

**Direct Connect**

# **Best Practices**

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## **Huawei Cloud Computing Technologies Co., Ltd.**

Address: Huawei Cloud Data Center Jiaoxinggong Road  
Qianzhong Avenue  
Gui'an New District  
Gui Zhou 550029  
People's Republic of China

Website: <https://www.huaweicloud.com/intl/en-us/>

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# 1 Direct Connect Best Practices

Direct Connect establishes high-speed, low-latency, stable, and secure dedicated network connections that connect your on-premises data center to the cloud.

You can use Direct Connect together with other cloud services to set up networks flexibly. You can refer to the best practices provided here for typical networking solutions.

**Table 1-1** Scenarios

Solution	Example Scenario	Cloud Services	Description
Connecting an on-premises data center to VPCs in the same region	Using a single Direct Connect connection: <ul style="list-style-type: none"><li>• <a href="#">Connecting an On-Premises Data Center to a VPC over a Single Connection and Using Static Routing to Route Traffic</a></li><li>• <a href="#">Connecting an On-Premises Data Center to a VPC over a Single Connection and Using BGP Routing to Route Traffic</a></li></ul>	<ul style="list-style-type: none"><li>• Direct Connect</li><li>• VPC</li><li>• ECS</li></ul>	You can use a single connection with a virtual gateway associated to connect an on-premises data center to a VPC and leverage the large bandwidth and private connectivity for fast, secure, stable data transmission

Solution	Example Scenario	Cloud Services	Description
	<p><b>Connecting an On-Premises Data Center to a VPC over Two Connections in Load Balancing Mode (Virtual Gateway)</b></p>	<ul style="list-style-type: none"> <li>• Direct Connect</li> <li>• VPC</li> <li>• ECS</li> </ul>	<p>To improve the network performance and reliability, you can deploy two connections to connect an on-premises data center to the VPC. The two connections work in load balancing mode.</p> <ul style="list-style-type: none"> <li>• When both connections work normally, the network transmission capability is greatly improved.</li> <li>• If one connection becomes faulty, the other connection is not a single point of failure, and your on-premises data center can still access the VPCs.</li> </ul>
	<p><b>Connecting an On-Premises Data Center to a VPC over Two Connections in an Active/Standby Pair (Virtual Gateway)</b></p>	<ul style="list-style-type: none"> <li>• Direct Connect</li> <li>• VPC</li> <li>• ECS</li> </ul>	<p>You want to ensure high reliability of the hybrid cloud network, while enjoying the following benefits:</p> <ul style="list-style-type: none"> <li>• A more cost-effective connection can be used as the standby one to lower costs.</li> <li>• The outbound connection is specified, which simplifies O&amp;M.</li> </ul> <p>You can create two connections that work in an active/standby pair. If the active connection becomes faulty, the standby one will automatically take over, which minimizes service interruptions.</p>
	<p><b>Connecting an On-Premises Data Center to Multiple VPCs that Do Not Need to Communicate with Each Other</b></p>	<ul style="list-style-type: none"> <li>• Direct Connect</li> <li>• VPC</li> <li>• ECS</li> </ul>	<p>You can create a single standard connection with multiple virtual gateways associated to access different VPCs. This enables end-to-end route isolation for different services.</p>

Solution	Example Scenario	Cloud Services	Description
	<p><b>Connecting an On-Premises Data Center to Multiple VPCs in the Same Region Using Direct Connect and VPC Peering</b></p>	<ul style="list-style-type: none"> <li>• Direct Connect</li> <li>• VPC</li> <li>• ECS</li> </ul>	<p>After you connect an on-premises data center to a VPC using Direct Connect, you can use VPC Peering to peer this VPC with other VPCs in the same region, so that the on-premises data center can access all connected VPCs.</p>
<p>Using a public NAT gateway and Direct Connect to accelerate Internet access</p>	<p><b>Using a Public NAT Gateway and Direct Connect to Accelerate Internet Access</b></p>	<ul style="list-style-type: none"> <li>• Direct Connect</li> <li>• VPC</li> <li>• EIP</li> <li>• NAT Gateway</li> </ul>	<p>You can use Direct Connect to connect your on-premises data center to the cloud and then buy a public NAT gateway to allow on-premises servers to access the Internet by setting SNAT rules or provide publicly accessible services by setting DNAT rules.</p>

# 2 Connecting an On-Premises Data Center to a VPC over a Single Connection and Using Static Routing to Route Traffic

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## Overview

Connect your on-premises network to the cloud over a single connection and use static routing to route traffic between your on-premises network and the VPC.

