

Google Cloud VPN

Configuration Guide

Introduction

This guide describes how to configure access to the Google Cloud VPN service. This provides secure access to their data-center services. Three different VPN options are available:

- Static routing
- Dynamic routing with BGP
- High availability dynamic routing

Static routing should be used if there are only a few routes that will be used between the Google cloud network and the remote router. Each required route must be manually configured on all peers to reach respective remote networks.

Dynamic routing with BGP should be used where there are potentially many routes to be used via the VPN. Dynamic routing is simpler than configuring a large number manually. Dynamic routing with BGP will also automatically advertise new routes as required.

High availability dynamic routing should be used where there is a requirement for an additional backup connection to the Google cloud.

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Products and software version that apply to this guide

This guide applies to AR4050S, AR3050S, AR2050V, and AR2010V firewalls and routers, running AlliedWare Plus™ version **5.5.0-1** or later.

For more information, see the following documents:

- The product's [Datasheet](#)
- The product's [Command Reference](#)

These documents are available from the above links on our website at alliedtelesis.com.

Related documents

The following documents give more information about the supported products:

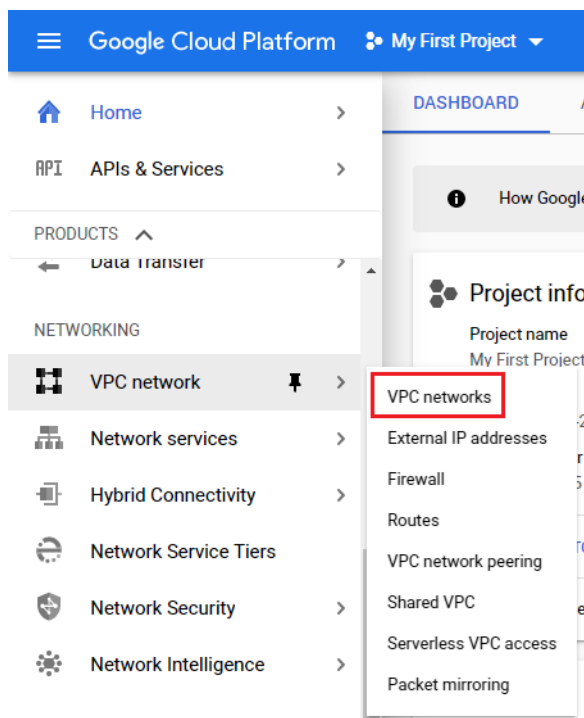
- [Getting Started with the Device GUI on VPN Routers](#)
- [Getting Started with the Device GUI on UTM Firewalls](#)
- The product's [Command Reference](#)

These documents are available from the links above or on our website at alliedtelesis.com

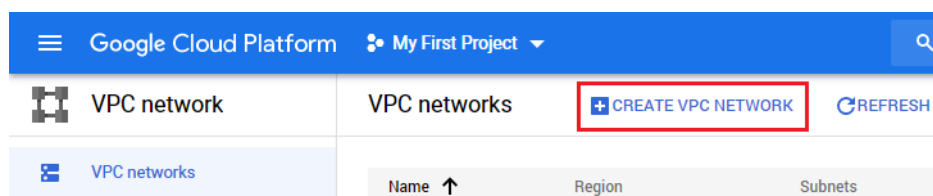
Static routing

To configure static routing to a Google Cloud VPN, use the following steps:

1. Log in to your Google Cloud Account. Navigate to the Home Page. From the menu on the left, under **Networking**, select the **VPC Network** page.



2. On the VPC network page, click on **Create VPC Network**.



3. Fill in a **Name** and, optionally, a **Description**.

Name ⓘ
Name is permanent

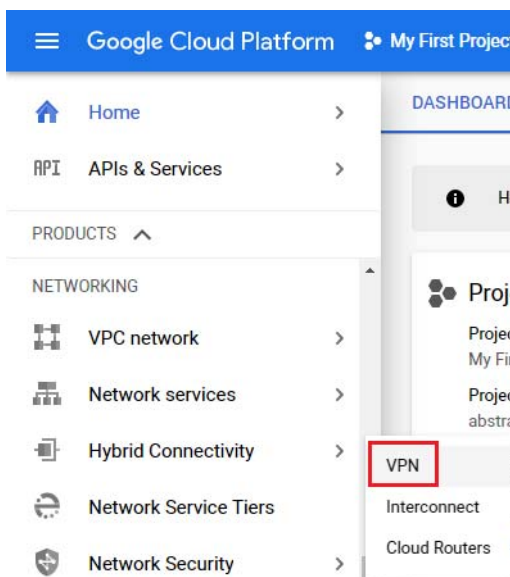
lowercase, no spaces

Description (Optional)

- In the **New subnet** section, fill in a **Name**, **Region**, and **IP address range**.
 The **Region** is where the VPN will exit the Google cloud. Normally, this would be the closest point to the AR-Series router.
 In the **IP address range** add your local IP address range. This will be your local address selector for the Google Cloud VPN. For this example, we are using **192.168.2.0/24**.

- Click on **Create** to create the VPC network.

- Once the VPC network has been created, you will be returned to the Home Page. On the Home Page, from the menu on the left under **Networking**, select **Hybrid Connectivity**, then **VPN**.



