CHAPTER 34

Configuring Twice NAT (ASA 8.3 and Later)

Twice NAT lets you identify both the source and destination address in a single rule. This chapter shows you how to configure twice NAT and includes the following sections:

Note For detailed information about how NAT works, see Chapter 32, “Information About NAT (ASA 8.3 and Later).”

Information About Twice NAT

Twice NAT lets you identify both the source and destination address in a single rule. Specifying both the source and destination addresses lets you specify that a source address should be translated to A when going to destination X, but be translated to B when going to destination Y, for example.

Note For static NAT, the rule is bidirectional, so be aware that “source” and “destination” are used in commands and descriptions throughout this guide even though a given connection might originate at the “destination” address. For example, if you configure static NAT with port address translation, and specify the source address as a Telnet server, and you want all traffic going to that Telnet server to have the port translated from 2323 to 23, then in the command, you must specify the *source* ports to be translated (real: 23, mapped: 2323). You specify the source ports because you specified the Telnet server address as the source address.

The destination address is optional. If you specify the destination address, you can either map it to itself (identity NAT), or you can map it to a different address. The destination mapping is always a static mapping.

Twice NAT also lets you use service objects for static NAT-with-port-translation; network object NAT only accepts inline definition.

For detailed information about the differences between twice NAT and network object NAT, see the "How NAT is Implemented" section on page 32-15.

Twice NAT rules are added to section 1 of the NAT rules table, or if specified, section 3. For more information about NAT ordering, see the "NAT Rule Order" section on page 32-20.

Licensing Requirements for Twice NAT

Model	License Requirement
All models	Base License.

Prerequisites for Twice NAT

- For both the real and mapped addresses, configure network objects or network object groups. Network object groups are particularly useful for creating a mapped address pool with discontinuous IP address ranges or multiple hosts or subnets. To create a network object or group, see the "Configuring Network Objects and Groups" section on page 25-2.
- For static NAT-with-port-translation, configure TCP or UDP service objects. To create a service object, see the "Configuring Service Objects and Service Groups" section on page 25-4.

For specific guidelines for objects and groups, see the configuration section for the NAT type you want to configure. See also the "Guidelines and Limitations" section.

Guidelines and Limitations

This section includes the guidelines and limitations for this feature.

Context Mode Guidelines

Supported in single and multiple context mode.

Firewall Mode Guidelines

- Supported in routed and transparent firewall mode.
- In transparent mode, you must specify the real and mapped interfaces; you cannot use --Any--.
- In transparent mode, you cannot configure interface PAT, because the transparent mode interfaces do not have IP addresses. You also cannot use the management IP address as a mapped address.
- In transparent mode, translating between IPv4 and IPv6 networks is not supported. Translating between two IPv6 networks, or between two IPv4 networks is supported.

IPv6 Guidelines

- Supports IPv6.

- For routed mode, you can also translate between IPv4 and IPv6.
- For transparent mode, translating between IPv4 and IPv6 networks is not supported. Translating between two IPv6 networks, or between two IPv4 networks is supported.
- For transparent mode, a PAT pool is not supported for IPv6.
- For static NAT, you can specify an IPv6 subnet up to /64. Larger subnets are not supported.
- When using FTP with NAT46, when an IPv4 FTP client connects to an IPv6 FTP server, the client must use either the extended passive mode (EPSV) or extended port mode (EPRT); PASV and PORT commands are not supported with IPv6.

Additional Guidelines

- You cannot configure FTP destination port translation when the source IP address is a subnet (or any other application that uses a secondary connection); the FTP data channel establishment does not succeed.
- If you change the NAT configuration, and you do not want to wait for existing translations to time out before the new NAT information is used, you can clear the translation table using the **clear xlate** command. However, clearing the translation table disconnects all current connections that use translations.

  Note If you remove a dynamic NAT or PAT rule, and then add a new rule with mapped addresses that overlap the addresses in the removed rule, then the new rule will not be used until all connections associated with the removed rule time out or are cleared using the **clear xlate** command. This safeguard ensures that the same address is not assigned to multiple hosts.

- You cannot use an object group with both IPv4 and IPv6 addresses; the object group must include only one type of address.
- When using the **any** keyword in a NAT rule, the definition of “any” traffic (IPv4 vs. IPv6) depends on the rule. Before the ASA performs NAT on a packet, the packet must be IPv6-to-IPv6 or IPv4-to-IPv4; with this prerequisite, the ASA can determine the value of **any** in a NAT rule. For example, if you configure a rule from “any” to an IPv6 server, and that server was mapped from an IPv4 address, then **any** means “any IPv6 traffic.” If you configure a rule from “any” to “any,” and you map the source to the interface IPv4 address, then **any** means “any IPv4 traffic” because the mapped interface address implies that the destination is also IPv4.
- Objects and object groups used in NAT cannot be undefined; they must include IP addresses.
- You can use the same objects in multiple rules.
- The mapped IP address pool cannot include:
  - The mapped interface IP address. If you specify --Any-- interface for the rule, then all interface IP addresses are disallowed. For interface PAT (routed mode only), use the interface name instead of the IP address.
  - (Transparent mode) The management IP address.
  - (Dynamic NAT) The standby interface IP address when VPN is enabled.
  - Existing VPN pool addresses.

Default Settings

- By default, the rule is added to the end of section 1 of the NAT table.
- (Routed mode) The default real and mapped interface is Any, which applies the rule to all interfaces.
- (8.3(1), 8.3(2), and 8.4(1)) The default behavior for identity NAT has proxy ARP disabled. You cannot configure this setting. (8.4(2) and later) The default behavior for identity NAT has proxy ARP enabled, matching other static NAT rules. You can disable proxy ARP if desired.
- If you specify an optional interface, then the ASA uses the NAT configuration to determine the egress interface. (8.3(1) through 8.4(1)) The only exception is for identity NAT, which always uses a route lookup, regardless of the NAT configuration. (8.4(2) and later) For identity NAT, the default behavior is to use the NAT configuration, but you have the option to always use a route lookup instead.

Configuring Twice NAT

This section describes how to configure twice NAT. This section includes the following topics:

- Configuring Dynamic NAT or Dynamic PAT Using a PAT Pool, page 34-4
- Configuring Dynamic PAT (Hide), page 34-12
- Configuring Static NAT or Static NAT-with-Port-Translation, page 34-18
- Configuring Identity NAT, page 34-24
- Configuring Per-Session PAT Rules, page 34-29

Configuring Dynamic NAT or Dynamic PAT Using a PAT Pool

This section describes how to configure twice NAT for dynamic NAT or for dynamic PAT using a PAT pool. For more information, see the “Dynamic NAT” section on page 32-8 or the “Dynamic PAT” section on page 32-10.

Guidelines

For a PAT pool:

- If available, the real source port number is used for the mapped port. However, if the real port is *not* available, by default the mapped ports are chosen from the same range of ports as the real port number: 0 to 511, 512 to 1023, and 1024 to 65535. Therefore, ports below 1024 have only a small PAT pool that can be used. (8.4(3) and later, not including 8.5(1) or 8.6(1)) If you have a lot of traffic that uses the lower port ranges, you can now specify for a PAT pool a flat range of ports to be used instead of the three unequal-sized tiers: either 1024 to 65535, or 1 to 65535.
- (8.4(3) and later, not including 8.5(1) or 8.6(1)) If you use the same PAT pool object in two separate rules, then be sure to specify the same options for each rule. For example, if one rule specifies extended PAT and a flat range, then the other rule must also specify extended PAT and a flat range.

For extended PAT for a PAT pool (8.4(3) and later, not including 8.5(1) or 8.6(1)):

- Many application inspections do not support extended PAT. See the “Default Settings” section on page 57-4 in Chapter 57, “Getting Started with Application Layer Protocol Inspection,” for a complete list of unsupported inspections.

- If you enable extended PAT for a dynamic PAT rule, then you cannot also use an address in the PAT pool as the PAT address in a separate static NAT with port translation rule. For example, if the PAT pool includes 10.1.1.1, then you cannot create a static NAT-with-port-translation rule using 10.1.1.1 as the PAT address.
- If you use a PAT pool and specify an interface for fallback, you cannot specify extended PAT.
- For VoIP deployments that use ICE or TURN, do not use extended PAT. ICE and TURN rely on the PAT binding to be the same for all destinations.

For round robin for a PAT pool:

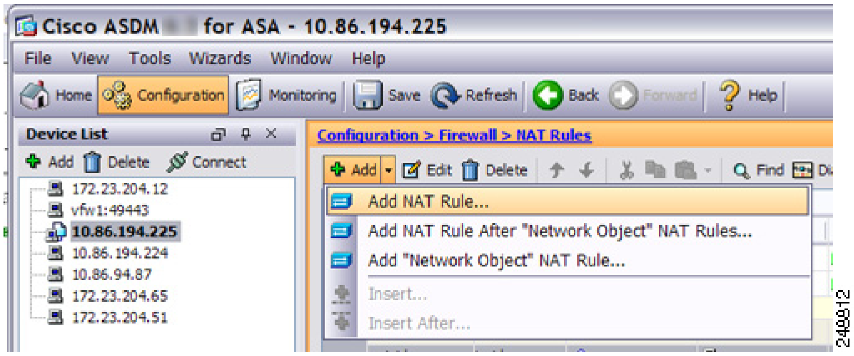
- (8.4(3) and later, not including 8.5(1) or 8.6(1)) If a host has an existing connection, then subsequent connections from that host will use the same PAT IP address if ports are available. **Note**: This "stickiness" does not survive a failover. If the ASA fails over, then subsequent connections from a host may not use the initial IP address.
- (8.4(2), 8.5(1), and 8.6(1)) If a host has an existing connection, then subsequent connections from that host will likely use *different* PAT addresses for each connection because of the round robin allocation. In this case, you may have problems when accessing two websites that exchange information about the host, for example an e-commerce site and a payment site. When these sites see two different IP addresses for what is supposed to be a single host, the transaction may fail.
- Round robin, especially when combined with extended PAT, can consume a large amount of memory. Because NAT pools are created for every mapped protocol/IP address/port range, round robin results in a large number of concurrent NAT pools, which use memory. Extended PAT results in an even larger number of concurrent NAT pools.

Detailed Steps

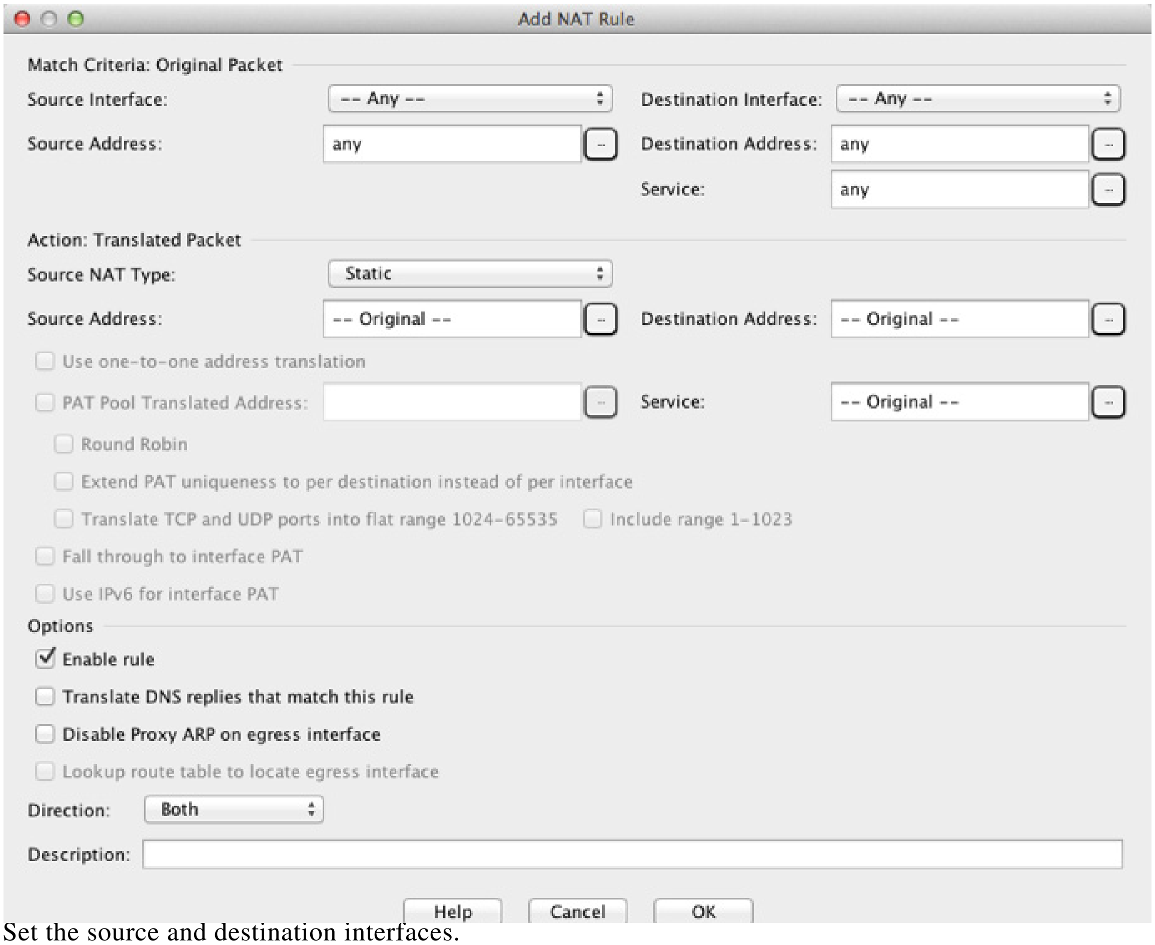
To configure dynamic NAT, perform the following steps:

Step 1 Choose **Configuration > Firewall > NAT Rules**, and then click **Add**.

If you want to add this rule to section 3 after the network object rules, then click the down arrow next to Add, and choose **Add NAT Rule After Network Object NAT Rules**.


Cisco ASDM for ASA - 10.86.194.225
File View Tools Wizards Window Help
Home Configuration Monitoring Save Refresh Back Forward Help
Device List
Add Delete Connect
172.23.204.12
vfw1:49443
10.86.194.225
10.86.194.224
10.86.94.87
172.23.204.65
172.23.204.51
Configuration > Firewall > NAT Rules
Add Edit Delete Find Di
Add NAT Rule...
Add NAT Rule After "Network Object" NAT Rules...
Add "Network Object" NAT Rule...
Insert...
Insert After...
248812

The Add NAT Rule dialog box appears.



Add NAT Rule

Match Criteria: Original Packet

Source Interface: -- Any --

Destination Interface: -- Any --

Source Address: any

Destination Address: any

Service: any

Action: Translated Packet

Source NAT Type: Static

Source Address: -- Original --

Destination Address: -- Original --

□ Use one-to-one address translation

□ PAT Pool Translated Address:

Service: -- Original --

□ Round Robin

□ Extend PAT uniqueness to per destination instead of per interface

□ Translate TCP and UDP ports into flat range 1024-65535 □ Include range 1-1023

□ Fall through to interface PAT

□ Use IPv6 for interface PAT

Options

☑ Enable rule

□ Translate DNS replies that match this rule

□ Disable Proxy ARP on egress interface

□ Lookup route table to locate egress interface

Direction: Both

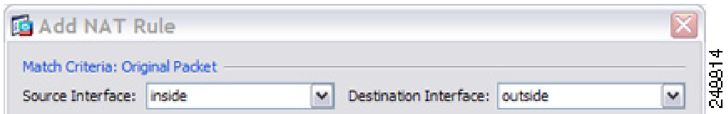
Description:

Step 2 Set the source and destination interfaces.

By default in routed mode, both interfaces are set to --Any--. In transparent firewall mode, you must set specific interfaces.

a. From the Match Criteria: Original Packet > Source Interface drop-down list, choose the source interface.

b. From the Match Criteria: Original Packet > Destination Interface drop-down list, choose the destination interface.



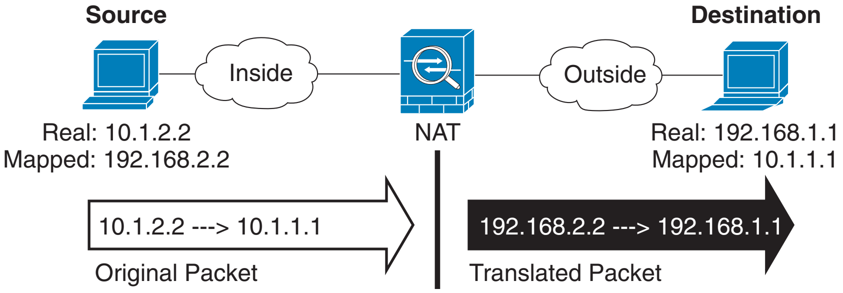
Add NAT Rule

Match Criteria: Original Packet

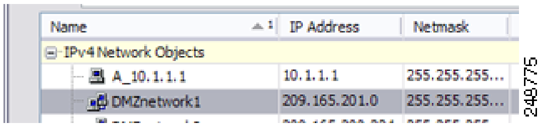
Source Interface: inside

Destination Interface: outside

Step 3 Identify the original packet addresses, either IPv4 or IPv6; namely, the packet addresses as they appear on the source interface network (the *real source address* and the *mapped destination address*). See the following figure for an example of the original packet vs. the translated packet.



a. For the Match Criteria: Original Packet > Source Address, click the browse button and choose an existing network object or group or create a new object or group from the Browse Original Source Address dialog box. The group cannot contain both IPv4 and IPv6 addresses; it must contain one type only. The default is **any**.



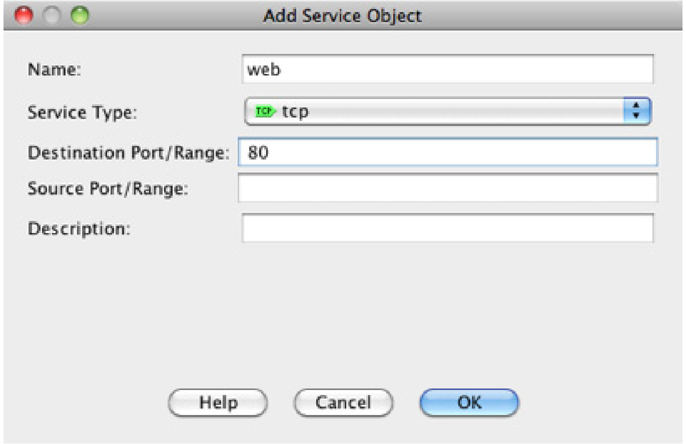
Name	IP Address	Netmask
IPv4 Network Objects		
A_10.1.1.1	10.1.1.1	255.255.255...
DMZnetwork1	209.165.201.0	255.255.255...

b. (Optional) For the Match Criteria: Original Packet > Destination Address, click the browse button and choose an existing network object or group or create a new object or group from the Browse Original Destination Address dialog box. The group cannot contain both IPv4 and IPv6 addresses; it must contain one type only.

Although the main feature of twice NAT is the inclusion of the destination IP address, the destination address is optional. If you do specify the destination address, you can configure static translation for that address or just use identity NAT for it. You might want to configure twice NAT without a destination address to take advantage of some of the other qualities of twice NAT, including the use of network object groups for real addresses, or manually ordering of rules. For more information, see the "Main Differences Between Network Object NAT and Twice NAT" section on page 32-15.

Step 4 (Optional) Identify the original packet port (the *mapped destination port*). For the Match Criteria: Original Packet > Service, click the browse button and choose an existing TCP or UDP service object or create a new object from the Browse Original Service dialog box.

Dynamic NAT does not support port translation. However, because the destination translation is always static, you can perform port translation for the destination port. A service object can contain both a source and destination port, but only the destination port is used in this case. If you specify the source port, it will be ignored. NAT only supports TCP or UDP. When translating a port, be sure the protocols in the real and mapped service objects are identical (both TCP or both UDP). For identity NAT, you can use the same service object for both the real and mapped ports. The "not equal" (**!=**) operator is not supported.



