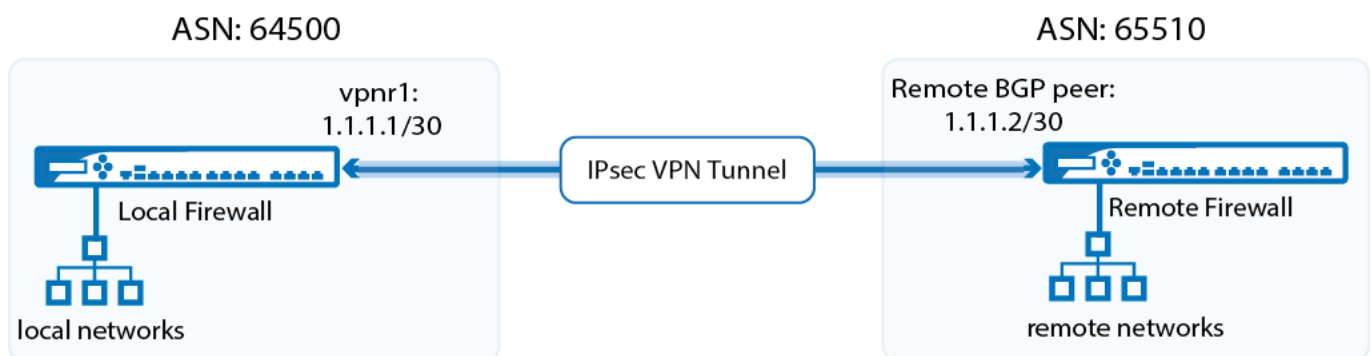


How to Configure BGP over an IKEv1 IPsec VPN to a Third-Party VPN Gateway

<https://campus.barracuda.com/doc/48202660/>

You can propagate and learn networks via BGP in which the peer is connected via a site-to-site IKEv1 IPsec tunnel. The BGP service uses the IPsec tunnel to dynamically learn the routes of the remote network via the intermediary network /30 assigned to the VPN next hop interface and the remote gateway.



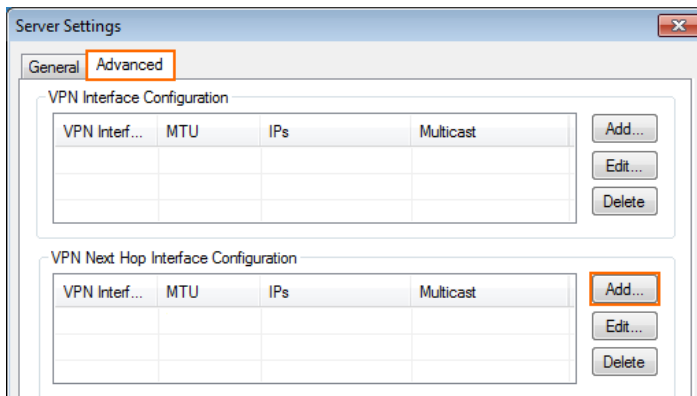
Before You Begin

- You must have a free /30 network.
- You must have or assign autonomous system numbers (ASNs) for the remote and local networks. The ASNs can be private if you are not propagating these networks to other public networks.

Step 1. Create VPN Next Hop Interfaces

Create a VPN next hop interface and assign an IP address out of the intermediary /30 network.

1. Go to **CONFIGURATION > Configuration Tree > Box > Virtual Servers > your virtual server > Assigned Services > VPN-Service > VPN Settings**.
2. Click **Lock**.
3. Click on **Click here for Server Settings**.
4. Click on the **Advanced** tab.

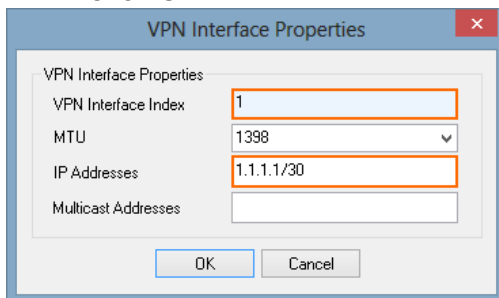


5. Create a VPN next hop interface for each IPsec tunnel by clicking **Add** in the **VPN Next Hop Interface Configuration** section.

