

Virtual Routing for Firepower Threat Defense

This chapter describes underlying concepts about virtual routers and on how virtual routing behaves within the Firepower Threat Defense.

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About Virtual Routers and Virtual Routing and Forwarding (VRF)

You can create multiple virtual routers to maintain separate routing tables for groups of interfaces. Because each virtual router has its own routing table, you can provide clean separation in the traffic flowing through the device.

Thus, you can provide support to two or more distinct customers over a common set of networking equipment. You can also use virtual routers to provide more separation for elements of your own network, for example, by isolating a development network from your general purpose corporate network.

Virtual routers implement the “light” version of Virtual Routing and Forwarding, or VRF-Lite, which does not support Multiprotocol Extensions for BGP (MBGP).

When you create a virtual router, you assign interfaces to the router. You can assign a given interface to one, and only one, virtual router. You would then define static routes, and configure routing protocols such as OSPF or BGP, for each virtual router. You would also configure separate routing processes over your entire network, so that routing tables on all participating devices are using the same per-virtual-router routing process and tables. Using virtual routers, you create logically-separated networks over the same physical network to ensure the privacy of the traffic that runs through each virtual router.

Because the routing tables are separate, you can use the same, or overlapping, address spaces across the virtual routers. For example, you could use the 192.168.1.0/24 address space for two separate virtual routers, supported by two separate physical interfaces.

Note that there are separate management and data routing tables per virtual router. For example, if you assign a management-only interface to a virtual router, then the routing table for that interface is separate from the data interfaces assigned to the virtual router.

Applications of Virtual Routers

You can use virtual routers to isolate network on shared resources and/or to isolate networks with common security policy. Thus, virtual routers help you to achieve:

- Traffic separation for customers through dedicated routing tables for each customer or for different departments.
- Common security policy management for different departments or networks.
- Shared internet access for different departments or network.

Global and User-Defined Virtual Routers

Global Virtual Routers

For a device with virtual routing capability, system creates a global virtual router by default. The system assigns all interfaces in your network to the global virtual router. A routed interface can belong to either a user-defined virtual router or a global virtual router. When you upgrade an FTD device to a version which has virtual router capability, all its existing routing configuration becomes part of the global virtual router.

User-Defined Virtual Routers

A user-defined virtual router is the one defined by you. You can create more than one virtual router on a device. However, anytime, an interface can be assigned to only one user-defined virtual router. While some of the device features are supported on user-defined virtual routers, few of the features are supported only on the global virtual routers.

Supported Features and Monitoring Policies

You can configure the following features on the global virtual router only:

- OSPFv3
- RIP
- EIGRP
- IS-IS
- BGPv6
- Multicast Routing
- Policy Based Routing (PBR)
- VPN

EIGRP, ISIS, and PBR are supported through Flex Config in FMC (see Predefined FlexConfig Objects). Configure only global virtual router interfaces for these features.

DHCP server auto-configuration uses WINS/DNS server that is learned from an interface. This interface can only be a global virtual router interface.

You can configure the following features separately for each user-defined virtual router:

- Static routes and their SLA monitors
- OSPFv2
- BGPv4
- Integrated Routing and Bridging (IRB)
- SNMP

Following features are used by the system when querying or communicating with the remote system (from-the-box traffic). These features use interfaces in the global virtual router only. That means, if you configure an interface for the feature, it must belong to the global virtual router. As a rule, anytime, if the system must look up a route to reach an external server for its own management purposes, it does the route lookup in the global virtual router.

- DNS server when used to resolve fully qualified names used in access control rules, or for resolving names for the **ping** command. If you specify **any** as the interface for a DNS server, the system considers interfaces in the global virtual router only.
- AAA server or identity realm when used with VPN. You can configure VPN on interfaces in the global virtual router only. Thus, the external AAA servers that are used for VPN, such as Active Directory, must be reachable through an interface in the global virtual router.
- Syslog server.

Configuring Policies to be Virtual-Router-Aware

When you create a virtual router, the routing table for that virtual router is automatically separated from the global virtual router or any other virtual router. However, security policies are not automatically virtual-router-aware.

For example, if you write an access control rule that applies to “any” source or destination security zone, then the rule will apply to all interfaces across all virtual routers. This might in fact be exactly what you want. For example, all of your customers might want to block access to the same list of objectionable URL categories.

But, if you need to apply a policy to one of the virtual routers but not others, you need to create security zones that contain interfaces from that single virtual router only. Then, use the virtual-router-constrained security zones in the source and destination criteria of the security policy.

By using security zones whose memberships are constrained to the interfaces assigned to a single virtual router, you can write virtual-router-aware rules in the following policies:

- Access control policy.
- Intrusion and file policies.
- SSL decryption policy.
- Identity policy and user-to-IP address mappings. If you use overlapping address spaces in virtual routers, ensure that you create separate realms for each virtual router and apply them correctly in the identity policy rules.

If you use overlapping address spaces in your virtual routers, you should use security zones to ensure that the right policies get applied. For example, if you use the 192.168.1.0/24 address space in two separate virtual routers, an access control rule that simply specifies the 192.168.1.0/24 network will apply to traffic in both virtual routers. If that is not the desired outcome, you can limit the application of the rule by also specifying the source/destination security zones for just one of the virtual routers.

Interconnecting Virtual Routers

You can configure static routes to route traffic between virtual routers.

For example, if you have the outside interface in the global virtual router, you can set up static default routes in each of the other virtual routers to send traffic to the outside interface. Then, any traffic that cannot be routed within a given virtual router gets sent to the global router for subsequent routing.

Static routes between virtual routers are known as route leaks, because you are leaking traffic to a different virtual router. When you are leaking routes, say, VR1 routes to VR2, you can initiate connections from VR2 to VR1 only. For traffic to flow from VR1 to VR2, you must configure the reverse route. When you create a static route to an interface in another virtual router, you do not need to specify a gateway address. Simply select the destination interface.

For inter-virtual-router routes, the system does destination interface look-up in the source virtual router. Then, it looks up the MAC address of the next hop in the destination virtual router. Thus, the destination virtual router must have either a dynamic (learned) or static route for the selected interface for the destination address.

Configuring NAT rules that use source and destination interfaces in different virtual routers can also allow traffic to route between virtual routers. If you do not select the option for NAT to do a route lookup, the rule will simply send traffic out the destination interface with a NATed address whenever destination translation happens. However, the destination virtual router should have a route for the translated destination IP address so that next-hop lookup can succeed.

Though NAT rule leaks traffic from one virtual router to another, to ensure correct routing, we recommend that you configure a static route leak between these virtual routers for the translated traffic. Without the route leak, sometimes the rule may not match the traffic you expect it to match, and the translation may not be applied.

Virtual routing does not support a cascading or chain of route leaks. For example, assume that your Firepower Threat Defense has VR1, VR2, and VR3 virtual routers; VR3 is directly connected to a network - 10.1.1.0/24. Now, assume you configure a route leak in VR1 for network 10.1.1.0/24 through interface in VR2 and in VR2 define a route leak for 10.1.1.0/24 through VR3. This chain of route leaks will not allow traffic to hop from VR1 to VR2 and then exit from VR3. In case of route leaks, the route lookups first determine egress interface from input Virtual Router’s routing table and then looks at the output of Virtual Router’s routing table for next hop lookup. From both the lookups, egress interface should match. In our example, the egress interfaces will not be the same and hence the traffic does not pass through.

Use static inter VRF route with caution when the destination network is not a direct-connected subnet of the upstream (outgoing) VR. For example, assume two VRs - VR1 and VR2. While VR1 handles the outgoing traffic which gets the default route from its external peer through BGP or any dynamic routing protocol, and VR2 handles the incoming traffic which is configured with static inter VRF default route with VR1 as the next-hop. When VR1 loses the default route from its peer, VR2 will not able to detect that its upstream (outgoing) VR lost the default route and the traffic is still sent toward VR1 which will eventually get dropped without notifications.

Overlapping IP Addresses

Virtual router creates multiple instances of routing tables that are independent, thereby, the same or overlapping IP addresses can be used without conflicts. FTD allows the same network to be part of two or more virtual routers. This involves multiple policies to be applied at the interface or at the virtual router level.

Other than few exceptions, the routing functions and most of the NGFW and IPS capability does not get impacted by the overlapping IP addresses. The following section describes the features that have limitations with overlapping IP addresses and the suggestions or recommendations to overcome them.

Limitations with Overlapping IP Addresses

When using an overlapping IP address in multiple virtual routers, to ensure proper application of the policy, you have to modify policies or rules for some of the features. Such features require you to use more specific interface either by splitting existing security zone or using new interface group as the need be.

Following features need modification for its proper functioning with an overlapping IP address:

- Network Map—Modify the network discovery policy to exclude some overlapping IP segments to ensure that there is no overlapping IP address being mapped.
- Identity Policy—The identity feed source cannot differentiate among virtual routers; to overcome this limitation, map overlapping address spaces or virtual routers in different realms.

For the following features, you need to apply rules on specific interfaces to ensure that different policies are applied on overlapping IP segments:

- Access Policy
- Prefilter Policy
- QoS/Rate Limit
- SSL Policy

Unsupported Features with Overlapping IP Addresses

- ISE SGT-based Rule in AC Policy—The static security group tag (SGT) to IP address mappings downloaded from Cisco Identity Services Engine (ISE) are not virtual-router-aware. Set up separate ISE systems per virtual router if you need to create different SGT mappings per virtual router. This is not necessary if you intend to map the same IP addresses to the same SGT number in each virtual router.
- Overlapping DHCP server pools are not supported across virtual routers.
- Events and Analytics—Many of the FMC analytics are dependent on network map and identity mappings which cannot differentiate if the same IP address belongs to two different end hosts. Hence, these analytics are not accurate when there are overlapping IP segments existing in same device but different virtual routers.

Configuring SNMP on User-Defined Virtual Routers

In addition to supporting SNMP on the management interface and Global virtual router data interfaces, Firepower Threat Defense now allows you to configure SNMP host on user-defined virtual routers.

Configuring an SNMP host on user-defined virtual routers includes the following process:

1. Configure device interfaces.
2. Configure virtual router on an interface.
3. Configure SNMP hosts on a virtual router interface.



Note SNMP is not virtual router-aware. Hence, while configuring SNMP server on the user-defined virtual router, ensure that the network address is not an overlapping IP address.

4. Deploy configurations to Firepower Threat Defense. On successful deployment, the-SNMP polling and traps are sent to the Network Management Station through the virtual router interface.

Maximum Number of Virtual Routers By Device Model

The maximum number of virtual routers you can create depends on the device model. The following table provides the maximum limits. You can double-check on your system by entering the **show vrf counters** command, which shows the maximum number of user-defined virtual routers for that platform not including the global virtual router. The numbers in the table below include user and global routers. For the Firepower 4100/9300, these numbers apply to native mode.

For platforms that support multi-instance capability, such as the Firepower 4100/9300, determine the maximum number of virtual routers per container instance by dividing the maximum virtual routers by the number of cores on the device, and then multiplying by the number of cores assigned to the instance, rounding down to the nearest whole number. For example, if the platform supports a maximum of 100 virtual routers, and it has 70 cores, then each core would support a maximum of 1.43 virtual routers (rounded). Thus, an instance assigned 6 cores would support 8.58 virtual routers, which rounds down to 8, and an instance assigned 10 cores would support 14.3 virtual routers (rounding down, 14).

Device Model	Maximum Virtual Routers
ASA 5508-X ASA 5516-X	10
Firepower 1010	Virtual routers are not supported on this model.
Firepower 1120	5
Firepower 1140	10
Firepower 1150	10
Firepower 2110	10
Firepower 2120	20
Firepower 2130	30
Firepower 2140	40
Firepower 4110	60

Device Model	Maximum Virtual Routers
Firepower 4112	60
Firepower 4115	80
Firepower 4120	80
Firepower 4125	100
Firepower 4140	100
Firepower 4145	100
Firepower 4150	100
Firepower 9300 appliance, all models	100
Firewall Threat Defense Virtual, all platforms	30
ISA 3000	10

Related Topics

Requirements and Prerequisites for Container Instances

Requirements and Prerequisites for Virtual Routers

Model support

Firewall Threat Defense

Supported domains

Any

User roles

Admin

Network Admin

Security Approver

Guidelines and Limitations for Virtual Routers

Firewall Mode Guidelines

Virtual routers are supported on routed firewall mode only.

Device Guidelines

- Virtual routers are supported only on routed Firepower Threat Defense devices of version 6.6 and higher. Though Firepower Management Center release 6.6 supports FTD versions earlier than 6.6, you cannot enable virtual routers on such devices.

Interface Guidelines

- You can assign an interface to only one virtual router.
- A virtual router can have any number of interfaces that are assigned to it.
- Only routed interfaces with logical names can be assigned to a user-defined virtual router.
- Named BVIs can also be assigned to a user-defined router and are supported by IRB in virtual routing.
- If you want to change a virtual router interface to a non-routed mode, remove the interface from the virtual router, and then change its mode.
- You can assign an interface to a virtual router, either from a global virtual router or from another user-defined virtual router.
- The following interfaces cannot be assigned to an user-defined virtual router:
  - Diagnostic interfaces.
  - Members of EtherChannel.
  - Members of Redundant interfaces.
  - Members of BVI.
  - VTIs.
- VTI is supported only in global virtual router. The tunnel source of VTI interface should also belong to the global virtual router.
- If a route using the interface that is being moved or its virtual router is deleted, exist in source or destination virtual router table, remove the routes before the interface movement or virtual router deletion.
- As separate routing tables are maintained for each virtual router, when an interface is moved from one virtual router to another virtual router, be it global or user-defined, the system removes the IP address configured on the interface temporarily. All existing connections on the interface are terminated. Thus, moving interfaces between virtual routers have drastic effect on the network traffic. Hence take precautionary measures before you move interfaces.

Global Virtual Router Guidelines

- The interfaces which are named and not part of other virtual routers, are part of the global virtual router.
- You cannot remove routed interfaces from global virtual router.
- You cannot modify global virtual router.
- Generally, after configuring interfaces, if you un-register and register back to same or another FMC, interface configuration is imported back from device. With virtual router support, there is a restriction—the IP address for only global virtual router interfaces is retained.

Additional Guidelines

- Security Intelligence Policy—The Security Intelligence policy is not virtual-router-aware. If you add an IP address, URL, or DNS name to the block list, it is blocked for all virtual routers. This limitation is applicable on the interface having security zones.
- NAT Rules—Do not mix interfaces in NAT rules. In virtual routing, if the specified source and destination interface objects (interface groups or security zones) have interfaces that belong to different virtual routers, the NAT rule diverts traffic from one virtual router through another virtual router. The NAT does the route lookup in the virtual router table for the inbound interface only. If necessary, define static routes in the source virtual router for the destination interface. If you leave the interface as **any**, the rule applies to all interfaces regardless of virtual router membership.
- DHCP Relay—Interconnecting virtual routers for DHCP relay is not supported. For example, if DHCP relay client is enabled on VR1 interface and DHCP relay server is enabled on VR2 interface, the DHCP requests will not be forwarded outside of VR2 interface.
- Recreating a deleted virtual router—When you recreate a virtual router that was deleted less than 10 seconds earlier, an error message appears stating that deletion of the virtual router is in progress. If you want to recreate a deleted virtual router successively, use a different name for the new virtual router.