Add Service Object

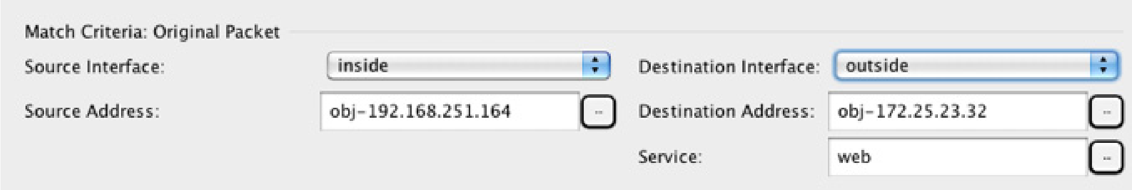
Name: web

Service Type: tcp

Destination Port/Range: 80

Source Port/Range:

Description:



Match Criteria: Original Packet

Source Interface: inside

Destination Interface: outside

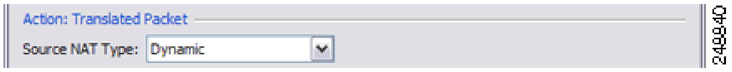
Source Address: obj-192.168.251.164

Destination Address: obj-172.25.23.32

Service: web

Step 5 Choose **Dynamic** from the Match Criteria: Translated Packet > Source NAT Type drop-down list.

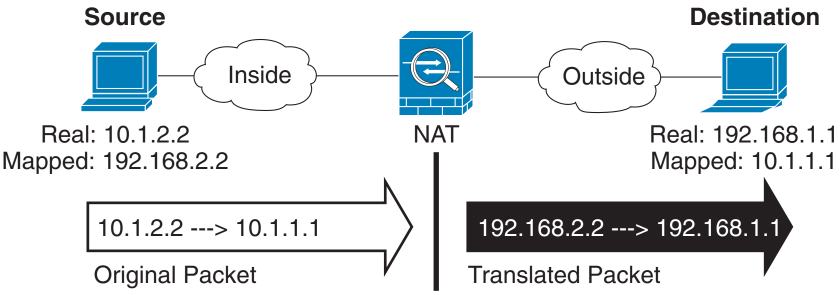
This setting only applies to the source address; the destination translation is always static.



Action: Translated Packet

Source NAT Type: Dynamic

Step 6 Identify the translated packet addresses, either IPv4 or IPv6; namely, the packet addresses as they appear on the destination interface network (the *mapped source address* and the *real destination address*). You can translate between IPv4 and IPv6 if desired. See the following figure for an example of the original packet vs. the translated packet.



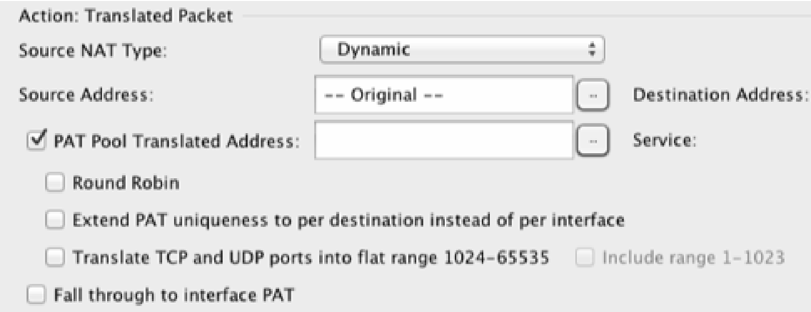
a. You can perform either dynamic NAT or Dynamic PAT using a PAT pool:

- Dynamic NAT—For the Match Criteria: Translated Packet > Source Address, click the browse button and choose an existing network object or group or create a new object or group from the Browse Translated Source Address dialog box.

  For dynamic NAT, you typically configure a larger group of source addresses to be mapped to a smaller group.

Note The object or group cannot contain a subnet.

- Dynamic PAT using a PAT pool—.To configure a PAT pool, check the **PAT Pool Translated Address** check box, then click the browse button and choose an existing network object or group or create a new object or group from the Browse Translated PAT Pool Address dialog box. **Note**: Leave the Source Address field empty.



Action: Translated Packet

Source NAT Type: Dynamic

Source Address: -- Original --

☑ PAT Pool Translated Address:

□ Round Robin

□ Extend PAT uniqueness to per destination instead of per interface

□ Translate TCP and UDP ports into flat range 1024-65535 □ Include range 1-1023

□ Fall through to interface PAT

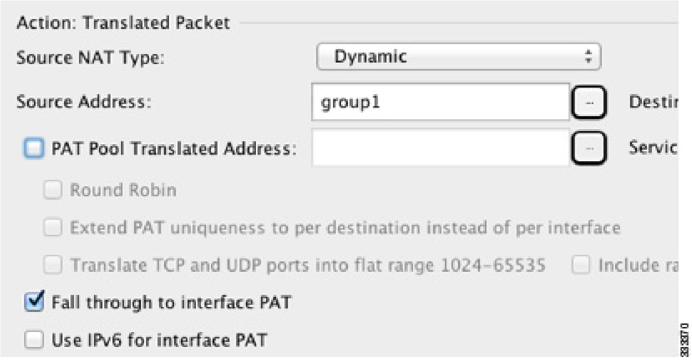
Note The object or group cannot contain a subnet.

(Optional) For a PAT pool, configure the following options:

- To assign addresses/ports in a round-robin fashion, check the **Round Robin** check box. Without round-robin, by default, all ports for a PAT address will be allocated before the next PAT address is used. The round-robin method assigns an address/port from each PAT address in the pool before returning to use the first address again, and then the second address, and so on.
- (8.4(3) and later, not including 8.5(1) or 8.6(1)) Check the **Extend PAT uniqueness to per destination instead of per interface** check box to use extended PAT. Extended PAT uses 65535 ports per *service*, as opposed to per IP address, by including the destination address and port in the translation information. Normally, the destination port and address are not considered when creating PAT translations, so you are limited to 65535 ports per PAT address. For example, with extended PAT, you can create a translation of 10.1.1.1:1027 when going to 192.168.1.7:23 as well as a translation of 10.1.1.1:1027 when going to 192.168.1.7:80.
- (8.4(3) and later, not including 8.5(1) or 8.6(1)) Check the **Translate TCP or UDP ports into flat range (1024-65535)** check box to use the 1024 to 65535 port range as a single flat range when allocating ports. When choosing the mapped port number for a translation, the ASA uses the real source port number if it is available. However, without this option, if the real port is *not* available, by default the mapped ports are chosen from the same range of ports as the real port number: 1 to 511, 512 to 1023, and 1024 to 65535. To avoid running out of ports at the low ranges, configure this setting. To use the entire range of 1 to 65535, also check the **Include range 1 to 1023** check box.

b. (Optional, Routed Mode Only) To use the interface IP address as a backup method if the other mapped source addresses are already allocated, check the **Fall through to interface PAT** check box. To use the IPv6 interface address, also check the **Use IPv6 for interface PAT** check box.

The destination interface IP address is used. This option is only available if you configure a specific Destination Interface.



Action: Translated Packet

Source NAT Type: Dynamic

Source Address: group1

□ PAT Pool Translated Address:

□ Round Robin

□ Extend PAT uniqueness to per destination instead of per interface

□ Translate TCP and UDP ports into flat range 1024-65535 □ Include ra

☑ Fall through to interface PAT

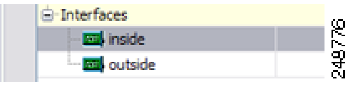
□ Use IPv6 for interface PAT

c. For the Match Criteria: Translated Packet > Destination Address, click the browse button and choose an existing network object, group, or interface or create a new object or group from the Browse Translated Destination Address dialog box.

For identity NAT for the destination address, simply use the same object or group for both the real and mapped addresses.

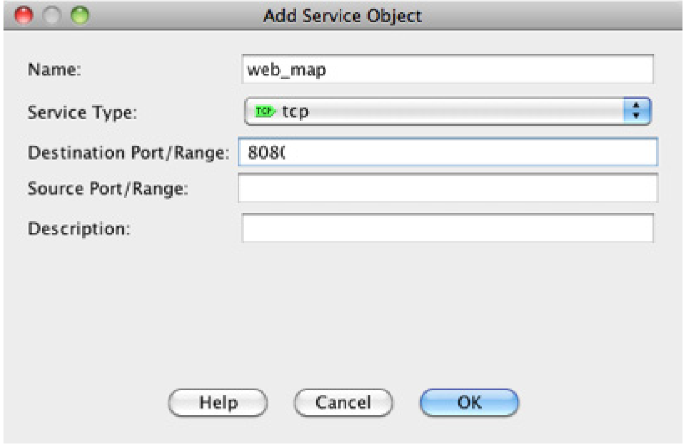
If you want to translate the destination address, then the static mapping is typically one-to-one, so the real addresses have the same quantity as the mapped addresses. You can, however, have different quantities if desired. For more information, see the "Static NAT" section on page 32-3. See the "Guidelines and Limitations" section on page 34-2 for information about disallowed mapped IP addresses.

For static interface NAT with port translation only, choose an interface from the Browse dialog box. Be sure to also configure a service translation (see Step 7). For this option, you must configure a specific interface for the Source Interface in Step 2. See the "Static Interface NAT with Port Translation" section on page 32-6 for more information.

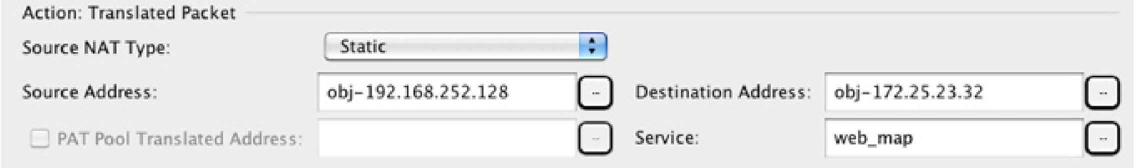


Step 7 (Optional) Identify the translated packet port (the *real destination port*). For the Match Criteria: Translated Packet > Service, click the browse button and choose an existing TCP or UDP service object or create a new object from the Browse Translated Service dialog box.

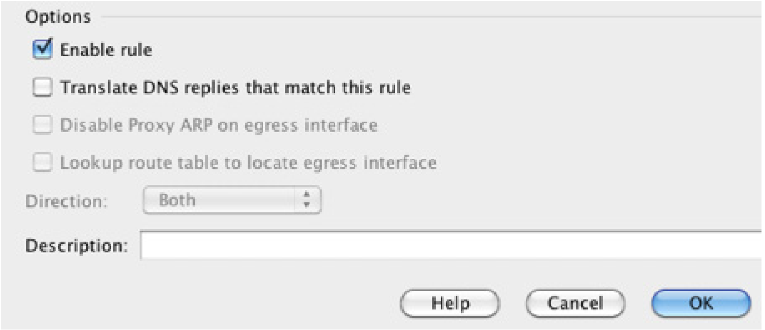
Dynamic NAT does not support port translation. However, because the destination translation is always static, you can perform port translation for the destination port. A service object can contain both a source and destination port, but only the destination port is used in this case. If you specify the source port, it will be ignored. NAT only supports TCP or UDP. When translating a port, be sure the protocols in the real and mapped service objects are identical (both TCP or both UDP). For identity NAT, you can use the same service object for both the real and mapped ports. The "not equal" (**!=**) operator is not supported.



Name: web_map
Service Type: tcp
Destination Port/Range: 808(
Source Port/Range:
Description:


Action: Translated Packet
Source NAT Type: Static
Source Address: obj-192.168.252.128
Destination Address: obj-172.25.23.32
□ PAT Pool Translated Address:
Service: web_map

Step 8 (Optional) Configure NAT options in the Options area.


Options
☑ Enable rule
□ Translate DNS replies that match this rule
□ Disable Proxy ARP on egress interface
□ Lookup route table to locate egress interface
Direction: Both
Description:

a. Enable rule —Enables this NAT rule. The rule is enabled by default.

b. (For a source-only rule) Translate DNS replies that match this rule—Rewrites the DNS A record in DNS replies. Be sure DNS inspection is enabled (it is enabled by default). You cannot configure DNS modification if you configure a destination address. See the "DNS and NAT" section on page 32-30 for more information.

c. Description—Adds a description about the rule up to 200 characters in length.

Step 9 Click **OK**.

Configuring Dynamic PAT (Hide)

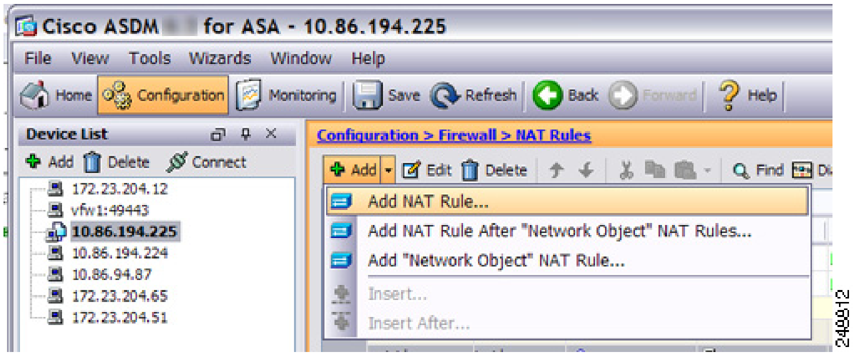
This section describes how to configure twice NAT for dynamic PAT (hide). For dynamic PAT using a PAT pool, see the "Configuring Dynamic NAT or Dynamic PAT Using a PAT Pool" section on page 34-4 instead of using this section. For more information, see the "Dynamic PAT" section on page 32-10.

Detailed Steps

To configure dynamic PAT, perform the following steps:

Step 1 Choose **Configuration > Firewall > NAT Rules**, and then click **Add**.

If you want to add this rule to section 3 after the network object rules, then click the down arrow next to Add, and choose **Add NAT Rule After Network Object NAT Rules**.


Cisco ASDM for ASA - 10.86.194.225
File View Tools Wizards Window Help
Home Configuration Monitoring Save Refresh Back Forward Help
Device List
Add Delete Connect
172.23.204.12
vfw1:49443
10.86.194.225
10.86.194.224
10.86.94.87
172.23.204.65
172.23.204.51
Configuration > Firewall > NAT Rules
Add Edit Delete Find
Add NAT Rule...
Add NAT Rule After "Network Object" NAT Rules...
Add "Network Object" NAT Rule...
Insert...
Insert After...
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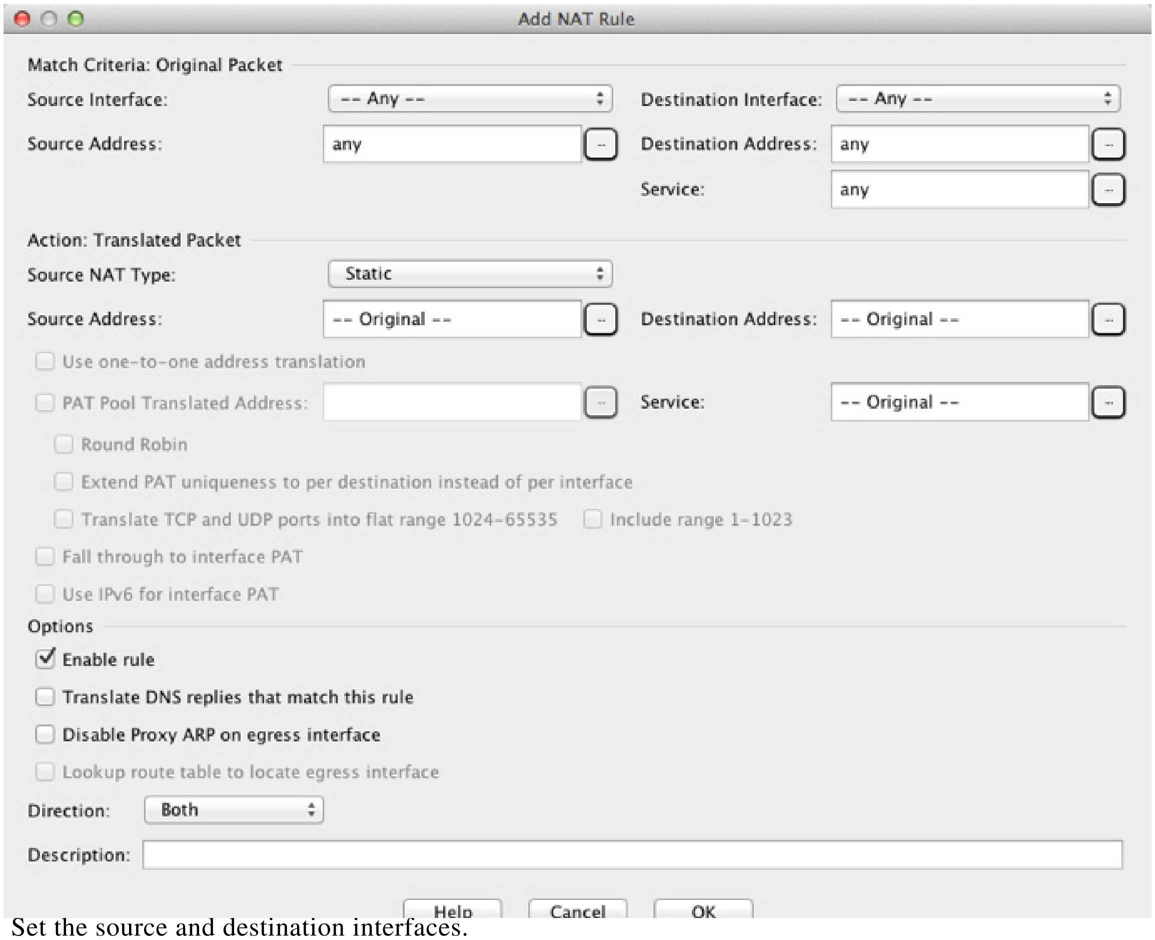
The Add NAT Rule dialog box appears.



Add NAT Rule

Match Criteria: Original Packet

Source Interface: -- Any --
Destination Interface: -- Any --
Source Address: any
Destination Address: any
Service: any

Action: Translated Packet

Source NAT Type: Static
Source Address: -- Original --
Destination Address: -- Original --

□ Use one-to-one address translation
□ PAT Pool Translated Address:
Service: -- Original --
□ Round Robin
□ Extend PAT uniqueness to per destination instead of per interface
□ Translate TCP and UDP ports into flat range 1024-65535 □ Include range 1-1023
□ Fall through to interface PAT
□ Use IPv6 for interface PAT

Options

☑ Enable rule
□ Translate DNS replies that match this rule
□ Disable Proxy ARP on egress interface
□ Lookup route table to locate egress interface

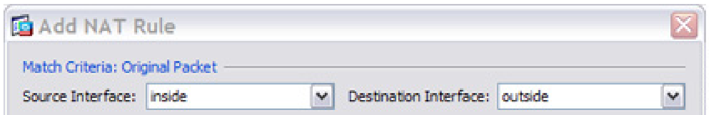
Direction: Both
Description:

Step 2 Set the source and destination interfaces.

By default in routed mode, both interfaces are set to --Any--. In transparent firewall mode, you must set specific interfaces.

a. From the Match Criteria: Original Packet > Source Interface drop-down list, choose the source interface.

b. From the Match Criteria: Original Packet > Destination Interface drop-down list, choose the destination interface.