7. On the VPN page, click on **Create VPN connection**.

Hybrid Connectivity
VPN

A virtual private network lets you securely connect your Google Compute Engine resources to your own private network. Google VPN uses IKEv1 or IKEv2 to establish the IPsec connectivity.
[Learn more](#)

Create VPN connection

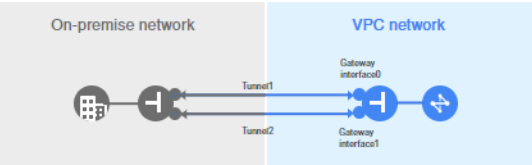
8. Select **Classic VPN**, then click on **Continue**.

← **Create a VPN**


A virtual private network lets you securely connect your Google Compute Engine resources to your own private network. Google VPN uses IKEv1 or IKEv2 to establish the IPsec connectivity. [Learn more](#)

VPN options

High-availability (HA) VPN
Supports dynamic routing (BGP) only
Supports high availability (99.99 SLA, within region)
[Learn more](#)



Classic VPN
Supports dynamic routing and static routing
No high availability
[Learn more](#)



CONTINUE CANCEL

9. In the **VPN gateway** section, fill in a **Name**, **Region**, and **IP address**, and, optionally, a **Description**.

The **Region** is where you want to locate the VPN Gateway.

The **IP address** is the local-address-selector that we created earlier. This will also provide our external IP address (in this case 34.93.250.183), and will be the router's ISAKMP and IPsec peer address.

← Create a VPN connection

A virtual private network lets you securely connect your Google Compute Engine resources to your own private network. Google VPN uses IKEv1 or IKEv2 to establish the IPsec connectivity. [Learn more](#)

Google Compute Engine VPN gateway ?

Name ? Name is permanent	<input type="text" value="vpn-to-at-router-1"/>
Description (Optional)	<input type="text" value="Google cloud VPN to AR4050S"/>
Network ?	<input type="text" value="default"/>
Region ?	<input type="text" value="asia-south1"/>
IP address ?	<input type="text" value="local-address-selector (34.93.250.183)"/>

10. In the **Tunnels** section, fill in a **Name** and, optionally, a **Description**.
11. In **Remote peer IP address**, enter the public external IP address of your router.
12. In the **IKE version** drop-down, select **IKE-v2**.
13. Enter a key for the **IKE pre-shared key**. This will be the same key used on your router for the ISAKMP peer.
14. Copy this and save it somewhere secure
15. Under **Routing options**, choose **Policy-based**.
16. Under **Remote network IP ranges**, enter the internal IP address range of your router.
17. Under **Local IP ranges**, enter the local-address-selector that you created earlier.

Tunnels ?
 You can have multiple tunnels to a single Peer VPN gateway.

New item
🗑️
⬆️

Name ?
 Name is permanent

Description (Optional)

Remote peer IP address ?
 Example: 192.0.2.1

IKE version ?

IKEv2

IKE pre-shared key
 Enter your own key or generate one automatically

⚠️ Make sure that you record the pre-shared key in a secure location. The key can't be retrieved after this form has been closed. [Learn more](#)

Routing options ?

Dynamic (BGP)

Route-based

Policy-based

Remote network IP ranges ?
 Enter multiple IP address ranges (in CIDR notation) by pressing Enter after each one

Local subnetworks ? (Optional)

None selected...

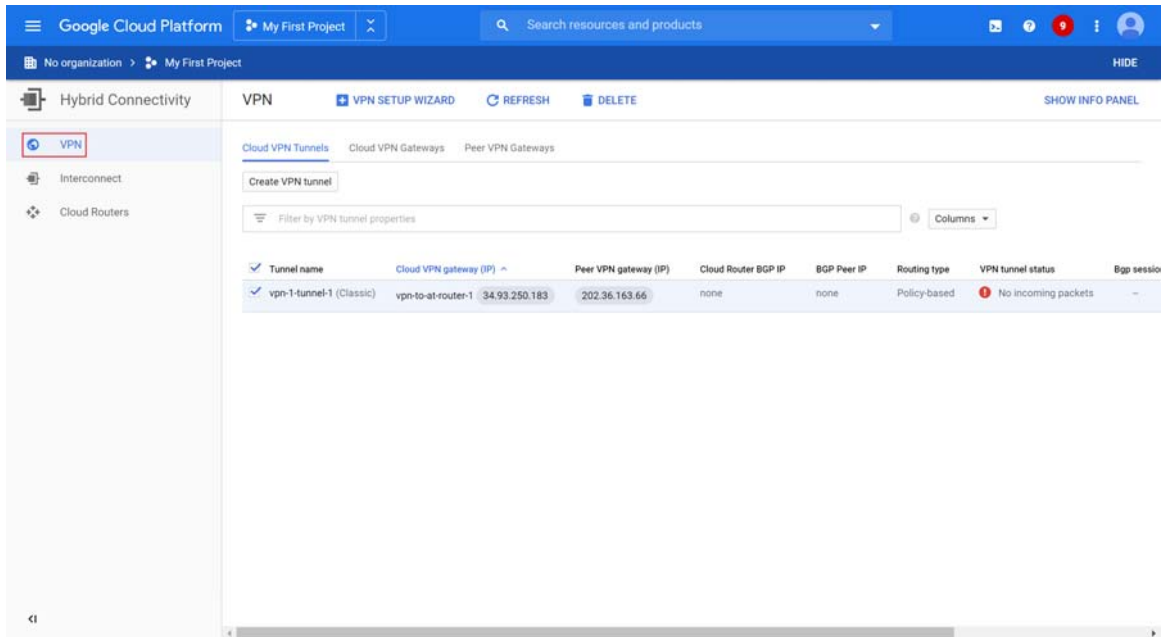
Local IP ranges ? (Optional)