Modifications to FMC Web Interface - Routing Page

Devices earlier to FTD 6.6 and few device models are not supported with virtual routing capability. The FMC web interface displays the same Routing page of FMC 6.5 or earlier version for such nonsupported devices. To know the supported devices and platform for virtual routing, see Supported Device Models.

You can configure virtual routers in the routing page of a supported device:

1. Navigate to **Devices** > **Device Management** and edit the virtual-router-aware device.
2. Click **Routing** to enter the virtual routers page.

For devices using virtual routing, the left pane of the Routing page displays the following:

- **Manage Virtual Routers**—allows you to create and manage virtual routers.
- List of virtual routing protocols—lists routing protocols that you can configure for the virtual routers.
- **General Settings**—allows you to configure BGP general settings that are applicable for all the virtual routers. Select the **Enable BGP** check box in order to define other BGP settings. To configure other BGP settings for a virtual router, navigate to **BGP** in the virtual routing protocols .

Manage Virtual Routers Page

When you click **Manage Virtual Routers** on the Virtual Routers pane, the Manage Virtual Routers page appears. This page displays the existing virtual routers on the device and the associated interfaces. In this page, you can **Add Virtual Router** (+) to the device. You can also **Edit** (✎) and **Delete** (🗑) user-defined virtual routers. You cannot edit or remove a global virtual router. You can only **View** (👁) the details of a global virtual router.

Create a Virtual Router

Procedure

Step 1 Choose **Devices** > **Device Management**, and edit the FTD device.

Step 2 Click **Routing**.

Step 3 Click **Manage Virtual Routers**.

Step 4 Click **Add Virtual Router** (+).

Step 5 In the Add Virtual Router box, enter a name and description for the virtual router.

Note
If you are creating a virtual router that was deleted less than 10 seconds earlier, an error message appears stating that deletion of the virtual router is in progress. If you want to create a deleted virtual router successively, use a different name for the new virtual router.

Step 6 Click **Ok**.

The Routing page appears, displaying the newly created virtual router page.

What to do next

- Configure a Virtual Router.

Configure a Virtual Router

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	N/A	Firepower Threat Defense and FTDv	Any	Admin/Network Admin/Security Approver

You can assign interfaces to a user-defined virtual router and configure the routing policies for the device. Though you cannot manually add or remove interfaces for a global virtual router, you can configure the routing policies for the device interfaces.

Before you begin

- To configure routing policies for a user-defined virtual router, add a router. See Create a Virtual Router, on page 10.
- All routing configuration settings of a non-VRF capable device are also available for a global virtual router. For information on the settings, see Routing Settings.
- Only limited routing protocols are supported for a user-defined virtual router.

Procedure

Step 1 From the **Devices** > **Device Management** page, edit the virtual-router supported device. Navigate to **Routing**. For information on the modifications to the routing page, see Modifications to FMC Web Interface - Routing Page, on page 9.

Step 2 From the drop-down list, select the desired virtual router.

Step 3 In the **Virtual Router Properties** page, you can modify the description.

Step 4 To add interfaces, select the interface under the **Available Interfaces** box, and then click **Add**.

Remember the following:

- Only interfaces with a logical name are listed under the **Available Interfaces** box. You can edit the interface and provide a logical name in **Interfaces**. Remember to save the changes for the settings to take effect.
- Only interfaces of global virtual routers are available for assigning. In other words, the **Available Interfaces** box lists only interfaces that are not assigned to any other user-defined virtual routers.

  You can assign physical interfaces, subinterfaces, redundant interfaces, bridge groups, and EtherChannels to a virtual router, but not their member interfaces. Because the member interfaces cannot be named, they cannot be used in virtual routing.

  You can assign the diagnostic interface and VTIs to the global virtual router only. You must ensure that the tunnel source of the VTI interface should also belong to the global virtual router.

Step 5 To save the settings, click **Save**.

Step 6 To configure the routing policy for the virtual router, click the respective names to open the corresponding settings page:

- **OSPF**—Only OSPFv2 is supported on the user-defined virtual router. All other settings for OSPFv2 are as applicable as for a non-virtual-router-aware interface, except that **Interface** allows you to select only the interfaces of the virtual router that you are configuring. You can define the OSPFv3 and OSPFv2 routing policies for a global virtual router. For information on the OSPF settings, see OSPF for Firepower Threat Defense.
- **RIP**—You can configure RIP routing policies only for a global virtual router. For information on RIP settings, see RIP for Firepower Threat Defense.
- **BGP**—This page displays the BGP general settings that you have configured in **Settings**:
  - You cannot modify any of those general settings on this page, except for the router ID settings. You can override the router ID settings that were defined in the **Settings** page by editing them on this page.
  - To configure other BGP IPv4 or IPv6 settings, you must enable the BGP option in **BGP** page under **General Settings**.
  - Only BGP configuration with an IPv4 address family is supported for a user-defined virtual router.

  For information on configuring BGP settings, see BGP for Firepower Threat Defense.
- **Static Route**—Use this setting to define where to send traffic for a specific destination network. You can also use this setting to create an inter-virtual router static route. You can create a leak of connected

or static route by using the interfaces of user-defined or global virtual routers. **FMC prefixes** to an interface to indicate that it is belonging to another virtual router and can be used for a route leak. For the route leak to be successful, do not specify next hop gateway.

The Static Route table displays the virtual router whose interface is used for a route leak in the **Leaked from Virtual Router** column. If it is not a route leak, the column displays N/A.

Irrespective of which virtual router the static route belongs, a Null0 interface is listed along with the interfaces of the same virtual router to which the static route belongs.

For information on static route settings, see Static and Default Routes for Firepower Threat Defense.

- **Multicast**—You can configure multicast routing policies only for a global virtual router. For information on multicast settings, see Multicast Routing for Firepower Threat Defense.

Step 7 To save the settings, click **Save**.

What to do next

- Modify a virtual router.
- Remove a virtual router.

Modify a Virtual Router

You can modify the description and other routing policies of a virtual router.

Procedure

Step 1 Choose **Devices** > **Device Management**, and edit the FTD device.

Step 2 Click **Routing**.

Step 3 Click **Manage Virtual Routers**.

All virtual routers along with the assigned interfaces are displayed in the **Virtual Routers** page.

Step 4 To modify a virtual router, click **Edit** ( ) against the desired virtual router.

Note
You cannot modify the general settings of the global virtual router. Hence, edit is not available for the global router; instead a **View** ( ) is provided to view the settings.

Step 5 To save the changes, click **Save**.

What to do next

- Remove a virtual router.

Remove Virtual Routers

Before you begin

- You cannot delete the Global virtual router. Hence, the delete option is not available for the Global virtual router.
- You can remove multiple virtual routers at a time.
- All the routing policies of the deleted virtual router are also deleted.
- All the interfaces of the deleted virtual router move to the global virtual router.
- If there are any restrictions on the movement of interfaces, such as overlapping IPs, route conflicts, and so on, you can remove the router only after resolving the conflicts.

Procedure

Step 1 Choose **Devices** > **Device Management**, and edit the FTD device.

Step 2 Click **Routing**.

Step 3 Click **Manage Virtual Routers**.

All virtual routers along with the mapped interfaces are displayed in the **Virtual Routers** page.

Step 4 To remove a virtual router, click **Delete** ( ) against the desired virtual router.

Step 5 To remove multiple routers, holding the CTRL key, click the virtual routers that you want to delete. Right-click, and then click **Delete**.

Step 6 To save the changes, click **Save**.

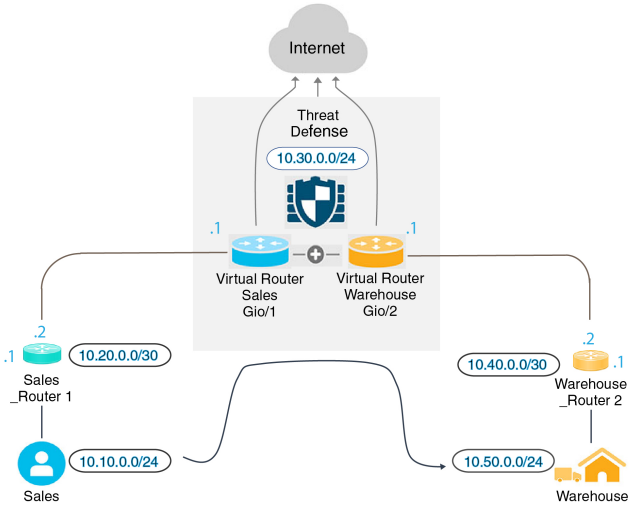
Configuration Examples for Virtual Routers

How to Route to a Distant Server through Virtual Routers

In virtual routing, you can create multiple virtual routers to maintain separate routing tables for groups of interfaces, thereby achieve network separation. In some scenarios, you may need to access a server that is reachable only through a separate virtual router. This example provides the procedure that interconnects virtual routers to reach to a host that is multiple hops away.

Consider an example, where a member of the sales department of a garment company wants to look up at the stock maintained by the warehousing department of its factory unit. In a virtual routing environment, you need to leak route between virtual routers where destination (warehousing department) is multiple hops away from sales department. This route leaking is done by adding multihop route leak, where, you configure a static route in Sales virtual router(source) to an interface in Warehouse virtual router (destination). As the destination network is multi-hop away, you also need to configure the Warehouse virtual router with the route to the destination network, namely 10.50.0.0/24.

Figure 1: Interconnecting Two Virtual Routers - An Example



Before you begin

This example assumes that you have already configured Sales_Router1 to route traffic from 10.20.0.1/30 interface to 10.50.0.5/24.

Procedure

Step 1 Configure the inside interface (Gi0/1) of the device to be assigned to Sales virtual router:

a) Choose **Devices** > **Device Management** > **Interfaces**.

b) Edit the Gi0/1 interface:

- **Name**—For this example, VR-Sales.
- Select the **Enabled** checkbox.
- In **IPV4**, for **IP Type**, choose **Use Static IP**.
- **IP Address**—Enter 10.30.0.1/24.

c) Click **Ok**.

d) Click **Save**.

Step 2 Configure the inside interface (Gi0/2) of the device to be assigned to Warehouse virtual router:

a) Choose **Devices** > **Device Management** > **Interfaces**.

b) Edit the Gi0/2 interface:

- **Name**—For this example, VR-Warehouse.
- Select the **Enabled** checkbox.
- In **IPV4**, for **IP Type**, choose **Use Static IP**.
- **IP Address**—Leave it blank. The system does not allow you to configure interfaces with same IP address (10.30.0.1/24), as you are yet to create user-defined virtual routers.

c) Click **Ok**.
d) Click **Save**.

Step 3 Create Sales and Warehouse virtual routers and assign their interfaces:

a) Choose **Devices** > **Device Management**, and edit the Firepower Threat Defense device.
b) Choose **Routing** > **Manage Virtual Routers**.
c) Click **Add Virtual Router** and create Sales.
d) Click **Add Virtual Router** and create Warehouse.
e) Select Sales from virtual router drop-down, in **Virtual Router Properties**, add VR-Sales as **Selected Interface** and save.
f) Select Warehouse from virtual router drop-down, in **Virtual Router Properties**, add VR-Warehouse as **Selected Interface** and save.

Step 4 Revisit the VR-Warehouse interface configuration:

a) Choose **Devices** > **Device Management** > **Interfaces**.
b) Click **Edit** against VR-Warehouse interface. Specify the IP Address as 10.30.0.1/24. The system now allows you to configure with same IP address of VR-Sales, because the interfaces are seperately assigned to two different virtual routers.
c) Click **Ok**.
d) Click **Save**.

Step 5 Create network objects for the warehouse server—10.50.0.0/24, and for the warehouse gateway— 10.40.0.2/30:

a) Choose **Object** > **Object Management**.
b) Choose **Add Network** > **Add Object**:

- **Name**—For this example, Warehouse-Server.
- **Network**—Click Network and enter 10.50.0.0/24.

c) Click **Save**.
d) Choose **Add Network** > **Add Object**:

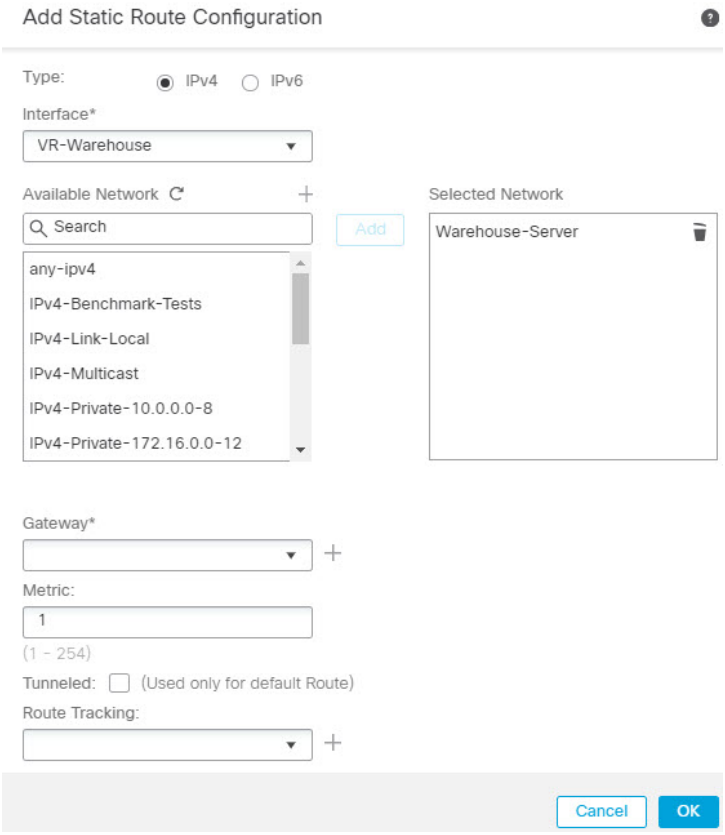
- **Name**—For this example, Warehouse-Gateway.
- **Network**—Click Host and enter 10.40.0.2.

e) Click **Save**.

Step 6 Define the route leak in Sales that points to the VR-Warehouse interface:

a) Choose **Devices** > **Device Management**, and edit the Firepower Threat Defense device.
b) Choose **Routing**.
c) Choose Sales virtual router from the drop-down, and then click **Static Route**.
d) Click **Add Route**. In **Add Static Route Configuration**, specify the following:

- **Interface**—Select VR-Warehouse.
- **Network**—Select the Warehouse-Server object.
- **Gateway**—Leave it blank. When leaking a route into another virtual router, do not select the gateway.