1. In the **VPN Interface Properties** window enter:

- **VPN Interface Index** – Enter a number between 0 and 99. Each interface index number must be unique.
- **IP Addresses** – Enter the first IP address in the /30 network.

2. Click **OK**.



6. Click **OK**.

7. Click **Send Changes** and **Activate**.

Step 2. Add the VPN Interface IP to the Virtual Server Addresses

Add the IP address of the virtual interface to the list of IP addresses that the virtual server listens on.

1. Go to **CONFIGURATION > Configuration Tree > Box > Virtual Servers > your virtual server > Server Properties**.
2. Click **Lock**.
3. In the **Additional IP** table, add the intermediary VPN IP address of the local VPN interface. E.g., 192.168.22.1 for the local NextGen Firewall F-Series or 192.168.22.2 for the remote NextGen Firewall F-Series.
4. Click **Send Changes** and **Activate**.

Step 3. Configure a Site-to-Site IKEv1 IPsec Tunnels

Configure a site-to-site IPsec tunnel using the VPN next hop interface.

1. Go to **CONFIGURATION > Configuration Tree > Box > Virtual Servers > your virtual server > Assigned Services > VPN-Service > Site to Site**.
2. Click on the **IPSEC IKEv1 Tunnels** tab.
3. Click **Lock**.
4. For each IPsec tunnel, right-click and click **New IPsec IKEv1 tunnel**.

1. Enter the IPsec tunnel configurations:

1. Enter a **Name**.
2. Enter the **Phase 1** and **Phase 2** settings:

	Phase 1	Phase 2
Encryption	AES	AES
Hash Meth.	SHA	SHA
DH-Group	Group2	Group 2
Lifetime(sec)	28800	3600
Perfect Forward Secrecy		Enable

3. In the **Local Networks** tab:

- **Local IKE Gateway** – Enter your external IP address. If you are using a dynamic WAN interface enter 0.0.0.0
- **ID-type** – Select **IPV4_ADDR_SUBNET (explicit)**.
- **Explicit Net** – Enter 0.0.0.0/0.

4. In the **Remote Networks** tab:

- **Remote IKE Gateway** – Enter the public IP address of the remote third-party VPN gateway.
- **ID-type** – Select **IPV4_ADDR_SUBNET (explicit)**.
- **Explicit Net** – Enter 0.0.0.0/0.

5. In the **Peer Identification** tab:

- **Shared Secret** – Enter the **Pre-Shared Key**.

6. In the **Advanced** tab:

- **Interface Index** – Enter the **VPN Next Hop Interface index** number you entered in step 1.
- **VPN Next Hop Routing** – Enter the second IP address of the /30 network that is assigned to the remote VPN gateway.

7. Click **OK**.

Basics | **TI - VPN Envelope Policy** | Advanced | RAW IPsec

DPD interval (s) <Default> VPN Next Hop Routing 1.1.1.2

HW Accel. Use Acceleration Card (if present) Encaps. Mode Auto Detec. ☐

Interface Index 1

Local Networks **Identify**

Initiates Tunnel Yes (active IKE)

Local IKE Gateway 62.99.0.58

ID-type IPV4_ADDR_SUBNET (explicit)

Explicit Net 0.0.0.0/0

Using "VPN Next Hop Routing" to determine network.

Remote Networks **Peer Identification**

Remote IKE Gateway 23.47.0.37

ID-type IPV4_ADDR_SUBNET (explicit)

Explicit Net 0.0.0.0/0

Using "VPN Next Hop Routing" to determine network.

5. Click **Send Changes** and **Activate**.

You now have one VPN next hop interface listed in the **Interfaces/IPs** section on the **CONTROL > Network** page and the VPN tunnels on the **CONTROL > VPN > STATUS**.