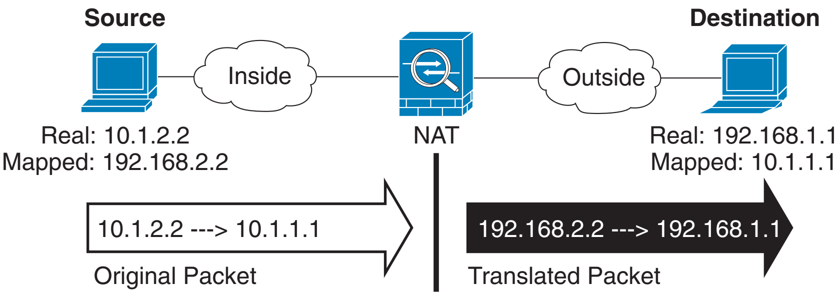
Add NAT Rule

Match Criteria: Original Packet

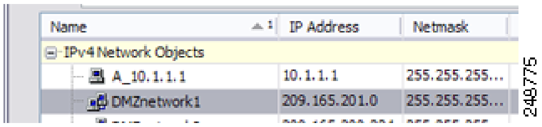
Source Interface: inside
Destination Interface: outside

248814

Step 3 Identify the original packet addresses, either IPv4 or IPv6; namely, the packet addresses as they appear on the source interface network (the *real source address* and the *mapped destination address*). See the following figure for an example of the original packet vs. the translated packet.



a. For the Match Criteria: Original Packet > Source Address, click the browse button and choose an existing network object or group or create a new object or group from the Browse Original Source Address dialog box. The group cannot contain both IPv4 and IPv6 addresses; it must contain one type only. The default is **any**.



Name	IP Address	Netmask
IPv4 Network Objects		
A_10.1.1.1	10.1.1.1	255.255.255...
DMZnetwork1	209.165.201.0	255.255.255...

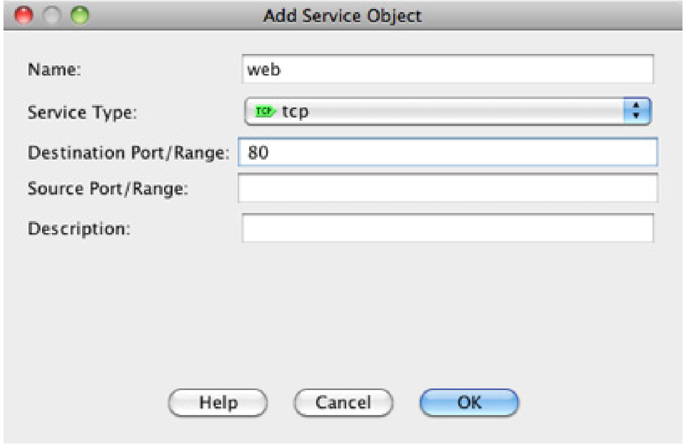
249775

b. (Optional) For the Match Criteria: Original Packet > Destination Address, click the browse button ... and choose an existing network object or group or create a new object or group from the Browse Original Destination Address dialog box. The group cannot contain both IPv4 and IPv6 addresses; it must contain one type only.

Although the main feature of twice NAT is the inclusion of the destination IP address, the destination address is optional. If you do specify the destination address, you can configure static translation for that address or just use identity NAT for it. You might want to configure twice NAT without a destination address to take advantage of some of the other qualities of twice NAT, including the use of network object groups for real addresses, or manually ordering of rules. For more information, see the "Main Differences Between Network Object NAT and Twice NAT" section on page 32-15.

Step 4 (Optional) Identify the original packet port (the *mapped destination port*). For the Match Criteria: Original Packet > Service, click the browse button and choose an existing TCP or UDP service object or create a new object from the Browse Original Service dialog box.

Dynamic PAT does not support additional port translation. However, because the destination translation is always static, you can perform port translation for the destination port. A service object can contain both a source and destination port, but only the destination port is used in this case. If you specify the source port, it will be ignored. NAT only supports TCP or UDP. When translating a port, be sure the protocols in the real and mapped service objects are identical (both TCP or both UDP). For identity NAT, you can use the same service object for both the real and mapped ports. The "not equal" (**!=**) operator is not supported.



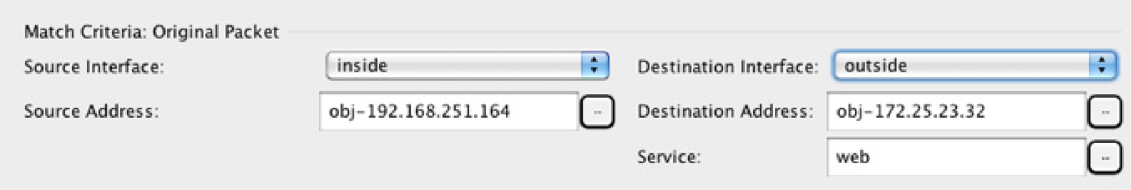
Name: web

Service Type: tcp

Destination Port/Range: 80

Source Port/Range:

Description:



Match Criteria: Original Packet

Source Interface: inside

Destination Interface: outside

Source Address: obj-192.168.251.164

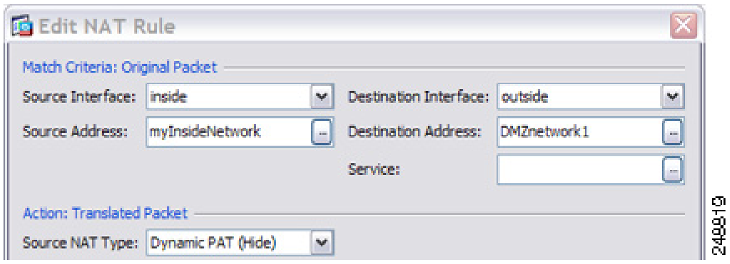
Destination Address: obj-172.25.23.32

Service: web

Step 5 Choose **Dynamic PAT (Hide)** from the Match Criteria: Translated Packet > Source NAT Type drop-down list.

This setting only applies to the source address; the destination translation is always static.

Note To configure dynamic PAT using a PAT pool, choose **Dynamic** instead of Dynamic PAT (Hide), see the "Configuring Dynamic NAT or Dynamic PAT Using a PAT Pool" section on page 34-4.



Match Criteria: Original Packet

Source Interface: inside

Destination Interface: outside

Source Address: myInsideNetwork

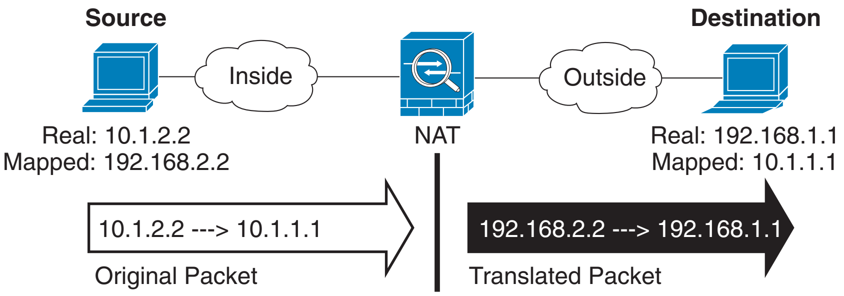
Destination Address: DMZnetwork1

Service:

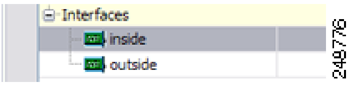
Action: Translated Packet

Source NAT Type: Dynamic PAT (Hide)

Step 6 Identify the translated packet addresses, either IPv4 or IPv6; namely, the packet addresses as they appear on the destination interface network (the *mapped source address* and the *real destination address*). You can translate between IPv4 and IPv6 if desired. See the following figure for an example of the original packet vs. the translated packet.

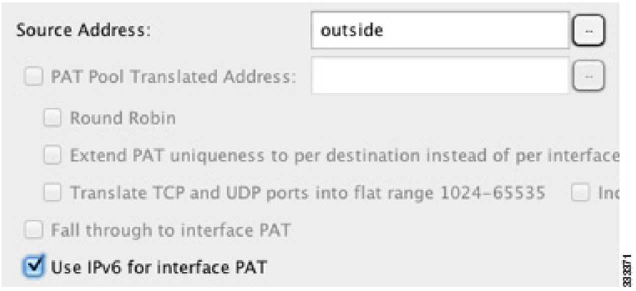


a. For the Match Criteria: Translated Packet > Source Address, click the browse button and choose an existing network object or interface or create a new object from the Browse Translated Source Address dialog box.



⊟ Interfaces
- inside
- outside

If you want to use the IPv6 address of the interface, check the **Use IPv6 for interface PAT** check box.



Source Address: outside ...

□ PAT Pool Translated Address: ...

□ Round Robin

□ Extend PAT uniqueness to per destination instead of per interface

□ Translate TCP and UDP ports into flat range 1024-65535 □ Inc

□ Fall through to interface PAT

☑ Use IPv6 for interface PAT

b. For the Match Criteria: Translated Packet > Destination Address, click the browse button and choose an existing network object or group or create a new object or group from the Browse Translated Destination Address dialog box. The group cannot contain both IPv4 and IPv6 addresses; it must contain one type only.

For identity NAT for the destination address, simply use the same object or group for both the real and mapped addresses.

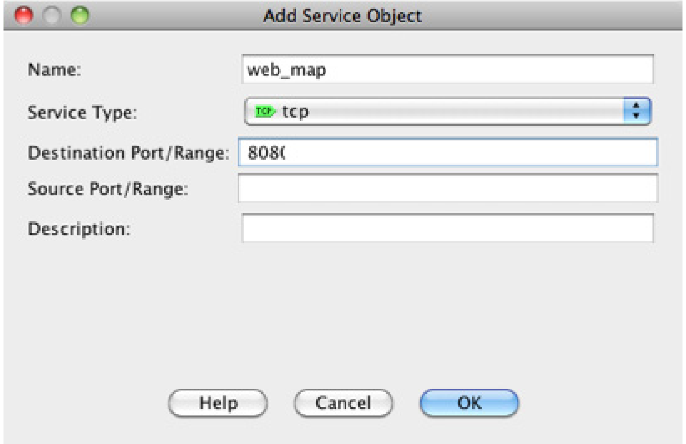
If you want to translate the destination address, then the static mapping is typically one-to-one, so the real addresses have the same quantity as the mapped addresses. You can, however, have different quantities if desired. For more information, see the "Static NAT" section on page 32-3. See the "Guidelines and Limitations" section on page 34-2 for information about disallowed mapped IP addresses.

For static interface NAT with port translation only, choose an interface from the Browse dialog box. Be sure to also configure a service translation (see Step 7). For this option, you must configure a specific interface for the Source Interface in Step 2. See the "Static Interface NAT with Port Translation" section on page 32-6 for more information.

Step 7 (Optional) Identify the translated packet port (the *real destination port*). For the Match Criteria: Translated Packet > Service, click the browse button and choose an existing TCP or UDP service object from the Browse Translated Service dialog box.

You can also create a new service object from the Browse Translated Service dialog box and use this object as the mapped destination port.

Dynamic PAT does not support additional port translation. However, because the destination translation is always static, you can perform port translation for the destination port. A service object can contain both a source and destination port, but only the destination port is used in this case. If you specify the source port, it will be ignored. NAT only supports TCP or UDP. When translating a port, be sure the protocols in the real and mapped service objects are identical (both TCP or both UDP). For identity NAT, you can use the same service object for both the real and mapped ports. The "not equal" (**!=**) operator is not supported.


Add Service Object

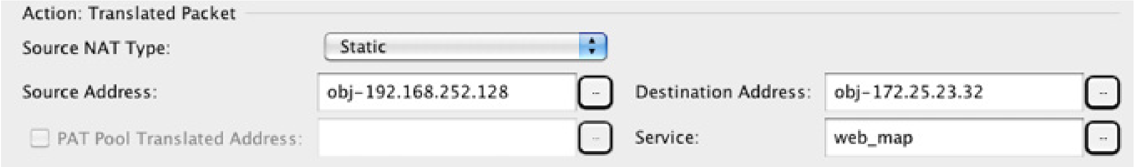
Name: web_map

Service Type: tcp

Destination Port/Range: 808(

Source Port/Range:

Description:


Action: Translated Packet

Source NAT Type: Static

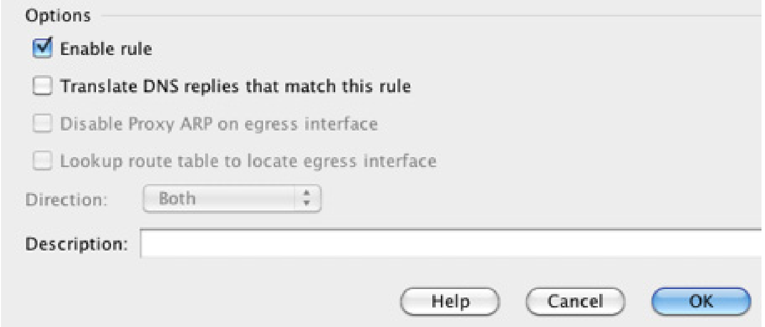
Source Address: obj-192.168.252.128

Destination Address: obj-172.25.23.32

□ PAT Pool Translated Address:

Service: web_map

Step 8 (Optional) Configure NAT options in the Options area.


Options

☑ Enable rule

□ Translate DNS replies that match this rule

□ Disable Proxy ARP on egress interface

□ Lookup route table to locate egress interface

Direction: Both

Description:

a. Enable rule —Enables this NAT rule. The rule is enabled by default.

b. (For a source-only rule) Translate DNS replies that match this rule—Rewrites the DNS A record in DNS replies. Be sure DNS inspection is enabled (it is enabled by default). You cannot configure DNS modification if you configure a destination address. See the "DNS and NAT" section on page 32-30 for more information.

c. Description—Adds a description about the rule up to 200 characters in length.

Step 9 Click **OK**.

Configuring Static NAT or Static NAT-with-Port-Translation

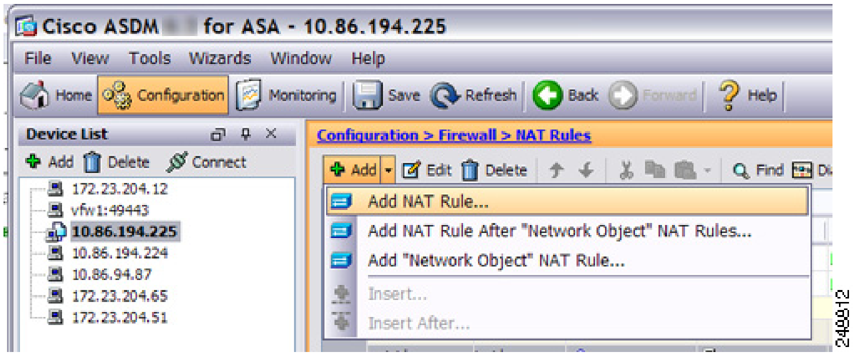
This section describes how to configure a static NAT rule using twice NAT. For more information about static NAT, see the "Static NAT" section on page 32-3.

Detailed Steps

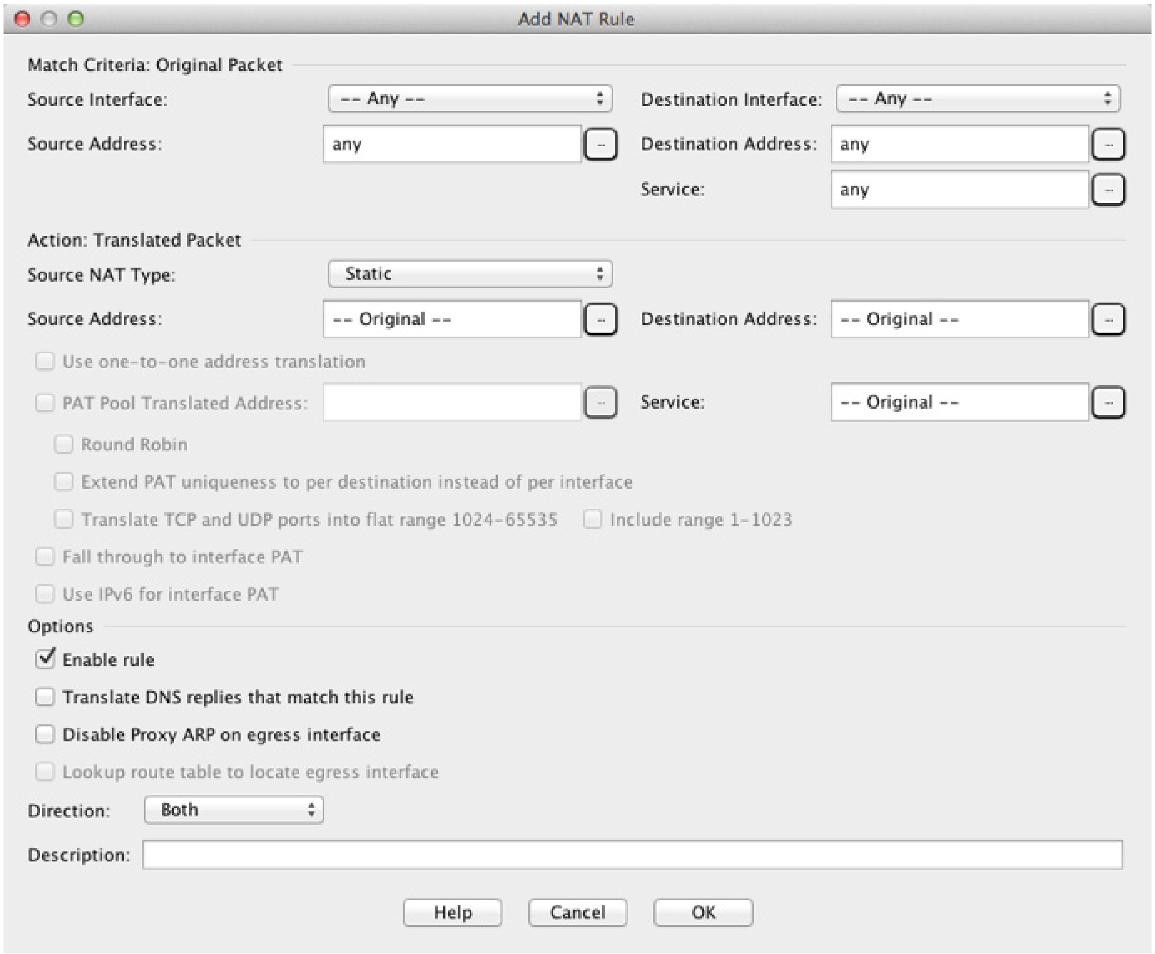
To configure static NAT, perform the following steps:

Step 1 Choose **Configuration > Firewall > NAT Rules**, and then click **Add**.

If you want to add this rule to section 3 after the network object rules, then click the down arrow next to Add, and choose **Add NAT Rule After Network Object NAT Rules**.


Cisco ASDM for ASA - 10.86.194.225
File View Tools Wizards Window Help
Home Configuration Monitoring Save Refresh Back Forward Help
Device List
Add Delete Connect
172.23.204.12
vfw1:49443
10.86.194.225
10.86.194.224
10.86.94.87
172.23.204.65
172.23.204.51
Configuration > Firewall > NAT Rules
Add Edit Delete Find
Add NAT Rule...
Add NAT Rule After "Network Object" NAT Rules...
Add "Network Object" NAT Rule...
Insert...
Insert After...
248812

The Add NAT Rule dialog box appears.



Add NAT Rule

Match Criteria: Original Packet

Source Interface: -- Any -- Destination Interface: -- Any --

Source Address: any Destination Address: any

Service: any

Action: Translated Packet

Source NAT Type: Static

Source Address: -- Original -- Destination Address: -- Original --

☐ Use one-to-one address translation

☐ PAT Pool Translated Address: Service: -- Original --

☐ Round Robin

☐ Extend PAT uniqueness to per destination instead of per interface

☐ Translate TCP and UDP ports into flat range 1024-65535 ☐ Include range 1-1023

☐ Fall through to interface PAT

☐ Use IPv6 for interface PAT

Options

☑ Enable rule

☐ Translate DNS replies that match this rule

☐ Disable Proxy ARP on egress interface

☐ Lookup route table to locate egress interface

Direction: Both

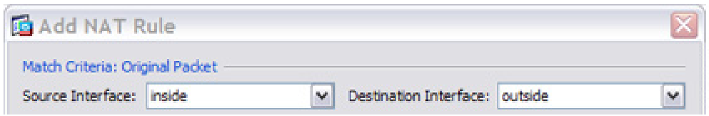
Description:

Step 2 Set the source and destination interfaces.