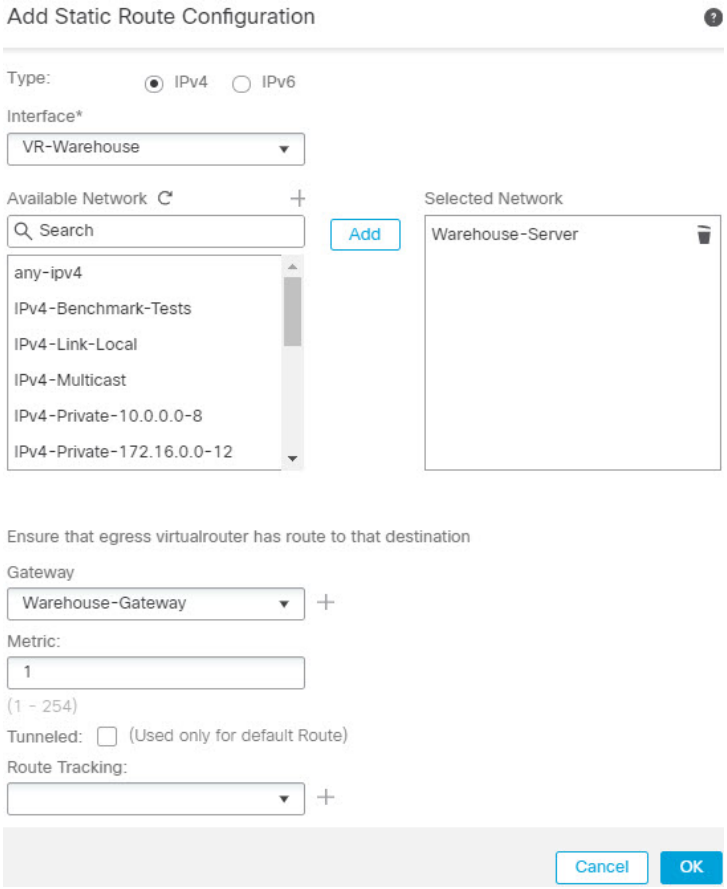


e) Click **Ok**.
f) Click **Save**.

Step 7 In the Warehouse virtual router, define the route that points to the Warehouse Router 2 gateway:

a) Choose Warehouse virtual router from the drop-down, and then click **Static Route**.
b) Click **Add Route**. In **Add Static Route Configuration**, specify the following:

- **Interface**—Select VR-Warehouse.
- **Network**—Select the Warehouse-Server object.
- **Gateway**—Select the Warehouse-Gateway object.



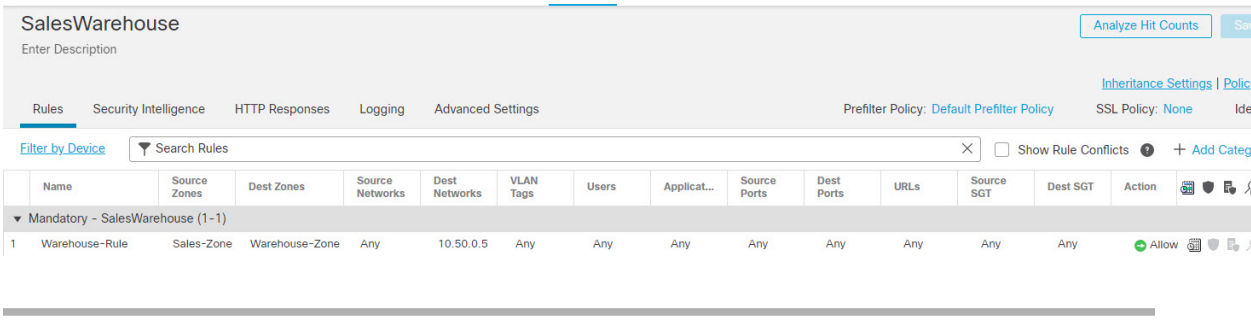
c) Click **Ok**.

d) Click **Save**.

Step 8 Configure access control rule that allows access to the warehouse server. For creating the access control rule, you need to create security zones. Use **Object** > **Object Management** > **Interface**. Choose **Add** > **Security Zone** and create security zones for VR-Sales and VR-Warehouse; for Warehouse-Server network object, create a Warehouse-Server interface group (Choose **Add** > **Interface Group**).

Step 9 Choose **Policies** > **Access Control** and configure an access control rule to allow traffic from the source interfaces in the Sales virtual router to the destination interfaces in the Warehouse virtual router for the destination Warehouse-Server network object.

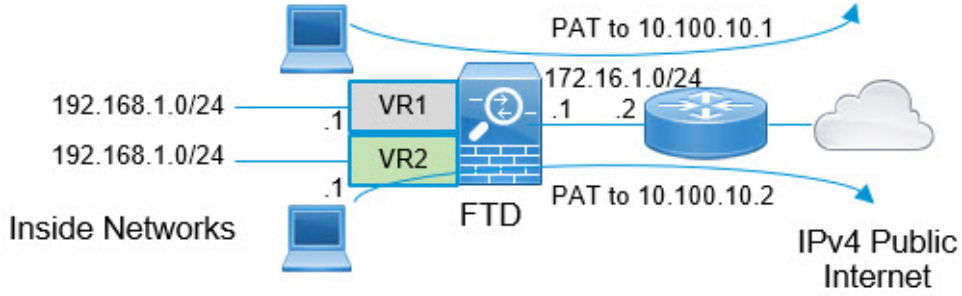
For example, if the interfaces in Sales are in the Sales-Zone security zone, and those in Warehouse are in the Warehouse-Zone security zone, the access control rule would look similar to the following:



How to Provide Internet Access with Overlapping Address Spaces

When using virtual routers, you can have the same network address for interfaces that reside in separate routers. However, because the IP addresses routed in these separate virtual routers are the same, apply NAT/PAT rules for each interface with separate NAT/PAT pools to ensure that return traffic goes to the correct destination. This example provides the procedure to configure the virtual routers and NAT/PAT rules to manage the overlapping address spaces.

For example, interfaces vr1-inside and vr2-inside on FTD is defined to use the IP address 192.168.1.1/24, managing endpoints on their segment in the 192.168.1.0/24 network. To allow Internet access from two virtual routers that use the same address space, you need to apply NAT rules separately to the interfaces within each virtual router, ideally using separate NAT or PAT pools. You could use PAT to translate the source addresses in VR1 to 10.100.10.1, and for those in VR2, to 10.100.10.2. The following illustration shows this setup, where the Internet-facing outside interface is part of the global router. You must define the NAT/PAT rules with the source interface (vr1-inside and vr2-inside) explicitly selected—using "any" as the source interface makes it impossible for the system to identify the correct source because the same IP address could exist on two different interfaces.



Note Even if you have some interfaces within virtual routers that does not use overlapping address spaces, define the NAT rule with the source interface to make troubleshooting easier, and to ensure a cleaner separation between traffic from the virtual routers that is Internet-bound.

Procedure

Step 1 Configure the inside interface of the device for VR1:

a) Choose **Devices** > **Device Management** > **Interfaces**.

b) Edit the interfaces that you want to assign to VR1:

- **Name**—For this example, vr1-inside.
- Select the **Enabled** checkbox.
- In **IPV4**, for **IP Type**, choose **Use Static IP**.
- **IP Address**—Enter 192.168.1.1/24.

c) Click **Ok**.

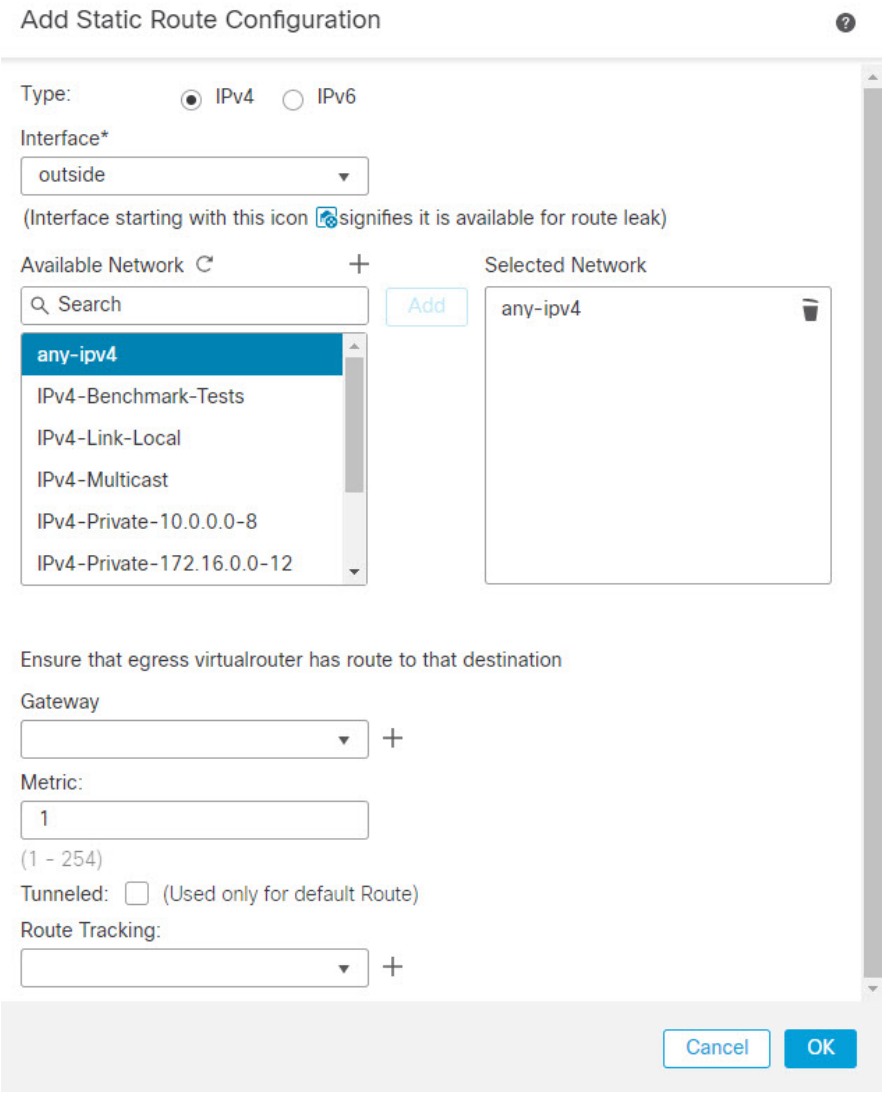
d) Click **Save**.

Step 2 Configure the inside interface of the device for VR2:

a) Choose **Devices** > **Device Management** > **Interfaces**.
b) Edit the interfaces that you want to assign to VR2:
   - **Name**—For this example, vr2-inside.
   - Select the **Enabled** checkbox.
   - In **IPV4**, for **IP Type**, choose **Use Static IP**.
   - **IP Address**—Leave it blank. The system does not allow you to configure interfaces with same IP address, as you are yet to create user-defined virtual routers.
c) Click **Ok**.
d) Click **Save**.

Step 3 Configure VR1 and the static default route leak to the outside interface:

a) Choose **Devices** > **Device Management**, and edit the FTD device.
b) Choose **Routing** > **Manage Virtual Routers**. Click **Add Virtual Router** and create VR1.
c) For VR1, in **Virtual Router Properties**, assign vr1-inside and save.
d) Click **Static Route**.
e) Click **Add Route**. In **Add Static Route Configuration**, specify the following:
   - **Interface**—Select the outside interface of the global router.
   - **Network**—Select the any-ipv4 object. This network is the default route for any traffic that cannot be routed within VR1.
   - **Gateway**—Leave it blank. When leaking a route into another virtual router, do not provide a Gateway.

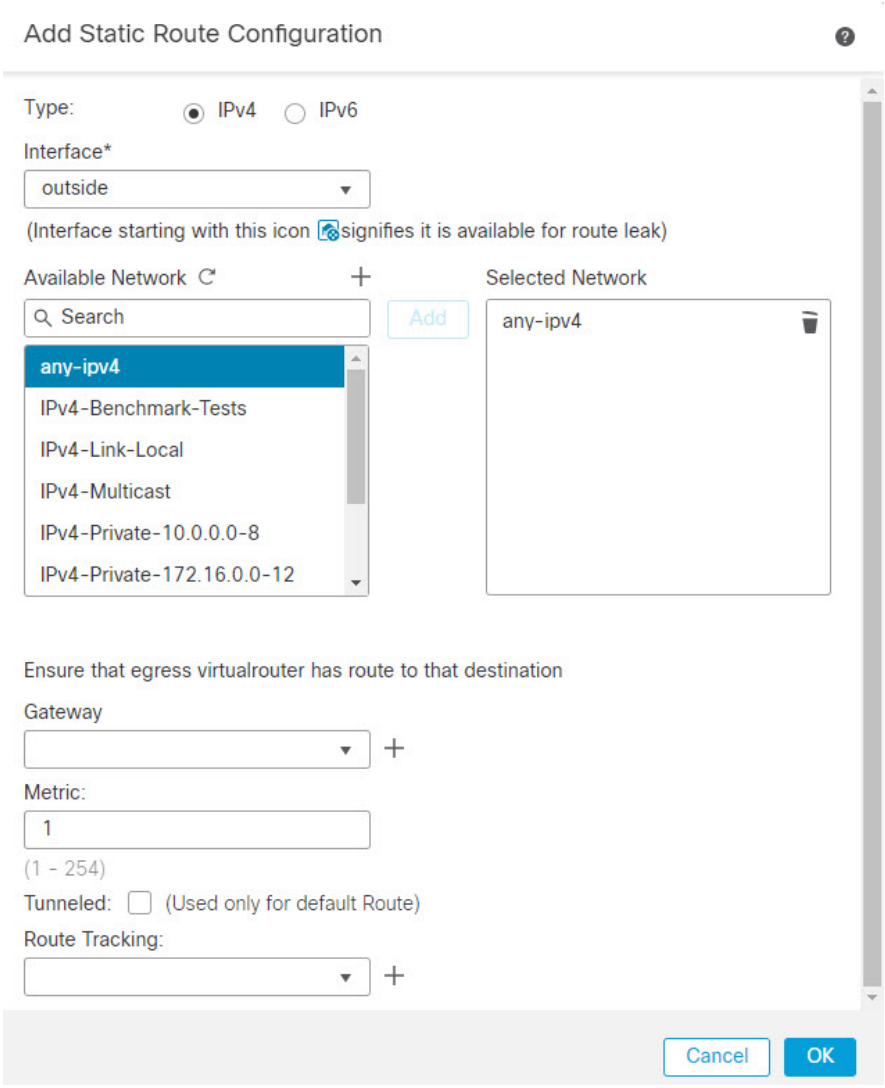


f) Click **Ok**.
g) Click **Save**.

Step 4 Configure VR2 and the static default route leak to the outside interface:

a) Choose **Devices** > **Device Management**, and edit the FTD device.
b) Choose **Routing** > **Manage Virtual Routers**. Click **Add Virtual Router** and create VR2.
c) For VR2, in **Virtual Router Properties**, assign vr2-inside and save.
d) Click **Static Route**.
e) Click **Add Route**. In **Add Static Route Configuration**, specify the following:

- **Interface**—Select the outside interface of the global router.
- **Network**—Select the any-ipv4 object. This network is the default route for any traffic that cannot be routed within VR2.
- **Gateway**—Leave it blank. When leaking a route into another virtual router, do not select the Gateway.

