside hosts among which TCP load distribution will occur.
accounting <i>list-name</i>	(Optional) Indicates the RADIUS profile name that matches the RADIUS configuration in the router.

Defaults

No pool of addresses is defined.

Command Modes

Global configuration (config)

Command History

Release	Modification
11.2	This command was introduced.
12.3(2)XE	The accounting keyword and <i>list-name</i> argument were added.
12.3(7)T	This command was integrated into Cisco IOS Release 12.3(7)T.
12.3(14)T	The add-route keyword was added.

Usage Guidelines

This command defines a pool of addresses using start address, end address, and either netmask or prefix length. The pool could define an inside global pool, an outside local pool, or a rotary pool.

Examples

The following example translates between inside hosts addressed from either the 192.168.1.0 or 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
```

The following example shows that a route has been added to the NVI interface for the global address:

```
ip nat pool NAT 192.168.25.20 192.168.25.30 netmask 255.255.255.0 add-route
ip nat source list 1 pool NAT vrf bank overload
```

Related Commands

Command	Description
clear ip nat translation	Clears dynamic NAT translations from the translation table.
debug ip nat	Displays information about IP packets translated by NAT.
ip nat	Designates that traffic originating from or destined for the interface is subject to NAT.
ip nat inside source	Enables NAT of the inside destination address.
ip nat outside source	Enables NAT of the outside source address.
ip nat service	Enables a port other than the default port.
ip nat source	Enables Network Address Translation on a virtual interface without inside or outside specification.
show ip nat statistics	Displays NAT statistics.
show ip nat translations	Displays active NAT translations.

ip nat source

To enable Network Address Translation (NAT) on a virtual interface without inside or outside specification, use the **ip nat source** command in global configuration mode. To remove NAT on a virtual interface without inside or outside specification, use the **no** form of this command.

Dynamic NAT

```
ip nat source {list {access-list-number | access-list-name} interface type number | pool name}
[overload | vrf name]
```

```
no ip nat source {list {access-list-number | access-list-name} interface type number | pool name}
overload | vrf name]
```

Static NAT

```
ip nat source {static {esp local-ip interface type number | local-ip global-ip} } [extendable
no-alias | no-payload | vrf name]
```

```
no ip nat source {static {esp local-ip interface type number | local-ip global-ip} } [extendable |
no-alias | no-payload | vrf name]
```

Port Static NAT

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

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

Network Static NAT

```
ip nat source static network local-network global-network mask [extendable | no-alias |
no-payload | vrf name]
```

```
no ip nat source static network local-network global-network mask [extendable | no-alias |
no-payload | vrf name]
```

Syntax Description

list <i>access-list-number</i>	Number 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.
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.
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>name</i>	Name of the pool from which global IP addresses are allocated dynamically.

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 using the same local IP address.
vrf name	(Optional) Associates the NAT translation rule with a particular VPN routing and forwarding (VRF) instance.
static local-ip	Sets up a single static translation. The <i>local-ip</i> argument establishes the local IP address assigned to a host on the inside network. The address could be randomly chosen, allocated from the RFC 1918, or obsolete.
<i>local-port</i>	Sets the local TCP/UDP port in a range from 1 to 65535.
static global-ip	Sets up a single static translation. The <i>local-ip</i> argument establishes the globally unique IP address of an inside host as it appears to the outside network.
<i>global-port</i>	Sets the global TCP/UDP port in the range from 1 to 65535.
extendable	(Optional) Extends the translation.
no-alias	(Optional) Prohibits as alias from being created for the global address.
no-payload	(Optional) Prohibits the translation of an embedded address or port in the payload.
esp local-ip	Establishes IPSec-ESP (tunnel mode) support.
tcp	Establishes the Transmission Control Protocol.
udp	Establishes the User Datagram Protocol.
network local-network	Specified the local subnet translation.
<i>global-network</i>	Specifies the global subnet translation.
<i>mask</i>	Establishes the IP network mask to be used with subnet translations.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.3(14)T	This command was introduced.

Examples

The following example shows how to configure a virtual interface without inside or outside specification for the global address:

```
ip nat source list 1 pool NAT vrf bank overload
ip nat source list 1 pool NAT vrf park overload
ip nat source static 192.168.123.1 192.168.125.10 vrf services
```

Related Commands

Command	Description
ip nat enable	Configures an interface connecting VPNs and the Internet for NAT translation.
ip nat pool	Defines a pool of IP addresses for Network Address Translation.

Cisco and the Cisco Logo are trademarks of Cisco Systems, Inc. and/or its affiliates in the U.S. and other countries. A listing of Cisco's trademarks can be found at www.cisco.com/go/trademarks. Third party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1005R)

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

Copyright © 2005 Cisco Systems, Inc. All rights reserved.

■ ip nat source