Interfaces/IPs	IPs	Interfaces	Proxy ARPs	ARPs	Statistics	OSPF	RIP	BGP	Switch Info	IPv6 ND Cache
Interface/IP	Label	Ping	MAC of duplicate IP	Info						
lo										
port1, Speed=1000Mb/s, Duplex=Full										
port2, Speed=1000Mb/s, Duplex=Full										
port3										
port4										
vpn1										
vpn1										

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 Site-to-Site



 Client-to-Site

 Status

Tunnel	Name	Type	Group	Info	State	Succ.	Fail	Last Access	Last Peer	Last Info	Last Duration	Last Client
 IPSec...	Fortinet-1.1.1.2-1.1.1.1				ACTIVE	653	0	42m 23s	10.17.11.77	Access Granted	42m 23s	Unknown

Step 4. Enable BGP and Add BGP Routes

Enable the direct attached or gateway routes your want to advertise via BGP.

1. Go to **CONFIGURATION > Configuration Tree > Box > Virtual Servers > your virtual**

server > Assigned Services > OSPF-RIP-BGP-Service > OSPF/RIP/BGP Settings .







2. Select **yes** from the **Run BGP Router** list.
3. Select **advertise-learn** from the **Operations Mode** list.

Operational Setup

Run OSPF Router	no	
Run RIP Router	no	
Run BGP Router	yes	
Hostname		
Operation Mode	advertise-learn	
Router ID	1.1.1.1	

4. In the left menu, click **BGP Router Setup**.
5. Enter the **AS Number** (e.g., 65000).
6. Enter the **Terminal Password**.
7. From the **Connected Routes** drop-down list, select **yes**.

BGP Router Configuration









AS Number	65500					
Terminal Password	Current					
	New	•••••				
	Confirm	•••••				
	Strength					
Networks	<div>     </div> <table><thead><tr><th>Name</th><th>Network Prefix</th></tr></thead><tbody></tbody></table>				Name	Network Prefix
Name	Network Prefix					

Route Redistribution Configuration

Connected Routes	yes	
RIP Routes	no	
OSPF Routes	no	

8. In the left menu, expand **Configuration Mode** and click **Switch to Advanced Mode**.
9. Click the **Set** button for the **Advanced Settings**. The **Advanced Settings** window opens.
10. Set the **Hold timer** to 30 seconds.
11. Set the **Keep Alive Timer** to 10 seconds.

Advanced BPG Settings Configuration

External Distance Definition	<input type="text" value="20"/>	
Internal Distance Definition	<input type="text" value="200"/>	
Local Distance Definition	<input type="text" value="200"/>	
Keep Alive Timer	<input type="text" value="10"/>	
Hold Timer	<input type="text" value="30"/>	
Default Local Preference	<input type="text"/>	
Administrative Distance	<input type="text"/>	
Prefer path with lowest MED	<input type="text" value="no"/>	






12. Click **OK**.
13. Click **Send Changes** and **Activate**.

Step 5. Add a BGP Neighbor for the Remote Gateway



To dynamically learn the routing of the neighboring network, set up a BGP neighbor for the VPN next hop interface.

1. In the left menu of the **OSPF/RIP/BGP Settings** page, click **Neighbor Setup IPv4**.
2. Click **Lock**.
3. For each IPsec tunnel, click the plus sign (+) next to the **Neighbors** table to add a new neighbor.
4. Enter a **Name** for the neighbor.
5. In the **Neighbors** window, configure the following settings in the **Usage and IP** section:
 - **Neighbor IPv4** – Enter the second IP address in the /30 network that is assigned to the remote gateway. E.g., 1.1.1.2
 - **OSPF Routing Protocol Usage** – Select **no**.
 - **RIP Routing Protocol Usage** – Select **no**.
 - **BGP Routing Protocol Usage** – Select **yes**.
6. In the **BGP Parameters** section, configure the following settings:
 - **AS Number** – Enter the ASN for the remote network: E.g., 65510
 - **Update Source** – Select **Interface**.
 - **Update Source Interface** – Enter the vpnr interface. E.g, vpnr1