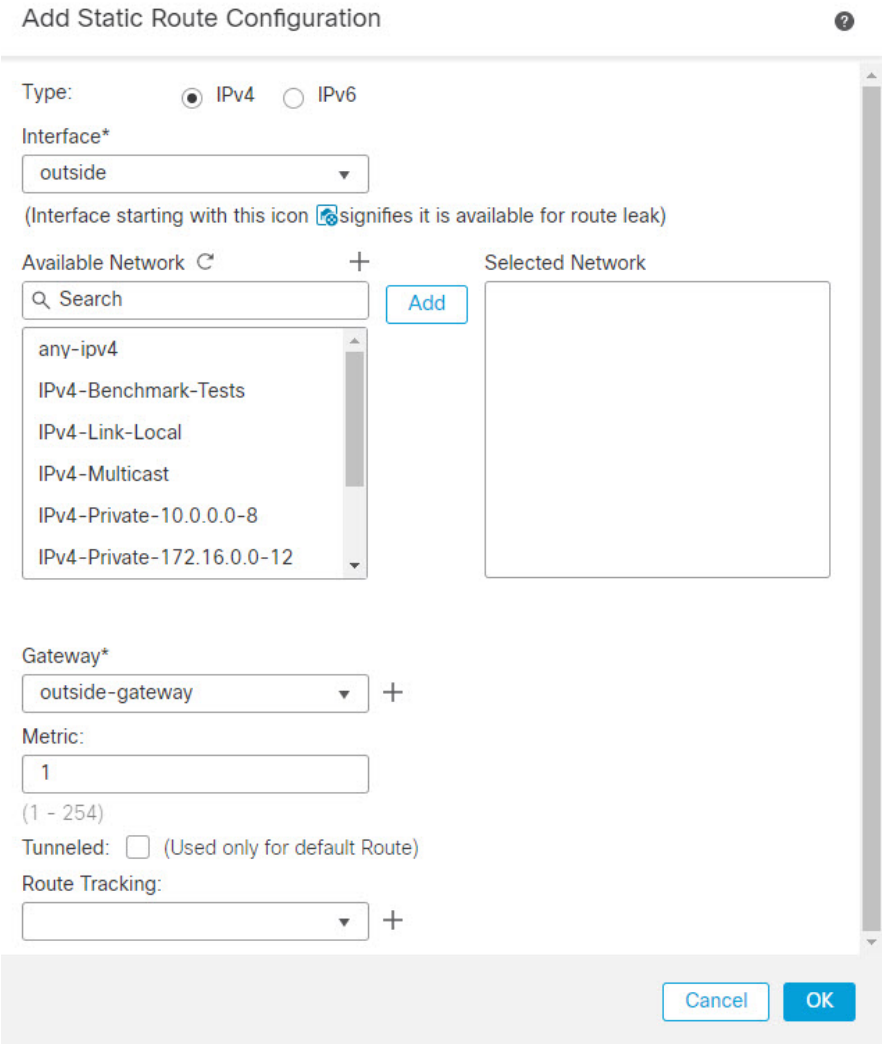


f) Click **Ok**.
g) Click **Save**.

Step 5 Configure IPv4 static default route, namely 172.16.1.2 on the outside interface of the global router:

a) Choose **Devices** > **Device Management**, and edit the FTD device.
b) Choose **Routing** and edit global router properties.
c) Click **Static Route**.
d) Click **Add Route**. In **Add Static Route Configuration**, specify the following:

- **Interface**—Select the outside interface of the global router.
- **Network**—Select the any-ipv4 object. This will be the default route for any IPv4 traffic.
- **Gateway**—If already created, select the host name from the drop-down. If the object is not yet created, click **Add** and define the host object for the IP address of the gateway at the other end of the network link on the outside interface, in this example, 172.16.1.2. After you create the object, select it in the Gateway field.



e) Click **Ok**.
f) Click **Save**.

Step 6 Revisit the vr2-inside interface configuration:

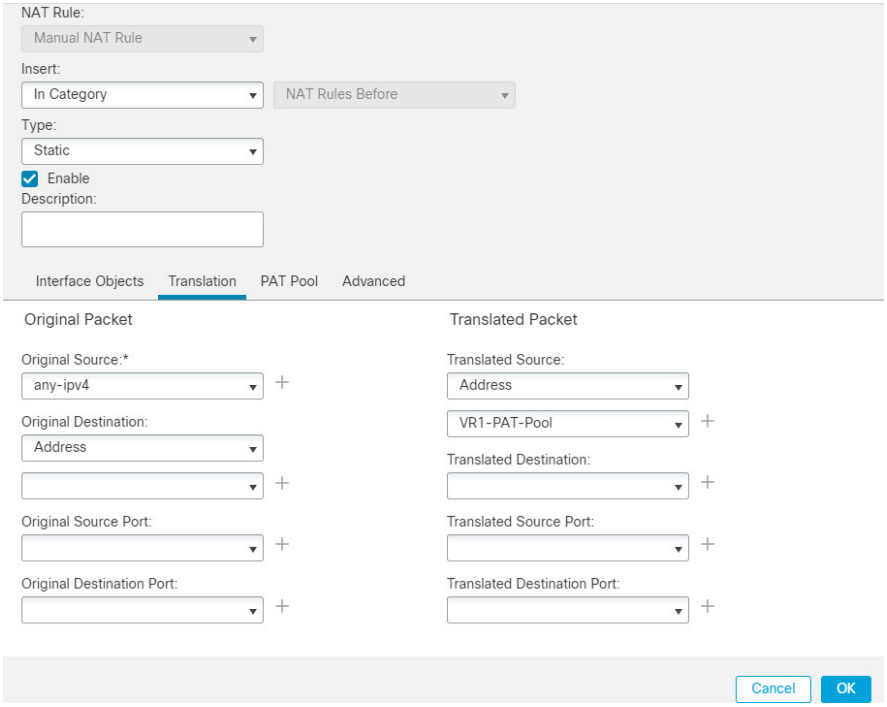
a) Choose **Devices** > **Device Management** > **Interfaces**.
b) Click **Edit** against vr2-inside interface. Specify the IP Address as 192.168.1.1/24. The system now allows you to configure with same IP address of vr1-inside, because the interfaces are separately assigned to two different virtual routers.
c) Click **Ok**.
d) Click **Save**.

Step 7 Create the NAT rule to PAT inside to outside traffic of VR1 to 10.100.10.1.

a) Choose **Devices** > **NAT**.
b) Click **New Policy** > **Threat Defense NAT**.
c) Enter InsideOutsideNATRule as the NAT policy name, and select the FTD device. Click **Save**.
d) In InsideOutsideNATRule page, click **Add Rule** and define the following:

- **NAT Rule**—Select Manual NAT Rule.

- **Type**—Select Dynamic.
- **Insert**—Above, if any dynamic NAT rule exists.
- Click **Enabled**.
- In **Interface Objects**, select vr1-interface object and click **Add to Source** (If the object is not available, create one in **Object** > **Object Management** > **Interface**), and select outside as **Add to Destination**.
- In **Translation**, for **Original Source**, select any-ipv4. For **Translated Source**, click **Add** and define host object VR1-PAT-Pool with 10.100.10.1. Select VR1-PAT-Pool as shown in the figure below:



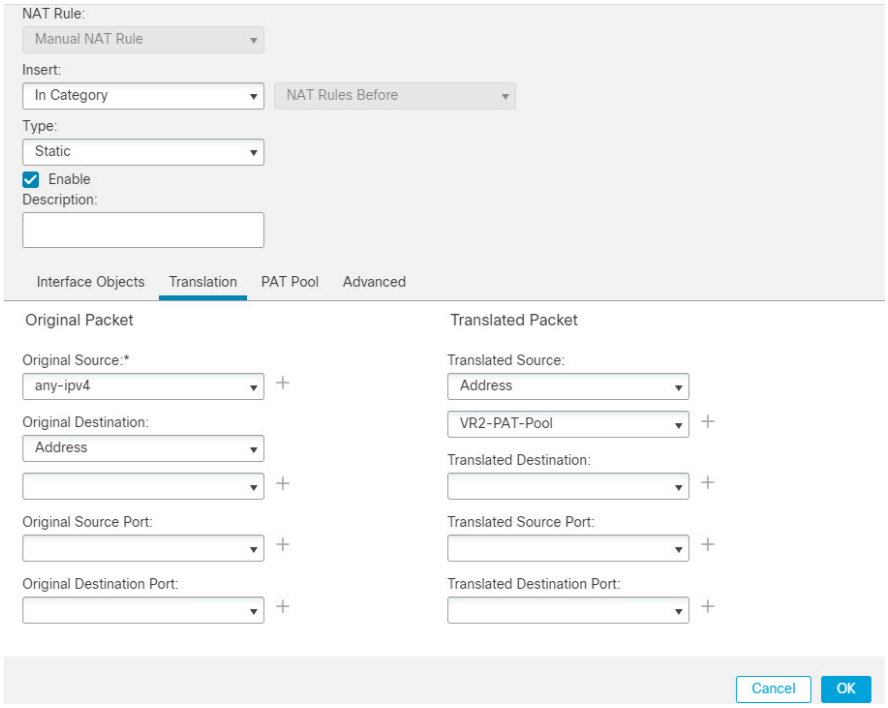
e) Click **Ok**.
f) Click **Save**.

Step 8 Add NAT rule to PAT inside to outside traffic of VR2 to 10.100.10.2.

a) Choose **Devices** > **NAT**.
b) Edit InsideOutsideNATRule to define the VR2 NAT rule:

- **NAT Rule**—Select Manual NAT Rule.
- **Type**—Select Dynamic.
- **Insert**—Above, if any dynamic NAT rule exists.
- Click **Enabled**.
- In **Interface Objects**, select vr2-interface object and click **Add to Source** (If the object is not available, create one in **Object** > **Object Management** > **Interface**), and select outside as **Add to Destination**.

- In **Translation**, for **Original Source**, select any-ipv4. For **Translated Source**, click **Add** and define host object VR2-PAT-Pool with 10.100.10.2. Select VR2-PAT-Pool as shown in the figure below:

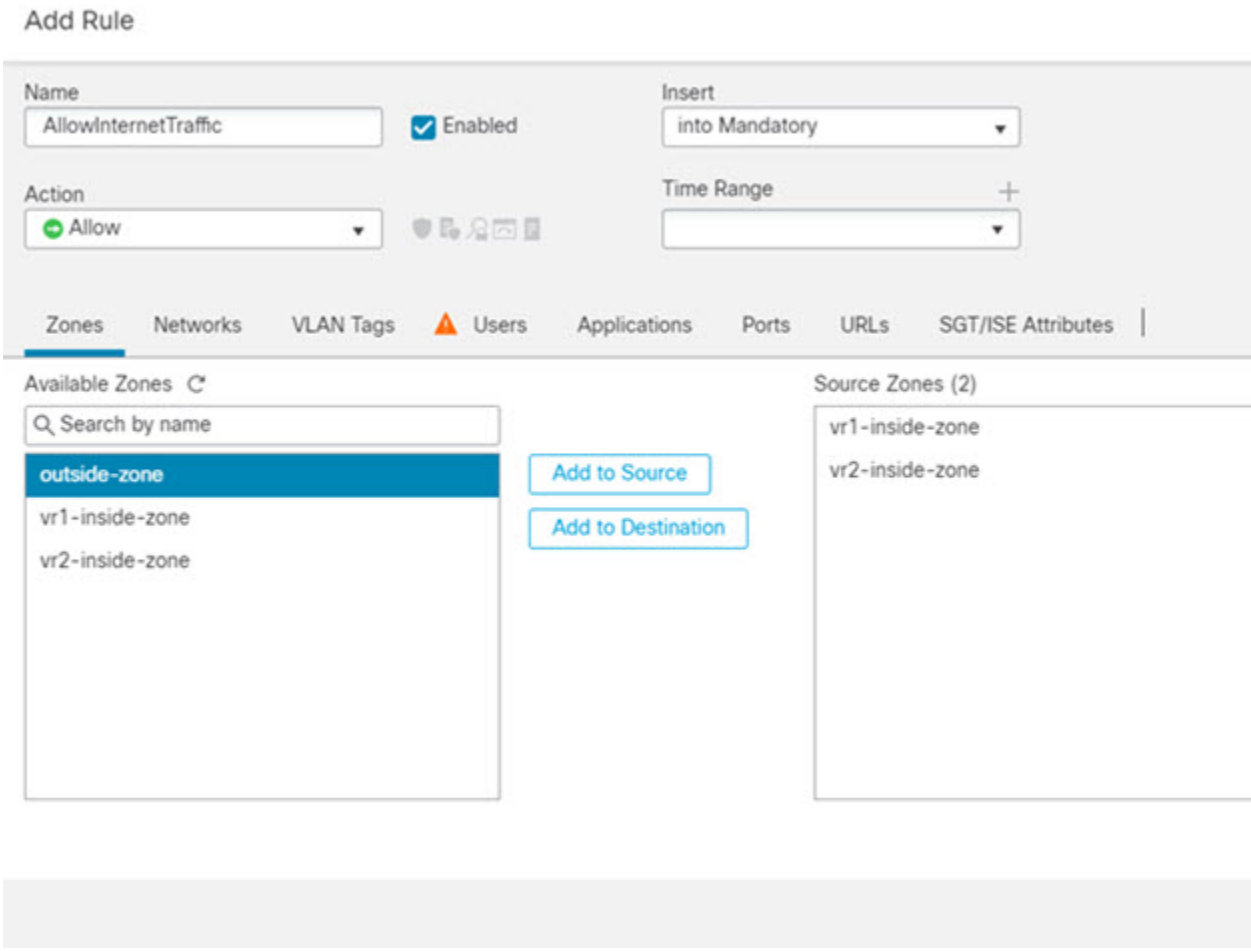


c) Click **Ok**.
d) Click **Save**.

Step 9 To configure the access control policy that allows traffic from the vr1-inside and vr2-inside interfaces to the outside interface, you need to create security zones. Use **Object** > **Object Management** > **Interface**. Choose **Add** > **Security Zone** and create security zones for vr1-inside, vr2-inside, and outside interfaces.

Step 10 Choose **Policies** > **Access Control** and configure an access control rule to allow traffic from vr1-inside-zone and vr2- inside-zone to outside-zone.

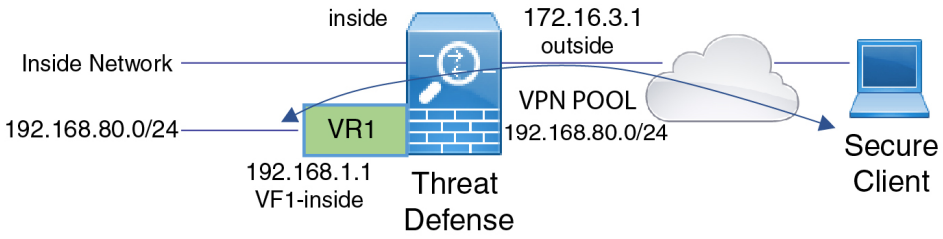
Assuming that you create zones named after the interfaces, a basic rule that allows all traffic to flow to the Internet will look like the following. You can apply other parameters to this access control policy:



How to Allow RA VPN Access to Internal Networks in Virtual Routing

On virtual routing-enabled devices, RA VPN is supported only on global virtual router interfaces. This example provides the procedure that allows your AnyConnect client user to connect to user-defined virtual router networks.

