Configure eBGP with Loopback Interface on Secure Firewall

Contents

Introduction

This document describes how to configure eBGP using a Loopback interface on the Cisco Secure Firewall.

Prerequisites

Requirements

Cisco recommends that you have knowledge of this topic:

- BGP protocol

Loopback interface support for BGP was introduced in version 7.4.0, which is the minimum version required for Secure Firewall Management Center and Cisco Secure Firepower Threat Defense.

Components Used

- Secure Firewall Management Center for VMware version 7.4.1
- 2 Cisco Secure Firepower Threat Defense for VMware version 7.4.1

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Background Information

Border Gateway Protocol (BGP) is an Exterior Gateway Protocol (EGP) standardized path-vector routing protocol that provides scalability, flexibility, and network stability. The BGP session between two peers with the same Autonomous System (AS) is called Internal BGP (iBGP). A BGP session between two peers with different Autonomous Systems (AS) is called External BGP (eBGP).

Typically, the peer relationship is established with the IP address of the interface closest to the peer, however, the use of a Loopback interface to establish the BGP session is useful since it not bring down the BGP session when there are multiple paths between BGP peers.

Note: The process describes the use of a Loopkack for an eBGP peer, however, is the same process for an iBGP peer so it can be used as a reference.

eBGP Configuration with a Loopback Interface

Scenario

In this configuration, Firewall SFTD-1 has a Loopback interface with the IP address 10.1.1.1/32, and the AS 64000, the Firewall SFTD-2 has a Loopback interface with the IP address 10.2.2.2/32 and the AS 64001. Both Firewalls use their outside interface to reach the Loopback interface of the other Firewall (in this scenario, the outside interface is preconfigured on both Firewalls).

Network Diagram

This document uses this network setup:

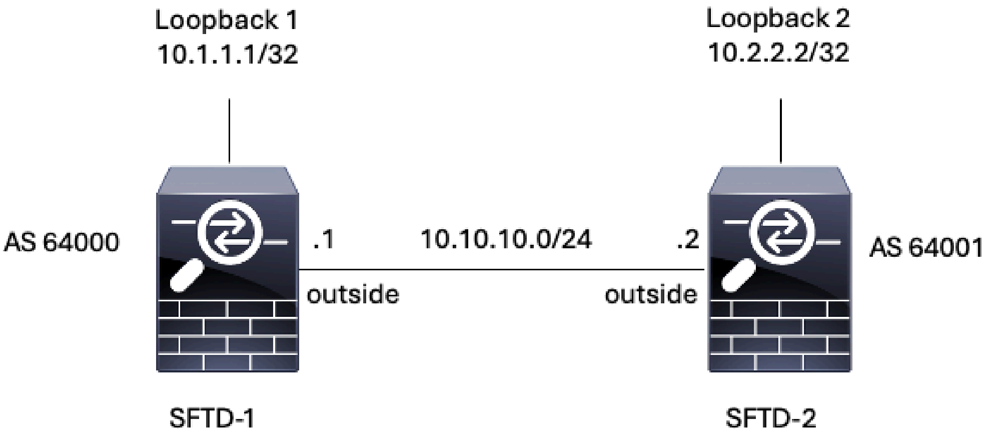


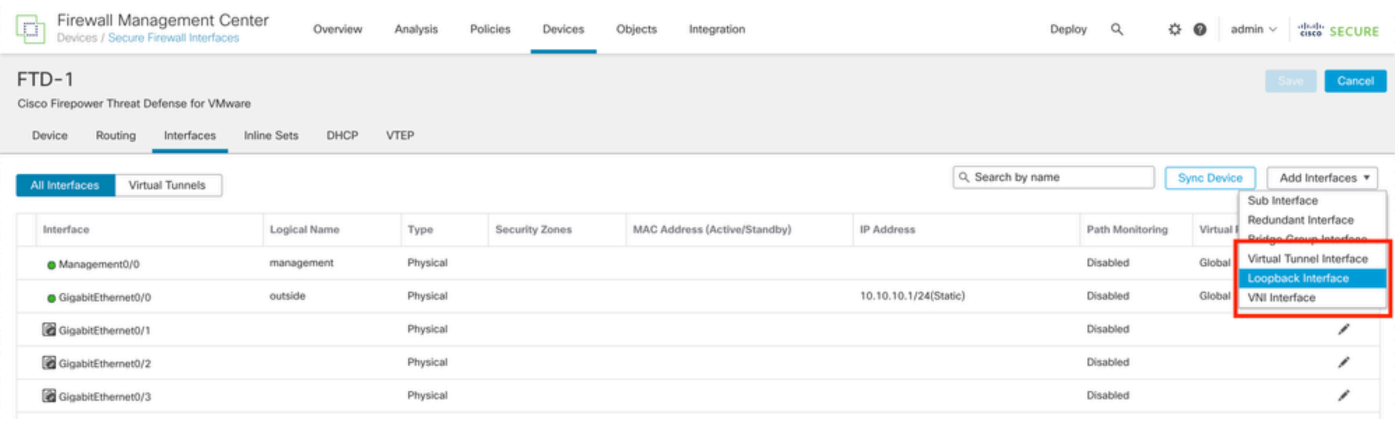
Image 1. Diagram of Escenario

Loopback Configuration

Step 1. Click **Devices** > **Device Management**, then select the device where you want to configure the Loopback.

Step 2**.** Click **Interfaces** > **All Interfaces.**

Step 3. Click **Add Interface** > **Loopback Interface.**



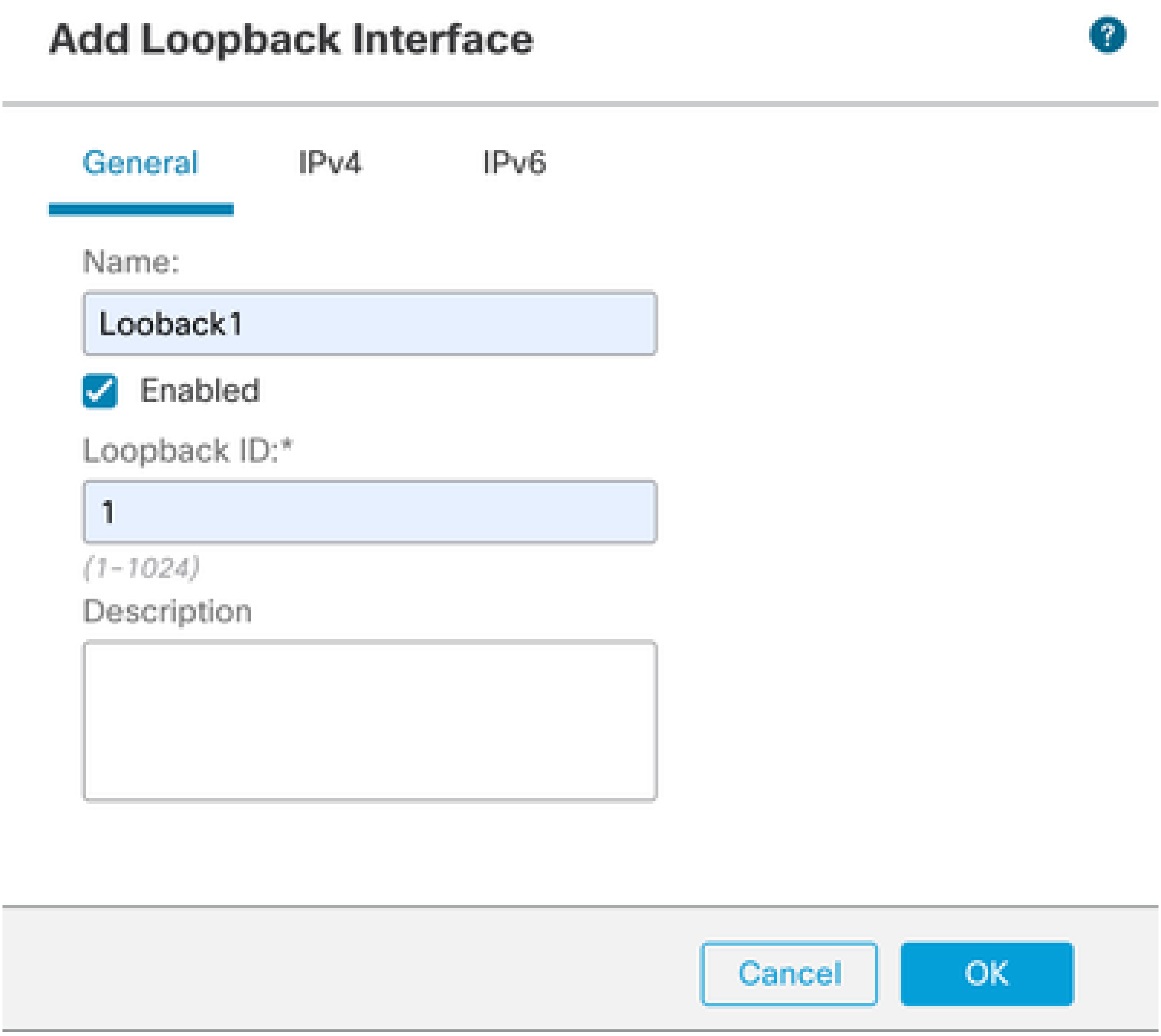
FTD-1

Cisco Firepower Threat Defense for VMware

Interface	Logical Name	Type	Security Zones	MAC Address (Active/Standby)	IP Address	Path Monitoring	Virtual
Management0/0	management	Physical				Disabled	Global
GigabitEthernet0/0	outside	Physical			10.10.10.1/24(Static)	Disabled	Global
GigabitEthernet0/1		Physical				Disabled	
GigabitEthernet0/2		Physical				Disabled	
GigabitEthernet0/3		Physical				Disabled	