18. Click on **Create**.

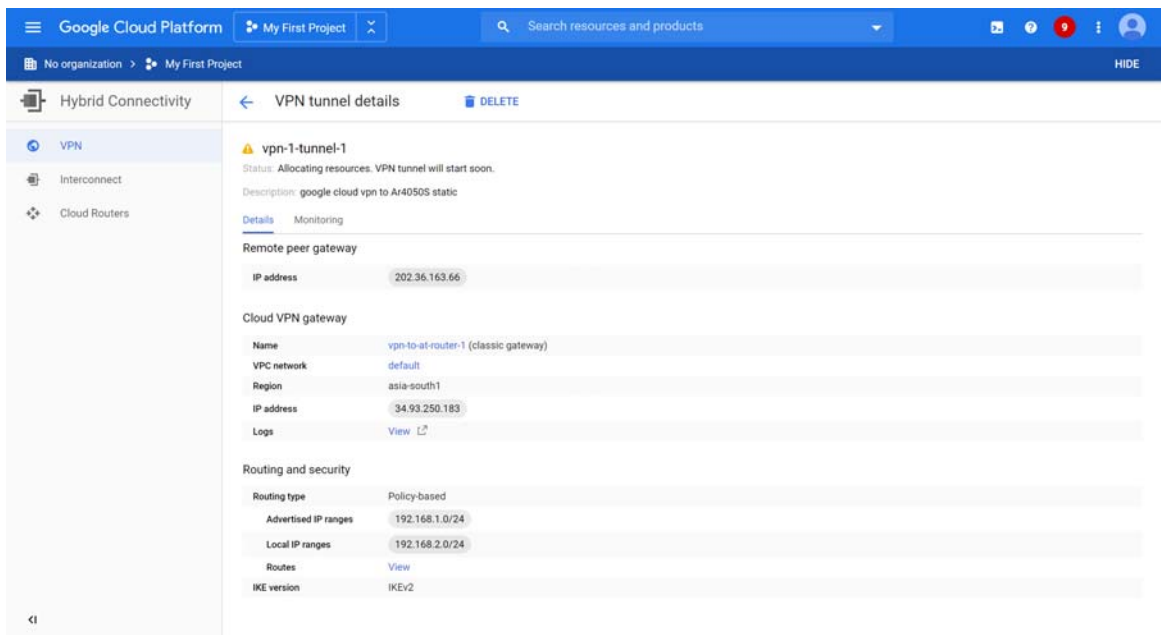
+ Add tunnel

Create

- Once the tunnel has been created, if you select **VPN** on the left menu, you can see the new tunnel. When you select this tunnel, you can see the details and connection status.



- You can click on the tunnel to display more information.



21. You can see that the VPN has established successfully.

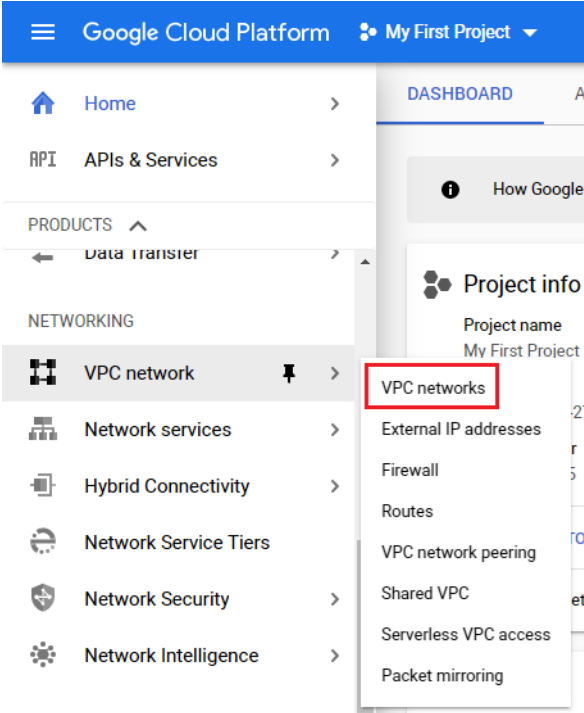
The screenshot shows the Google Cloud Platform console for a project named 'My First Project'. The navigation menu on the left includes 'Hybrid Connectivity', 'VPN', 'Interconnect', and 'Cloud Routers'. The main content area is titled 'VPN' and contains tabs for 'Cloud VPN Tunnels', 'Cloud VPN Gateways', and 'Peer VPN Gateways'. A 'Create VPN tunnel' button is visible at the top. Below it is a filter input field and a 'Columns' dropdown menu. A table lists the VPN tunnels with the following data:

<input type="checkbox"/>	Tunnel name	Cloud VPN gateway (IP)	Peer VPN gateway (IP)	Cloud Router BGP IP	BGP Peer IP	Routing type	VPN tunnel status	Bgp sessio
<input type="checkbox"/>	vpn-1-tunnel-1 (Classic)	vpn-to-at-router-1 34.93.250.183	202.36.163.66	none	none	Policy-based	Established	-

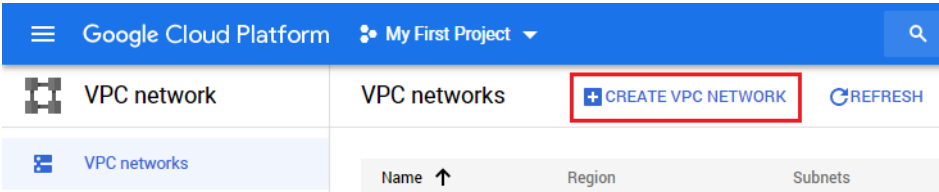
Dynamic routing

To configure dynamic routing to a Google Cloud VPN, use the following steps:

- 1. Log in to your Google Cloud Account. Navigate to the Home Page. From the menu on the left, under **Networking**, select the **VPC Network** page.



- 2. On the VPC network page, click on **Create VPC Network**.



- 3. Fill in a **Name** and, optionally, a **Description**.

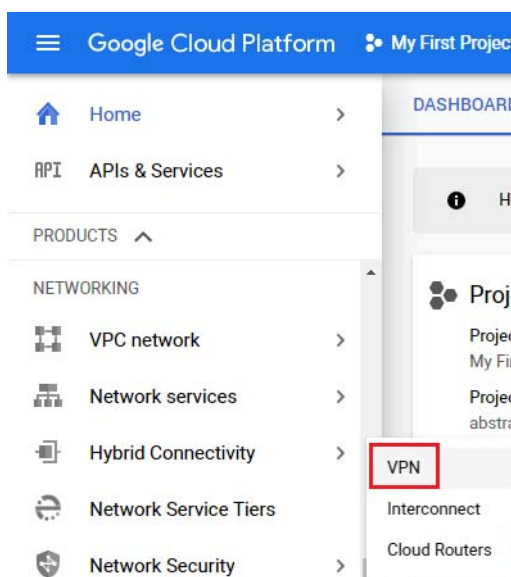
Name ⓘ
Name is permanent

Description (Optional)

- In the **New subnet** section, fill in a **Name**, **Region**, and **IP address range**.
 The **Region** is where the VPN will exit the Google cloud. Normally, this would be the closest point to the AR-Series router.
 In the **IP address range** add your local IP address range. This will be your local address selector for the Google Cloud VPN. For this example, we are using **192.168.2.0/24**.

- Click on **Create** to create the VPC network.

- Once the VPC network has been created, you will be returned to the Home Page. On the Home Page, from the menu on the left under **Networking**, select **Hybrid Connectivity**, then **VPN**.



7. On the VPN page, click on **Create VPN connection**.

Hybrid Connectivity
VPN

A virtual private network lets you securely connect your Google Compute Engine resources to your own private network. Google VPN uses IKEv1 or IKEv2 to establish the IPsec connectivity.
[Learn more](#)

Create VPN connection

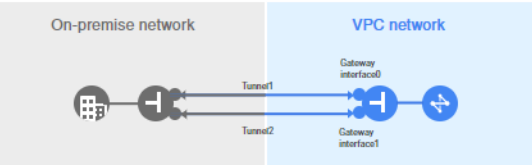
8. Select **Classic VPN**, then click on **Continue**.

← **Create a VPN**


A virtual private network lets you securely connect your Google Compute Engine resources to your own private network. Google VPN uses IKEv1 or IKEv2 to establish the IPsec connectivity. [Learn more](#)

VPN options

High-availability (HA) VPN
Supports dynamic routing (BGP) only
Supports high availability (99.99 SLA, within region)
[Learn more](#)



Classic VPN
Supports dynamic routing and static routing
No high availability
[Learn more](#)



CONTINUE CANCEL

- In the **VPN gateway** section, fill in a **Name**, **Region**, and, optionally, a **Description**. The **Region** is where you want to locate the VPN Gateway.

← Create a VPN connection

A virtual private network lets you securely connect your Google Compute Engine resources to your own private network. Google VPN uses IKEv1 or IKEv2 to establish the IPSec connectivity. [Learn more](#)

Google Compute Engine VPN gateway ?

Name ?
Name is permanent

Description (Optional)

Network ?

Region ?

IP address ?

- From the **IP address** drop-down, select **Create IP address**. Enter the **local-address-selector** that we created earlier. This will give our external IP address, and will be the router’s ISAKMP and IPSec peer address.