In the following example, the RA VPN (AnyConnect client) user connects to the outside interface of FTD at 172.16.3.1, and is given an IP address within the pool of 192.168.80.0/24. The user can access the inside network of only the global virtual router. To allow traffic flow through the network of the user-defined virtual router VR1, namely 192.168.1.0/24, leak the route by configuring the static routes on global and VR1.



Before you begin

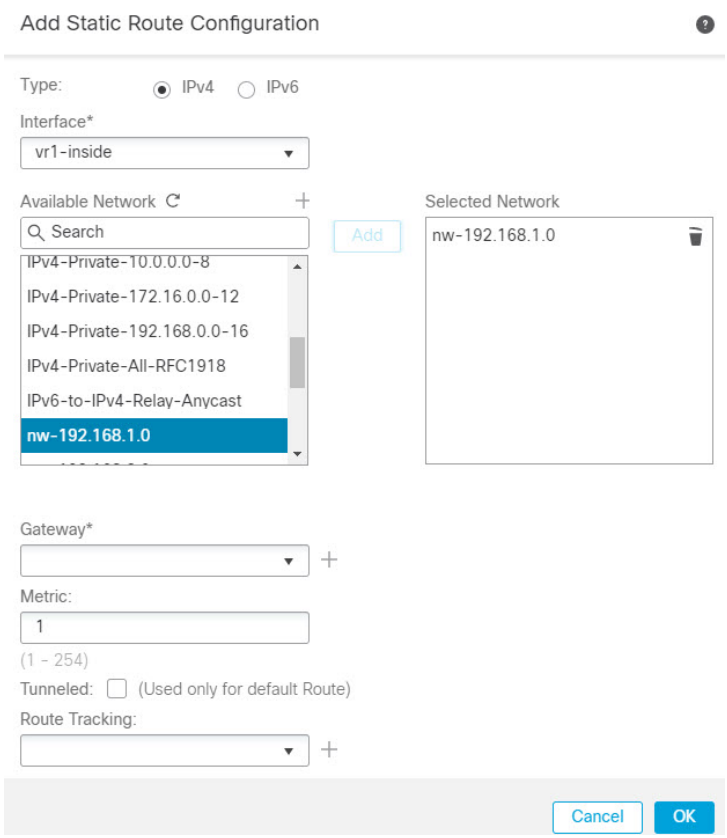
This example assumes that you have already configured the RA VPN, defined the virtual routers, and configured and assigned the interfaces to the appropriate virtual routers.

Procedure

Step 1 Configure route leak from Global virtual router to the user-defined VR1:

a) Choose **Devices** > **Device Management**, and edit the FTD device.
b) Click **Routing**. By default, the Global routing properties page appears.
c) Click **Static Route**.
d) Click **Add Route**. In **Add Static Route Configuration**, specify the following:

- **Interface**—Select the VR1 inside interface.
- **Network**—Select the VR1 virtual router network object. You can create one using the **Add Object** option.
- **Gateway**—Leave it blank. When leaking a route into another virtual router, does not select the gateway.



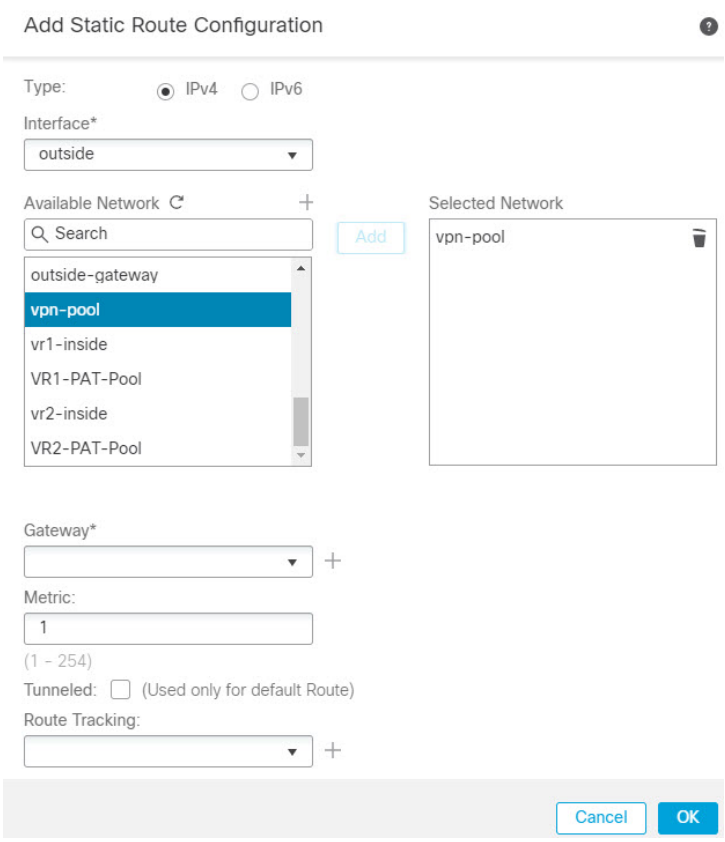
The route leak allows AnyConnect Clients assigned IP addresses in the VPN pool to access the 192.168.1.0/24 network in the VR1 virtual router.

e) Click **Ok**.

Step 2 Configure the route leak from VR1 to the Global virtual router:

a) Choose **Devices** > **Device Management**, and edit the FTD device.
b) Click **Routing** and from the drop-down, select VR1.
c) Click **Static Route**.
d) Click **Add Route**. In **Add Static Route Configuration**, specify the following:

- **Interface**—Select the outside interface of the global router.
- **Network**—Select the global virtual router network object.
- **Gateway**—Leave it blank. When leaking a route into another virtual router, does not select the gateway.



The configured static route allows endpoints on the 192.168.1.0/24 network (VR1) to initiate connections to AnyConnect Clients assigned IP addresses in the VPN pool.

e) Click **Ok**.

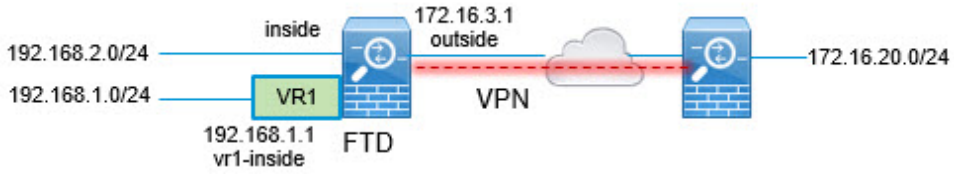
What to do next

If RA VPN address pool and the IP addresses in the user-defined virtual router overlap, you must also use static NAT rules on the IP addresses to enable proper routing. Alternatively, you can change your RA VPN address pool so that there is no overlap.

How to Secure Traffic from Networks in Multiple Virtual Routers over a Site-to-Site VPN

On virtual routing-enabled devices, Site-to-Site VPN is supported only on global virtual router interfaces. You cannot configure it on an interface that belongs to a user-defined virtual router. This example provides the procedure that allows you to secure the connections from or to networks hosted within user-defined virtual routers over the site-to-site VPN. You also need to update the site-to-site VPN connection to include the user-defined virtual routing networks.

Let us consider a scenario, where, a site-to-site VPN is configured between a branch office network to a company headquaters network; the FTD in the branch office having virtual routers. In this case, the site-to-site VPN is defined on the outside interface of the branch office at 172.16.3.1. This VPN includes the inside network 192.168.2.0/24 without extra configuration, because the inside interface is also part of the global virtual router. But, to provide site-to-site VPN services to the 192.168.1.0/24 network, which is part of the VR1 virtual router, you must leak the route by configuring the static routes on global and VR1, and add the VR1 network to the site-to-site VPN configuration.



Before you begin

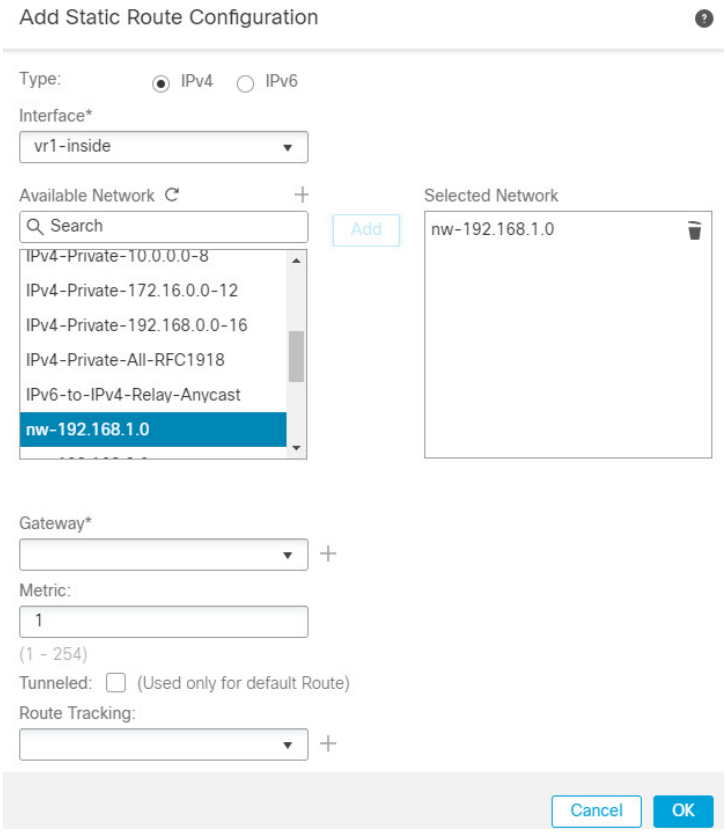
This example assumes that you have already configured the site-to-site VPN between the 192.168.2.0/24 local network and the 172.16.20.0/24 external network, defined the virtual routers, and configured and assigned the interfaces to the appropriate virtual routers.

Procedure

Step 1 Configure route leak from the Global virtual router to the user-defined VR1:

a) Choose **Devices** > **Device Management**, and edit the FTD device.
b) Click **Routing**. By default, the Global routing properties page appears.
c) Click **Static Route**.
d) Click **Add Route**. In **Add Static Route Configuration**, specify the following:

- **Interface**—Select the VR1 inside interface.
- **Network**—Select the VR1 virtual router network object. You can create one using the **Add Object** option.
- **Gateway**—Leave it blank. When leaking a route into another virtual router, do not select the gateway.



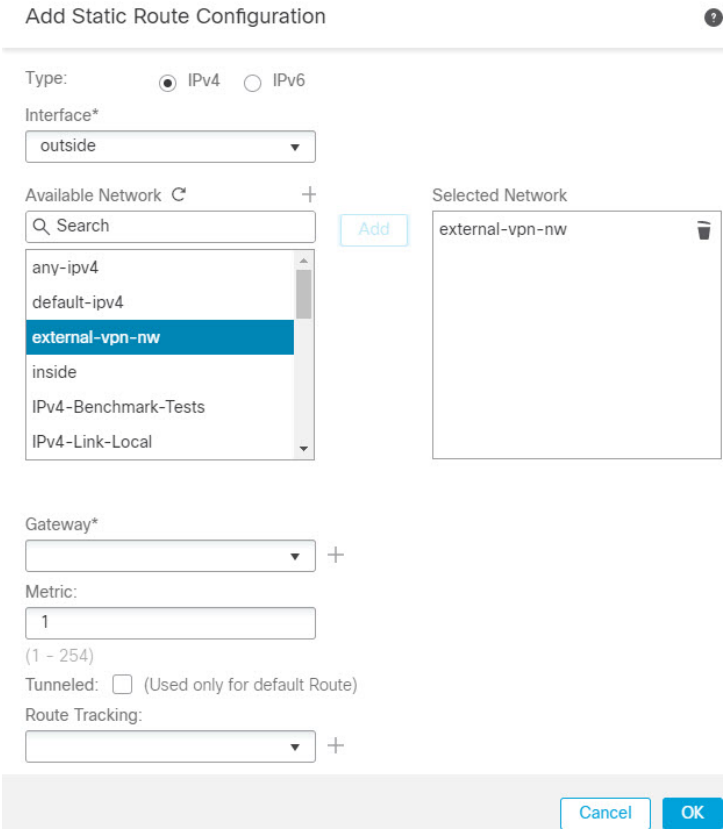
The route leak allows endpoints protected by the external (remote) end of the site-to-site VPN to access the 192.168.1.0/24 network in the VR1 virtual router.

e) Click **Ok**.

Step 2 Configure the route leak from VR1 to the Global virtual router:

a) Choose **Devices** > **Device Management**, and edit the FTD device.
b) Click **Routing** and from the drop-down, select VR1.
c) Click **Static Route**.
d) Click **Add Route**. In **Add Static Route Configuration**, specify the following:

- **Interface**—Select the outside interface of the global router.
- **Network**—Select the global virtual router network object.
- **Gateway**—Leave it blank. When leaking a route into another virtual router, do not select the gateway.

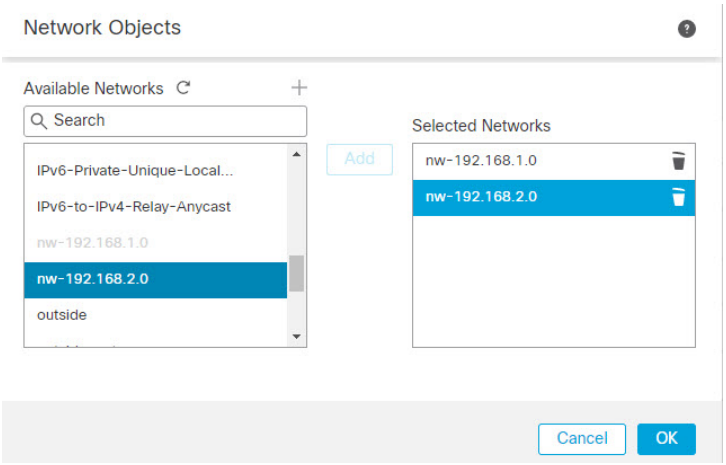


This static route allows endpoints on the 192.168.1.0/24 network (VR1) to initiate connections that will traverse the site-to-site VPN tunnel. For this example, the remote endpoint that is protecting the 172.16.20.0/24 network.

e) Click **Ok**.