## Prerequisites

- Your on-premises network must use a single-mode fiber with a 1GE, 10GE, 40GE, or 100GE optical module to connect to the access device in the cloud.
- Auto-negotiation for the port has been disabled. Port speed and full duplex mode have been manually configured.
- 802.1Q VLAN encapsulation is supported on your on-premises network.

## Typical Topology

Your on-premises network is connected to a VPC over a single connection.

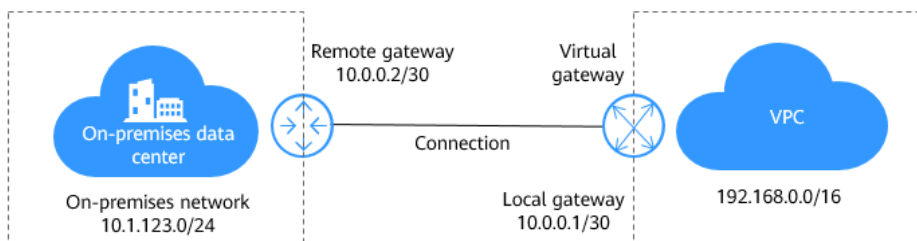
For details on how to create a VPC, see the [Creating a VPC](#).

[Table 2-1](#) lists the CIDR blocks used in this example.

**Table 2-1** CIDR blocks


Item	CIDR Block
Your on-premises network	10.1.123.0/24
Local and remote gateways (addresses for interconnection)	10.0.0.0/30
VPC	192.168.0.0/16

**Figure 2-1** Accessing a VPC over a connection through static routes



## Procedure

### Step 1 Create a connection.

1. Go to the **Connections** page.
2. In the upper left corner of the page, click  and select a region and project.
3. In the upper right corner, click **Create Connection**.
4. On the **Create Connection** page, enter the equipment room details and select the Direct Connect location and port based on **Table 2-2**.

**Figure 2-2** Creating a connection

The screenshot shows the 'Create Connection' page in a cloud management console. The page has a breadcrumb trail: '< Create Connection' (with a help icon), 'Self Service Installation', and 'Full Service Installation' (with a 'New!' tag). The configuration form includes the following fields and options:

- Billing Mode:** Yearly/Monthly (selected)
- Region:** EU-Dublin (selected)
- Connection Name:** (empty text input)
- Location:** Dublin (selected)
- Carrier:** Other (selected)
- Port Type:** 1GE single-mode optical ... (selected)
- Leased Line Bandwidth (Mbits):** 1,000 (selected)
- Equipment Room Address:** (empty text input)
- Tag:** (empty text input for Tag key and Tag value)
- Description:** (empty text input)

At the bottom left, the 'Port Price' is listed as '\$138.00 USD'. At the bottom right, there is a red 'Confirm Configuration' button.

**Table 2-2** Parameters for creating a connection

Parameter	Example Value	Description
Billing Mode	Yearly/Monthly	Specifies how you will be billed for the connection. Currently, only <b>Yearly/Monthly</b> is supported.



Parameter	Example Value	Description
Region	EU-Dublin	Specifies the region where the connection resides. You can also change the region in the upper left corner of the console.
Connection Name	dc-123	Specifies the name of the connection.
Location	Dublin	Specifies the Direct Connect location where your leased line can be connected to.
Carrier	Other	Specifies the carrier that provides the leased line.
Port Type	1GE single-mode optical port	Specifies the type of the port: 1GE single-mode optical port, 10GE single-mode optical port, 40GE single-mode optical port, or 100GE single-mode optical port.
Leased Line Bandwidth (Mbit/s)	100	Specifies the bandwidth of the line you need to lease from the carrier.
Equipment Room Address	Room xx, xx building, xx road, xx district, xx city	Specifies the address of your equipment room. The address must be specific to the floor your equipment room is on.
Tag	example_key1 example_value1	Adds tags to help you identify your connection. You can change them after the connection is created.
Description	-	Provides supplementary information about the connection.
Required Duration	3 months	Specifies how long the connection will be used for.
Auto-renew	3 months	Specifies whether to automatically renew the subscription to ensure service continuity.  For example, if you select this option and the required duration is three months, the system automatically renews the subscription for another three months.
Enterprise Project	default	Specifies the enterprise project by which connections are centrally managed. Select an existing enterprise project.