By default in routed mode, both interfaces are set to --Any--. In transparent firewall mode, you must set specific interfaces.

a. From the Match Criteria: Original Packet > Source Interface drop-down list, choose the source interface.

b. From the Match Criteria: Original Packet > Destination Interface drop-down list, choose the destination interface.



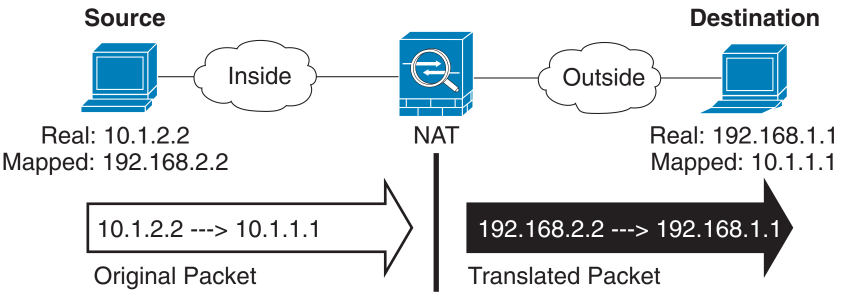
Add NAT Rule

Match Criteria: Original Packet

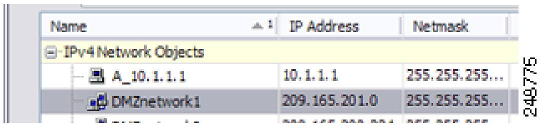
Source Interface: inside Destination Interface: outside

240814

Step 3 Identify the original packet addresses, either IPv4 or IPv6; namely, the packet addresses as they appear on the source interface network (the *real source address* and the *mapped destination address*). See the following figure for an example of the original packet vs. the translated packet.



a. For the Match Criteria: Original Packet > Source Address, click the browse button and choose an existing network object or group or create a new object or group from the Browse Original Source Address dialog box. The group cannot contain both IPv4 and IPv6 addresses; it must contain one type only. The default is **any**, but do not use this option except for identity NAT. See the "Configuring Identity NAT" section on page 34-24 for more information.



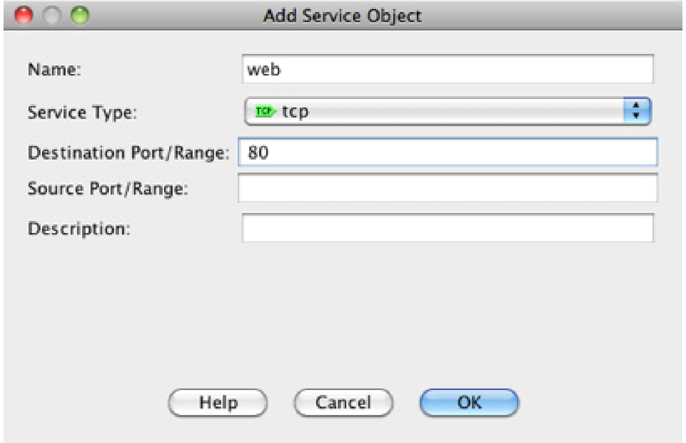
Name	IP Address	Netmask
IPv4 Network Objects		
A_10.1.1.1	10.1.1.1	255.255.255...
DMZnetwork1	209.165.201.0	255.255.255...

b. (Optional) For the Match Criteria: Original Packet > Destination Address, click the browse button and choose an existing network object or group or create a new object or group from the Browse Original Destination Address dialog box.

Although the main feature of twice NAT is the inclusion of the destination IP address, the destination address is optional. If you do specify the destination address, you can configure static translation for that address or just use identity NAT for it. You might want to configure twice NAT without a destination address to take advantage of some of the other qualities of twice NAT, including the use of network object groups for real addresses, or manually ordering of rules. For more information, see the "Main Differences Between Network Object NAT and Twice NAT" section on page 32-15.

Step 4 (Optional) Identify the original packet source or destination port (the *real source port* **or** the *mapped destination port*). For the Match Criteria: Original Packet > Service, click the browse button and choose an existing TCP or UDP service object or create a new object from the Browse Original Service dialog box.

A service object can contain both a source and destination port. You should specify *either* the source *or* the destination port for both the real and mapped service objects. You should only specify *both* the source and destination ports if your application uses a fixed source port (such as some DNS servers); but fixed source ports are rare. In the rare case where you specify both the source and destination ports in the object, the original packet service object contains the real source port/mapped destination port; the translated packet service object contains the mapped source port/real destination port. NAT only supports TCP or UDP. When translating a port, be sure the protocols in the real and mapped service objects are identical (both TCP or both UDP). For identity NAT, you can use the same service object for both the real and mapped ports. The "not equal" (**!=**) operator is not supported.



Add Service Object

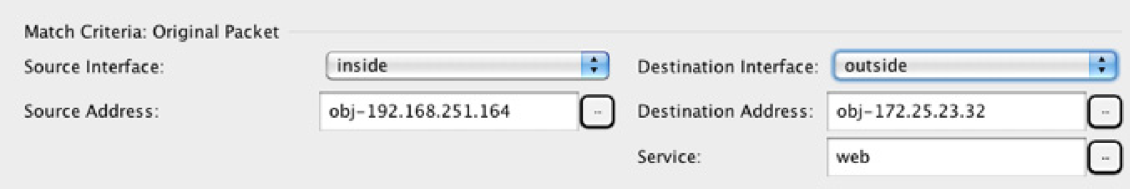
Name: web

Service Type: tcp

Destination Port/Range: 80

Source Port/Range:

Description:



Match Criteria: Original Packet

Source Interface: inside

Destination Interface: outside

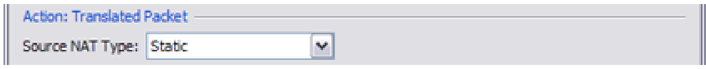
Source Address: obj-192.168.251.164

Destination Address: obj-172.25.23.32

Service: web

Step 5 Choose **Static** from the Match Criteria: Translated Packet > Source NAT Type drop-down list. Static is the default setting.

This setting only applies to the source address; the destination translation is always static.

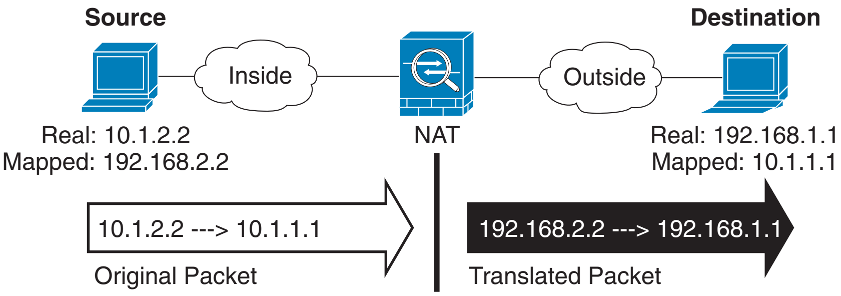


Action: Translated Packet

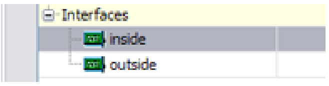
Source NAT Type: Static

248842

Step 6 Identify the translated packet addresses, either IPv4 or IPv6; namely, the packet addresses as they appear on the destination interface network (the *mapped source address* and the *real destination address*). You can translate between IPv4 and IPv6 if desired. See the following figure for an example of the original packet vs. the translated packet.



a. For the Match Criteria: Translated Packet > Source Address, click the browse button and choose an existing network object or group or create a new object or group from the Browse Translated Source Address dialog box.

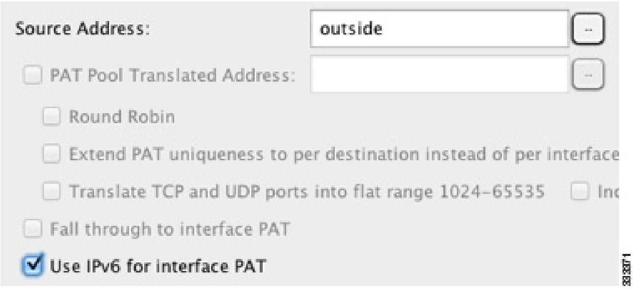


Interfaces
- inside
- outside

248776

For static NAT, the mapping is typically one-to-one, so the real addresses have the same quantity as the mapped addresses. You can, however, have different quantities if desired.

For static interface NAT with port translation, you can specify the interface instead of a network object/group for the mapped address. If you want to use the IPv6 address of the interface, check the **Use IPv6 for interface PAT** check box.



Source Address: outside

□ PAT Pool Translated Address:

□ Round Robin

□ Extend PAT uniqueness to per destination instead of per interface

□ Translate TCP and UDP ports into flat range 1024-65535 □ Inc

□ Fall through to interface PAT

☑ Use IPv6 for interface PAT

For more information, see the "Static Interface NAT with Port Translation" section on page 32-6. See the "Guidelines and Limitations" section on page 34-2 for information about disallowed mapped IP addresses.

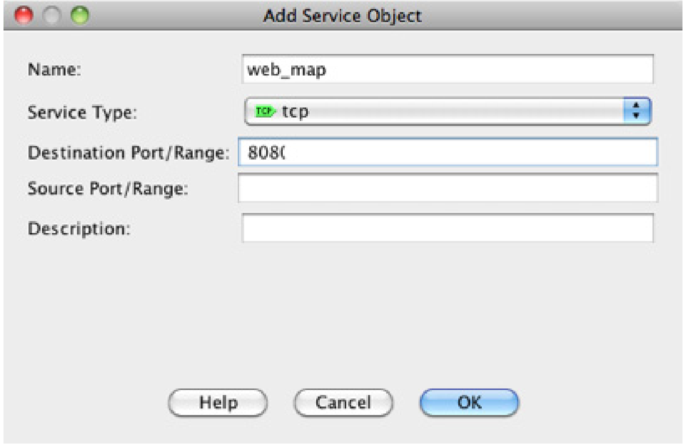
b. For the Match Criteria: Translated Packet > Destination Address, click the browse button and choose an existing network object, group, or interface or create a new object or group from the Browse Translated Destination Address dialog box.

For static NAT, the mapping is typically one-to-one, so the real addresses have the same quantity as the mapped addresses. You can, however, have different quantities if desired.

For static interface NAT with port translation, you can specify the interface instead of a network object/group for the mapped address. For more information, see the "Static Interface NAT with Port Translation" section on page 32-6. See the "Guidelines and Limitations" section on page 34-2 for information about disallowed mapped IP addresses.

Step 7 (Optional) Identify the translated packet source or destination port (the *mapped source port* **or** the *real destination port*). For the Match Criteria: Translated Packet > Service, click the browse button and choose an existing TCP or UDP service object or create a new object from the Browse Translated Service dialog box.

A service object can contain both a source and destination port. You should specify *either* the source *or* the destination port for both real and mapped service objects. You should only specify *both* the source and destination ports if your application uses a fixed source port (such as some DNS servers); but fixed source ports are rare. In the rare case where you specify both the source and destination ports in the object, the original packet service object contains the real source port/mapped destination port; the translated packet service object contains the mapped source port/real destination port. NAT only supports TCP or UDP. When translating a port, be sure the protocols in the real and mapped service objects are identical (both TCP or both UDP). For identity NAT, you can use the same service object for both the real and mapped ports. The "not equal" (**!=**) operator is not supported.



Add Service Object

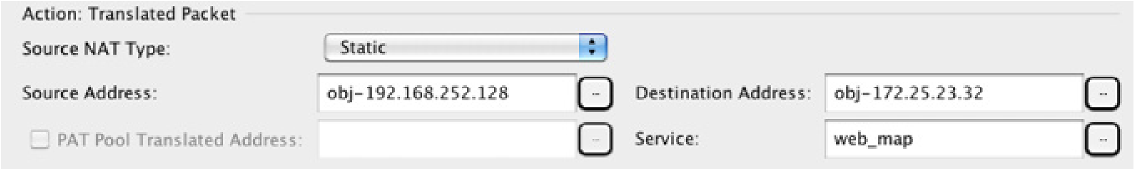
Name: web_map

Service Type: tcp

Destination Port/Range: 808(

Source Port/Range:

Description:



Action: Translated Packet

Source NAT Type: Static

Source Address: obj-192.168.252.128

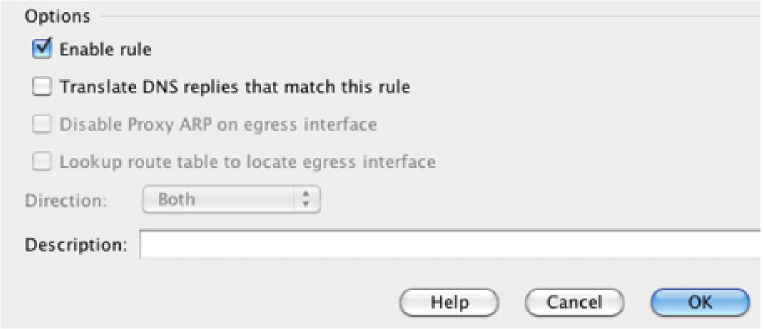
Destination Address: obj-172.25.23.32

□ PAT Pool Translated Address:

Service: web_map

Step 8 (Optional) For NAT46, check the **Use one-to-one address translation** check box. For NAT46, specify one-to-one to translate the first IPv4 address to the first IPv6 address, the second to the second, and so on. Without this option, the IPv4-embedded method is used. For a one-to-one translation, you must use this keyword.

Step 9 (Optional) Configure NAT options in the Options area.



Options

☑ Enable rule

□ Translate DNS replies that match this rule

□ Disable Proxy ARP on egress interface

□ Lookup route table to locate egress interface

Direction: Both

Description:

a. Enable rule —Enables this NAT rule. The rule is enabled by default.

b. (For a source-only rule) Translate DNS replies that match this rule—Rewrites the DNS A record in DNS replies. Be sure DNS inspection is enabled (it is enabled by default). You cannot configure DNS modification if you configure a destination address. See the "DNS and NAT" section on page 32-30 for more information.

c. Disable Proxy ARP on egress interface—Disables proxy ARP for incoming packets to the mapped IP addresses. See the "Mapped Addresses and Routing" section on page 32-22 for more information.

d. Direction—To make the rule unidirectional, choose **Unidirectional**. The default is Both. Making the rule unidirectional prevents traffic from initiating connections to the real addresses.

e. Description—Adds a description about the rule up to 200 characters in length.

Step 10 Click **OK**.

Configuring Identity NAT

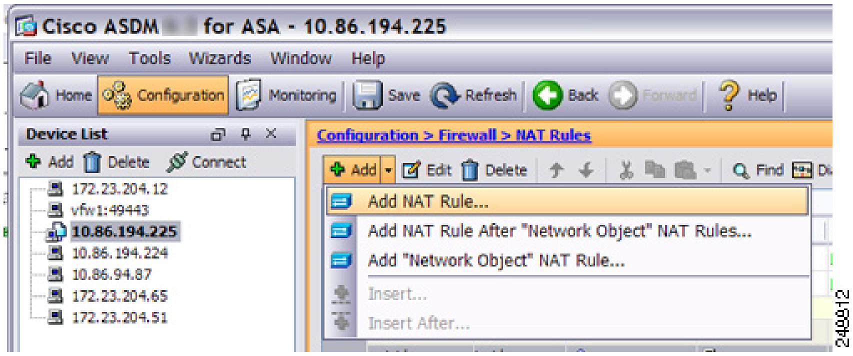
This section describes how to configure an identity NAT rule using twice NAT. For more information about identity NAT, see the "Identity NAT" section on page 32-12.

Detailed Steps

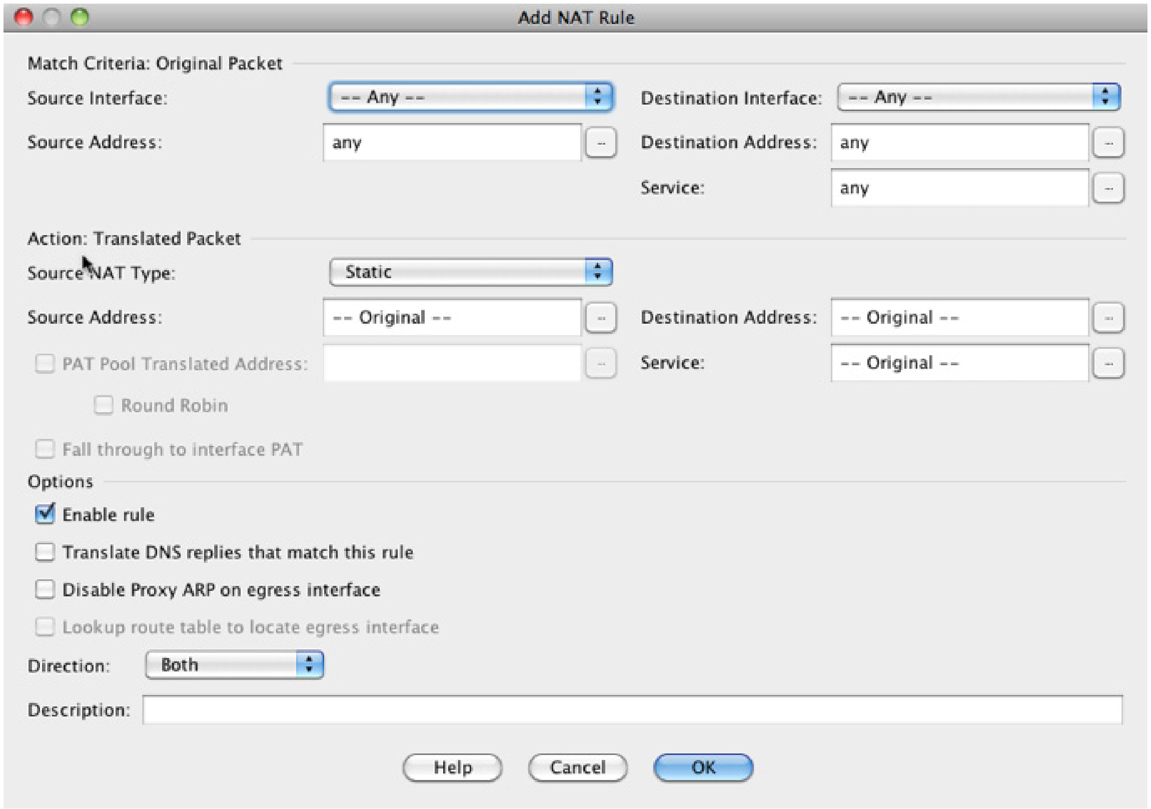
To configure identity NAT, perform the following steps:

Step 1 Choose **Configuration > Firewall > NAT Rules**, and then click **Add**.

If you want to add this rule to section 3 after the network object rules, then click the down arrow next to Add, and choose **Add NAT Rule After Network Object NAT Rules**.


Cisco ASDM for ASA - 10.86.194.225
File View Tools Wizards Window Help
Home Configuration Monitoring Save Refresh Back Forward Help
Device List
Add Delete Connect
172.23.204.12
vfw1:49443
10.86.194.225
10.86.194.224
10.86.94.87
172.23.204.65
172.23.204.51
Configuration > Firewall > NAT Rules
Add Edit Delete Find
Add NAT Rule...
Add NAT Rule After "Network Object" NAT Rules...
Add "Network Object" NAT Rule...
Insert...
Insert After...
248812

The Add NAT Rule dialog box appears.