Image 2. Add Interface Loopback

Step 4. In the **General** section, configure the name of the Loopback, check the **Enabled** box, and configure the **Loopback ID.**



Add Loopback Interface

Name: Looback1

☑ Enabled

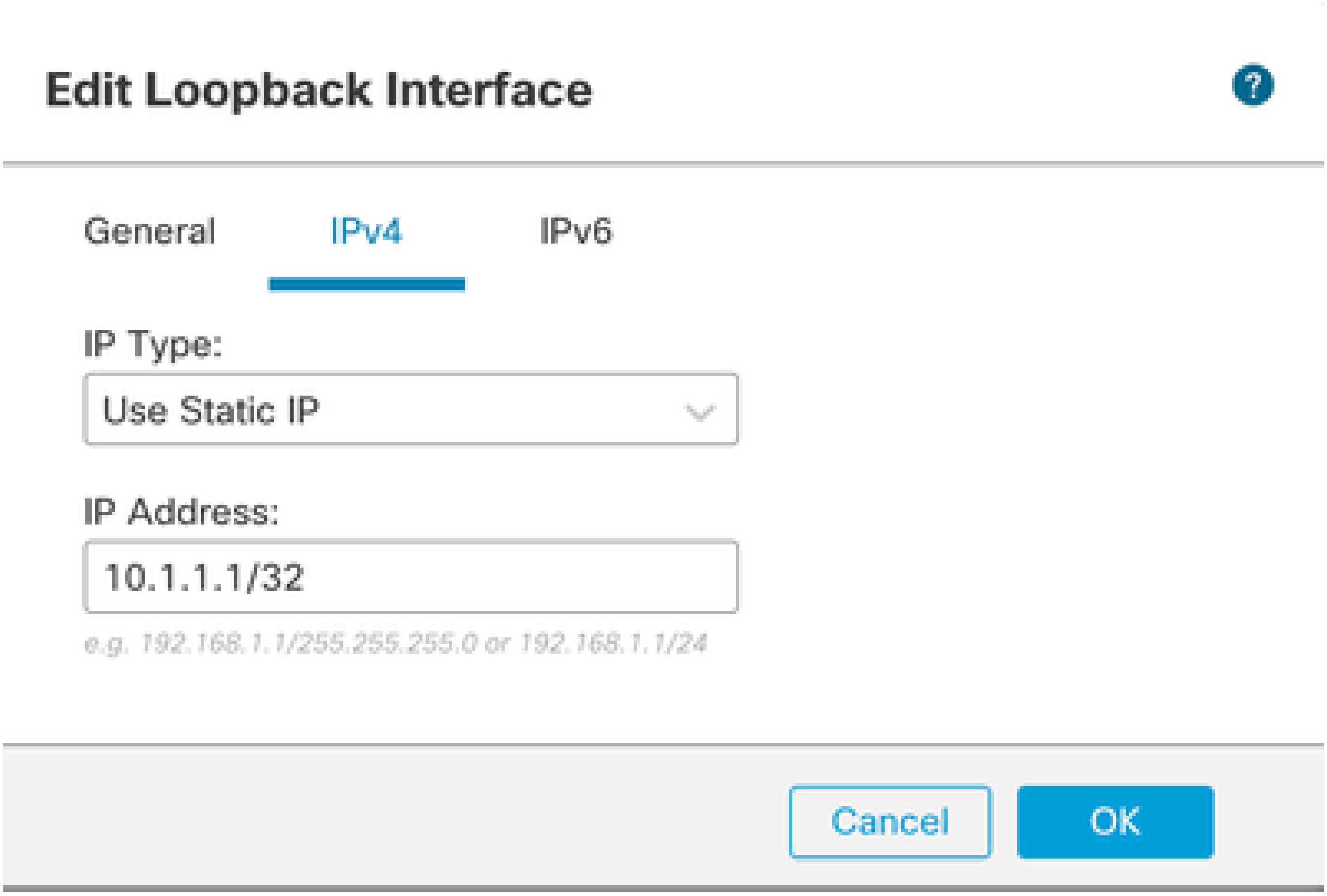
Loopback ID:* 1

(1-1024)

Description

Image 3. Basic Loopback Interface Configuration

Step 5. In the **IPv4** section, select the **Use Static IP** option in the **IP Type** section, configure the Loopback IP, then click **OK** to save the changes.



Edit Loopback Interface

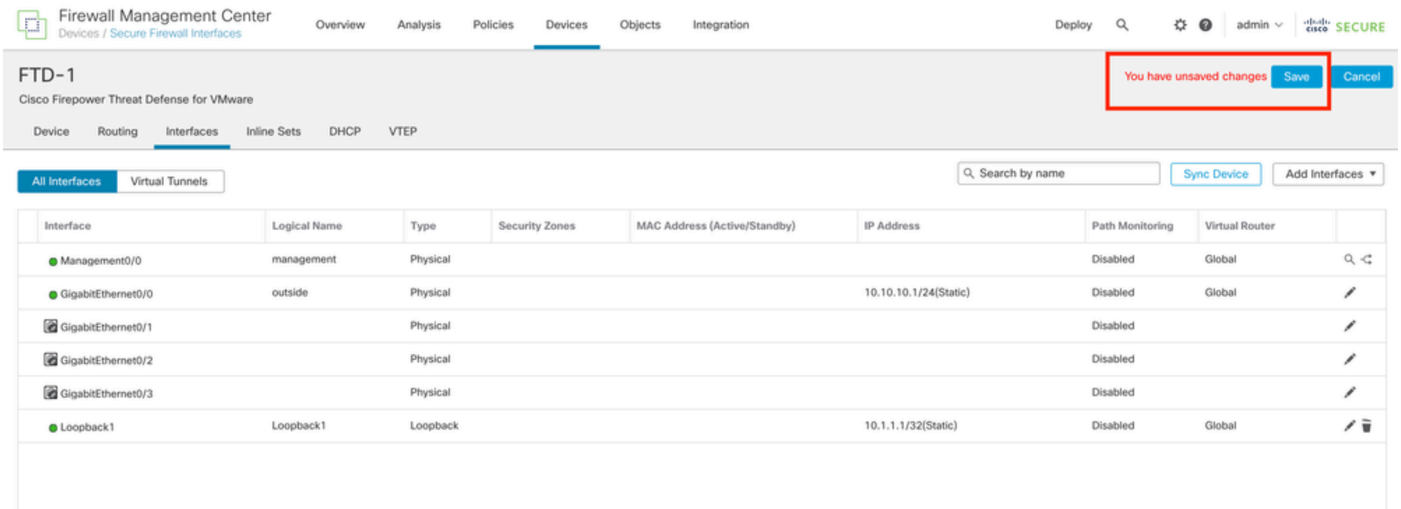
IP Type: Use Static IP

IP Address: 10.1.1.1/32

e.g. 192.168.1.1/255.255.255.0 or 192.168.1.1/24

Image 4. Loopback IP Address Configuration

Step 6. Click **Save.**



Firewall Management Center
Devices / Secure Firewall Interfaces

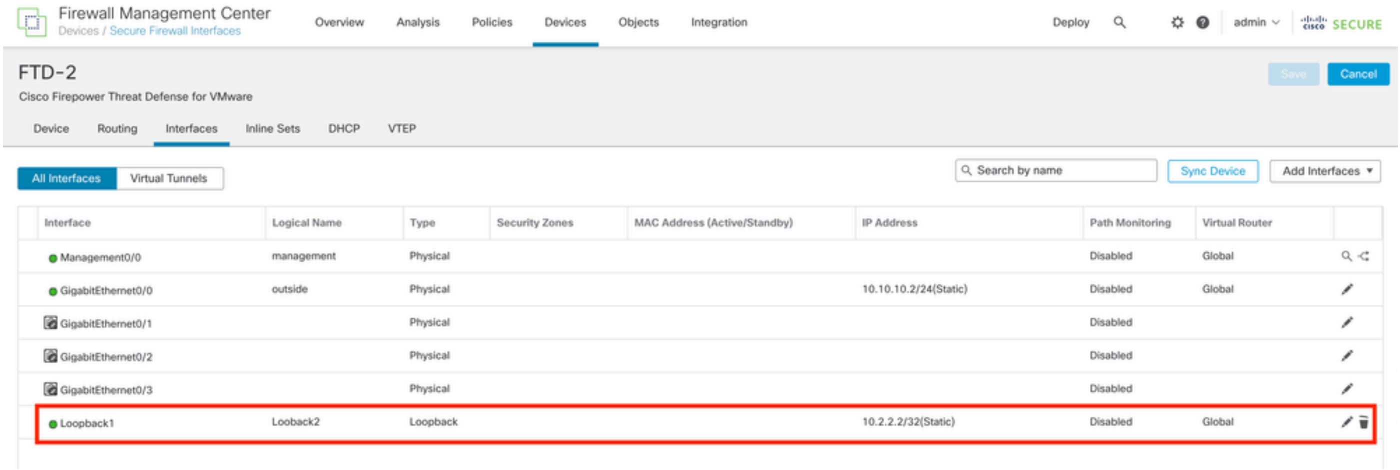
FTD-1
Cisco Firepower Threat Defense for VMware

You have unsaved changes

	Interface	Logical Name	Type	Security Zones	MAC Address (Active/Standby)	IP Address	Path Monitoring	Virtual Router
●	Management0/0	management	Physical				Disabled	Global
●	GigabitEthernet0/0	outside	Physical			10.10.10.1/24(Static)	Disabled	Global
	GigabitEthernet0/1		Physical				Disabled	
	GigabitEthernet0/2		Physical				Disabled	
	GigabitEthernet0/3		Physical				Disabled	
●	Loopback1	Loopback1	Loopback			10.1.1.1/32(Static)	Disabled	Global

Image 5. Save the Loopback Interface Configuration

Step 7. Repeat the process with the second Firewall.