Reserve a new static IP address

Name ?
Name is permanent

Description (Optional)

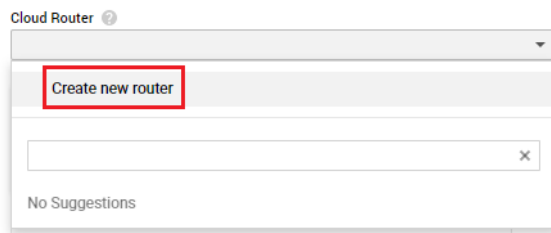
[CANCEL](#) [RESERVE](#)

11. In the **Tunnels** section, fill in a **Name** and, optionally, a **Description**.
12. In **Remote peer IP address**, enter the public external IP address of your router.
13. In the **IKE version** drop-down, select **IKE-v2**.
14. Enter a key for the **IKE pre-shared key**. This will be the same key used on your device for the ISAKMP peer. Copy this and save it somewhere secure.
15. Under **Routing Options** select **Dynamic (BGP)**.

The screenshot shows a 'New item' form for creating a VPN tunnel. The form is titled 'New item' and has a blue header bar with a trash icon and an up arrow. The form contains the following sections:

- Name:** A text input field with a question mark icon. Below it, it says 'Name is permanent'. The value 'vpn-1-tunnel-1' is entered.
- Description (Optional):** A text area with a question mark icon.
- Remote peer IP address:** A text input field with a question mark icon. Below it, it says 'Example: 192.0.2.1'. The value '192.0.2.1' is entered.
- IKE version:** A dropdown menu with a question mark icon. The value 'IKEv2' is selected.
- IKE pre-shared key:** A text input field with a question mark icon. Below it, it says 'Enter your own key or generate one automatically'. There is a 'Generate and copy' button.
- Warning:** A yellow warning box with a triangle icon. The text reads: 'Make sure that you record the pre-shared key in a secure location. The key can't be retrieved after this form has been closed. [Learn more](#)'.
- Routing options:** A section with a question mark icon. It has three tabs: 'Dynamic (BGP)' (selected), 'Route-based', and 'Policy-based'.
- Cloud Router:** A dropdown menu with a question mark icon.
- Warning:** A yellow warning box with a lightbulb icon. The text reads: 'Turn on global dynamic routing for network atl-vpc-network to allow this router to dynamically learn routes to and from all GCP regions on a network. If you're using an internal load balancer with VPN or Interconnect, learn how global dynamic routing may affect you.'
- BGP session:** A text input field with a question mark icon. The value 'None' is entered.
- Buttons:** 'Done' and 'Cancel' buttons at the bottom.

- From the **Cloud Router** drop-down box, choose **Create new router**. This will take you to a new screen.



- Fill in a **Name** and, optionally, a **Description**.
- Enter a value for the **Google ASN**. You can use any number in the 64512 - 65534 or 4200000000 - 4294967294 range.

Create a router

Google Cloud Router dynamically exchanges routes between your Virtual Private Cloud (VPC) and on-premises networks by using Border Gateway Protocol (BGP)

Name ?
Name is permanent

lowercase, no spaces

Description (Optional)

Network ?
default

Region ?
Region is permanent

us-central1 (Iowa)

Google ASN ?

Advertised routes

Routes

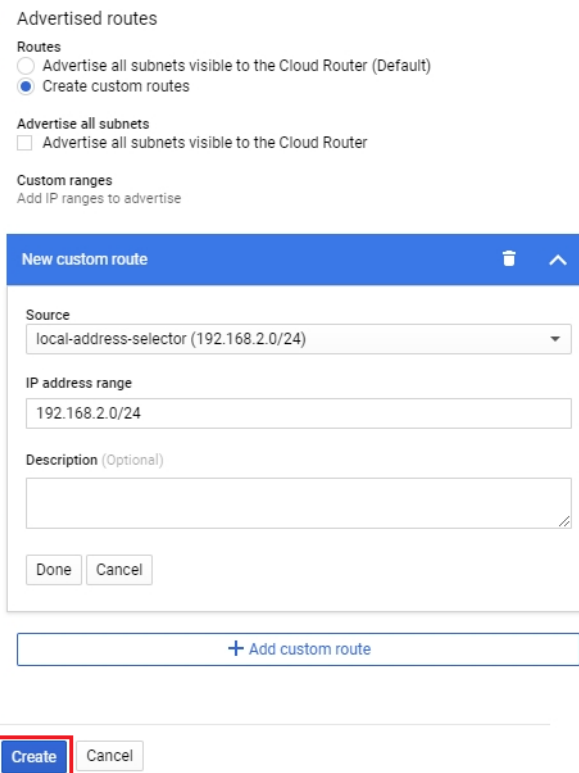
- Advertise all subnets visible to the Cloud Router (Default)
- Create custom routes

Advertise all subnets

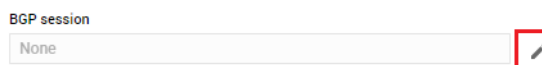
- Advertise all subnets visible to the Cloud Router

Custom ranges
Add IP ranges to advertise

19. Under **Advertised routes**, select **Create custom routes**.
20. Click on the **+Add custom route** button.
21. From the **Source** drop-down box, select **local-address-selector (192.168.2.0/24)**. The **IP address range** will be shown as 192.168.2.0/24.
22. Click on the **Create** button.



23. You will be returned to the **Create a VPN Connection** page.
24. Next to the **BGP Session** dialog box, click on the button to the right to add a BGP session. You will then be taken to the Create BGP session page.