Add NAT Rule

Match Criteria: Original Packet

Source Interface: -- Any -- Destination Interface: -- Any --

Source Address: any Destination Address: any

Service: any

Action: Translated Packet

Source NAT Type: Static

Source Address: -- Original -- Destination Address: -- Original --

□ PAT Pool Translated Address: Service: -- Original --

□ Round Robin

□ Fall through to interface PAT

Options

☑ Enable rule

□ Translate DNS replies that match this rule

□ Disable Proxy ARP on egress interface

□ Lookup route table to locate egress interface

Direction: Both

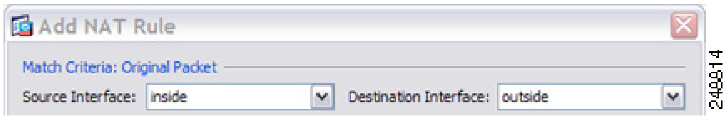
Description:

Step 2 Set the source and destination interfaces.

By default in routed mode, both interfaces are set to --Any--. In transparent firewall mode, you must set specific interfaces.

a. From the Match Criteria: Original Packet > Source Interface drop-down list, choose the source interface.

b. From the Match Criteria: Original Packet > Destination Interface drop-down list, choose the destination interface.

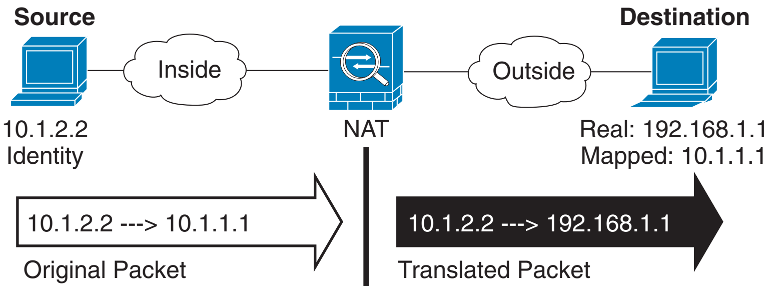


Add NAT Rule

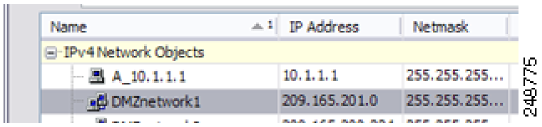
Match Criteria: Original Packet

Source Interface: inside Destination Interface: outside

Step 3 Identify the original packet addresses, either IPv4 or IPv6; namely, the packet addresses as they appear on the source interface network (the *real source address* and the *mapped destination address*). See the following figure for an example of the original packet vs. the translated packet where you perform identity NAT on the inside host but translate the outside host.



a. For the Match Criteria: Original Packet > Source Address, click the browse button and choose an existing network object or group or create a new object or group from the Browse Original Source Address dialog box. The group cannot contain both IPv4 and IPv6 addresses; it must contain one type only. The default is **any**; only use this option when also setting the mapped address to **any**.



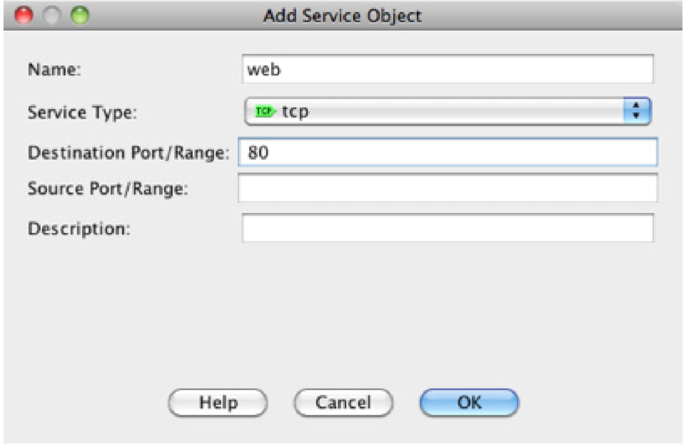
Name	IP Address	Netmask
IPv4 Network Objects		
A_10.1.1.1	10.1.1.1	255.255.255...
DMZnetwork1	209.165.201.0	255.255.255...

b. (Optional) For the Match Criteria: Original Packet > Destination Address, click the browse button ... and choose an existing network object or group or create a new object or group from the Browse Original Destination Address dialog box.

Although the main feature of twice NAT is the inclusion of the destination IP address, the destination address is optional. If you do specify the destination address, you can configure static translation for that address or just use identity NAT for it. You might want to configure twice NAT without a destination address to take advantage of some of the other qualities of twice NAT, including the use of network object groups for real addresses, or manually ordering of rules. For more information, see the "Main Differences Between Network Object NAT and Twice NAT" section on page 32-15.

Step 4 (Optional) Identify the original packet source or destination port (the *real source port* **or** the *mapped destination port*). For the Match Criteria: Original Packet > Service, click the browse button and choose an existing TCP or UDP service object or create a new object from the Browse Original Service dialog box.

A service object can contain both a source and destination port. You should specify *either* the source *or* the destination port for both service objects. You should only specify *both* the source and destination ports if your application uses a fixed source port (such as some DNS servers); but fixed source ports are rare. In the rare case where you specify both the source and destination ports in the object, the original packet service object contains the real source port/mapped destination port; the translated packet service object contains the mapped source port/real destination port. NAT only supports TCP or UDP. When translating a port, be sure the protocols in the real and mapped service objects are identical (both TCP or both UDP). For identity NAT, you can use the same service object for both the real and mapped ports. The "not equal" (**!=**) operator is not supported.



Add Service Object

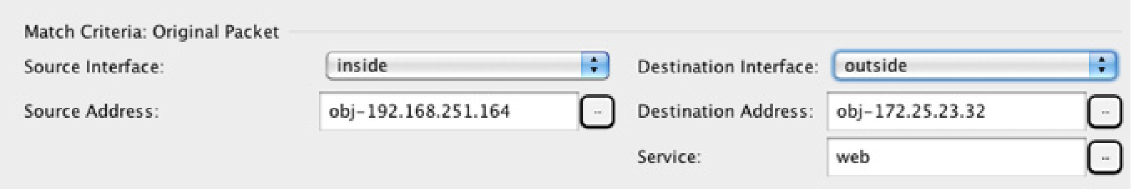
Name: web

Service Type: tcp

Destination Port/Range: 80

Source Port/Range:

Description:



Match Criteria: Original Packet

Source Interface: inside

Destination Interface: outside

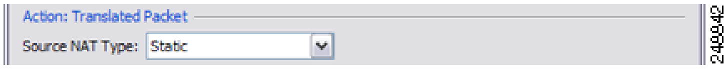
Source Address: obj-192.168.251.164

Destination Address: obj-172.25.23.32

Service: web

Step 5 Choose **Static** from the Match Criteria: Translated Packet > Source NAT Type drop-down list. Static is the default setting.

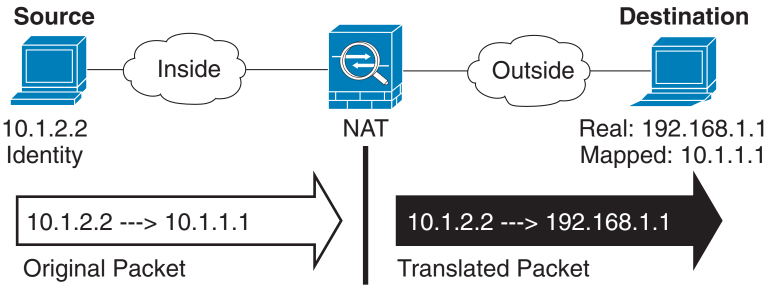
This setting only applies to the source address; the destination translation is always static.



Action: Translated Packet

Source NAT Type: Static

Step 6 Identify the translated packet addresses; namely, the packet addresses as they appear on the destination interface network (the *mapped source address* and the *real destination address*). See the following figure for an example of the original packet vs. the translated packet where you perform identity NAT on the inside host but translate the outside host.



a. For the Match Criteria: Translated Packet > Source Address, click the browse button and choose the same network object or group from the Browse Translated Source Address dialog box that you chose for the real source address. Use **any** if you specified **any** for the real address.

b. For the Match Criteria: Translated Packet > Destination Address, click the browse button and choose an existing network object, group, or interface or create a new object or group from the Browse Translated Destination Address dialog box.

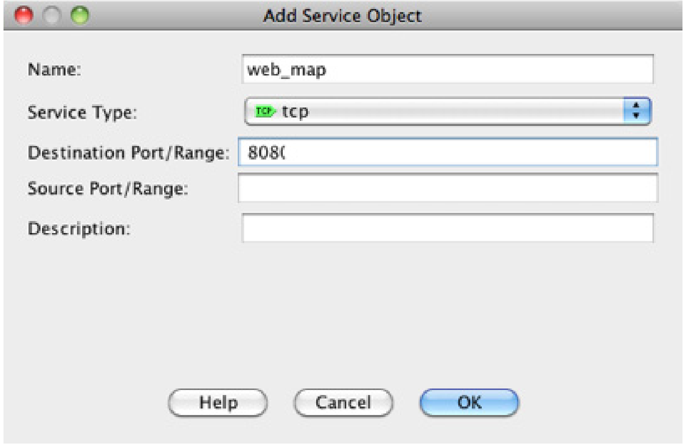
For identity NAT for the destination address, simply use the same object or group for both the real and mapped addresses.

If you want to translate the destination address, then the static mapping is typically one-to-one, so the real addresses have the same quantity as the mapped addresses. You can, however, have different quantities if desired. For more information, see the "Static NAT" section on page 32-3. See the "Guidelines and Limitations" section on page 34-2 for information about disallowed mapped IP addresses.

For static interface NAT with port translation only, choose an interface. If you specify an interface, be sure to also configure a a service translation. For more information, see the "Static Interface NAT with Port Translation" section on page 32-6.

Step 7 (Optional) Identify the translated packet source or destination port (the *mapped source port* **or** the *real destination port*). For the Match Criteria: Translated Packet > Service, click the browse button and choose an existing TCP or UDP service object or create a new object from the Browse Translated Service dialog box.

A service object can contain both a source and destination port. You should specify *either* the source *or* the destination port for both service objects. You should only specify *both* the source and destination ports if your application uses a fixed source port (such as some DNS servers); but fixed source ports are rare. In the rare case where you specify both the source and destination ports in the object, the original packet service object contains the real source port/mapped destination port; the translated packet service object contains the mapped source port/real destination port. NAT only supports TCP or UDP. When translating a port, be sure the protocols in the real and mapped service objects are identical (both TCP or both UDP). For identity NAT, you can use the same service object for both the real and mapped ports. The "not equal" (**!=**) operator is not supported.


Add Service Object

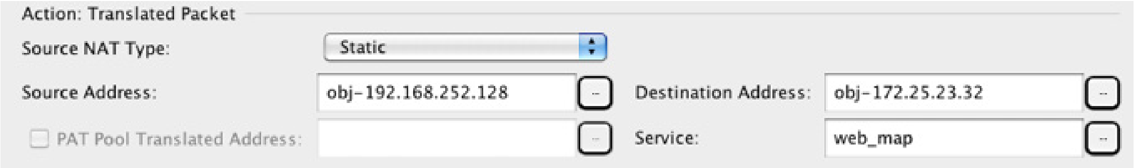
Name: web_map

Service Type: tcp

Destination Port/Range: 808(

Source Port/Range:

Description:


Action: Translated Packet

Source NAT Type: Static

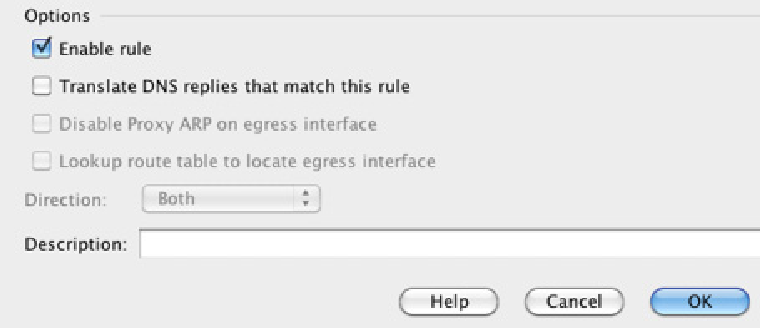
Source Address: obj-192.168.252.128

Destination Address: obj-172.25.23.32

□ PAT Pool Translated Address:

Service: web_map

Step 8 (Optional) Configure NAT options in the Options area.



Options

☑ Enable rule

□ Translate DNS replies that match this rule

□ Disable Proxy ARP on egress interface

□ Lookup route table to locate egress interface

Direction: Both

Description:

a. Enable rule —Enables this NAT rule. The rule is enabled by default.

b. Disable Proxy ARP on egress interface—Disables proxy ARP for incoming packets to the mapped IP addresses. See the "Mapped Addresses and Routing" section on page 32-22 for more information.

c. (Routed mode; interface(s) specified) Lookup route table to locate egress interface—Determines the egress interface using a route lookup instead of using the interface specified in the NAT command. See the "Determining the Egress Interface" section on page 32-24 for more information.

d. Direction—To make the rule unidirectional, choose **Unidirectional**. The default is Both. Making the rule unidirectional prevents traffic from initiating connections to the real addresses. You might want to use this setting for testing purposes.

e. Description—Adds a description about the rule up to 200 characters in length.

Note Although the "Translate DNS replies that match this rule" check box is available if you do not configure a destination address, this option is not applicable to identity NAT because you are translating the address to itself, so the DNS reply does not need modification. See the "DNS and NAT" section on page 32-30 for more information.

Step 9 Click **OK**.

Configuring Per-Session PAT Rules

By default, all TCP PAT traffic and all UDP DNS traffic uses per-session PAT. To use multi-session PAT for traffic, you can configure per-session PAT rules: a permit rule uses per-session PAT, and a deny rule uses multi-session PAT. For more information about per-session vs. multi-session PAT, see the "Per-Session PAT vs. Multi-Session PAT (Version 9.0(1) and Later)" section on page 32-11.

Detailed Steps

To configure a per-session PAT rule, see the "Configuring Per-Session PAT Rules" section on page 33-18.

Monitoring Twice NAT

The Monitoring > Properties > Connection Graphs > Xlates pane lets you view the active Network Address Translations in a graphical format. You can choose up to four types of statistics to show in one graph window. You can open multiple graph windows at the same time.

Fields

- Available Graphs—Lists the components you can graph.
  - Xlate Utilization—Displays the ASA NAT utilization.
- Graph Window Title—Shows the graph window name to which you want to add a graph type. To use an existing window title, select one from the drop-down list. To display graphs in a new window, enter a new window title.
- Add—Click to move the selected entries in the Available Graphs list to the Selected Graphs list.
- Remove—Click to remove the selected entry from the Selected Graphs list.
- Show Graphs—Click to display a new or updated graph window.

The Monitoring > Properties > Connection Graphs > Perfmon pane lets you view the performance information in a graphical format. You can choose up to four types of statistics to show in one graph window. You can open multiple graph windows at the same time.

Fields

- Available Graphs—Lists the components you can graph.
  - AAA Perfmon—Displays the ASA AAA performance information.
  - Inspection Perfmon—Displays the ASA inspection performance information.
  - Web Perfmon—Displays the ASA web performance information, including URL access and URL server requests.
  - Connections Perfmon—Displays the ASA connections performance information.
  - Xlate Perfmon—Displays the ASA NAT performance information.
- Graph Window Title—Shows the graph window name to which you want to add a graph type. To use an existing window title, select one from the drop-down list. To display graphs in a new window, enter a new window title.
- Add—Click to move the selected entries in the Available Graphs list to the Selected Graphs list.
- Remove—Click to remove the selected statistic type from the Selected Graphs list.
- Show Graphs—Click to display a new or updated graph window.

Configuration Examples for Twice NAT

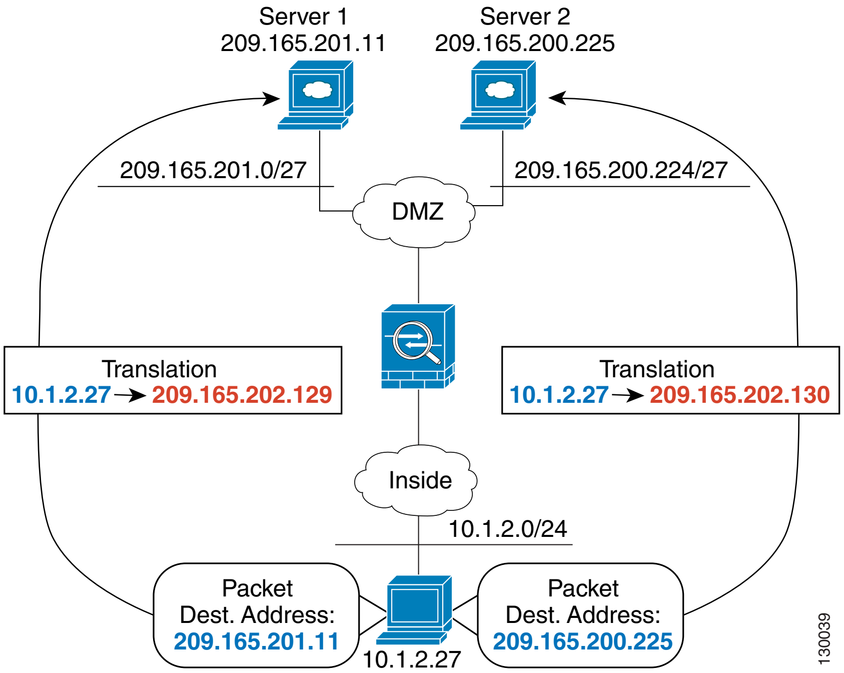
This section includes the following configuration examples:

- Different Translation Depending on the Destination (Dynamic PAT), page 34-31
- Different Translation Depending on the Destination Address and Port (Dynamic PAT), page 34-39

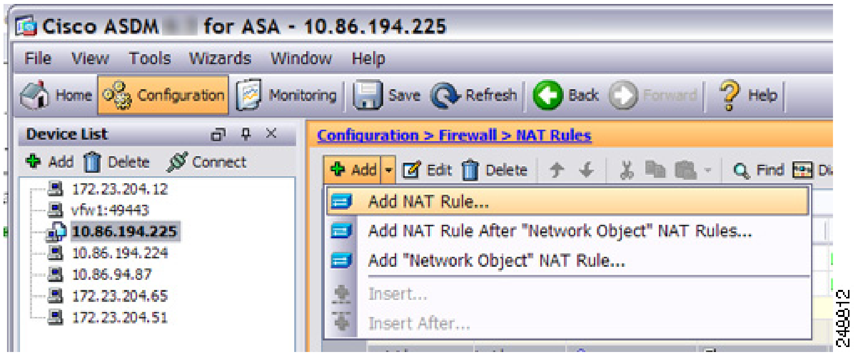
Different Translation Depending on the Destination (Dynamic PAT)

Figure 34-1 shows a host on the 10.1.2.0/24 network accessing two different servers. When the host accesses the server at 209.165.201.11, the real address is translated to 209.165.202.129:*port*. When the host accesses the server at 209.165.200.225, the real address is translated to 209.165.202.130:*port*.

