



Match-in-VRF Support for NAT

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The Match-in-VRF Support for NAT feature supports Network Address Translation (NAT) of packets that communicate between two hosts within the same VPN routing and forwarding (VRF) instance. In intra-VPN NAT, both the local and global address spaces for end hosts are isolated to their respective VPNs, and as a result, the translated addresses for the hosts overlap each other. The Match-in-VRF Support for NAT feature helps separate the address space for translated addresses among VPNs.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Restrictions for Match-in-VRF Support for NAT

The Match-in-VRF Support for NAT feature is not supported on interface overload configuration.

Information About Match-in-VRF Support for NAT



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Match-in-VRF Support for NAT

In Cisco IOS XE Release 3.5S and later releases, the Match-in-VRF Support for NAT feature supports NAT of packets that communicate between two hosts within the same VPN.

The VRF-aware NAT enables communication between hosts in the private address space in different VPN routing and forwarding (VRF) instances and common servers in the Internet or the global domain. Because IP addresses of the inside hosts overlap with each other, the VRF-aware NAT facilitates communication between these hosts by converting overlapped inside IP addresses into globally unique addresses. The Match-in-VRF Support for NAT feature extends VRF-aware NAT by supporting intra-VPN NAT capability. In the intra-VPN NAT, both the local and global address spaces for end hosts are isolated to their respective VPNs, and as a result translated addresses for hosts overlap each other. To separate the address space for translated addresses among VPNs, configure the **match-in-vrf** keyword in the NAT mapping (**ip nat inside source** command) configuration. Both static and dynamic NAT configurations support the **match-in-vrf** keyword.



Note

All NAT commands that support VRF support the **match-in-vrf** keyword. Because NAT outside rules (**ip nat outside source** command) support the match-in-VRF functionality by default, the **match-in-vrf** keyword is not supported by NAT outside rules.

In VRF-aware NAT, the IP alias and Address Resolution Protocol (ARP) entries for inside global addresses are configured in the global domain. For intra-VPN NAT, the IP alias and ARP entries for inside global addresses are configured in the VRF through which the translation happens. In intra-VPN NAT, configuration of the **match-in-vrf** keyword implies that at least one NAT outside interface is configured in the same VRF. The ARP entry in that VRF replies to the ARP request from the outside host.

If inside addresses are configured, the match-in-VRF is determined through inside mappings during the address translation of VRF traffic. If you have configured only outside mapping of IP addresses for address translations, the match-in-VRF will work. When a translation entry is created with both inside and outside mappings, the **match-in-vrf** keyword is determined by the inside mapping.

The Match-in-VRF Support for NAT feature supports the configuration of multiple dynamic mappings with the same IP address pool.

How to Configure Match-in-VRF Support for NAT

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Configuring Static NAT with Match-in-VRF

Perform the following task to configure a static NAT translation and to enable NAT inside and outside traffic in the same VRF.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip nat inside source static** *local-ip global-ip* [**vrf** *vrf-name* [**match-in-vrf**]]
4. **interface** *type number*
5. **ip address** *ip-address mask* [**secondary**]
6. **ip nat inside**
7. **ip vrf forwarding** *vrf-name*
8. **exit**
9. **interface** *type number*
10. **ip address** *ip-address mask*
11. **ip nat outside**
12. **ip vrf forwarding** *vrf-name*
13. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	ip nat inside source static <i>local-ip global-ip</i> [vrf <i>vrf-name</i> [match-in-vrf]] Example: Router(config)# ip nat inside source static 10.10.10.1 172.16.131.1 vrf vrf1 match-in-vrf	Establishes static translation between an inside local address and an inside global address. <ul style="list-style-type: none"> • The match-in-vrf keyword enables NAT inside and outside traffic in the same VRF.
Step 4	interface <i>type number</i> Example: Router(config)# interface gigabitethernet 0/0/1	Specifies an interface and enters interface configuration mode.