5. Click **Confirm Configuration**.
6. Confirm the configuration and click **Pay Now**.
7. Confirm the order, select a payment method, and click **Confirm**.
8. After you have paid for the order, a connection ID is allocated to you automatically, and the connection information is displayed on the management console. You will be contacted to confirm the construction plan and relevant information (including your company name, constructor, expected construction time, and construction workers).
9. After having confirmed the construction plan, you can arrange the carrier to deploy the dedicated line and connect it to your equipment room based on your construction plan.
10. In normal cases, Huawei onsite engineers will connect the dedicated line to the Huawei Cloud gateway port within two working days.
11. Verify that the connection is in the **Normal** state, which means that the connection is ready, and the billing starts.

**Step 2** Create a virtual gateway.

1. In the navigation pane on the left, choose **Direct Connect > Virtual Gateways**.
2. Click **Create Virtual Gateway**.
3. Configure the parameters based on [Table 2-3](#).

**Figure 2-3** Creating a virtual gateway  
**Create Virtual Gateway**

\* Name

\* Enterprise Project  [Create Enterprise Project](#)

\* VPC  [Create VPC](#)

\* Local Subnet

BGP ASN

Tag   
 It is recommended that you use TMS's predefined tag function to add the same tag to different cloud resources. [View predefined tags](#)

You can add 20 more tags.

Description

**Table 2-3** Parameters required for creating a virtual gateway

Parameter	Example Value	Description
Name	vgw-123	Specifies the virtual gateway name. The name can contain 1 to 64 characters.
Enterprise Project	default	Specifies the enterprise project by which virtual gateways are centrally managed. Select an existing enterprise project.
VPC	VPC-001	Specifies the VPC to be associated with the virtual gateway.

Parameter	Example Value	Description
Local Subnet	192.168.0.0/16	Specifies the CIDR blocks of the subnets in the VPC to be accessed using Direct Connect.  You can add one or more CIDR blocks. If there are multiple CIDR blocks, separate every entry with a comma (,).
BGP ASN	64512	Specifies the BGP ASN of the virtual gateway.
Tag	<b>example_key1</b> <b>example_value1</b>	Adds tags to help you identify your virtual gateway. You can change them after the virtual gateway is created.
Description	-	Provides supplementary information about the virtual gateway.

4. Click **OK**.

**Step 3** Create a virtual interface.

1. In the navigation pane on the left, choose **Direct Connect > Virtual Interfaces**.
2. In the upper right corner, click **Create Virtual Interface**.
3. Configure the parameters based on [Table 2-4](#).

**Figure 2-4** Creating a virtual interface for your own account

The screenshot shows the 'Create Virtual Interface' configuration page. The 'Virtual Interface Owner' is set to 'Current account'. The 'Region' is 'EU-Dublin'. The 'Name' is 'vif-test'. The 'Virtual Interface Priority' is 'Preferred'. The 'Connection' is '--Select--'. The 'Gateway' is 'Virtual gateway'. The 'Virtual Gateway' is '--Select--'. The 'VLAN' is empty. The 'Enterprise Project' is '--Select--'. The 'Bandwidth (Mbit/s)' is empty. The 'Tag' section has 'Tag key' and 'Tag value' fields. A 'Create Now' button is at the bottom right.

**Table 2-4** Parameters for creating a virtual interface

Parameter	Example Value	Description
Virtual Interface Owner	Current account	Specifies the account that this virtual interface will be created for.
Region	EU-Dublin	Specifies the region where the connection resides. You can also change the region in the upper left corner of the console.
Name	vif-test	Specifies the virtual interface name. The name can contain 1 to 64 characters.