Figure 34-1 Twice NAT with Different Destination Addresses

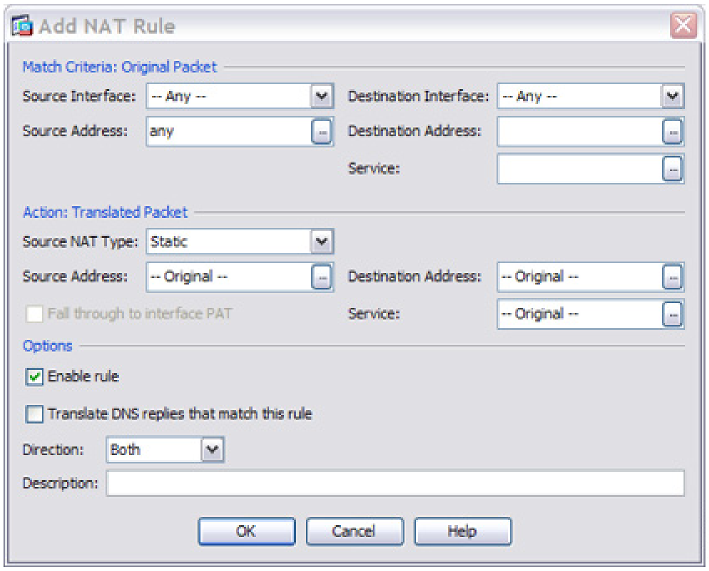


Step 1 Add a NAT rule for traffic from the inside network to DMZ network 1:


Cisco ASDM for ASA - 10.86.194.225
File View Tools Wizards Window Help
Home Configuration Monitoring Save Refresh Back Forward Help
Device List
Add Delete Connect
172.23.204.12
vfw1:49443
10.86.194.225
10.86.194.224
10.86.94.87
172.23.204.65
172.23.204.51
Configuration > Firewall > NAT Rules
Add Edit Delete Find
Add NAT Rule...
Add NAT Rule After "Network Object" NAT Rules...
Add "Network Object" NAT Rule...
Insert...
Insert After...
248812

By default, the NAT rule is added to the end of section 1. If you want to add a NAT rule to section 3, after the network object NAT rules, choose **Add NAT Rule After Network Object NAT Rules**.

The Add NAT Rule dialog box appears.



Add NAT Rule

Match Criteria: Original Packet

Source Interface: -- Any --
Destination Interface: -- Any --
Source Address: any
Destination Address:
Service:

Action: Translated Packet

Source NAT Type: Static
Source Address: -- Original --
Destination Address: -- Original --
☐ Fall through to interface PAT
Service: -- Original --

Options

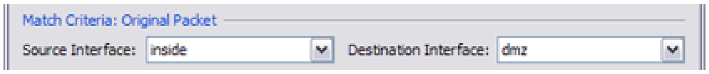
☑ Enable rule

☐ Translate DNS replies that match this rule

Direction: Both

Description:

Step 2 Set the source and destination interfaces:

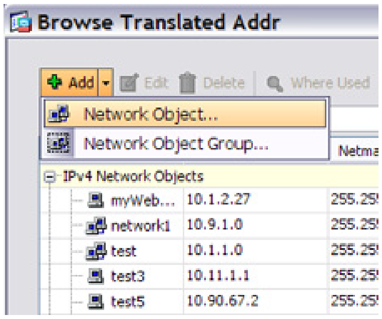


Match Criteria: Original Packet

Source Interface: inside
Destination Interface: dmz

Step 3 For the Original Source Address, click the browse button to add a new network object for the inside network in the Browse Original Source Address dialog box.

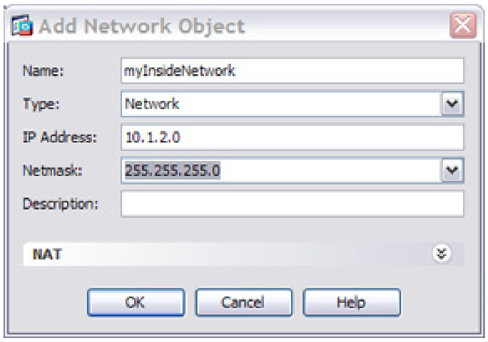
a. Add the new network object.



Browse Translated Addr

		Netma
IPv4 Network Objects		
myWeb...	10.1.2.27	255.25
network1	10.9.1.0	255.25
test	10.1.1.0	255.25
test3	10.11.1.1	255.25
test5	10.90.67.2	255.25

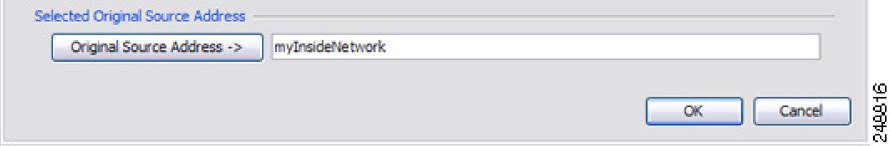
b. Define the inside network addresses, and click **OK**.



Add Network Object

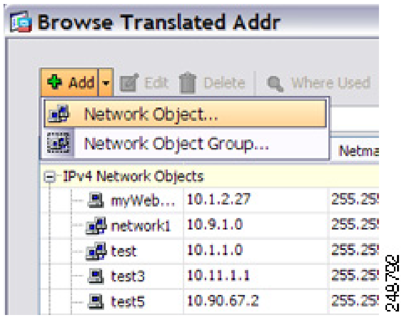
Name: myInsideNetwork
Type: Network
IP Address: 10.1.2.0
Netmask: 255.255.255.0
Description:

c. Choose the new network object by double-clicking it. Click **OK** to return to the NAT configuration.


Selected Original Source Address
Original Source Address -> myInsideNetwork

Step 4 For the Original Destination Address, click the browse button to add a new network object for DMZ network 1 in the Browse Original Destination Address dialog box.

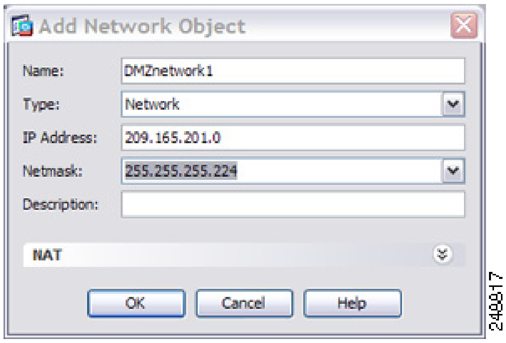
a. Add the new network object.



IPv4 Network Objects

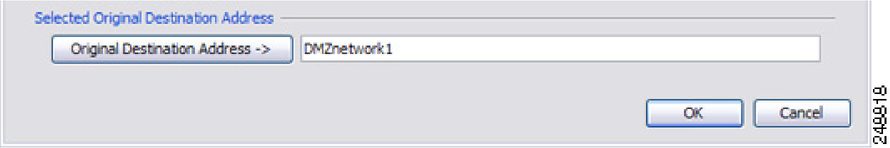
myWeb...	10.1.2.27	255.25
network1	10.9.1.0	255.25
test	10.1.1.0	255.25
test3	10.11.1.1	255.25
test5	10.90.67.2	255.25

b. Define the DMZ network 1 addresses, and click **OK**.

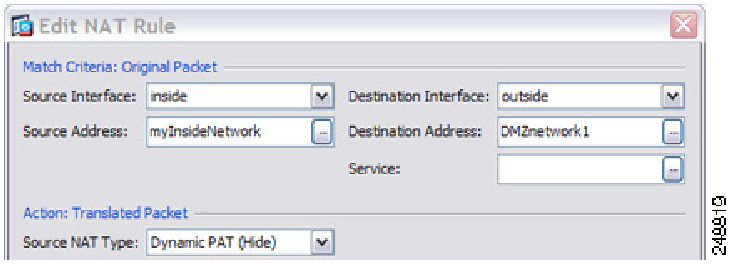

Add Network Object

Name: DMZnetwork1
Type: Network
IP Address: 209.165.201.0
Netmask: 255.255.255.224
Description:

c. Choose the new network object by double-clicking it. Click **OK** to return to the NAT configuration.


Selected Original Destination Address
Original Destination Address -> DMZnetwork1

Step 5 Set the NAT Type to **Dynamic PAT (Hide)**:



Edit NAT Rule

Match Criteria: Original Packet

Source Interface: inside

Destination Interface: outside

Source Address: myInsideNetwork

Destination Address: DMZnetwork1

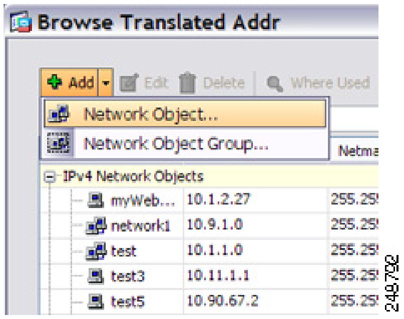
Service:

Action: Translated Packet

Source NAT Type: Dynamic PAT (Hide)

Step 6 For the Translated Source Address, click the browse button to add a new network object for the PAT address in the Browse Translated Source Address dialog box.

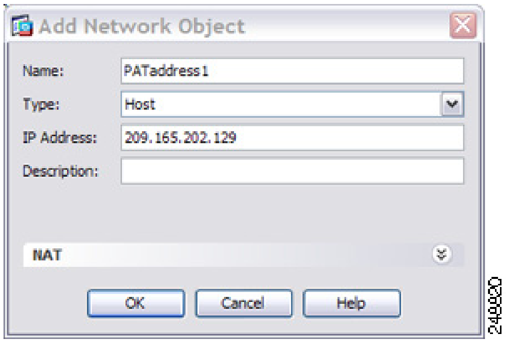
a. Add the new network object.



Browse Translated Addr

myWeb...	10.1.2.27	255.25!
network1	10.9.1.0	255.25!
test	10.1.1.0	255.25!
test3	10.11.1.1	255.25!
test5	10.90.67.2	255.25!

b. Define the PAT address, and click **OK**.



Add Network Object

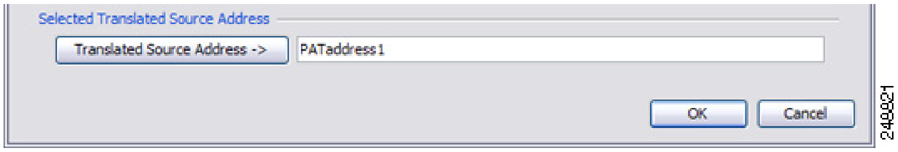
Name: PATaddress1

Type: Host

IP Address: 209.165.202.129

Description:

c. Choose the new network object by double-clicking it. Click **OK** to return to the NAT configuration.

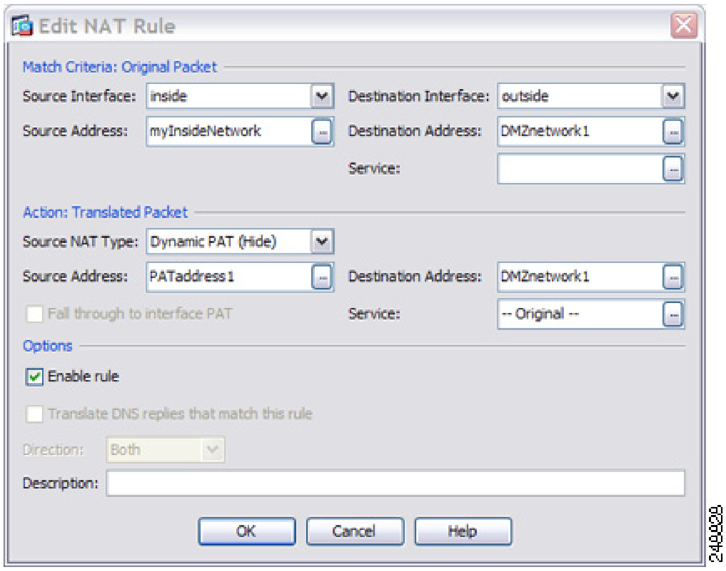


Selected Translated Source Address

Translated Source Address -> PATaddress1

Step 7 For the Translated Destination Address, type the name of the Original Destination Address (DMZnetwork1) or click the browse button to choose it.

Because you do not want to translate the destination address, you need to configure identity NAT for it by specifying the same address for the Original and Translated destination addresses.



Edit NAT Rule

Match Criteria: Original Packet

Source Interface: inside
Destination Interface: outside
Source Address: myInsideNetwork
Destination Address: DMZnetwork1
Service:

Action: Translated Packet

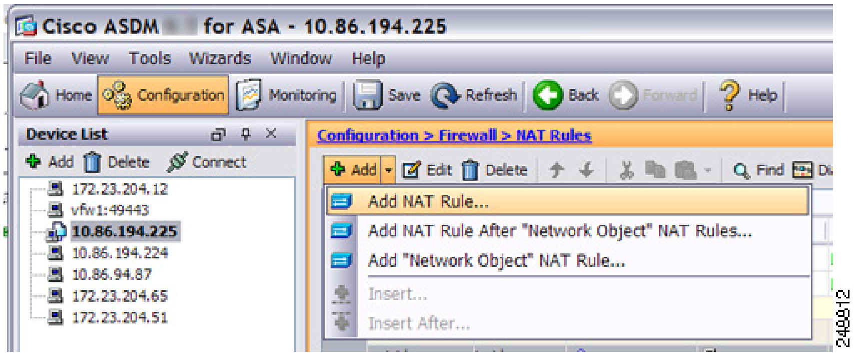
Source NAT Type: Dynamic PAT (Hide)
Source Address: PATaddress1
Destination Address: DMZnetwork1
□ Fall through to interface PAT
Service: -- Original --

Options

☑ Enable rule
□ Translate DNS replies that match this rule
Direction: Both
Description:

Step 8 Click **OK** to add the rule to the NAT table.

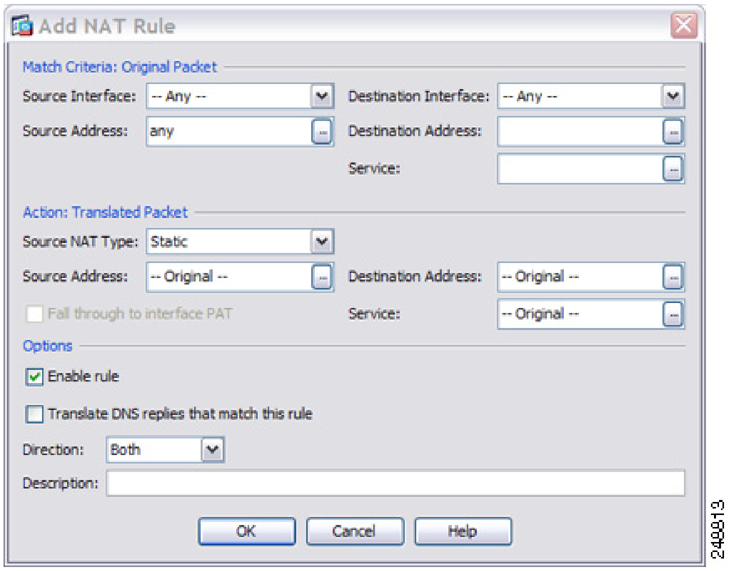
Step 9 Add a NAT rule for traffic from the inside network to DMZ network 2:



Cisco ASDM for ASA - 10.86.194.225
File View Tools Wizards Window Help
Home Configuration Monitoring Save Refresh Back Forward Help
Device List
Add Delete Connect
172.23.204.12
vfw1:49443
10.86.194.225
10.86.194.224
10.86.94.87
172.23.204.65
172.23.204.51
Configuration > Firewall > NAT Rules
Add Edit Delete Find
Add NAT Rule...
Add NAT Rule After "Network Object" NAT Rules...
Add "Network Object" NAT Rule...
Insert...
Insert After...
248812

By default, the NAT rule is added to the end of section 1. If you want to add a NAT rule to section 3, after the network object NAT rules, choose **Add NAT Rule After Network Object NAT Rules**.

The Add NAT Rule dialog box appears.



Match Criteria: Original Packet

Source Interface: -- Any --
Destination Interface: -- Any --
Source Address: any
Destination Address:
Service:

Action: Translated Packet

Source NAT Type: Static
Source Address: -- Original --
Destination Address: -- Original --
□ Fall through to interface PAT
Service: -- Original --

Options

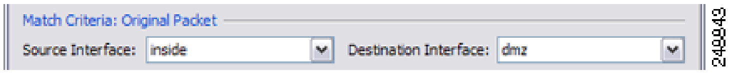
☑ Enable rule

□ Translate DNS replies that match this rule

Direction: Both

Description:

Step 10 Set the source and destination interfaces:



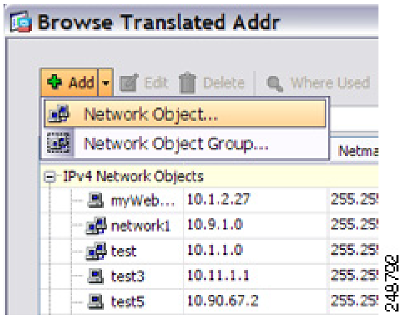
Match Criteria: Original Packet

Source Interface: inside
Destination Interface: dmz

Step 11 For the Original Source Address, type the name of the inside network object (myInsideNetwork) or click the browse button to choose it.

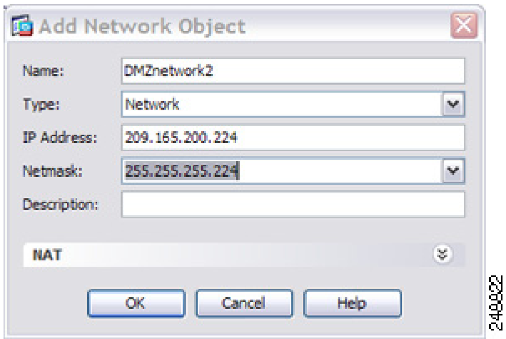
Step 12 For the Original Destination Address, click the browse button to add a new network object for DMZ network 2 in the Browse Original Destination Address dialog box.

a. Add the new network object.



		Netma
IPv4 Network Objects		
myWeb...	10.1.2.27	255.25!
network1	10.9.1.0	255.25!
test	10.1.1.0	255.25!
test3	10.11.1.1	255.25!
test5	10.90.67.2	255.25!

b. Define the DMZ network 2 addresses, and click **OK**.



Name: DMZnetwork2

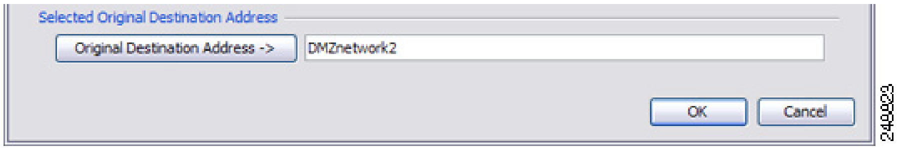
Type: Network

IP Address: 209.165.200.224

Netmask: 255.255.255.224

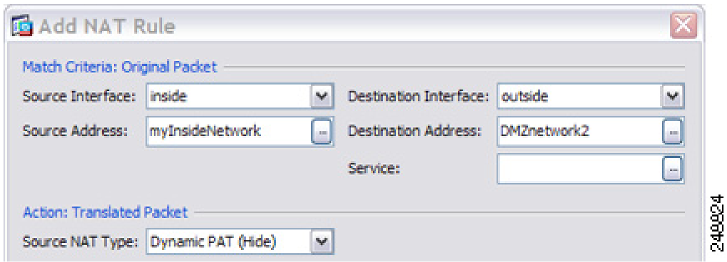
Description:

c. Choose the new network object by double-clicking it. Click **OK** to return to the NAT configuration.


Selected Original Destination Address
Original Destination Address ->
OK
Cancel
249823

Original Destination Address: DMZnetwork2

Step 13 Set the NAT Type to **Dynamic PAT (Hide)**:



Source Interface: inside

Destination Interface: outside

Source Address: myInsideNetwork

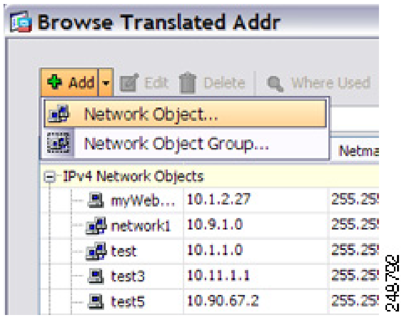
Destination Address: DMZnetwork2

Service:

Source NAT Type: Dynamic PAT (Hide)

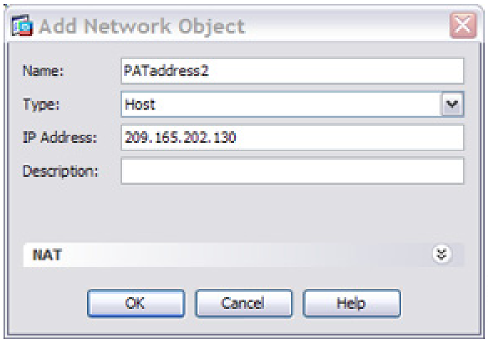
Step 14 For the Translated Source Address, click the browse button to add a new network object for the PAT address in the Browse Translated Source Address dialog box.

a. Add the new network object.