Interface	Logical Name	Type	Security Zones	MAC Address (Active/Standby)	IP Address	Path Monitoring	Virtual Router
Management0/0	management	Physical				Disabled	Global
GigabitEthernet0/0	outside	Physical			10.10.10.2/24(Static)	Disabled	Global
GigabitEthernet0/1		Physical				Disabled	
GigabitEthernet0/2		Physical				Disabled	
GigabitEthernet0/3		Physical				Disabled	
Loopback1	Loopback2	Loopback			10.2.2.2/32(Static)	Disabled	Global

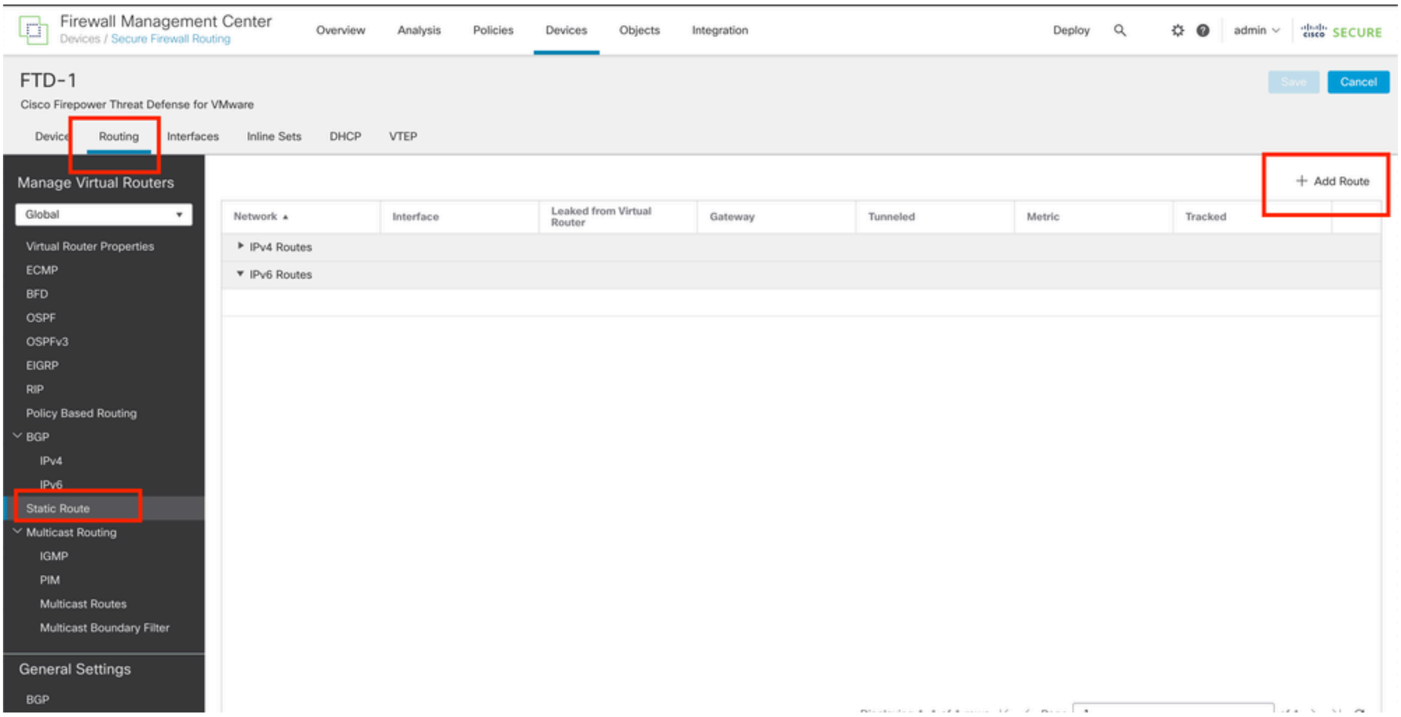
Image 6. Loopback Interface Configuration on peer

Static Route Configuration

A static route must be configured to ensure the remote peer address (Loopback) used for peering is reachable through the desired interface.

Step 1. Click **Devices** > **Device Management,** then select the device you want to configure the static route.

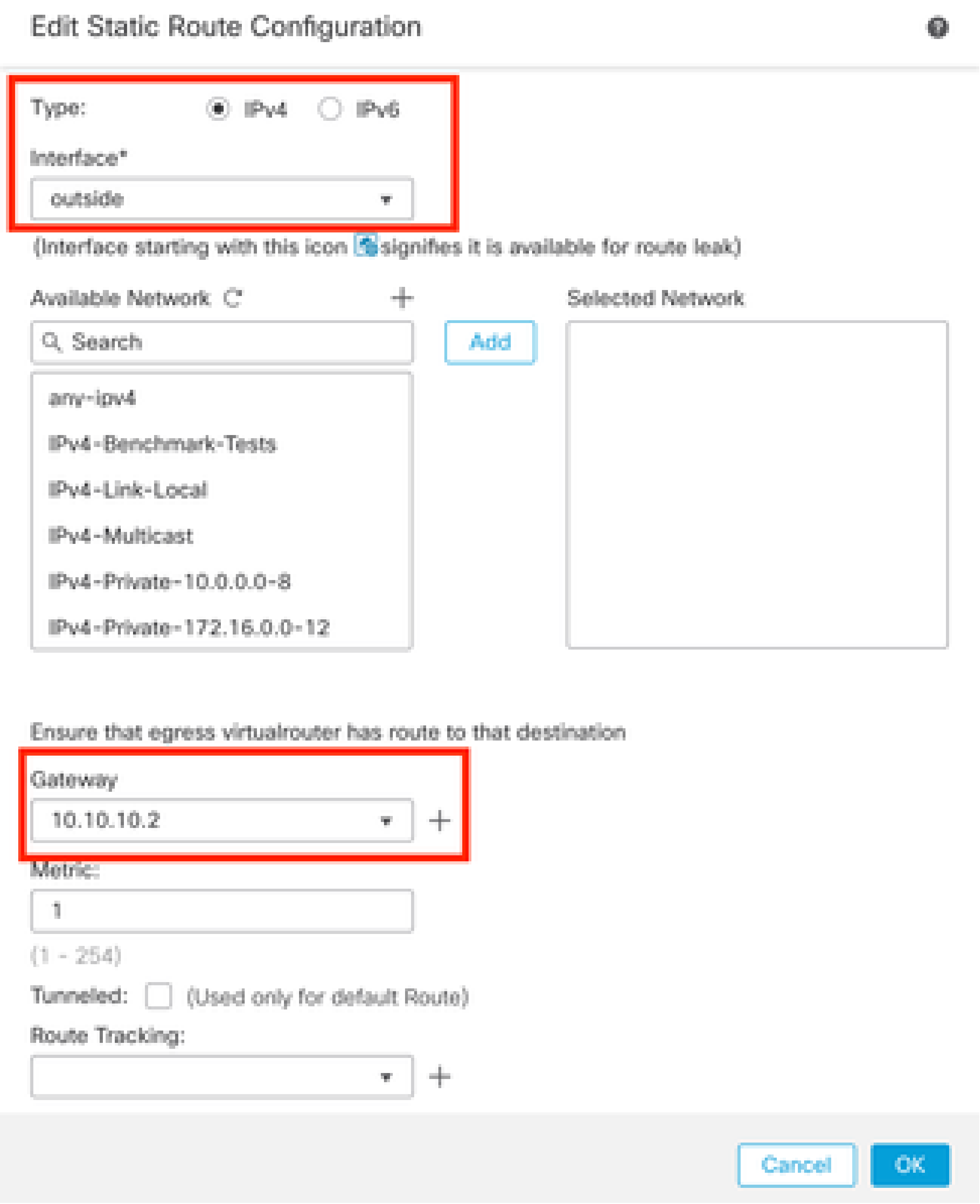
Step 2. Click **Routing** > **Manage Virtual Routers** > **Static Route,** then click **Add Route**.



Network	Interface	Leaked from Virtual Router	Gateway	Tunneled	Metric	Tracked
▸ IPv4 Routes						
▾ IPv6 Routes						

Image 7. Add New Static Route

Step 3. Check the IPv4 option for **Type**. Select the physical interface used to reach the Loopback of the remote peer in the **Interface** option, and then specify the next hop to reach the Loopback on the **Gateway** section.