Step 3 Add the 192.168.1.0/24 network to the site-to-site VPN connection profile:

a) Choose **Devices** > **VPN** > **Site To Site**, and edit the VPN Topology.
b) In **Endpoints**, edit Node A endpoint.
c) In **Edit Endpoint**, in the **Protected Networks** field, click **Add New Network Object**.
d) Add the VR1 network object with 192.168.1.0 network:

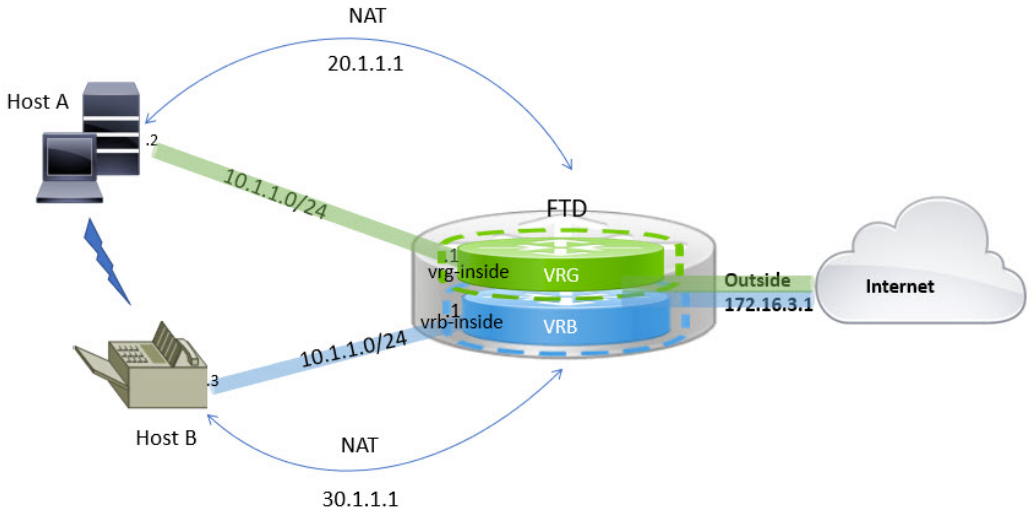


e) Click **Ok** and save the configuration.

How to Route Traffic between Two Overlapping Network Host in Virtual Routing

You can configure hosts on the virtual routers that have same network address. If the hosts want to communicate, you can configure twice NAT. This example provides the procedure to configure the NAT rules to manage the overlapping network host.

In the following example, two hosts Host A and Host B belong to different virtual routers: VRG (interface vrg-inside), VRB (interface vrb-inside) respectively with the same subnet 10.1.1.0/24. For both the hosts to communicate, create a NAT policy where, VRG-Host interface object would use a mapped NAT address - 20.1.1.1, and VRB-Host interface object would use a mapped NAT address - 30.1.1.1. Thus, Host A uses 30.1.1.1 to communicate to Host B; Host B uses 20.1.1.1 to reach Host A.



Before you begin

This example assumes that you have already configured:

- vrg-inside and vrb-inside interfaces are associated with virtual routers: VRG and VRB respectively and vrg-inside and vrb-inside interfaces configured with same subnet address (say, 10.1.1.0/24).
- Interfaces zones VRG-Inf, VRB-Inf created with vrg-inside and vrb-inside interfaces respectively.
- Host A in VRG with vrg-inside as default gateway; Host B in VRB with vrb-inside as default gateway.

Procedure

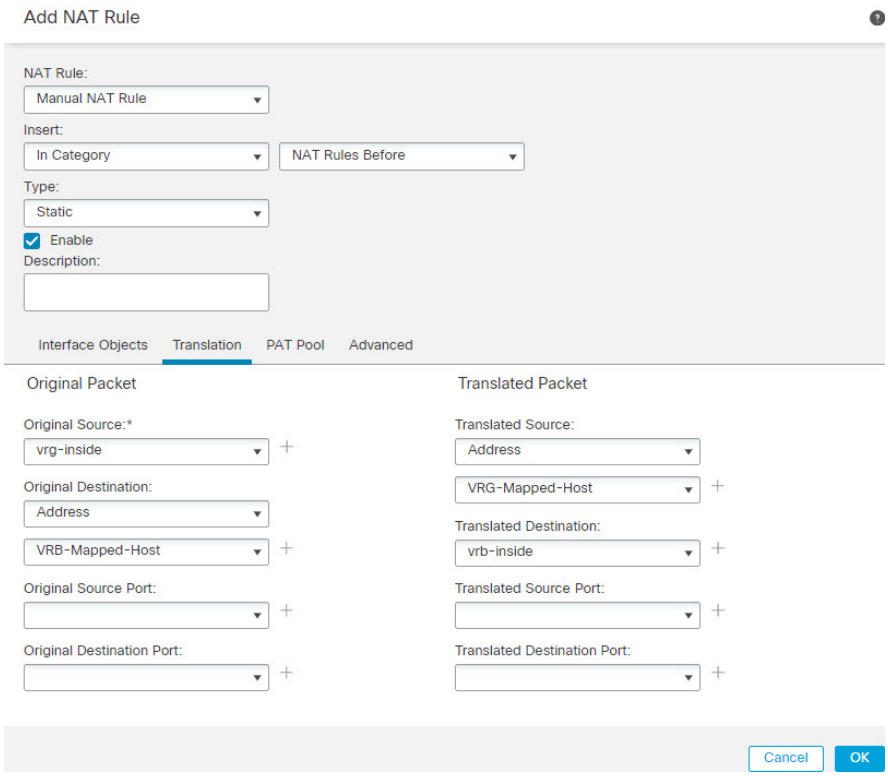
Step 1 Create the NAT rule to handle traffic from Host A to Host B. Choose **Devices** > **NAT**.

Step 2 Click **New Policy** > **Threat Defense NAT**.

Step 3 Enter a NAT policy name, and select the FTD device. Click **Save**.

Step 4 In the NAT page, click **Add Rule** and define the following:

- **NAT Rule**—Select Manual NAT Rule.
- **Type**—Select Static.
- **Insert**—Select Above, if any NAT rule exists.
- Click **Enabled**.
- In **Interface Objects**, select VRG-Inf object and click **Add to Source** (If the object isn't available, create one in **Object** > **Object Management** > **Interface**), and select VRB-Inf object and click **Add to Destination**.
- In **Translation**, select the following:
  - **Original Source**, select vrg-inside.
  - **Original Destination**, click **Add** and define object VRB-Mapped-Host with 30.1.1.1. Select VRB-Mapped-Host.
  - **Translated Source**, click **Add** and define object, VRG-Mapped-Host with 20.1.1.1. Select VRG-Mapped-Host.
  - **Translated Destination**, select vrb-inside as shown in the following figure:



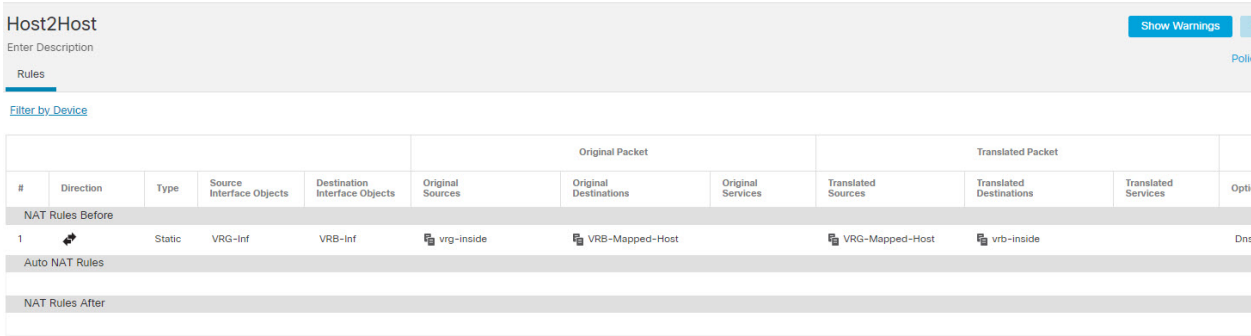
When you run the **show nat detail** command on the FTD device, you will see an output similar to this:

```
firepower(config-service-object-group)# show nat detail
Manual NAT Policies (Section 1)
1 (2001) to (3001) source static vrg-inside VRG-MAPPED-HOST destination static VRB-MAPPED-HOST
 vrb-inside
translate_hits = 0, untranslate_hits = 0
Source - Origin: 10.1.1.1/24, Translated: 20.1.1.1/24
Destination - Origin: 30.1.1.1/24, Translated: 10.1.1.1/24
```

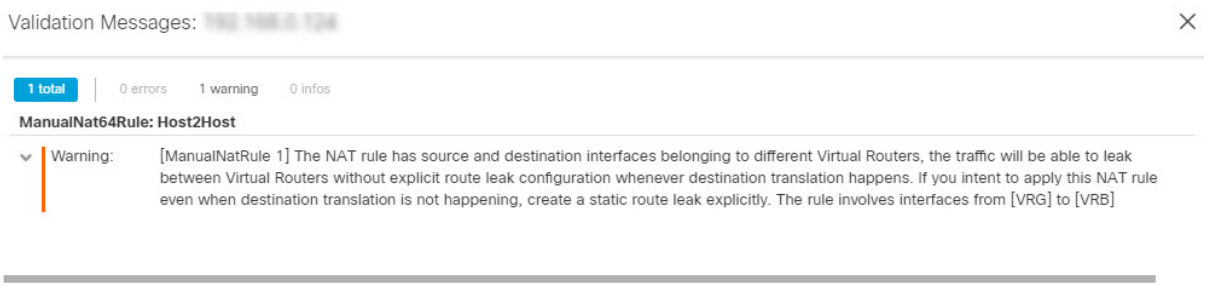
Step 5 Click **Ok**.

Step 6 Click **Save**.

The NAT rule looks like this:



When you deploy the configuration, a warning message appears:

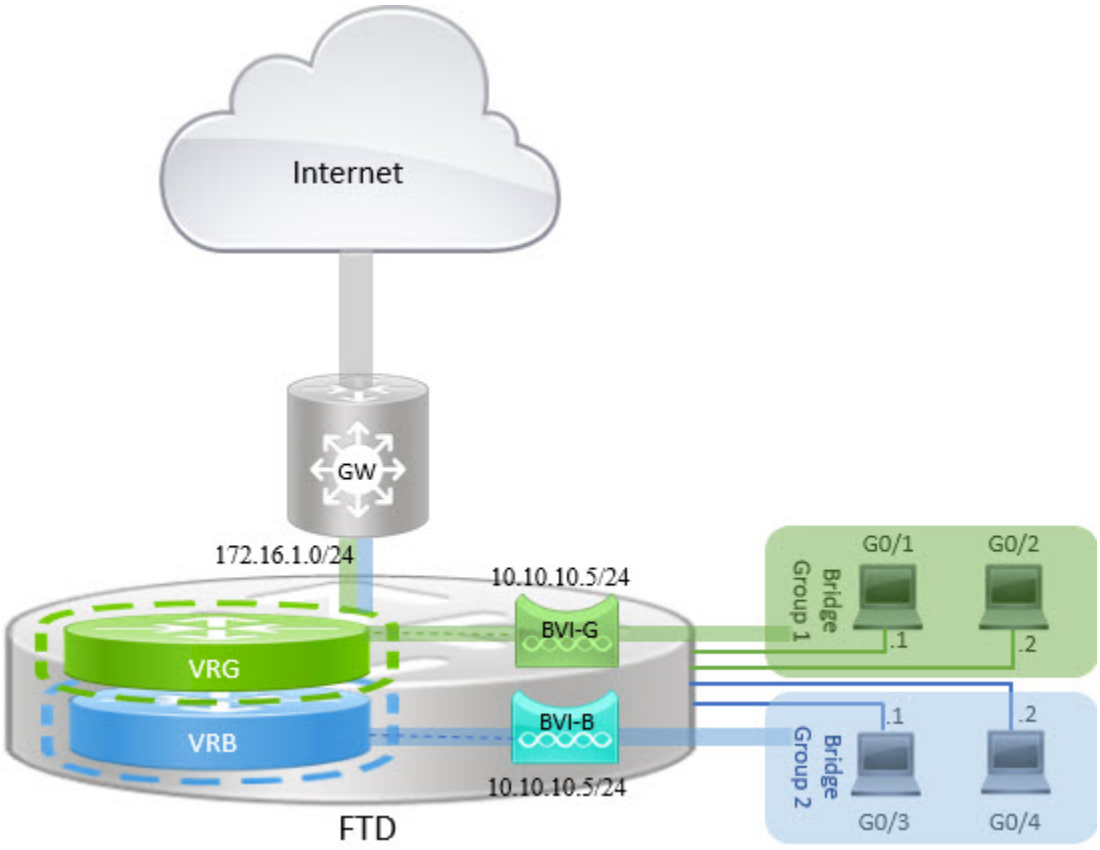


How to Manage Overlapping Segments in Routed Firewall Mode with BVI Interfaces

You can deploy single FTD between multiple overlapping networks transparently and/or deploy the firewall between the hosts of same network. To achieve this deployment, configure BVI per virtual router. The procedure to configure the BVIs in virtual router is explained here.

BVI is a virtual interface within a router that acts like a normal routed interface. It does not support bridging, but represents the comparable bridge group to routed interfaces within the router. All the packets coming in or going out of these bridged interfaces, pass through the BVI interface. The interface number of the BVI is the number of the bridge group that the virtual interface represents.

In the following example, BVI-G is configured in VRG and Bridge Group 1 is the routed interface for interfaces G0/1 and G0/2. Similarly, BVI-B is configured in VRB and Bridge Group 2 is the routed interface for interfaces G0/3 and G0/4. Consider that both BVIs have the same IP subnet address, say 10.10.10.5/24. Because of virtual routers, the network is isolated on the shared resources.



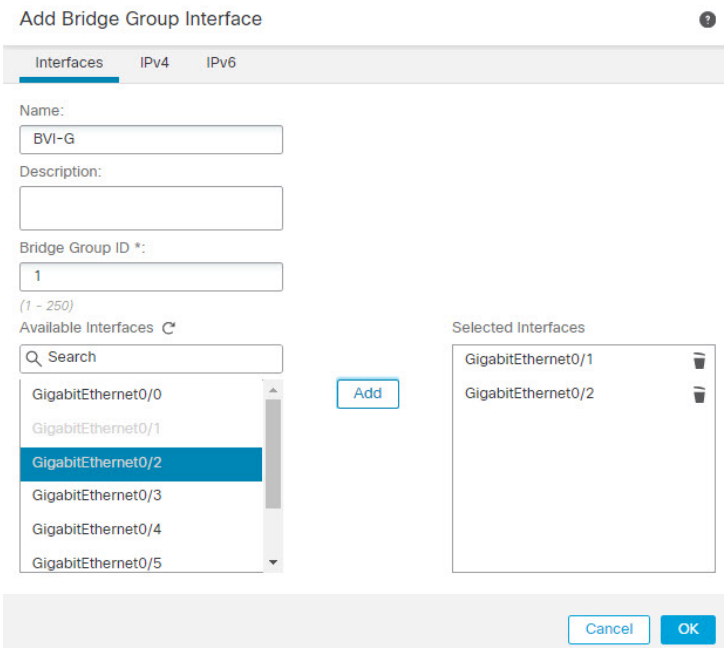
Procedure

Step 1 Choose **Devices** > **Device Management**. Edit the required device.