25. Enter the details for the **BGP session**.

The **Peer ASN** is the BGP ASN number of the device. In this case we used 65000.

The **Cloud Router BGP IP** and **BGP peer IP** addresses must be in the same /30 subnet. The **Cloud Router BGP IP** address we have used here is 169.254.0.1. This is the IP address used on the Google Cloud VPN tunnel and BGP peer.

The **BGP peer IP** address is 169.254.0.2. This is the IP address of the tunnel on the device router and will be the device's BGP peer address.

Create BGP session

Name [?]
Name is permanent

Peer ASN [?]

Advertised route priority (MED) (Optional) [?]
MED value is used for Active/Passive configuration

Cloud Router BGP IP [?] BGP peer IP [?]

[Advertised routes](#)

26. Click on **Save and Continue**. This will return you to the **Create a VPN Connection** page.

27. Click on the Create button. Once the VPN is created, you are taken to the VPN page. You can see the VPN that you have created under **Cloud VPN Gateways**.

Cloud VPN Tunnels **Cloud VPN Gateways** Peer VPN Gateways

<input type="checkbox"/> Gateway name ^	IP address	VPC network	Region	VPN tunnels	
<input type="checkbox"/> atl-vpn-1	34.87.200.142	atl-vpc-network	australia-southeast1	vpn-1-tunnel-1	Add VPN tunnel [?]

28. If you click on the **Cloud VPN Tunnels** tab, you can see the tunnel that you have created. This shows additional information including the **VPN tunnel status** and the **BGP session status**. Here you can see that the VPN and BGP peer have established successfully.

Cloud VPN Tunnels | Cloud VPN Gateways | Peer VPN Gateways

Create VPN tunnel

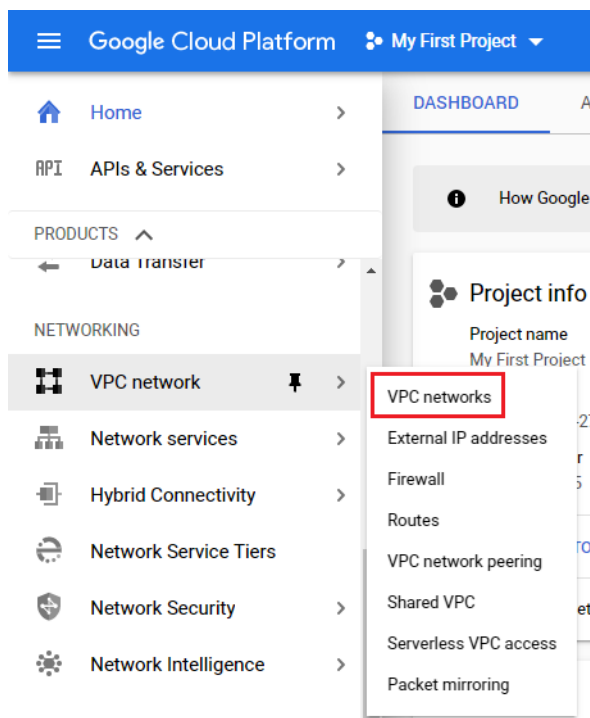
Filter by VPN tunnel properties Columns

<input type="checkbox"/>	Tunnel name	Cloud VPN gateway (IP) ^	Peer VPN gateway (IP)	Cloud Router BGP IP	BGP Peer IP	Routing type	VPN tunnel status	Bgp session status
<input type="checkbox"/>	vpn-1-tunnel-1 (Classic)	atl-vpn-1 34.87.200.142	202.36.163.66	169.254.0.1	169.254.0.2	Dynamic (BGP)	Established	BGP established

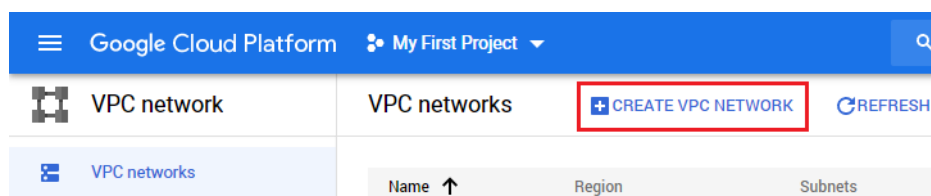
Dynamic routing with high availability

To configure dynamic routing with high availability to a Google Cloud VPN, use the following steps:

1. Log in to your Google Cloud Account. Navigate to the Home Page. From the menu on the left, under **Networking**, select the **VPC Network** page.