Edit Static Route Configuration

Type: ● IPv4 ○ IPv6

Interface*: outside

(Interface starting with this icon signifies it is available for route leak)

Ensure that egress virtualrouter has route to that destination

Gateway: 10.10.10.2

Metric: 1

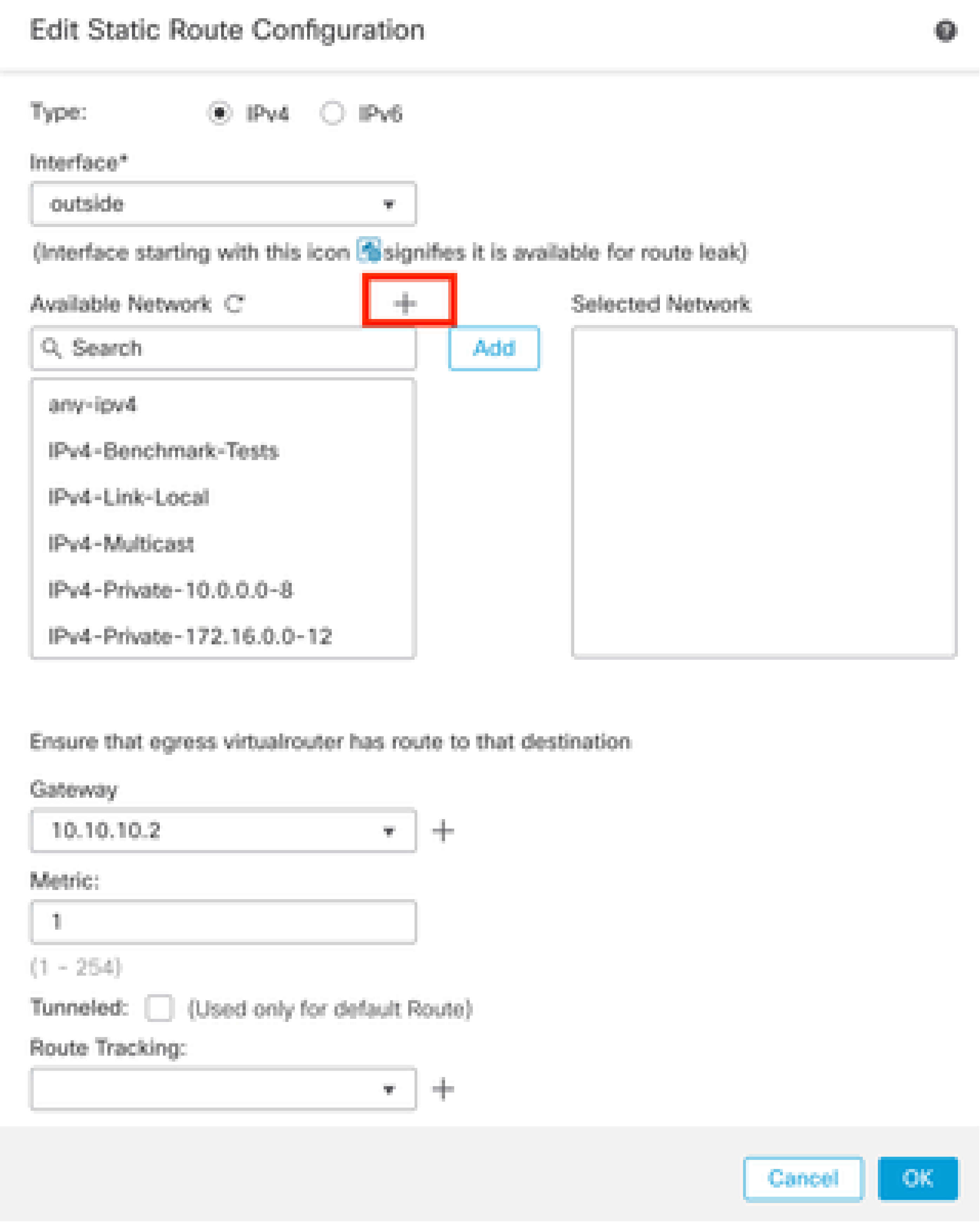
(1 - 254)

Tunneled: □ (Used only for default Route)

Route Tracking:

Image 8. Static Route Configuration

Step 4. Click the icon (+) next to the **Available Network** section.



Edit Static Route Configuration

Type: ● IPv4 ○ IPv6

Interface*

outside

(Interface starting with this icon signifies it is available for route leak)

Available Network

Selected Network

any-ipv4

IPv4-Benchmark-Tests

IPv4-Link-Local

IPv4-Multicast

IPv4-Private-10.0.0.0-8

IPv4-Private-172.16.0.0-12

Ensure that egress virtualrouter has route to that destination

Gateway

10.10.10.2

Metric:

1

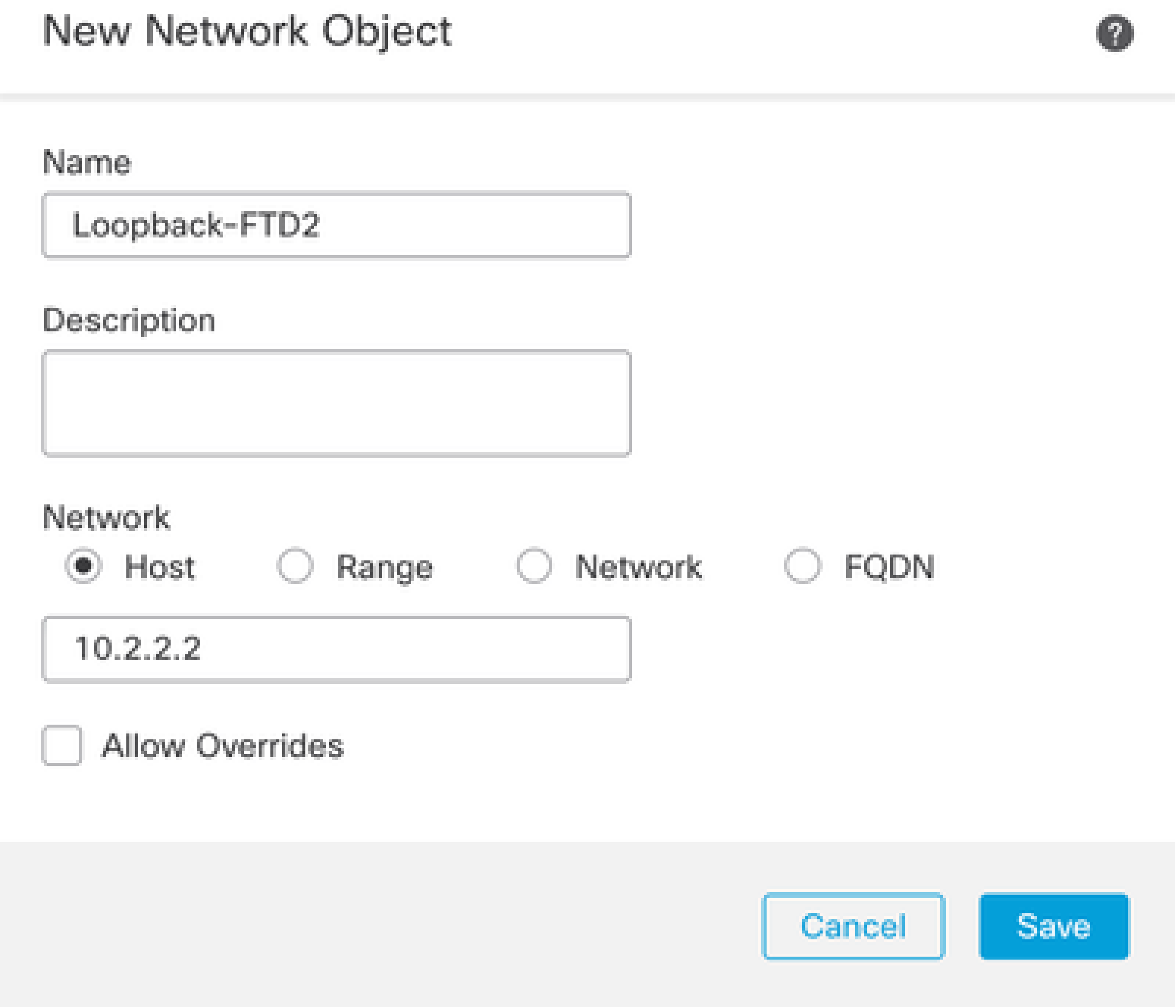
(1 - 254)

Tunneled: □ (Used only for default Route)

Route Tracking:

Image 9. Add New Network Object

Step 5. Configure a name for reference and the IP of the Looback of the remote peer and **Save**.