Command or Action	Purpose
<p>Step 5 <code>ip address ip-address mask [secondary]</code></p> <p>Example: Router(config-if)# ip address 10.114.11.39 255.255.255.0</p>	Sets a primary IP address for an interface.
<p>Step 6 <code>ip nat inside</code></p> <p>Example: Router(config-if)# ip nat inside</p>	Marks the interface as connected to the inside.
<p>Step 7 <code>ip vrf forwarding vrf-name</code></p> <p>Example: Router(config-if)# ip vrf forwarding vrf1</p>	Associates a VRF with an interface or subinterface.
<p>Step 8 <code>exit</code></p> <p>Example: Router(config-if)# exit</p>	Exits interface configuration mode and returns to global configuration mode.
<p>Step 9 <code>interface type number</code></p> <p>Example: Router(config)# interface gigabitethernet 0/0/0</p>	Specifies a different interface and enters interface configuration mode.
<p>Step 10 <code>ip address ip-address mask</code></p> <p>Example: Router(config-if)# ip address 172.31.232.182 255.255.255.240</p>	Sets a primary IP address for an interface.
<p>Step 11 <code>ip nat outside</code></p> <p>Example: Router(config-if)# ip nat outside</p>	Marks the interface as connected to the outside. Note NAT outside rules support the match-in-VRF functionality by default.
<p>Step 12 <code>ip vrf forwarding vrf-name</code></p> <p>Example: Router(config-if)# ip vrf forwarding vrf1</p>	Associates a VRF with an interface or subinterface.

	Command or Action	Purpose
Step 13	end Example: Router(config-if)# end	Exits interface configuration mode and returns to privileged EXEC mode.

Configuring Dynamic NAT with Match-in-VRF

Perform the following task to configure a dynamic NAT translation with the same address pool and to enable NAT inside and outside traffic in the same VRF.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip nat inside source list** *access-list-number* **pool** *pool-name* [**vrf** *vrf-name* [**match-in-vrf**]]
4. **access-list** *access-list-number* **permit source** [*source-wildcard*]
5. **ip nat inside source list** *access-list-number* **pool** *pool-name* **vrf** *vrf-name* [**match-in-vrf**]
6. **interface** *type number*
7. **ip address** *ip-address mask*
8. **ip nat inside**
9. **ip vrf forwarding** *vrf-name*
10. **exit**
11. **interface** *type number*
12. **ip address** *ip-address mask*
13. **ip nat outside**
14. **ip vrf forwarding** *vrf-name*
15. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.

Command or Action	Purpose
<p>Step 3 <code>ip nat inside source list <i>access-list-number</i> pool <i>pool-name</i> [<i>vrf vrf-name</i> [<i>match-in-vrf</i>]]</code></p> <p>Example: <pre>Router(config)# ip nat inside source list 1 pool shared-pool vrf vrf1 match-in-vrf</pre></p>	<p>Enables multiple dynamic mappings to be configured with the same address pool.</p> <ul style="list-style-type: none"> The match-in-vrf keyword enables NAT inside and outside traffic in the same VRF.
<p>Step 4 <code>access-list <i>access-list-number</i> permit source [<i>source-wildcard</i>]</code></p> <p>Example: <pre>Router(config)# access-list 1 permit 192.168.34.0 0.0.0.255</pre></p>	<p>Defines a standard access list permitting those addresses that are to be translated.</p>
<p>Step 5 <code>ip nat inside source list <i>access-list-number</i> pool <i>pool-name</i> vrf <i>vrf-name</i> [<i>match-in-vrf</i>]</code></p> <p>Example: <pre>Router(config)# ip nat inside source list 1 pool shared-pool vrf vpn1</pre></p>	<p>Establishes dynamic source translation, specifying the access list defined in the previous step.</p>
<p>Step 6 <code>interface <i>type number</i></code></p> <p>Example: <pre>Router(config)# interface gigabitethernet 0/0/1</pre></p>	<p>Specifies an interface and enters interface configuration mode.</p>
<p>Step 7 <code>ip address <i>ip-address mask</i></code></p> <p>Example: <pre>Router(config-if)# ip address 172.31.232.182 255.255.255.240</pre></p>	<p>Sets a primary IP address for an interface.</p>
<p>Step 8 <code>ip nat inside</code></p> <p>Example: <pre>Router(config-if)# ip nat inside</pre></p>	<p>Marks the interface as connected to the inside.</p>
<p>Step 9 <code>ip vrf forwarding <i>vrf-name</i></code></p> <p>Example: <pre>Router(config-if)# ip vrf forwarding vpn1</pre></p>	<p>Associates a VRF with an interface or subinterface.</p>