IPv4 Network Objects		
myWeb...	10.1.2.27	255.25!
network1	10.9.1.0	255.25!
test	10.1.1.0	255.25!
test3	10.11.1.1	255.25!
test5	10.90.67.2	255.25!

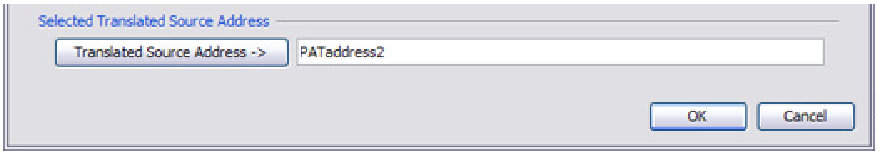
b. Define the PAT address, and click **OK**.



Name: PATaddress2
Type: Host
IP Address: 209.165.202.130
Description:

249825

c. Choose the new network object by double-clicking it. Click **OK** to return to the NAT configuration.

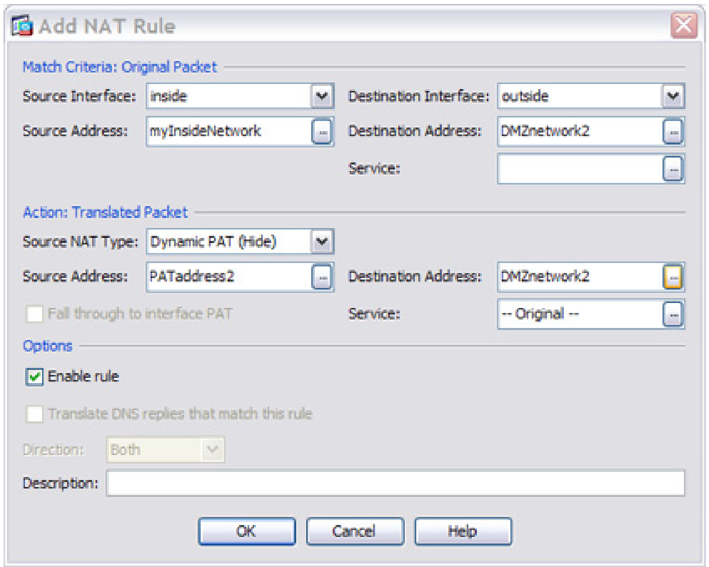


Translated Source Address -> PATaddress2

249826

Step 15 For the Translated Destination Address, type the name of the Original Destination Address (DMZnetwork2) or click the browse button to choose it.

Because you do not want to translate the destination address, you need to configure identity NAT for it by specifying the same address for the Original and Translated destination addresses.



Match Criteria: Original Packet

Source Interface: inside
Destination Interface: outside
Source Address: myInsideNetwork
Destination Address: DMZnetwork2
Service:

Action: Translated Packet

Source NAT Type: Dynamic PAT (Hide)
Source Address: PATaddress2
Destination Address: DMZnetwork2
□ Fall through to interface PAT
Service: -- Original --

Options

☑ Enable rule
□ Translate DNS replies that match this rule
Direction: Both
Description:

249827

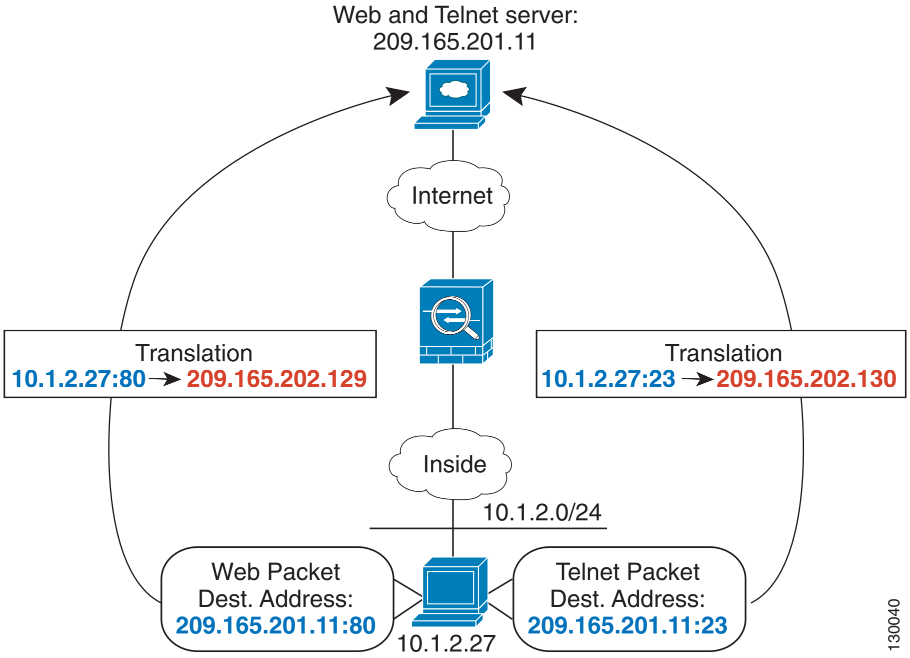
Step 16 Click **OK** to add the rule to the NAT table.

Step 17 Click **Apply**.

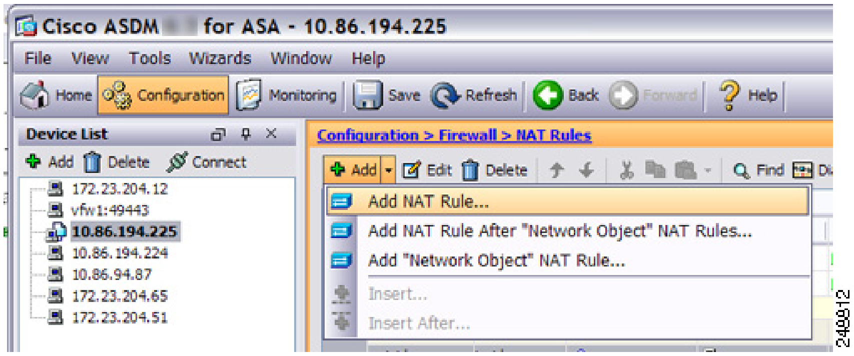
Different Translation Depending on the Destination Address and Port (Dynamic PAT)

Figure 34-2 shows the use of source and destination ports. The host on the 10.1.2.0/24 network accesses a single host for both web services and Telnet services. When the host accesses the server for Telnet services, the real address is translated to 209.165.202.129:*port*. When the host accesses the same server for web services, the real address is translated to 209.165.202.130:*port*.

Figure 34-2 Twice NAT with Different Destination Ports

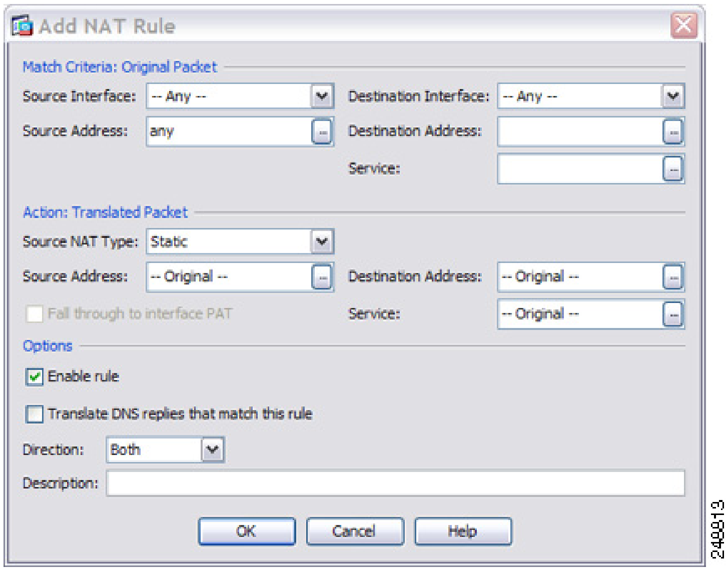


Step 1 Add a NAT rule for traffic from the inside network to the Telnet server:


Cisco ASDM for ASA - 10.86.194.225
File View Tools Wizards Window Help
Home Configuration Monitoring Save Refresh Back Forward Help
Device List
Add Delete Connect
172.23.204.12
vfw1:49443
10.86.194.225
10.86.194.224
10.86.94.87
172.23.204.65
172.23.204.51
Configuration > Firewall > NAT Rules
Add Edit Delete Find
Add NAT Rule...
Add NAT Rule After "Network Object" NAT Rules...
Add "Network Object" NAT Rule...
Insert...
Insert After...
248812

By default, the NAT rule is added to the end of section 1. If you want to add a NAT rule to section 3, after the network object NAT rules, choose **Add NAT Rule After Network Object NAT Rules**.

The Add NAT Rule dialog box appears.



Add NAT Rule

Match Criteria: Original Packet

Source Interface: -- Any -- Destination Interface: -- Any --

Source Address: any Destination Address:

Service:

Action: Translated Packet

Source NAT Type: Static

Source Address: -- Original -- Destination Address: -- Original --

□ Fall through to interface PAT Service: -- Original --

Options

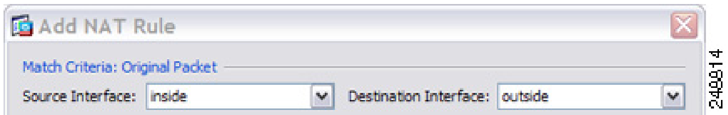
☑ Enable rule

□ Translate DNS replies that match this rule

Direction: Both

Description:

Step 2 Set the source and destination interfaces:



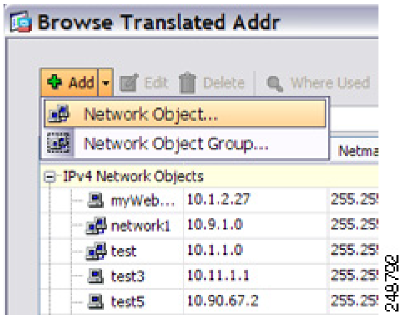
Add NAT Rule

Match Criteria: Original Packet

Source Interface: inside Destination Interface: outside

Step 3 For the Original Source Address, click the browse button to add a new network object for the inside network in the Browse Original Source Address dialog box.

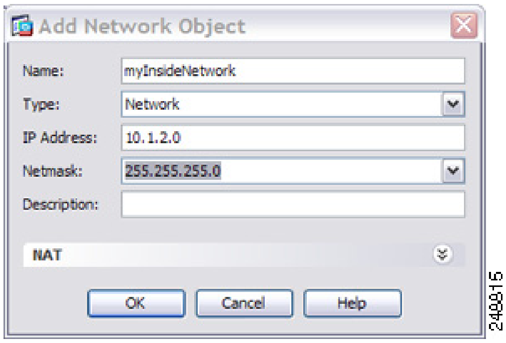
a. Add the new network object.



Browse Translated Addr

IPv4 Network Objects		
myWeb...	10.1.2.27	255.25!
network1	10.9.1.0	255.25!
test	10.1.1.0	255.25!
test3	10.11.1.1	255.25!
test5	10.90.67.2	255.25!

b. Define the inside network addresses, and click **OK**.



Name: myInsideNetwork

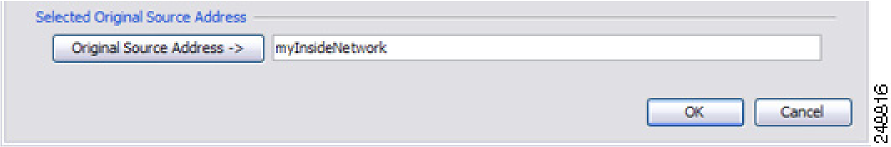
Type: Network

IP Address: 10.1.2.0

Netmask: 255.255.255.0

Description:

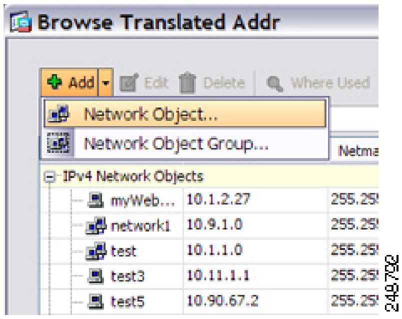
c. Choose the new network object by double-clicking it. Click **OK** to return to the NAT configuration.



Original Source Address -> myInsideNetwork

Step 4 For the Original Destination Address, click the browse button to add a new network object for the Telnet/Web server in the Browse Original Destination Address dialog box.

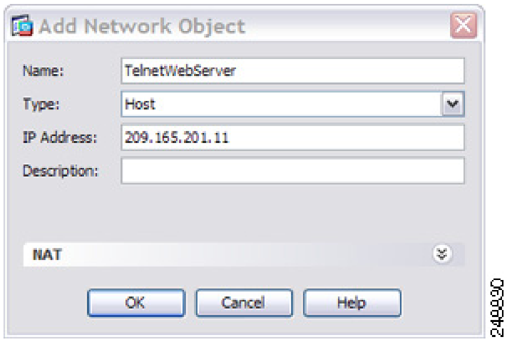
a. Add the new network object.



IPv4 Network Objects

myWeb...	10.1.2.27	255.25
network1	10.9.1.0	255.25
test	10.1.1.0	255.25
test3	10.11.1.1	255.25
test5	10.90.67.2	255.25

b. Define the server address, and click **OK**.



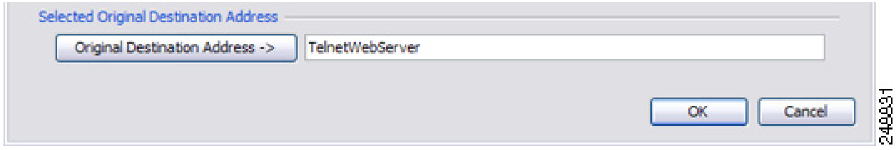
Name: TelnetWebServer

Type: Host

IP Address: 209.165.201.11

Description:

c. Choose the new network object by double-clicking it. Click **OK** to return to the NAT configuration.

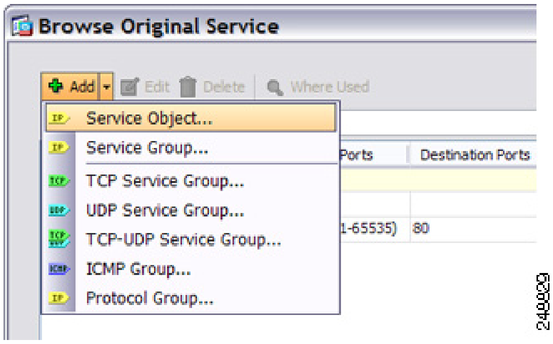


Selected Original Destination Address

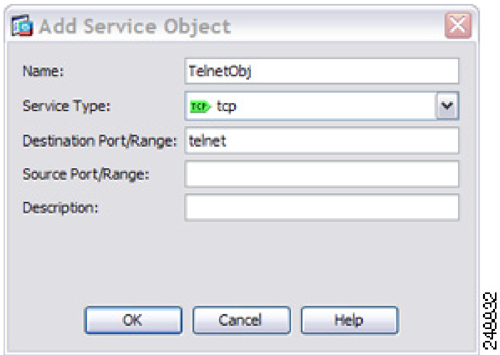
Original Destination Address -> TelnetWebServer

Step 5 For the Original Service, click the browse button to add a new service object for Telnet in the Browse Original Service dialog box.

a. Add the new service object.



b. Define the protocol and port, and click **OK**.



Add Service Object

Name: TelnetObj

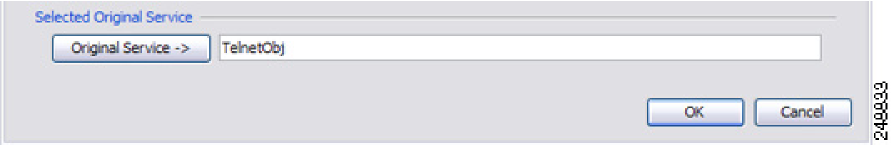
Service Type: tcp

Destination Port/Range: telnet

Source Port/Range:

Description:

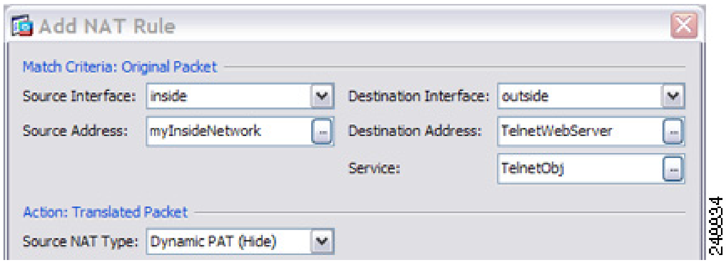
c. Choose the new service object by double-clicking it. Click **OK** to return to the NAT configuration.



Selected Original Service

Original Service -> TelnetObj

Step 6 Set the NAT Type to **Dynamic PAT (Hide)**:



Add NAT Rule

Match Criteria: Original Packet

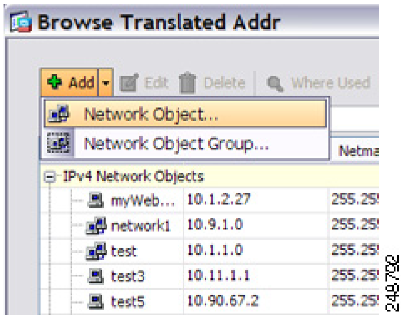
Source Interface: inside
Destination Interface: outside
Source Address: myInsideNetwork
Destination Address: TelnetWebServer
Service: TelnetObj

Action: Translated Packet

Source NAT Type: Dynamic PAT (Hide)

Step 7 For the Translated Source Address, click the browse button to add a new network object for the PAT address in the Browse Translated Source Address dialog box.

a. Add the new network object.

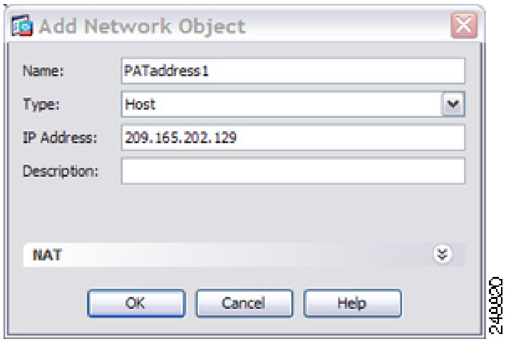


Browse Translated Addr

IPv4 Network Objects

myWeb...	10.1.2.27	255.25
network1	10.9.1.0	255.25
test	10.1.1.0	255.25
test3	10.11.1.1	255.25
test5	10.90.67.2	255.25

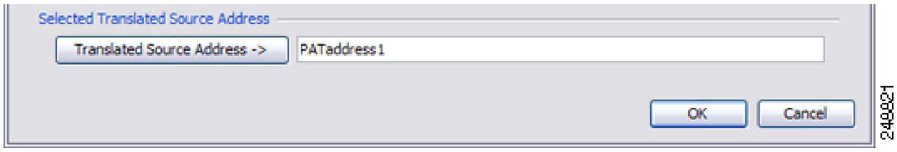
b. Define the PAT address, and click **OK**.



Add Network Object

Name: PATaddress1
Type: Host
IP Address: 209.165.202.129
Description:

c. Choose the new network object by double-clicking it. Click **OK** to return to the NAT configuration.