Step 2 In **Interfaces**, choose **Add Interfaces** > **Bridge Group Interface**.

a) Enter the following details for BVI-G:

- **Name**—For this example, BVI-G.
- **Bridge Group ID**—For this example, 1.
- **Available Interface**—Select the interfaces.
- In **IPV4**, for **IP Type**, choose **Use Static IP**.
- **IP Address**—Enter 10.10.10.5/24.

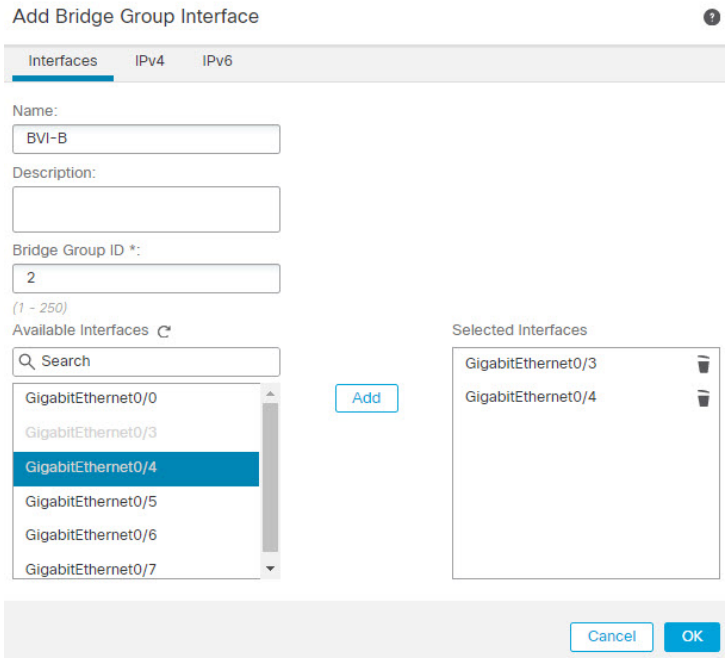


b) Click **Ok**.

c) Click **Save**.

a) Enter the following details for BVI-B:

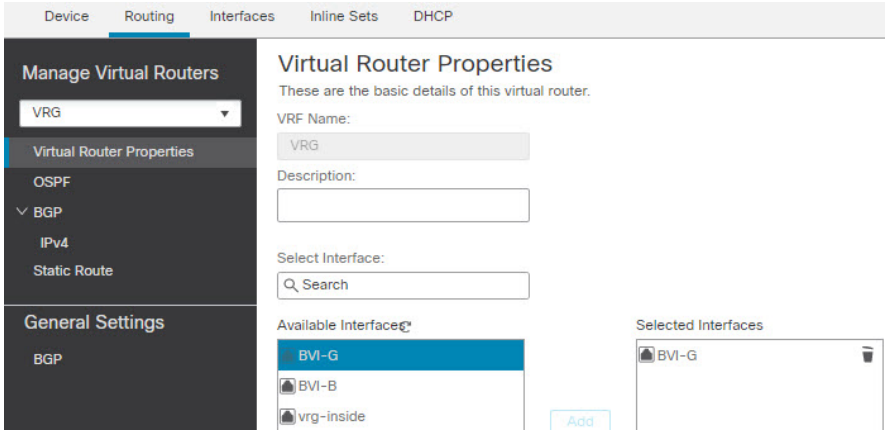
- **Name**—For this example, BVI-B.
- **Bridge Group ID**—For this example, 2.
- **Available Interface**—Select the sub interfaces.
- In **IPV4**, for **IP Type**, choose **Use Static IP**.
- **IP Address**—Leave this field empty as the system does not allow two interfaces to have overlapping IP address. You can revisit the Bridge Group and provide the same IP address after aligning it under a virtual router.



b) Click **Ok**.
c) Click **Save**.

Step 3 Create virtual router, say VRG, and select BVI-G as its network:

a) Choose **Devices** > **Device Management**.
b) Edit the device, and choose **Routing** > **Manage Virtual Routers**.
c) Click **Add Virtual Router**. Enter a name for the virtual router and click **Ok**.
d) In **Virtual Routing Properties**, select **BVI-G** and click **Add**.

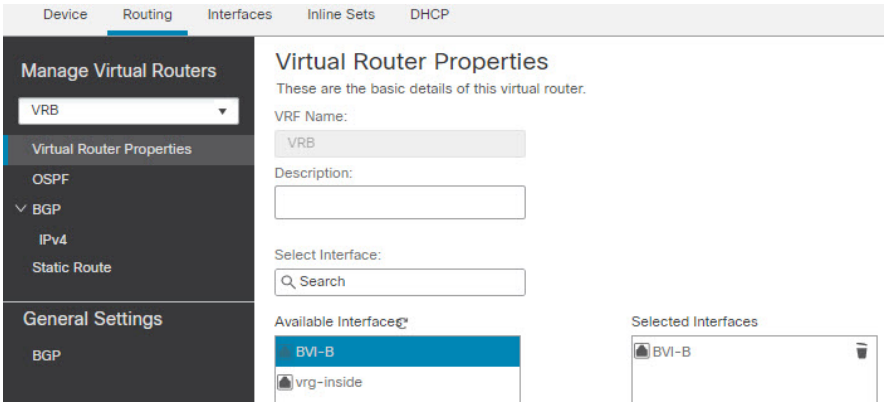


e) Click **Save**.

Step 4 Create virtual router, say VRB, and select BVI-B as its network:

a) Choose **Devices** > **Device Management**.
b) Edit the device, and choose **Routing** > **Manage Virtual Routers**.
c) Click **Add Virtual Router**. Enter a name for the virtual router and click **Ok**.

d) In **Virtual Routing Properties**, select **BVI-B** and click **Add**.



e) Click **Save**.

Step 5 Revisit the BVI-B configuration:

a) Choose **Devices** > **Device Management** > **Interfaces**.

b) Click **Edit** against BVI-B interface. Specify the IP Address as 10.10.10.5/24. The system now allows you to configure with same IP address of BVI-G, because the interfaces are seperately assigned to two different virtual routers.

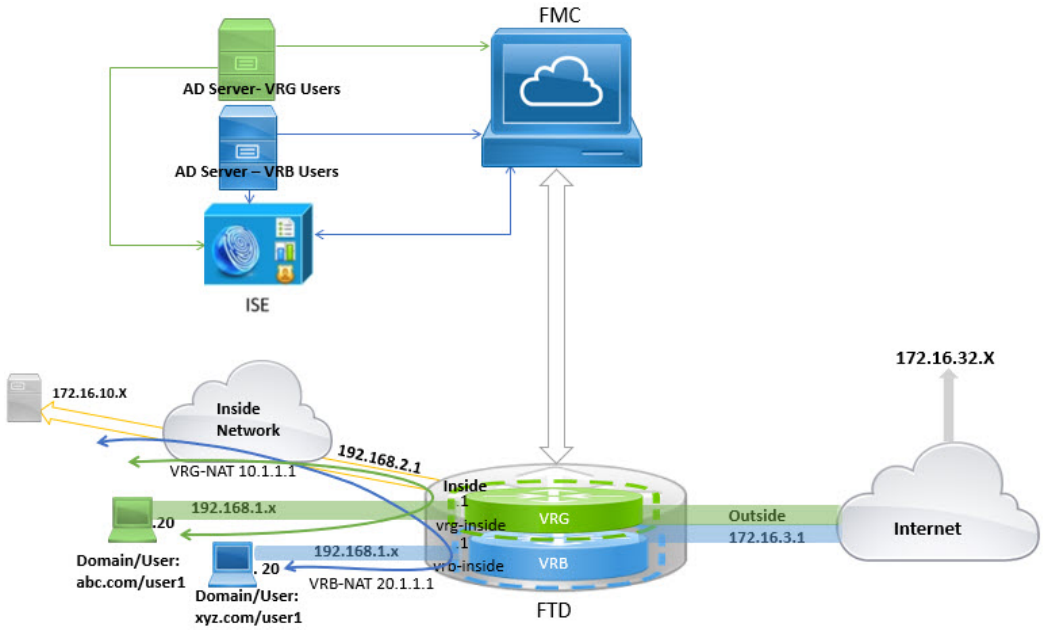
c) Click **Ok**.

d) Click **Save**.

If you want to enable inter-BVI communication, use an external router as default gateway. In overlapping BVI scenarios, as in this example, use twice NAT external router as gateway to establish inter-BVI traffic. When configuring NAT for the members of a bridge group, you specify the member interface. You cannot configure NAT for the bridge group interface (BVI) itself. When doing NAT between bridge group member interfaces, you must specify the real and mapped addresses. You cannot specify “any” as the interface.

How to Configure User Authentication with Overlapping Networks

In virtual routing, you can configure multiple virtual routers with overlapping IP and overlapping users. In the example, VRG, and VRB are the virtual routers with overlapping IP - 192.168.1.1/24. The users on two different domains are also on overlapping network IP 192.168.1.20. For VRG and VRB users to access the shared server 172.16.10.X, leak routes to the global virtual router. Use source NAT to handle the overlapping IP. For controlling the access from VRG and VRB users, you must set user authentication in FMC. FMC uses realms, Active Directories, Identity source, and Identity rules and policies for authenticating user identity. Because FTD does not have direct role in authenticating users, user access is managed only through the access control policy. For controlling traffic from the overlapping users, use Identity policy and rules to create access control policy.



Before you begin

This example assumes that you have:

- Two AD servers for the VRG and VRB users.
- ISE with the two AD servers added.

Procedure

Step 1 Configure the inside interface of the device for VRG:

a) Choose **Devices** > **Device Management** > **Interfaces**.

b) Edit the interfaces that you want to assign to VRG:

- **Name**—For this example, VRG-inside.
- Select the **Enabled** checkbox.
- In **IPV4**, for **IP Type**, choose **Use Static IP**.
- **IP Address**—Enter 192.168.1.1/24.

c) Click **Ok**.

d) Click **Save**.

Step 2 Configure the inside interface of the device for VRB:

a) Choose **Devices** > **Device Management** > **Interfaces**.

b) Edit the interfaces that you want to assign to VRB:

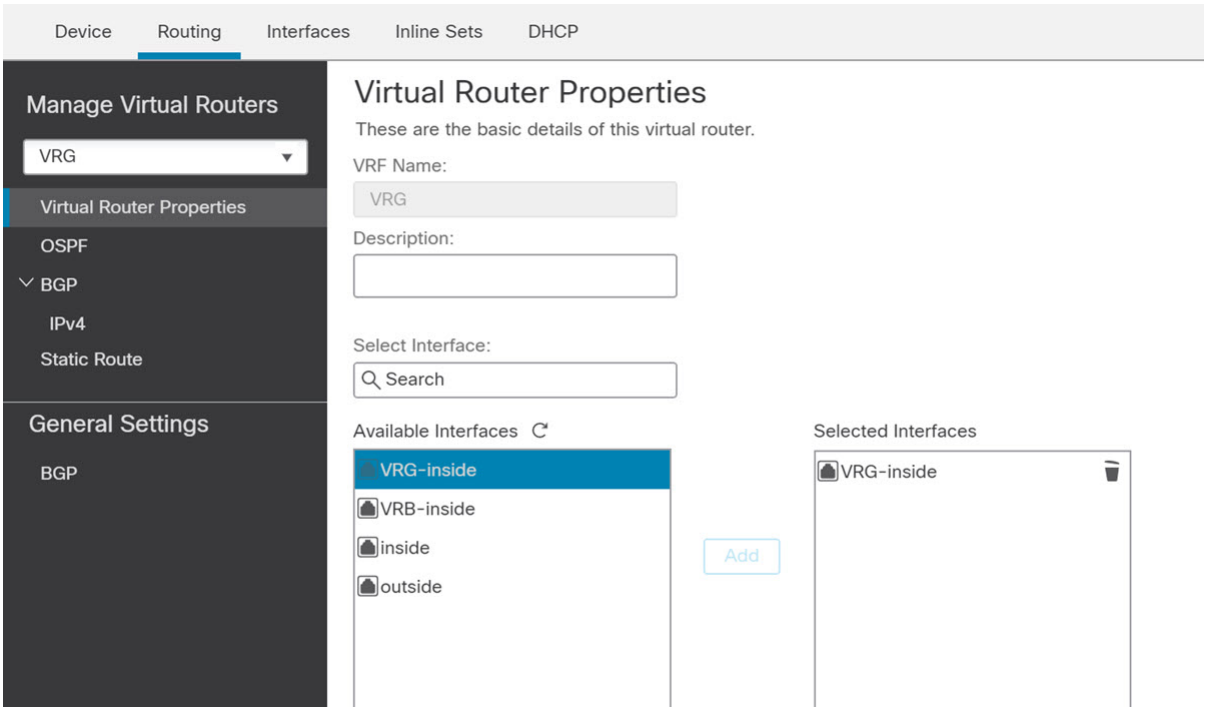
- **Name**—For this example, VRB-inside.

- Select the **Enabled** checkbox.
- In **IPV4**, for **IP Type**, choose **Use Static IP**.
- **IP Address**—Leave it blank. The system doesn't allow you to configure interfaces with same IP address, as you're yet to create user-defined virtual routers.

c) Click **Ok**.
d) Click **Save**.

Step 3 Configure VRG and the static default route leak to the inside interface of the Global router for the VRG users to access the common server 172.16.10.1:

a) Choose **Devices** > **Device Management**, and edit the FTD device.
b) Choose **Routing** > **Manage Virtual Routers**. Click **Add Virtual Router** and create VRG.
c) For VRG, in **Virtual Router Properties**, assign VRG-inside and save.



d) Click **Static Route**.
e) Click **Add Route**. In **Add Static Route Configuration**, specify the following:

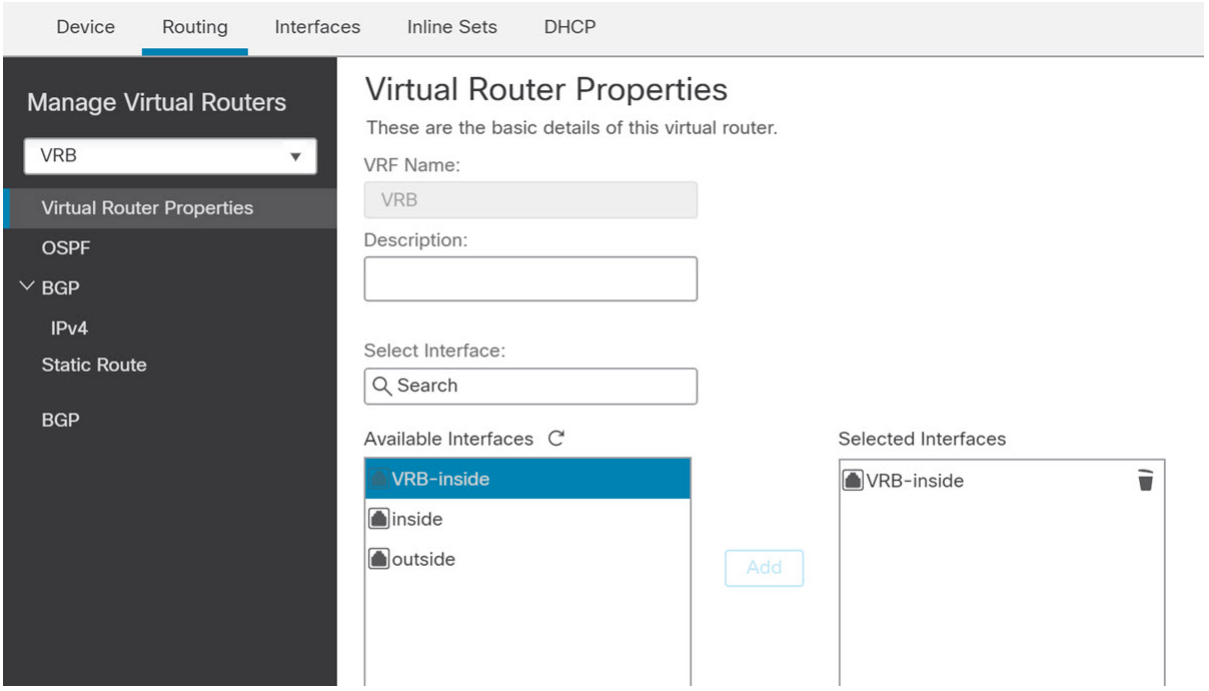
- **Interface**—Select the inside interface of the global router.
- **Network**—Select the any-ipv4 object.
- **Gateway**—Leave it blank. When leaking a route into another virtual router, do not select a gateway.

f) Click **Ok**.
g) Click **Save**.