New Network Object

Name: Loopback-FTD2

Description:

Network

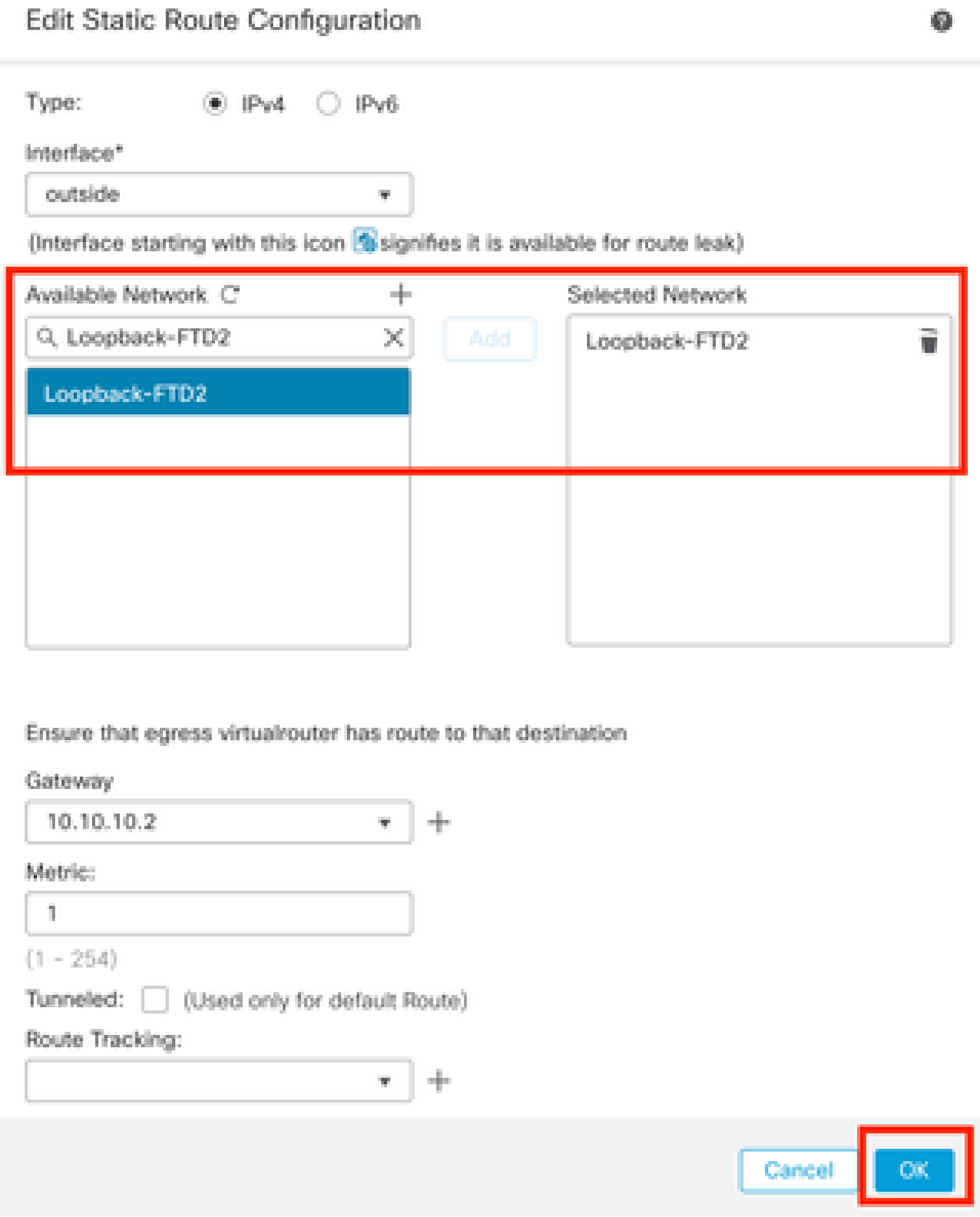
● Host ○ Range ○ Network ○ FQDN

10.2.2.2

□ Allow Overrides

Image 10. Configure Network Destination In the Static Route

Step 6. Search the new object created in the search bar, select it, then click **Add,** and then click **OK**.



Edit Static Route Configuration

Type: ● IPv4 ○ IPv6

Interface*: outside

(Interface starting with this icon signifies it is available for route leak)

Available Network: Loopback-FTD2

Selected Network: Loopback-FTD2

Ensure that egress virtualrouter has route to that destination

Gateway: 10.10.10.2

Metric: 1

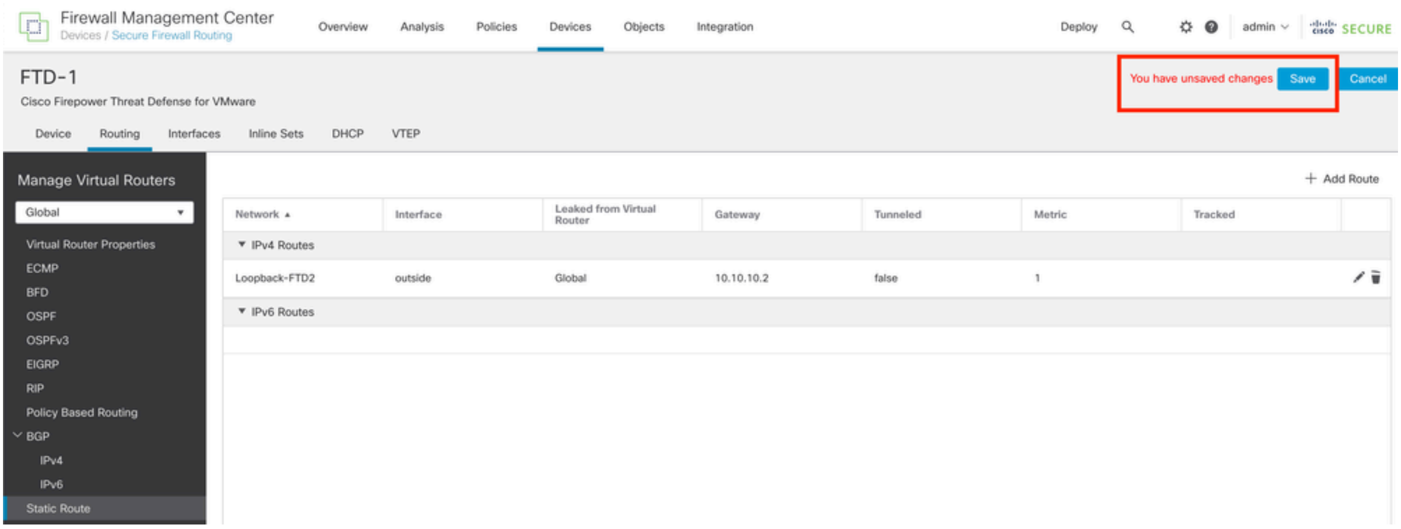
(1 - 254)

Tunneled: □ (Used only for default Route)

Route Tracking:

Image 11. Configure Next Hop in Static Route

Step 7. Click **Save.**



FTD-1

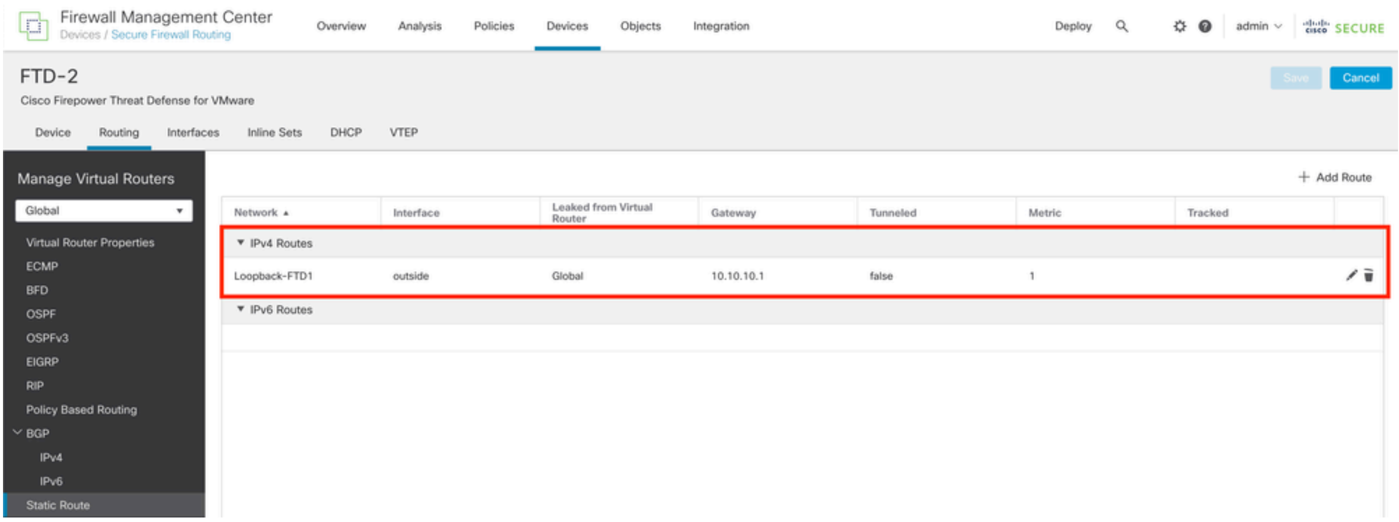
Cisco Firepower Threat Defense for VMware

You have unsaved changes

Network ▲	Interface	Leaked from Virtual Router	Gateway	Tunneled	Metric	Tracked
▼ IPv4 Routes						
Loopback-FTD2	outside	Global	10.10.10.2	false	1	
▼ IPv6 Routes						

Image 12. Save the Static Route Interface Configuration

Step 8. Repeat the process with the second Firewall.