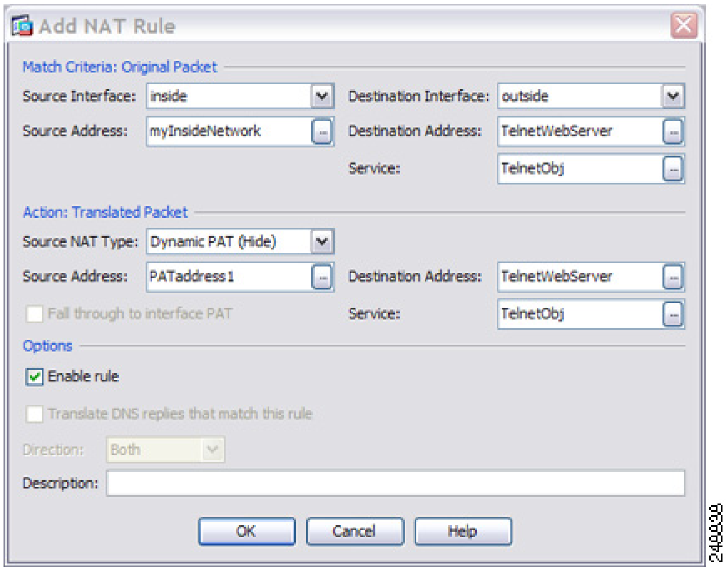


Selected Translated Source Address

Translated Source Address -> PATaddress1

Step 8 For the Translated Destination Address, type the name of the Original Destination Address (TelnetWebServer) or click the browse button to choose it.

Because you do not want to translate the destination address, you need to configure identity NAT for it by specifying the same address for the Original and Translated destination addresses.



Add NAT Rule

Match Criteria: Original Packet

Source Interface: inside
Destination Interface: outside
Source Address: myInsideNetwork
Destination Address: TelnetWebServer
Service: TelnetObj

Action: Translated Packet

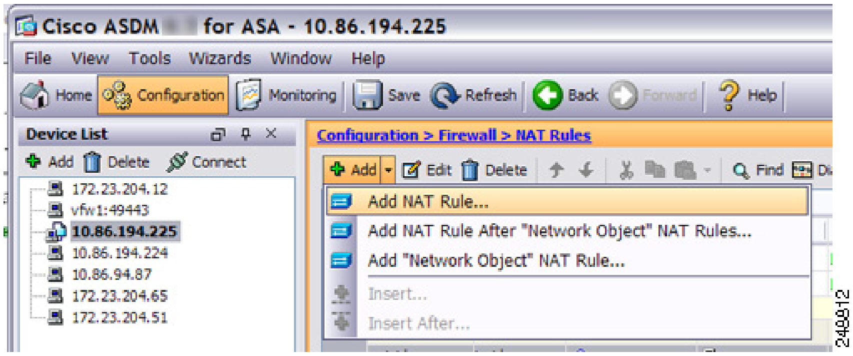
Source NAT Type: Dynamic PAT (Hide)
Source Address: PATaddress1
Destination Address: TelnetWebServer
☐ Fall through to interface PAT
Service: TelnetObj

Options

☑ Enable rule
☐ Translate DNS replies that match this rule
Direction: Both
Description:

Step 9 Click **OK** to add the rule to the NAT table.

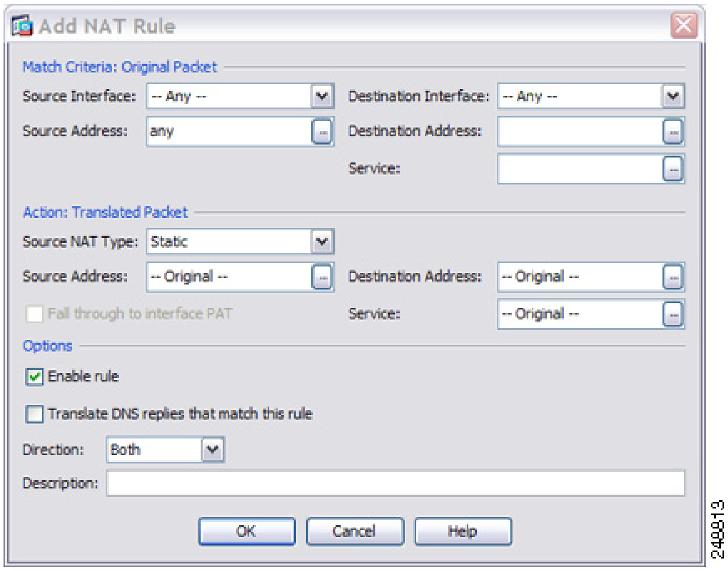
Step 10 Add a NAT rule for traffic from the inside network to the web server:



Cisco ASDM for ASA - 10.86.194.225
File View Tools Wizards Window Help
Home Configuration Monitoring Save Refresh Back Forward Help
Device List
Add Delete Connect
172.23.204.12
vfw1:49443
10.86.194.225
10.86.194.224
10.86.94.87
172.23.204.65
172.23.204.51
Configuration > Firewall > NAT Rules
Add Edit Delete Find
Add NAT Rule...
Add NAT Rule After "Network Object" NAT Rules...
Add "Network Object" NAT Rule...
Insert...
Insert After...
249812

By default, the NAT rule is added to the end of section 1. If you want to add a NAT rule to section 3, after the network object NAT rules, choose **Add NAT Rule After Network Object NAT Rules**.

The Add NAT Rule dialog box appears.



Add NAT Rule

Match Criteria: Original Packet

Source Interface: -- Any --
Destination Interface: -- Any --
Source Address: any
Destination Address:
Service:

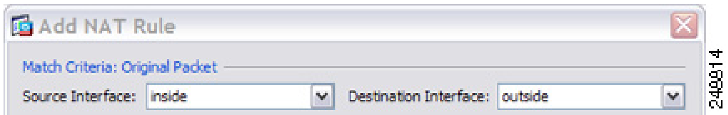
Action: Translated Packet

Source NAT Type: Static
Source Address: -- Original --
Destination Address: -- Original --
☐ Fall through to interface PAT
Service: -- Original --

Options

☑ Enable rule
☐ Translate DNS replies that match this rule
Direction: Both
Description:

Step 11 Set the real and mapped interfaces:



Add NAT Rule

Match Criteria: Original Packet

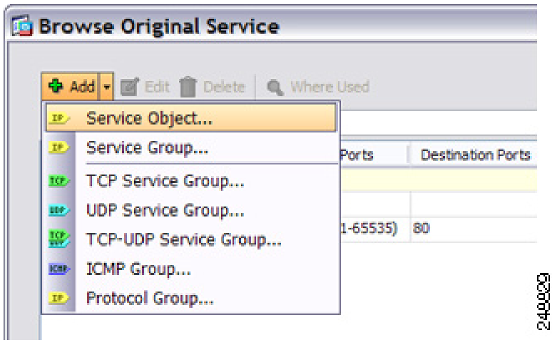
Source Interface: inside
Destination Interface: outside

Step 12 For the Original Source Address, type the name of the inside network object (myInsideNetwork) or click the browse button to choose it.

Step 13 For the Original Destination Address, type the name of the Telnet/web server network object (TelnetWebServer) or click the browse button to choose it.

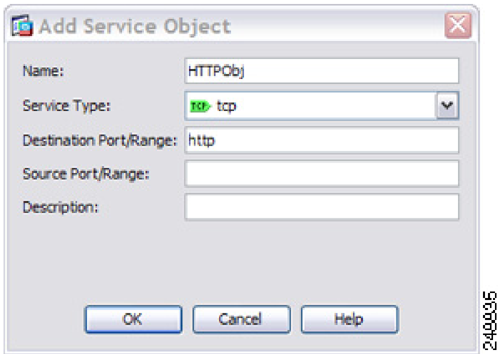
Step 14 For the Original Service, click the browse button to add a new service object for HTTP in the Browse Original Service dialog box.

a. Add the new service object.



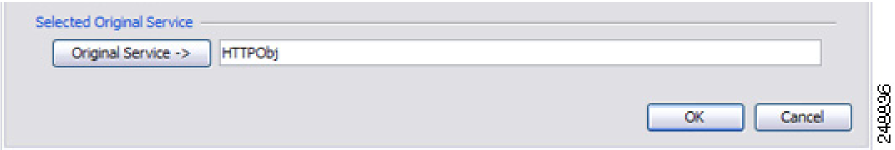
Browse Original Service

b. Define the protocol and port, and click **OK**.



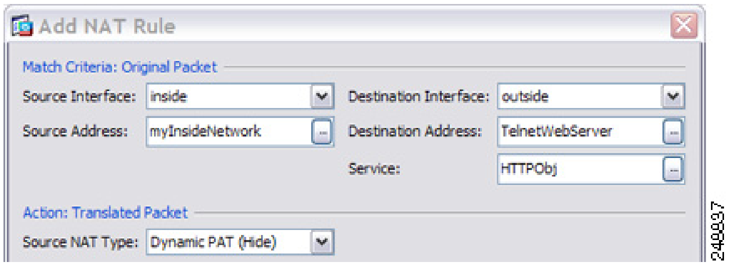
Name: HTTPObj
Service Type: tcp
Destination Port/Range: http
Source Port/Range:
Description:

c. Choose the new service object by double-clicking it. Click **OK** to return to the NAT configuration.



Original Service: HTTPObj

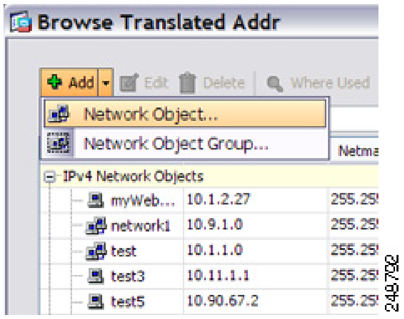
Step 15 Set the NAT Type to **Dynamic PAT (Hide)**:



Source Interface: inside
Destination Interface: outside
Source Address: myInsideNetwork
Destination Address: TelnetWebServer
Service: HTTPObj
Source NAT Type: Dynamic PAT (Hide)

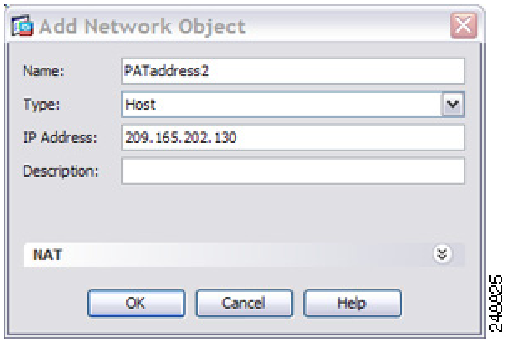
Step 16 For the Translated Source Address, click the browse button to add a new network object for the PAT address in the Browse Translated Source Address dialog box.

a. Add the new network object.



IPv4 Network Objects		Netma
myWeb...	10.1.2.27	255.25
network1	10.9.1.0	255.25
test	10.1.1.0	255.25
test3	10.11.1.1	255.25
test5	10.90.67.2	255.25

b. Define the PAT address, and click **OK**.



Add Network Object

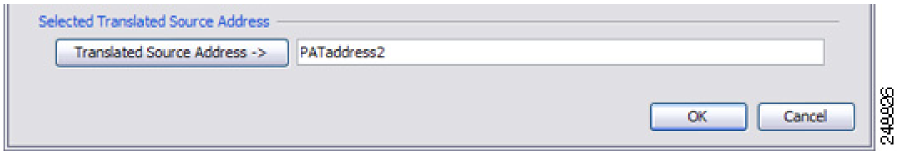
Name: PATaddress2

Type: Host

IP Address: 209.165.202.130

Description:

c. Choose the new network object by double-clicking it. Click **OK** to return to the NAT configuration.

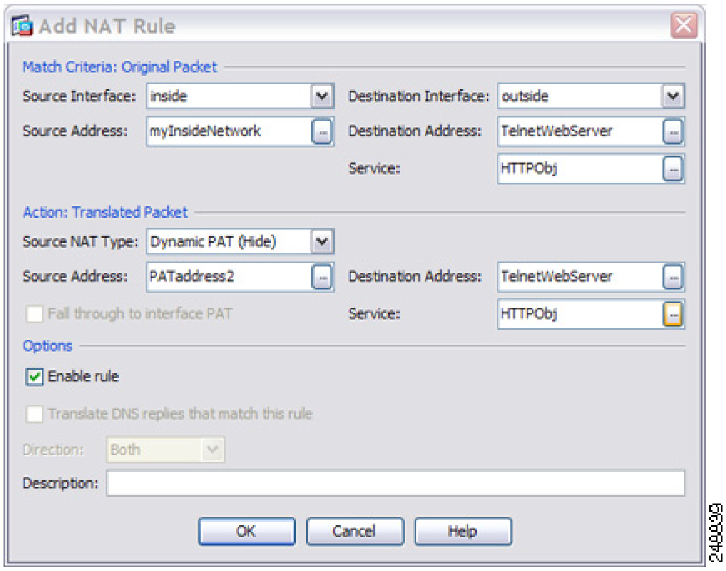


Selected Translated Source Address

Translated Source Address -> PATaddress2

Step 17 For the Translated Destination Address, type the name of the Original Destination Address (TelnetWebServer) or click the browse button to choose it.

Because you do not want to translate the destination address, you need to configure identity NAT for it by specifying the same address for the Original and Translated destination addresses.



Add NAT Rule

Match Criteria: Original Packet

Source Interface: inside

Destination Interface: outside

Source Address: myInsideNetwork

Destination Address: TelnetWebServer

Service: HTTPObj

Action: Translated Packet

Source NAT Type: Dynamic PAT (Hide)

Source Address: PATaddress2

Destination Address: TelnetWebServer

□ Fall through to interface PAT

Service: HTTPObj

Options

☑ Enable rule

□ Translate DNS replies that match this rule

Direction: Both

Description:

Step 18 Click **OK** to add the rule to the NAT table.

Step 19 Click **Apply**.

Feature History for Twice NAT

Table 34-1 lists each feature change and the platform release in which it was implemented. ASDM is backwards-compatible with multiple platform releases, so the specific ASDM release in which support was added is not listed.

Table 34-1 Feature History for Twice NAT

Feature Name	Platform Releases	Feature Information
Twice NAT	8.3(1)	Twice NAT lets you identify both the source and destination address in a single rule. We modified the following screen: Configuration > Firewall > NAT Rules.
Identity NAT configurable proxy ARP and route lookup	8.4(2)/8.5(1)	In earlier releases for identity NAT, proxy ARP was disabled, and a route lookup was always used to determine the egress interface. You could not configure these settings. In 8.4(2) and later, the default behavior for identity NAT was changed to match the behavior of other static NAT configurations: proxy ARP is enabled, and the NAT configuration determines the egress interface (if specified) by default. You can leave these settings as is, or you can enable or disable them discretely. Note that you can now also disable proxy ARP for regular static NAT. For pre-8.3 configurations, the migration of NAT exempt rules (the **nat 0 access-list** command) to 8.4(2) and later now includes the following keywords to disable proxy ARP and to use a route lookup: **no-proxy-arp** and **route-lookup**. The **unidirectional** keyword that was used for migrating to 8.3(2) and 8.4(1) is no longer used for migration. When upgrading to 8.4(2) from 8.3(1), 8.3(2), and 8.4(1), all identity NAT configurations will now include the **no-proxy-arp** and **route-lookup** keywords, to maintain existing functionality. The **unidirectional** keyword is removed. We modified the following screen: Configuration > Firewall > NAT Rules > Add/Edit NAT Rule
PAT pool and round robin address assignment	8.4(2)/8.5(1)	You can now specify a pool of PAT addresses instead of a single address. You can also optionally enable round-robin assignment of PAT addresses instead of first using all ports on a PAT address before using the next address in the pool. These features help prevent a large number of connections from a single PAT address from appearing to be part of a DoS attack and makes configuration of large numbers of PAT addresses easy. We modified the following screens: Configuration > Firewall > NAT Rules > Add/Edit NAT Rule.

Table 34-1 Feature History for Twice NAT (continued)

Feature Name	Platform Releases	Feature Information
Round robin PAT pool allocation uses the same IP address for existing hosts	8.4(3)	When using a PAT pool with round robin allocation, if a host has an existing connection, then subsequent connections from that host will use the same PAT IP address if ports are available. We did not modify any screens. *This feature is not available in 8.5(1) or 8.6(1).*
Flat range of PAT ports for a PAT pool	8.4(3)	If available, the real source port number is used for the mapped port. However, if the real port is *not* available, by default the mapped ports are chosen from the same range of ports as the real port number: 0 to 511, 512 to 1023, and 1024 to 65535. Therefore, ports below 1024 have only a small PAT pool. If you have a lot of traffic that uses the lower port ranges, when using a PAT pool, you can now specify a flat range of ports to be used instead of the three unequal-sized tiers: either 1024 to 65535, or 1 to 65535. We modified the following screens: Configuration > Firewall > NAT Rules > Add/Edit NAT Rule. *This feature is not available in 8.5(1) or 8.6(1).*
Extended PAT for a PAT pool	8.4(3)	Each PAT IP address allows up to 65535 ports. If 65535 ports do not provide enough translations, you can now enable extended PAT for a PAT pool. Extended PAT uses 65535 ports per *service*, as opposed to per IP address, by including the destination address and port in the translation information. We modified the following screens: Configuration > Firewall > NAT Rules > Add/Edit NAT Rule. *This feature is not available in 8.5(1) or 8.6(1).*

Table 34-1 Feature History for Twice NAT (continued)

Feature Name	Platform Releases	Feature Information
Automatic NAT rules to translate a VPN peer's local IP address back to the peer's real IP address	8.4(3)	In rare situations, you might want to use a VPN peer's real IP address on the inside network instead of an assigned local IP address. Normally with VPN, the peer is given an assigned local IP address to access the inside network. However, you might want to translate the local IP address back to the peer's real public IP address if, for example, your inside servers and network security is based on the peer's real IP address. You can enable this feature on one interface per tunnel group. Object NAT rules are dynamically added and deleted when the VPN session is established or disconnected. You can view the rules using the **show nat** command. **Note** Because of routing issues, we do not recommend using this feature unless you know you need this feature; contact Cisco TAC to confirm feature compatibility with your network. See the following limitations: • Only supports Cisco IPsec and AnyConnect Client. • Return traffic to the public IP addresses must be routed back to the ASA so the NAT policy and VPN policy can be applied. • Does not support load-balancing (because of routing issues). • Does not support roaming (public IP changing). ASDM does not support this command; enter the command using the Command Line Tool.
NAT support for IPv6	9.0(1)	NAT now supports IPv6 traffic, as well as translating between IPv4 and IPv6. Translating between IPv4 and IPv6 is not supported in transparent mode. We modified the following screen: Configuration > Firewall > NAT Rules.

Table 34-1 Feature History for Twice NAT (continued)

Feature Name	Platform Releases	Feature Information
NAT support for reverse DNS lookups	9.0(1)	NAT now supports translation of the DNS PTR record for reverse DNS lookups when using IPv4 NAT, IPv6 NAT, and NAT64 with DNS inspection enabled for the NAT rule.
Per-session PAT	9.0(1)	The per-session PAT feature improves the scalability of PAT and, for clustering, allows each member unit to own PAT connections; multi-session PAT connections have to be forwarded to and owned by the master unit. At the end of a per-session PAT session, the ASA sends a reset and immediately removes the xlate. This reset causes the end node to immediately release the connection, avoiding the TIME_WAIT state. Multi-session PAT, on the other hand, uses the PAT timeout, by default 30 seconds. For "hit-and-run" traffic, such as HTTP or HTTPS, the per-session feature can dramatically increase the connection rate supported by one address. Without the per-session feature, the maximum connection rate for one address for an IP protocol is approximately 2000 per second. With the per-session feature, the connection rate for one address for an IP protocol is 65535/*average-lifetime*. By default, all TCP traffic and UDP DNS traffic use a per-session PAT xlate. For traffic that requires multi-session PAT, such as H.323, SIP, or Skinny, you can disable per-session PAT by creating a per-session deny rule. We introduced the following screen: Configuration > Firewall > Advanced > Per-Session NAT Rules.