Usage and IP

Neighbor IPv4	<input type="text" value="1.1.1.2"/>	
Active	<input type="text" value="yes"/>	
OSPF Routing Protocol Usage	<input type="text" value="no"/>	
RIP Routing Protocol Usage	<input type="text" value="no"/>	
BGP Routing Protocol Usage	<input type="text" value="yes"/>	

OSPF Parameters

Neighbor Priority	<input type="text"/>	
Dead Neighbor Poll Interval	<input type="text"/>	

BGP Parameters

AS Number	<input type="text" value="65510"/>	
Description	<input type="text"/>	
Peer Group Affiliation	<input type="text"/>	
Update Source	<input type="text" value="Interface"/>	
Update Source Interface	<input type="text" value="vpn1"/>	
Update Source IPv4 Address	<input type="text"/>	
Peer Filtering For Input	<input type="button" value="Set..."/> <input type="button" value="Clear"/>	NOTSET: No section present 
Peer Filtering For Output	<input type="button" value="Set..."/> <input type="button" value="Clear"/>	NOTSET: No section present 

7. Click **OK**.
8. Click **Send Changes** and **Activate**.

Step 6. Configure Routes to be Advertised via BGP

To propagate a route set advertise to **yes**, or enter the network as a BGP network manually.

On Box Level

For direct-attached gateway routes and the management network, enable advertising the route in the network configuration.

1. Go to **CONFIGURATION > Configuration Tree > Box > Network**.
2. Click **Lock**.
3. (optional) To propagate the management network, set **Advertise Route** to **yes**.
4. In the left menu, click on **Routing**.
5. Double-click on the **Routes** you want to propagate, and set **Advertise Route** to **yes**.

6. Click **OK**.
7. Click **Send Changes** and **Activate**.

Manually BGP Networks

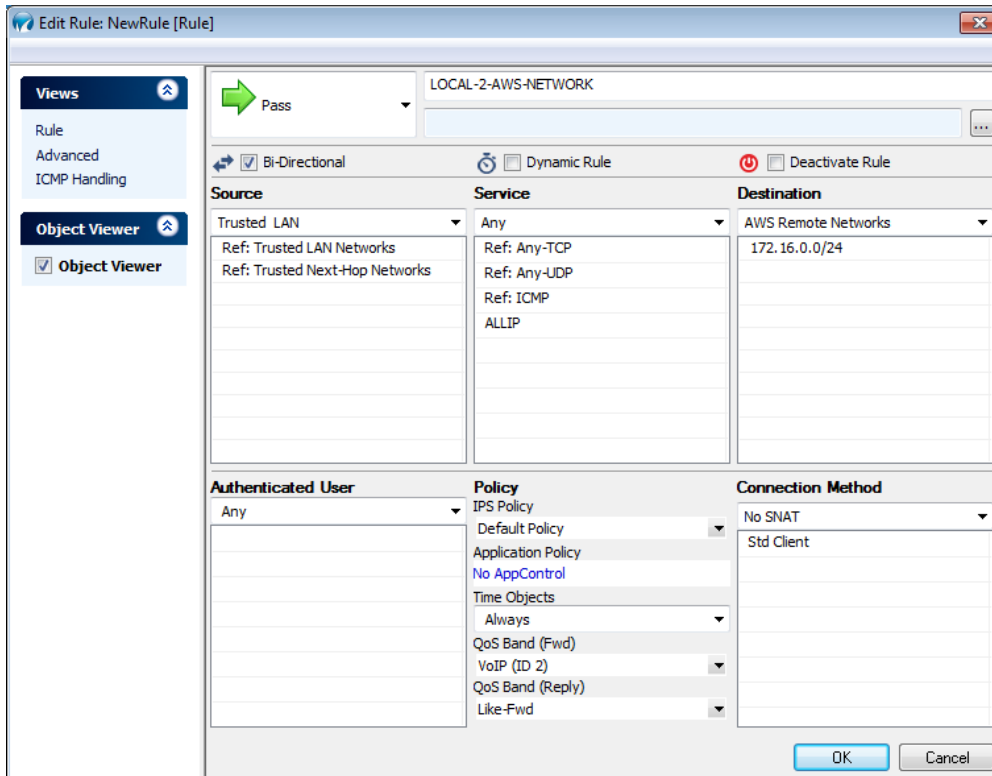
To manually add networks that are advertised to the neighbor, you can also enter them directly as a BGP network.