FTD-2

Cisco Firepower Threat Defense for VMware

Network ▲	Interface	Leaked from Virtual Router	Gateway	Tunneled	Metric	Tracked
▼ IPv4 Routes						
Loopback-FTD1	outside	Global	10.10.10.1	false	1	
▼ IPv6 Routes						

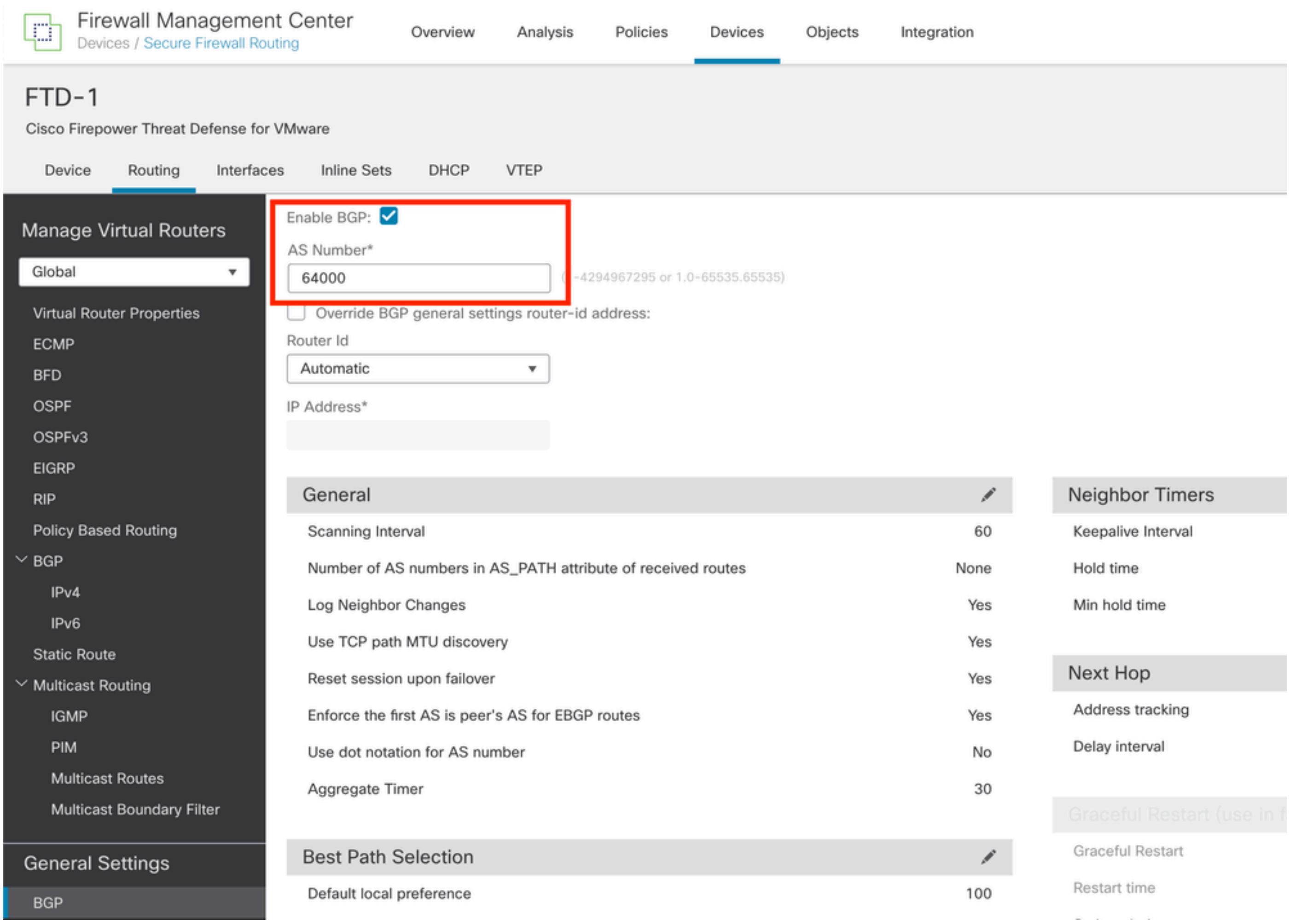
Image 13. Configure Static Route on Peer

BGP Configuration

Step 1. Click **Devices** > **Device Management**, and select the device you want to enable BGP.

Step 2. Click **Routing** > **Manage Virtual Routers** > **General Settings**, and then click **BGP**.

Step 3. Check the **Enable BGP** box, then configure the local AS of the Firewall into the **AS Number** section.



Enable BGP: ☑

AS Number* 64000 (1-4294967295 or 1.0-65535.65535)

☐ Override BGP general settings router-id address:

Router Id: Automatic

IP Address*

General	
Scanning Interval	60
Number of AS numbers in AS_PATH attribute of received routes	None
Log Neighbor Changes	Yes
Use TCP path MTU discovery	Yes
Reset session upon failover	Yes
Enforce the first AS is peer's AS for EBGP routes	Yes
Use dot notation for AS number	No
Aggregate Timer	30

Best Path Selection	
Default local preference	100

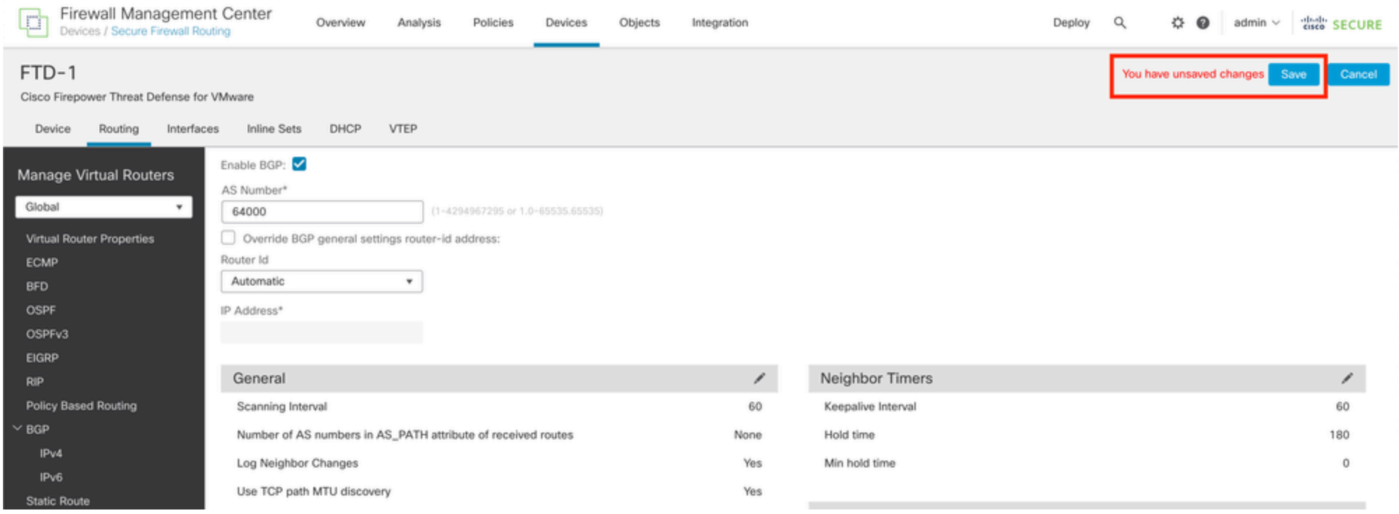
Neighbor Timers: Keepalive Interval; Hold time; Min hold time

Next Hop: Address tracking; Delay interval

Graceful Restart (use in f: Graceful Restart; Restart time

Image 14. Enable BGP Globally

Step **4.** Save the changes by clicking the **Save** button.



Enable BGP: ☑

AS Number* 64000 (1-4294967295 or 1.0-65535.65535)

☐ Override BGP general settings router-id address:

Router Id: Automatic

IP Address*

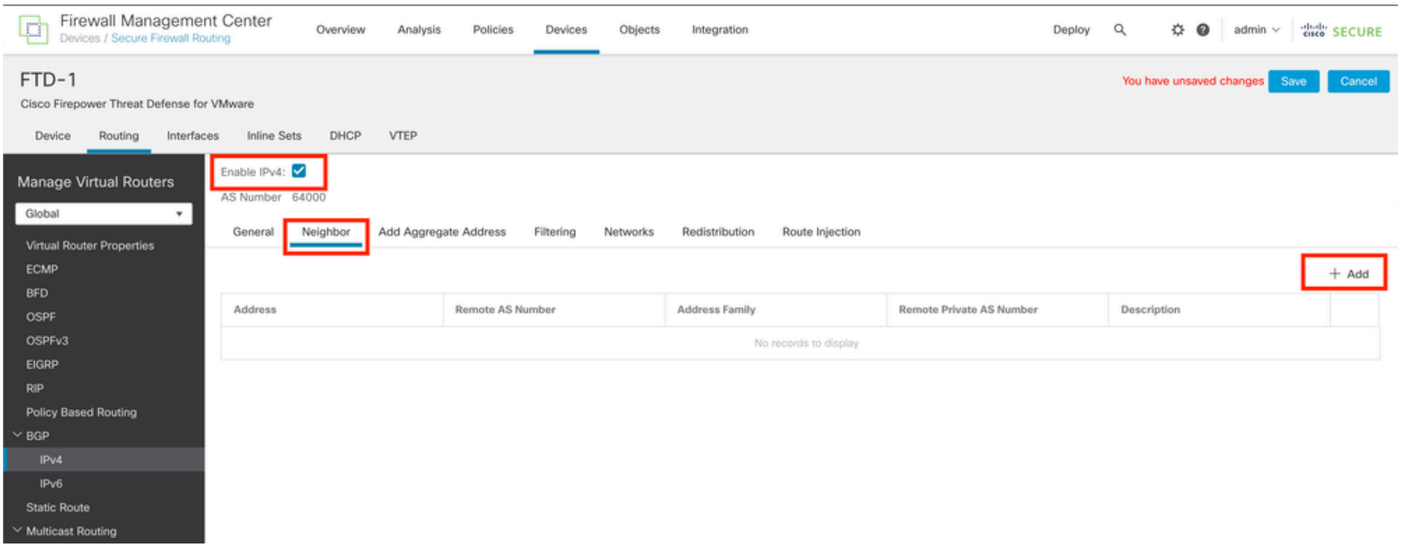
General	
Scanning Interval	60
Number of AS numbers in AS_PATH attribute of received routes	None
Log Neighbor Changes	Yes
Use TCP path MTU discovery	Yes

Neighbor Timers	
Keepalive Interval	60
Hold time	180
Min hold time	0

Image 15. Save the BGP Enable Change

Step 5**.** In the **Manage Virtual Routers** section, go to the **BGP** option, and then click **IPv4**.