Step 4 Configure VRB and the static default route leak to the inside interface of the Global router for the VRB users to access the shared server 172.16.10.x:

a) Choose **Devices** > **Device Management**, and edit the FTD device.

b) Choose **Routing** > **Manage Virtual Routers**. Click **Add Virtual Router** and create VRB.
c) For VRB, in **Virtual Router Properties**, assign VRB-inside and save.



d) Click **Static Route**.
e) Click **Add Route**. In **Add Static Route Configuration**, specify the following:

- **Interface**—Select the inside interface of the global router.
- **Network**—Select the any-ipv4 object.
- **Gateway**—Leave it blank. When leaking a route into another virtual router, do not select a gateway.

f) Click **Ok**.
g) Click **Save**.

Step 5 Revisit the VRB-inside interface configuration:

a) Choose **Devices** > **Device Management** > **Interfaces**.
b) Click **Edit** against VRB-inside interface. Specify the IP Address as 192.168.1.1/24. The system now allows you to configure with the same IP address as that of VRG-inside, because the interfaces are seperately assigned to two different virtual routers.
c) Click **Ok**.
d) Click **Save**.

Step 6 Add NAT rules for the source objects VRG and VRB. Click **Devices** > **NAT**.

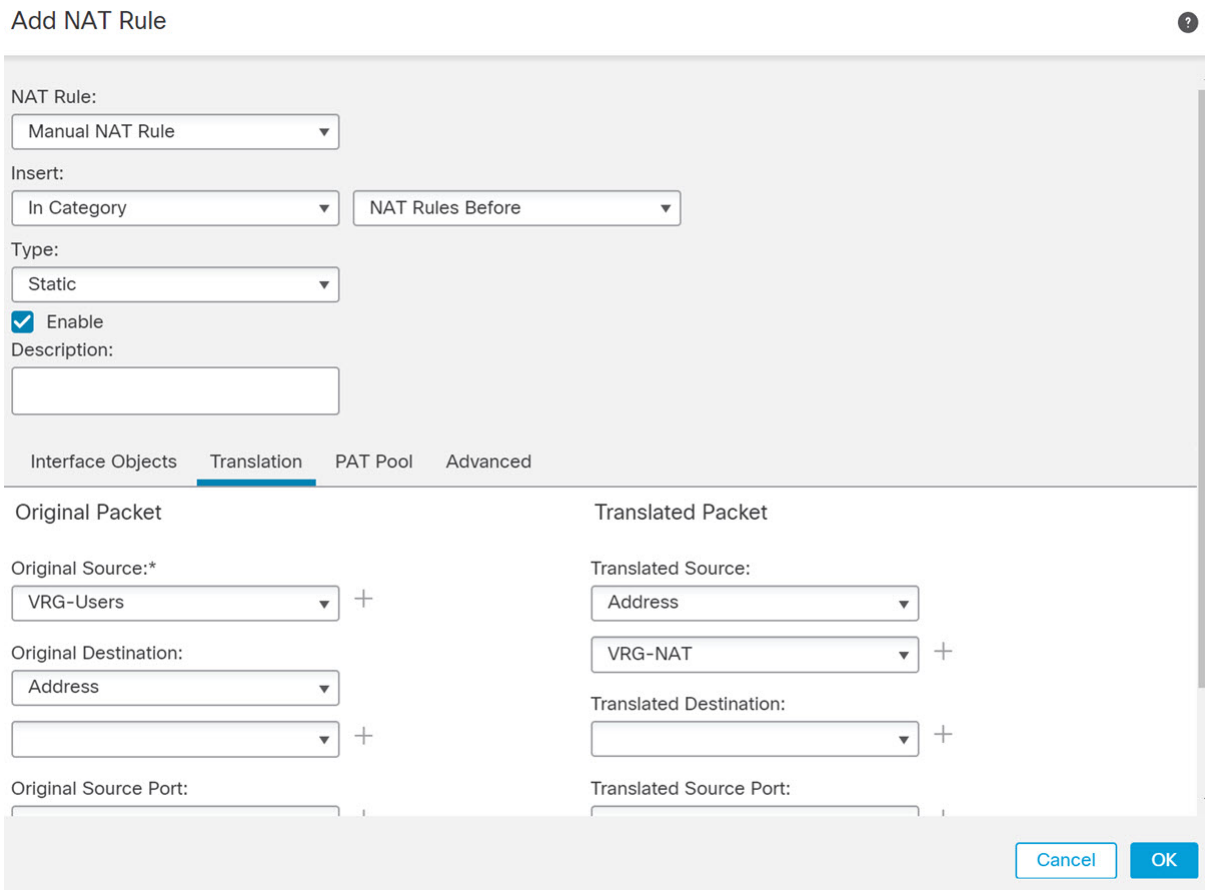
Step 7 Click **New Policy** > **Threat Defense NAT**.

Step 8 Enter a NAT policy name, and select the FTD device. Click **Save**.

Step 9 In the NAT page, click **Add Rule** and define the following source NAT for VRG:

- **NAT Rule**—Select Manual NAT Rule.
- **Type**—Select Static.

- **Insert**—Select Above, if any NAT rule exists.
- Click **Enabled**.
- In **Interface Objects**, select VRG-Inside object and click **Add to Source** (If the object is not available, create one in **Object** > **Object Management** > **Interface**), and select Global-Inside object and click **Add to Destination**.
- In **Translation**, select the following:
  - **Original Source**, select VRG-Users.
  - **Translated Source**, click **Add** and define object, VRG-NAT with 10.1.1.1. Select VRG-NAT as shown in the following figure:

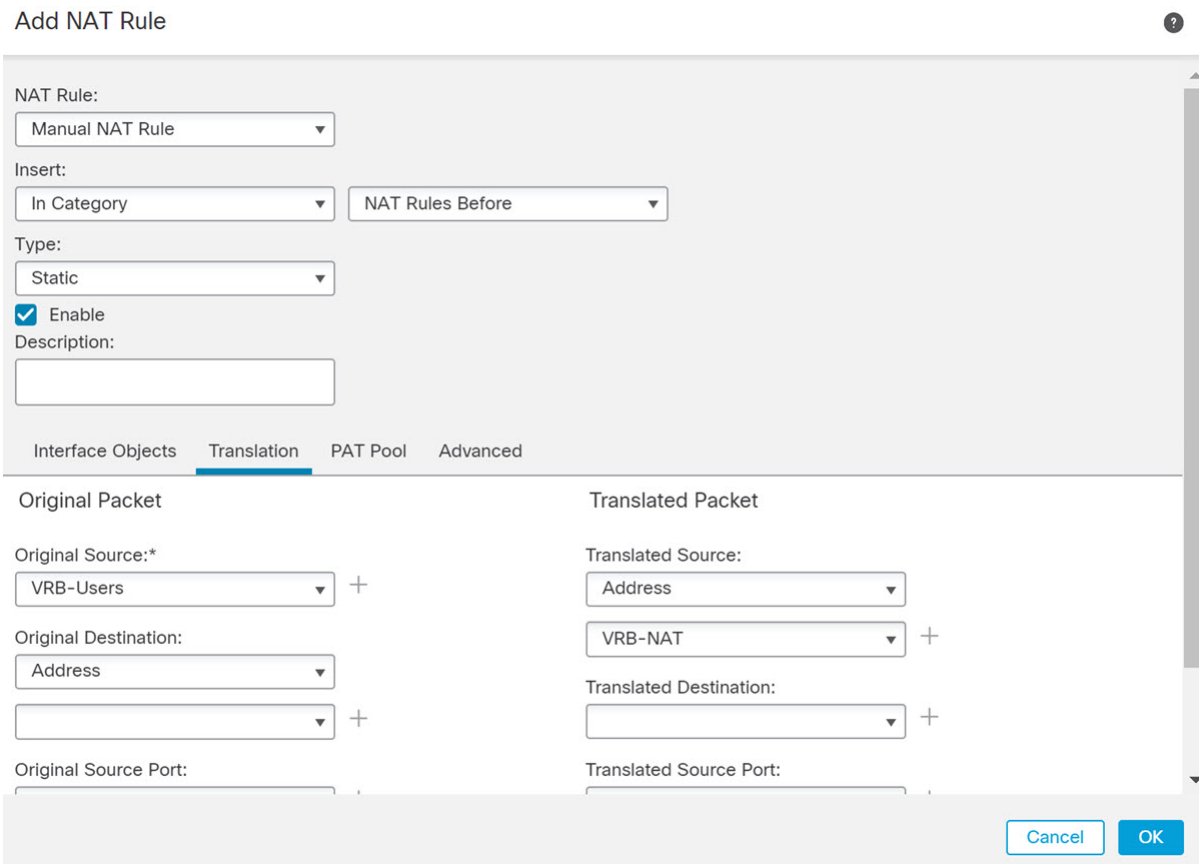


Step 10 Click **Ok**.

Step 11 In the NAT page, click **Add Rule** and define the following source NAT for VRB:

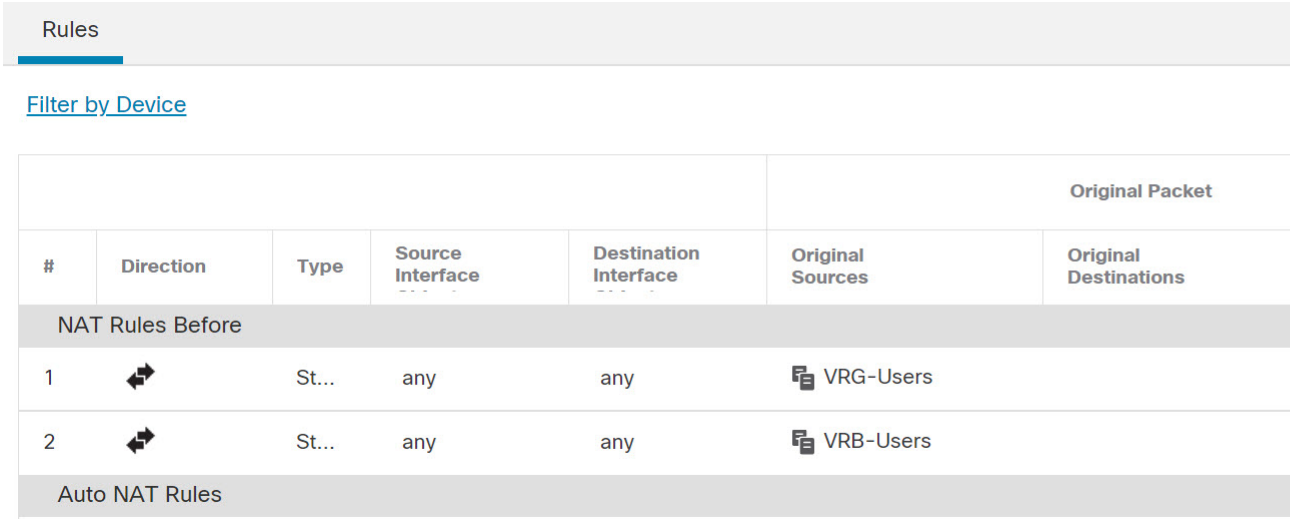
- **NAT Rule**—Select Manual NAT Rule.
- **Type**—Select Static.
- **Insert**—Select Above, if any NAT rule exists.
- Click **Enabled**.

- In **Interface Objects**, select VRB-Inside object and click **Add to Source** (If the object is not available, create one in **Object** > **Object Management** > **Interface**), and select Global-Inside object and click **Add to Destination**.
- In **Translation**, select the following:
  - **Original Source**, select VRB-Users.
  - **Translated Source**, click **Add** and define object, VRB-NAT with 20.1.1.1. Select VRB-NAT as shown in the following figure:



Step 12 Click **Save**.

The NAT rule looks like this:



Step 13 Add the two unique AD servers in FMC one for each VRG and VRB users—choose **System** > **Integration** > **Realms**.

Step 14 Click **New Realm** and complete the fields. For detailed information on the fields, see Realm Fields.

Step 15 For controlling the access from VRG and VRB users, define 2 Active Directories, see Realm Directory and Synchronize fields and Create a Realm and Realm Directory.

Step 16 Add ISE in FMC—choose **System** > **Integration** > **Identity Sources**.

Step 17 Click **Identity Services Engine** and complete the fields. For detailed information on the fields, see How to Configure ISE/ISE-PIC for User Control Using a Realm.

Step 18 Create Identity policy, rules, and then define access control policy for controlling access of overlapping users from VRG and VRB.

History for Virtual Routers in Firepower Threat Defense

Feature	Version	Details
Virtual router support for the ISA 3000	7.0	You can configure up to 10 virtual routers on an ISA 3000 device. New/modified screens: None
Virtual routers for Snort 3 enabled devices	7.0	Snort3 enabled devices now support virtual router features. Hence, you do not have to remove Snort 2 device from virtual routers before proceeding to switch to a Snort3 engine. New/modified screens: None
SNMP support on user-defined virtual routers	7.0	Firepower Threat Defense now supports configuring SNMP on user-defined virtual routers. New/modified screens: None

Feature	Version	Details
Bulk removal of virtual routers	6.7	You can remove multiple virtual routers from Firepower Threat Defense at a time. New/modified screens: **Devices** > **Device Management** > **Routing** > **Manage Virtual Routers** page.
Virtual Routers for Firepower Threat Defense	6.6	Virtual routers for Firepower Threat Defense were introduced. New/modified screens: Virtual routers can be created and Threat Defense interfaces can be assigned to the virtual routers in the **Devices** > **Device Management** > **Routing** page. Supported platforms: Firepower Threat Defense