	Command or Action	Purpose
Step 10	exit Example: Router(config-if)# exit	Exits interface configuration mode and returns to global configuration mode.
Step 11	interface type number Example: Router(config)# interface gigabitethernet 0/0/0	Specifies a different interface and enters interface configuration mode.
Step 12	ip address ip-address mask Example: Router(config-if)# ip address 172.31.232.182 255.255.255.240	Sets a primary IP address for an interface.
Step 13	ip nat outside Example: Router(config-if)# ip nat outside	Marks the interface as connected to the outside. Note NAT outside rules support the match-in-VRF functionality by default.
Step 14	ip vrf forwarding vrf-name Example: Router(config-if)# ip vrf forwarding vpn1	Associates a VRF with an interface or subinterface.
Step 15	end Example: Router(config-if)# end	Exits interface configuration mode and returns to global configuration mode.

Configuration Examples for Match-in-VRF Support for NAT

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- [Example: Configuring Dynamic NAT with Match-in-VRF, page 8](#)

Example: Configuring Static NAT with Match-in-VRF

The following example shows how to configure a static NAT translation between the local IP address 10.10.10.1 and the global IP address 172.16.131.1. The **match-in-vrf** keyword enables NAT inside and outside traffic in the same VRF.

```
Router# configure terminal
Router(config)# ip nat inside source static 10.10.10.1 172.16.131.1 vrf vrf1 match-in-vrf
```

```

Router(config)# interface gigabitethernet 0/0/1
Router(config-if)# ip address 10.114.11.39 255.255.255.0
Router(config-if)# ip nat inside
Router(config-if)# ip vrf forwarding vrf1
Router(config-if)# exit
Router(config)# interface gigabitethernet 0/0/0
Router(config-if)# ip address 172.31.232.182 255.255.255.240
Router(config-if)# ip nat outside
Router(config-if)# ip vrf forwarding vrf1
Router(config-if)# end

```

Example: Configuring Dynamic NAT with Match-in-VRF

The following example shows how to configure dynamic NAT mappings with the same address pool. The **match-in-vrf** keyword enables NAT inside and outside traffic in the same VRF.

```

Router# configure terminal
Router(config)# ip nat inside source list 1 pool shared-pool vrf vrf1 match-in-vrf
Router(config)# access-list 1 permit 192.168.34.0 0.0.0.255
Router(config)# ip nat inside source list 1 pool shared-pool vrf vpn1
Router(config)# interface gigabitethernet 0/0/1
Router(config-if)# ip address 172.31.232.182 255.255.255.240
Router(config-if)# ip nat inside
Router(config-if)# ip vrf forwarding vpn1
Router(config-if)# exit
Router(config)# interface gigabitethernet 0/0/0
Router(config-if)# ip address 172.31.232.182 255.255.255.240
Router(config-if)# ip nat outside
Router(config-if)# ip vrf forwarding vpn1
Router(config-if)# end

```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
NAT commands	Cisco IOS IP Addressing Services Command Reference
NAT for IP Address Conservation	“Configuring NAT for IP Address Conservation” module

Standards and RFCs

Standard/RFC	Title
No new or modified standards are supported by this -- feature, and support for existing standards has not been modified by this feature.	

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

Technical Assistance

Description	Link
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Feature Information for Match-in-VRF Support for NAT

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 1 Feature Information for Match-in-VRF Support for NAT

Feature Name	Releases	Feature Information
Match-in-VRF Support for NAT	Cisco IOS XE Release 3.5S	The Match-in-VRF Support for NAT feature supports the NAT translation of packets that communicate between two hosts within the same VPN.

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