Step 6**.** Check the **Enable IPv4** box, then click **Neighbor**, and then click **+ Add**.



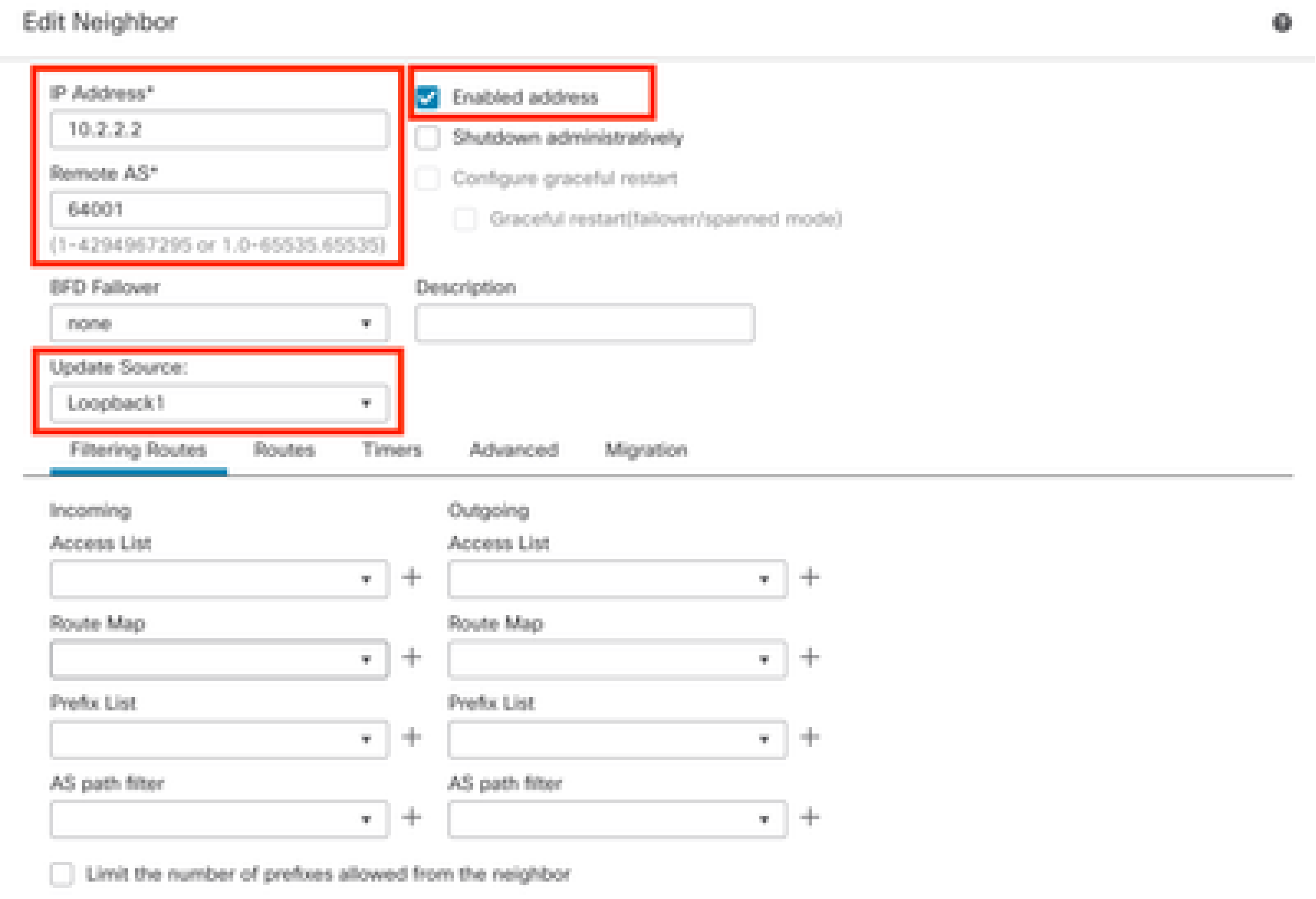
Enable IPv4: ☑

AS Number 64000

Image 16. Add a New BGP Peer

Step 7**.** Configure the IP address of the remote peer in the **IP Address** section, then configure the AS of the remote peer in the **Remote AS** section, and check the **Enable address** box.

Step 8. Select the local interface Loopback in the **Update Source** section.



IP Address*: 10.2.2.2

Remote AS*: 64001

(1-4294967295 or 1.0-65535.65535)

☑ Enabled address

☐ Shutdown administratively

☐ Configure graceful restart

☐ Graceful restart(failover/spanned mode)

BFD Failover: none

Description:

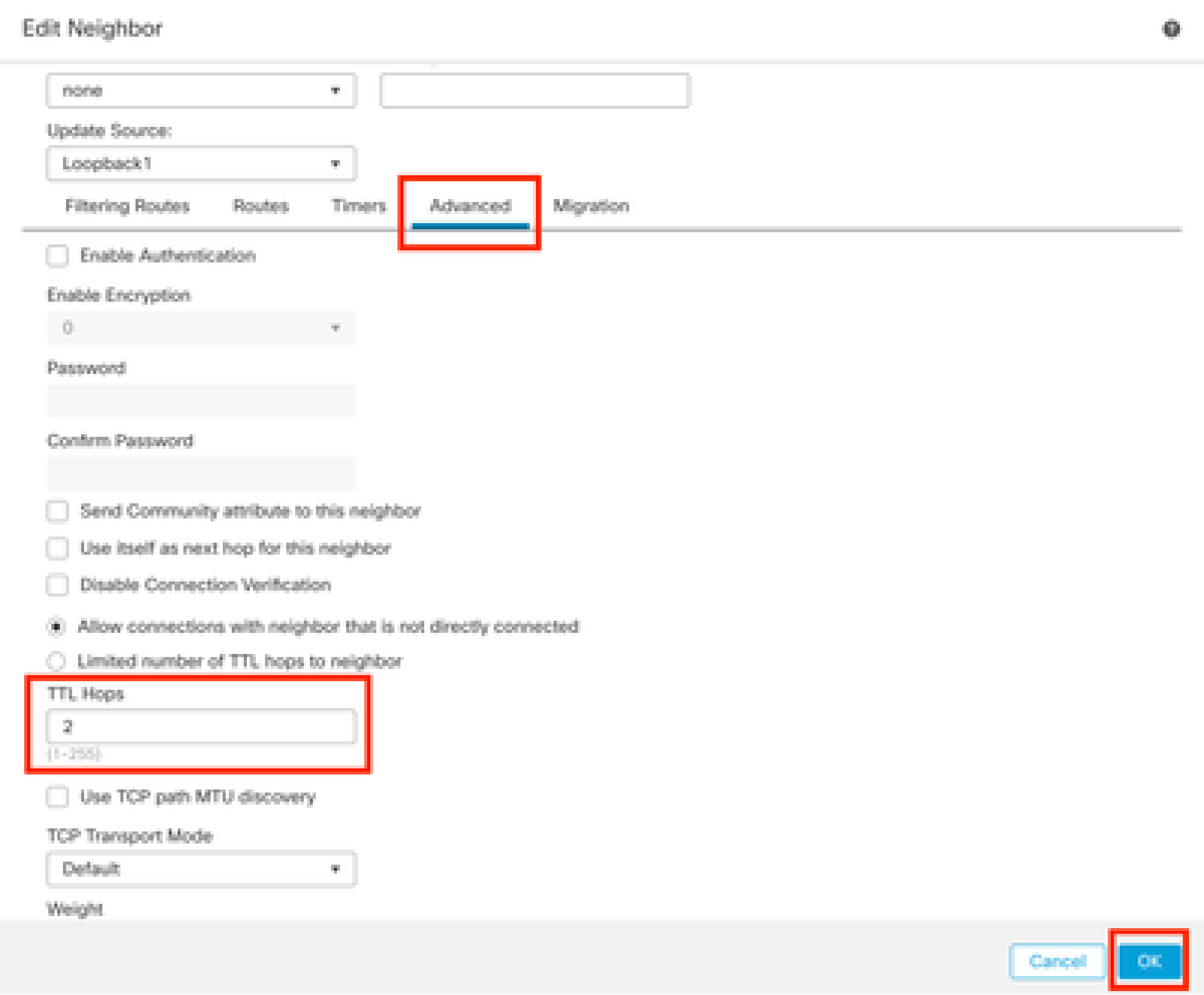
Update Source: Loopback1

☐ Limit the number of prefixes allowed from the neighbor

Image 17. Basic BGP Peer Parameters

Note: The **Update Source** option enables the **neighbor update-source** command, used to permit any operational interface (including Loopbacks). This command can be specified to establish TCP connections.