2. On the VPC network page, click on **Create VPC Network**.



3. Fill in a **Name** and, optionally, a **Description**.

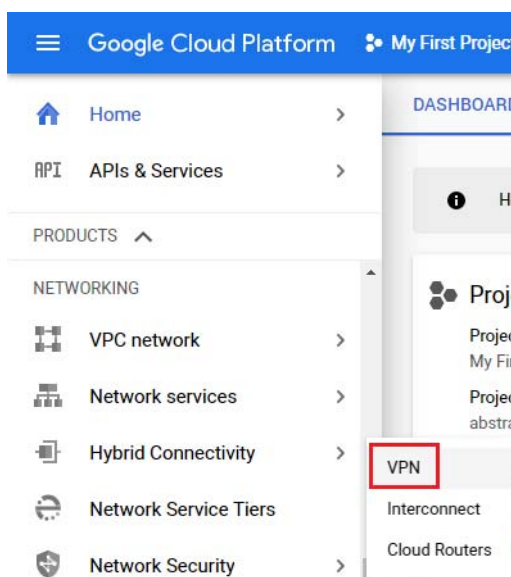
Name ⓘ
Name is permanent

Description (Optional)

- In the **New subnet** section, fill in a **Name**, **Region**, and **IP address range**.
 The **Region** is where the VPN will exit the Google cloud. Normally, this would be the closest point to the AR-Series router.
 In the **IP address range** add your local IP address range. This will be your local address selector for the Google Cloud VPN. For this example, we are using **192.168.2.0/24**.

- Click on **Create** to create the VPC network.

- Once the VPC network has been created, you will be returned to the Home Page. On the Home Page, from the menu on the left under **Networking**, select **Hybrid Connectivity**, then **VPN**.



7. On the VPN page, click on **Create VPN connection**.

Hybrid Connectivity
VPN

A virtual private network lets you securely connect your Google Compute Engine resources to your own private network. Google VPN uses IKEv1 or IKEv2 to establish the IPsec connectivity.
[Learn more](#)

Create VPN connection

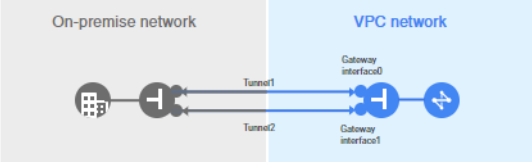
8. Select **High Availability (HA) VPN** then click on **Continue**.

← Create a VPN


A virtual private network lets you securely connect your Google Compute Engine resources to your own private network. Google VPN uses IKEv1 or IKEv2 to establish the IPsec connectivity. [Learn more](#)

VPN options

High-availability (HA) VPN
Supports dynamic routing (BGP) only
Supports high availability (99.99 SLA, within region)
[Learn more](#)



Classic VPN
Supports dynamic routing and static routing
No high availability
[Learn more](#)



CONTINUE CANCEL

9. In the **Create Cloud HA VPN gateway** section, fill in a **Name** and **Region**, and select the **VPC network**.

The **Region** is where you want to locate the VPN Gateway.

For the **VPC network**, select the network you created earlier.

Click **Create and continue**.

The screenshot shows the 'Create a VPN' dialog box with the following fields and options:

- VPN gateway name:** A text input field containing 'lowercase, no spaces'.
- VPC network:** A dropdown menu with 'default' selected.
- Region:** A dropdown menu that is currently empty.
- VPN gateway public IP address:** A section with a note: 'Two IP addresses will be automatically allocated for each of your gateway interfaces'.
- Buttons:** 'Create & continue' (highlighted with a red box) and 'Cancel'.

10. You can see that 2 external interface addresses have been created, in this case **35.242.41.67** and **35.220.41.224**.

The screenshot shows the 'Create a VPN' dialog box with the following fields and options:

- Progress:** 'Create Cloud HA VPN gateway' is checked, 'Add VPN tunnels' is selected, and 'Config' is next.
- Information:** 'A VPN tunnel connects the Cloud VPN gateway to a peer gateway. Traffic sent through the tunnel is encrypted using the IPsec protocol operating in tunnel mode. Learn more'.
- Configuration:** 'VPC network: atl-vpc-network-ha Region: australia-southeast1' and 'VPN gateway name: atl-vpc-gateway-ha'.
- Interfaces:** Two IP addresses are listed: '0 : 35.242.41.67' and '1 : 35.220.41.224'.
- Peer VPN gateway:** Radio buttons for 'On-prem or Non-Google Cloud' (selected) and 'Google Cloud'.
- Peer VPN gateway name:** A dropdown menu with 'Choose...' selected.
- Buttons:** 'Create & continue' and 'Cancel'.

11. From the **Peer VPN gateway name** drop-down, select **Create new peer VPN gateway**. This will open the **Add a peer VPN gateway** dialog.

12. Fill in a Name.

Select how many **Peer VPN gateway interfaces** you will be using. In this example, we are using two.

Click on **Create**.

Add a peer VPN gateway

A peer VPN gateway is the gateway to which this Cloud VPN gateway will connect. It can be an on-premises gateway, a third-party VPN service or another Cloud VPN gateway. When connecting to another Cloud VPN gateway, you must ensure that the other Cloud VPN gateway is in the same GCP region so that you meet high-availability requirements. [Learn more](#)

Name ⓘ

Name is permanent

Peer VPN gateway interfaces ⓘ**Interfaces** one interface two interfaces four interfaces

Interface 0 IP address

Interface 1 IP address

 13. You will be returned to the **Create cloud HA VPN gateway page.**

- Under **Routing options**, in the **Cloud router** box, select **Create new router** from the drop-down menu.
- Enter a value for the **Google ASN**. You can use any number in the 64512 - 65534 or 4200000000 - 4294967294 range.