1. Go to **CONFIGURATION > Configuration Tree > Box > Virtual Servers > your virtual server > Assigned Services > OSPF-RIP-BGP-Service > OSPF/RIP/BGP Settings**.
2. Click **Lock**.
3. In the left menu click **BGP Router Setup**.
4. Click **+** to add an entry to the **Networks** list.
5. Enter a **Name**.
6. Click **OK**.
7. Enter the network you want to propagate as the **Network Prefix**.
8. Click **OK**.
9. Click **Send Changes** and **Activate**.

Step 7. Create an Access Rule for VPN Traffic

To allow traffic to and from the VPN networks, a pass access rule is needed.

1. [Create a Pass access rule](#):
 - **Bi-Directional** – Enable.
 - **Source** – Select the local network(s) you are propagating via BGP.
 - **Service** – Select the service you want to have access to the remote network or **ALL** for complete access.
 - **Destination** – Enter the remote networks.
 - **Connection Method** – Select **No Src NAT**.



2. Click **OK**.
3. Move the access rule up in the rule list, so that it is the first rule to match this type of traffic.
4. Click **Send Changes** and **Activate**.

Step 8. Configure your Third-Party VPN Gateway

Contact the vendor of your third-party device for instructions on how to configure the remote site for this setup.

Configure the remote VPN gateway using the same encryption settings and shared key for the IPsec tunnel. Also configure the BGP service to listen on the second IP address of the /30 network and the F-Series Firewall as a BGP neighbor. This setup has been tested with the following third-party devices:

Third Party Device	Test Device Firmware Version*	Link
Fortinet FortiGate 60D	v5.2.1,build618 (GA)	For more information, see Fortinet documentation .

* This firmware has shown to be working in our tests. If you are using a different device or firmware version, your mileage may vary.

Monitoring

You now have an IPsec VPN tunnel connecting your F-Series firewalls to a third-party VPN gateway. It may take some time for BGP to learn the new routes.

IPsec Tunnel

Go to **VPN > Status** and verify that the IPsec tunnel is **Active**.

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Client-to-Site

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Status









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Tunnel	Name	Type	Group	Info	State	Succ.	Fail	Last Access	Last Peer	Last Info	Last Duration	Last Client
<div><div></div>IPSEC...</div>	Fortinet-1.1.1.2-1.1.1.1	<div><div></div></div>			ACTIVE	653	0	42m 23s	10.17.11.77	Access Granted	42m 23s	Unknown

BGP

Go to **CONTROL > NETWORK > BGP** and verify that you are connected to the remote BGP neighbor and that networks are learned.

Interfaces/IPs	IPs	Interfaces	Proxy ARPs	ARPs	Statistics	OSPF	RIP	BGP	Switch Info	IPv6 ND Cache	
Network	Next Hop	Metric	Local Pref	Weight	Path	Origin					
  Local											
  > 172.16.254.0/24	0.0.0.0	0		32768	Local	IGP					
 AS 65510											
 Neighbor: 1.1.1.2											
..... PrefixesReceived: 1											
..... Up/Down-Time: 00:24:17											
..... Sent Messages: 4447											
..... Received Messages: 4784											
  > 172.16.154.0/24	1.1.1.2			0	65510	IGP					

Figures

1. bgp_over_ipsec__thrid_party_vpn.png
2. bgp_ipsec_01.png
3. bgp_ipsec_02.png
4. bgp_ipsec_03.png
5. bgp_ipsec_04.png
6. bgp_ipsec_05.png
7. bgp_ipsec_06.png
8. bgp_ipsec_07.png
9. bgp_ipsec_08.png
10. bgp_ipsec_09.png
11. FW01.png
12. bgp_ipsec_05.png
13. bgp_ipsec_99.png

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