Step 9**.** Click **Advanced,** then configure the number 2 in the **TTL Hops** option, and click **OK**.



Edit Neighbor

none ▾

Update Source:
Loopback1 ▾

☐ Enable Authentication

Enable Encryption
0 ▾

Password

Confirm Password

☐ Send Community attribute to this neighbor

☐ Use itself as next hop for this neighbor

☐ Disable Connection Verification

● Allow connections with neighbor that is not directly connected

○ Limited number of TTL hops to neighbor

TTL Hops
2
(1-255)

☐ Use TCP path MTU discovery

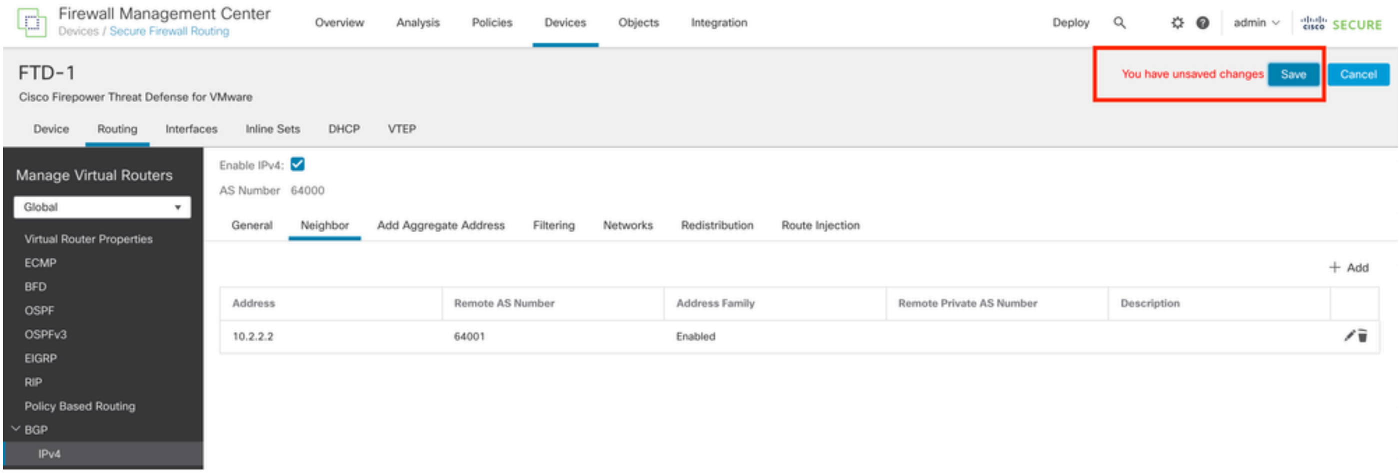
TCP Transport Mode
Default ▾

Weight

Image 18. Configure the TTLs Hop Number

Note: The **TTL Hops** option enables the **ebgp-multihop** command, used to change the TTL value to allow the packet to reach the external BGP peer that is not directly connected or has an interface other than the directly connected interface.

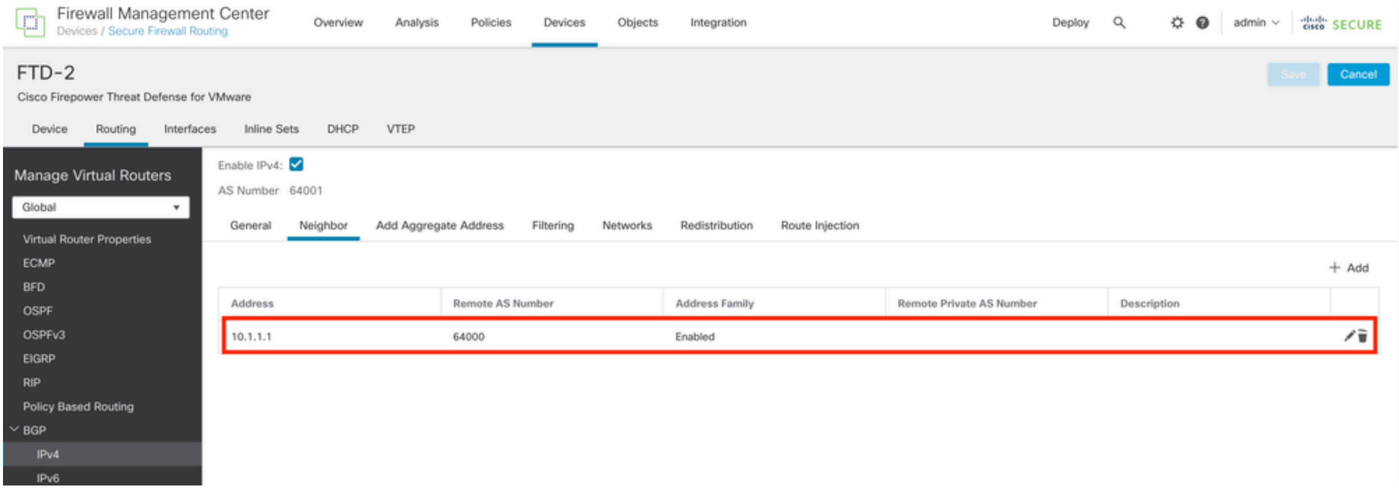
Step 10. Click **Save** and deploy the changes**.**



Address	Remote AS Number	Address Family	Remote Private AS Number	Description
10.2.2.2	64001	Enabled		

Image 19. Save the BGP Configuration

Step 11. Repeat the process with the second Firewall.



Address	Remote AS Number	Address Family	Remote Private AS Number	Description
10.1.1.1	64000	Enabled		

Image 20. Configure BGP on Peer

Verify

Step 1. Verify the Loopback and static route configuration, then check the connectivity between BGP peers with a ping test.

show running-config interface interface_name

show running-config route

show destination_ip

SFTD-1	SFTD-2
show running-config interface Loopback1 interface Loopback1 nameif Loopback1	**show running-config interface Loopback1** interface Loopback1 nameif Looback2

ip address 10.1.1.1 255.255.255.255 **show running-config route** route outside 10.2.2.2 255.255.255.255 10.10.10.2 1 ping 10.2.2.2 **Sending 5, 100-byte ICMP Echos to 10.2.2.2, timeout is 2 seconds:** **!!!!!** Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms	ip address 10.2.2.2 255.255.255.255 **show running-config route** route outside 10.1.1.1 255.255.255.255 10.10.10.1 1 ping 10.1.1.1 **Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:** **!!!!!** Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms

Step 2. Verify the BGP configuration, then ensure that the BGP peering is established.

show running-config router bgp

show bgp neighbors

show bgp summary

SFTD-1	**SFTD-2**
show running-config router bgp router bgp **64000** bgp log-neighbor-changes bgp router-id vrf auto-assign address-family ipv4 unicast neighbor 10.2.2.2 remote-as 64001 neighbor 10.2.2.2 **ebgp-multihop 2** neighbor 10.2.2.2 transport path-mtu-discovery disable neighbor 10.2.2.2 **update-source Loopback1** neighbor 10.2.2.2 activate no auto-summary no synchronization exit-address-family !	**show running-config router bgp** router bgp **64001** bgp log-neighbor-changes bgp router-id vrf auto-assign address-family ipv4 unicast neighbor 10.1.1.1 remote-as 64000 neighbor 10.1.1.1 **ebgp-multihop 2** neighbor 10.1.1.1 transport path-mtu-discovery disable neighbor 10.1.1.1 **update-source Looback2** neighbor 10.1.1.1 activate no auto-summary no synchronization exit-address-family !

show bgp neighbors | i BGP **BGP neighbor is 10.2.2.2**, vrf single_vf, remote AS 64001, external link BGP version 4, remote router ID 10.2.2.2 BGP state = **Established**, up for 1d15h BGP table version 7, neighbor version 7/0 External BGP neighbor may be up to 2 hops away. **show bgp summary** BGP router identifier 10.1.1.1, local AS number 64000 BGP table version is 7, main routing table version 7 Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd 10.2.2.2 4 64001 2167 2162 7 0 0 1d15h 0	**show bgp neighbors | i BGP** **BGP neighbor is 10.1.1.1**, vrf single_vf, remote AS 64000, external link BGP version 4, remote router ID 10.1.1.1 BGP state = **Established**, up for 1d16h BGP table version 1, neighbor version 1/0 External BGP neighbor may be up to 2 hops away. **show bgp summary** BGP router identifier 10.2.2.2, local AS number 64001 BGP table version is 1, main routing table version 1 Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd 10.1.1.1 4 64000 2168 2173 1 0 0 1d16h 0

Troubleshooting

If you are experiencing any issues during the process, please review this article:

- **Border Gateway Protocol (BGP)**