Create a router

Google Cloud Router dynamically exchanges routes between your Virtual Private Cloud (VPC) and on-premises networks by using Border Gateway Protocol (BGP)

Name ⓘ
Name is permanent

Description (Optional)

Network ⓘ
atl-vpc-network-ha

Region ⓘ
Region is permanent

Google ASN ⓘ
64512

Advertised routes

Routes

Advertise all subnets visible to the Cloud Router (Default)

Create custom routes

Advertise all subnets

Advertise all subnets visible to the Cloud Router

Custom ranges
Add IP ranges to advertise

16. Under **Advertised routes**, select **Create custom routes**, and click on the **+Add custom route** button.
17. In the **New custom route** section, select the local address that you created earlier. This will automatically fill in the IP address range.
18. Click on **Create**.

19. You will be returned to the **Create cloud HA VPN gateway** page.
20. Click on the first of the two **VPN tunnel (not yet configured)** boxes.
21. Fill in the **Name** and the **Pre-shared key**.

- Then click on the second **VPN tunnel (not yet configured)** box, and fill in the **Name** and **Pre-shared key**.

← Create a VPN

Name ?
Name is permanent
atl-tunnel-ha-2

Description (Optional)

IKE version ?
IKEv2

IKE pre-shared key
Enter your own key or generate one automatically
secret Generate and copy

! Make sure that you record the pre-shared key in a secure location. The key can't be retrieved after this form has been closed. [Learn more](#)

Done Cancel

You can add more VPN tunnels to the same VPN gateway afterwards

Create & continue Cancel

- Once both tunnels have been configured, click on **Create and continue**. The 2 tunnels will now be created.
- On the **Configure BGP sessions** page, there is a **Configure** button for each tunnel.

Click Configure BGP Session to set up the BGP session on the Cloud Router atl-cloud-router-ha for each tunnel.

BGP session	Cloud VPN tunnel	Cloud VPN gateway	Cloud VPN gateway interface
Configure	atl-tunnel-ha-1	atl-vpc-gateway-ha	0 35.242.41.67
Configure	atl-tunnel-ha-2	atl-vpc-gateway-ha	1 35.220.41.224

Save BGP configuration Configure BGP sessions later

- Click on the first **Configure** button. This will open the **Create BGP session** dialog.

26. On the **Create BGP session** page, enter the remote BGP **Peer ASN** number.
27. Enter an IP address for the **Cloud router BGP IP** field. This will be the IP address for this cloud tunnel and BGP peer.
28. Enter an IP address for the **BGP peer IP**. This will be the IP address of this tunnel on the device, and the BGP IP address.
29. Click on **Save and continue**.

Create BGP session

Name [?]
Name is permanent

Peer ASN [?]

Advertised route priority (MED) (Optional) [?]
MED value is used for Active/Passive configuration

Cloud Router BGP IP [?] BGP peer IP [?]

Advertised routes

Save and continue Cancel

30. You will be returned to the **Create cloud HA VPN gateway** page.
31. Repeat the process for the second BGP session.
32. Once both BGP sessions have been configured, click on **Save BGP configuration**.

Click Configure BGP Session to set up the BGP session on the Cloud Router atl-cloud-router-ha for each tunnel.

BGP session	Cloud VPN tunnel	Cloud VPN gateway	Cloud VPN gateway interface
atl-bg-ha-1	atl-tunnel-ha-1	atl-vpc-gateway-ha	0 35.242.41.67
atl-bgp-ha-2	atl-tunnel-ha-2	atl-vpc-gateway-ha	1 35.220.41.224

Save BGP configuration Configure BGP sessions later

33. You will then see the **Summary** page.

Create Cloud HA VPN gateway
 Add VPN tunnels
 Configure BGP sessions
 4 Summary and reminder

Summary

Your VPN connections have been set up with these resources created:

Cloud VPN gateway
atl-vpc-gateway-ha

Cloud VPN tunnel(s)

Name	VPN tunnel status	BGP session	BGP status	MED (priority)
atl-tunnel-ha-1	⚠️ First handshake	atl-bg-ha-1	⚠️ Waiting for peer	
atl-tunnel-ha-2	⚠️ First handshake	atl-bgp-ha-2	⚠️ Waiting for peer	

Peer VPN gateway profile
atl-peer-gateway-ha

Reminder

To establish the connections, make sure that the followings are completed later

1. Configure your peer-side device/VPN gateway to access your VPC networks with the following information

atl-tunnel-ha-1

34. Click on the **OK** button at the bottom of the page.

35. You will then be taken to the **Cloud VPN tunnels** page. You can see that the two tunnels have been created. You can see that both VPN tunnels are **Established** and both BGP sessions are **Established**.

Tunnel name	Cloud VPN gateway (IP) ^	Peer VPN gateway (IP)	Cloud Router BGP IP	BGP Peer IP	Routing type	VPN tunnel status	Bgp session s
atl-tunnel-ha-1	atl-vpc-gateway-ha 35.242.41.67	atl-peer-gateway-ha 202.36.163.66	169.254.0.1	169.254.0.2	Dynamic (BGP)	✔️ Established	✔️ BGP est
atl-tunnel-ha-2	atl-vpc-gateway-ha 35.220.41.224	atl-peer-gateway-ha 202.36.163.144	169.254.0.5	169.254.0.6	Dynamic (BGP)	✔️ Established	✔️ BGP est

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