Parameter	Example Value	Description
Virtual Interface Priority	Preferred	Specifies whether the virtual interface will be preferentially used over other virtual interfaces. There are two options: <b>Preferred</b> and <b>Standard</b> . If multiple virtual interfaces are associated with one Direct Connect device, the load is balanced among virtual interfaces with the same priority, while virtual interfaces with different priorities are working in active/standby pairs.
Connection	dc-test12	Specifies the connection you can use to connect your on-premises network to Huawei Cloud.
Gateway	Virtual gateway	Specifies the type of the gateway that the virtual interface connects to. You can select a virtual gateway or global DC gateway. In this example, select a virtual gateway.
Virtual Gateway	vgw-123	This parameter is mandatory when <b>Gateway</b> is set to <b>Virtual gateway</b> . Specifies the virtual gateway that the virtual interface connects to.
Global DC Gateway	dgw-123	This parameter is mandatory when <b>Gateway</b> is set to <b>Global DC gateway</b> . Specifies the global DC gateway that the virtual interface connects to.

Parameter	Example Value	Description
VLAN	30	Specifies the ID of the VLAN for the virtual interface. <ul style="list-style-type: none"><li>- Standard connections: You need to configure the VLAN.</li><li>- Hosted connections: The VLAN will be allocated by the partner. You do not need to configure the VLAN.</li></ul>
Bandwidth (Mbit/s)	1,000	Specifies the bandwidth that can be used by the virtual interface. The bandwidth cannot exceed that of the connection.
Enable Rate Limiting	Not enabled	Limits the highest bandwidth that can be used by the virtual interface. If this option is enabled, the rate limit gradients are as follows: <ul style="list-style-type: none"><li>- If the bandwidth is less than or equal to 100 Mbit/s, the rate limit gradient is 10 Mbit/s.</li><li>- If the bandwidth is greater than 100 Mbit/s but is less than or equal to 1,000 Mbit/s, the rate limit gradient is 100 Mbit/s.</li><li>- If the bandwidth is greater than 1,000 Mbit/s but is less than or equal to 100 Gbit/s, the rate limit gradient is 1 Gbit/s.</li><li>- If the bandwidth is greater than 100 Gbit/s, the rate limit gradient is 10 Gbit/s.</li></ul> For example, if the bandwidth is 52 Mbit/s, the actual rate limit is 60 Mbit/s. If the bandwidth is 115 Mbit/s, the actual rate limit is 200 Mbit/s.

Parameter	Example Value	Description
Enterprise Project	default	Specifies the enterprise project by which virtual interfaces are centrally managed. Select an existing enterprise project.
Tag	-	Adds tags to help you identify your virtual interface. You can change them after the virtual interface is created.
IP Address Family	<b>IPv4</b>	Specifies the address type of the virtual interface. <b>IPv4</b> is selected by default.
Local Gateway	10.0.0.1/30	Specifies the IP address used by Huawei Cloud to connect to your on-premises network. After you configure <b>Local Gateway</b> on the console, the configuration will be automatically delivered to the gateway used by Huawei Cloud.
Remote Gateway	<b>10.0.0.2/30</b>	Specifies the IP address used by the on-premises data center to connect to Huawei Cloud. After you configure <b>Remote Gateway</b> on the console, you need to configure the IP address on the interface of the on-premises device. <b>CAUTION</b> The IP addresses of the local gateway and remote gateway must be in the same IP address range. Generally, an IP address range with a 30-bit mask is used. The IP addresses you plan cannot conflict with IP addresses used on your on-premises network. Plan an IP address range that will be used at both ends of the connection for network communication between your on-premises data center and the cloud.



Parameter	Example Value	Description
Remote Subnet	10.1.123.0/24	Specifies the subnets and masks of your on-premises network. If there are multiple subnets, use commas (,) to separate them.
Routing Mode	Static	Specifies whether static routing or dynamic routing is used to route traffic between your on-premises network and the cloud network.  If there are or will be two or more connections, select BGP routing for higher availability.
BGP ASN	-	Specifies the ASN of the BGP peer.  This parameter is required when BGP routing is selected.
BGP MD5 Authentication Key	-	Specifies the password used to authenticate the BGP peer using MD5.  This parameter can be set when BGP routing is selected, and the parameter values on both gateways must be the same.  The key contains 8 to 255 characters and must contain at least two types of the following characters: <ul style="list-style-type: none"> <li>- Uppercase letters</li> <li>- Lowercase letters</li> <li>- Digits</li> <li>- Special characters ~!,,:;-_ "(){ } [ ] / @ # \$ % ^ &amp; * + \   =</li> </ul>
Description	-	Provides supplementary information about the virtual interface.

4. Click **Create Now**.

 **NOTE**

The default security group rule denies all the inbound traffic. Ensure that security group rules in both directions are correctly configured to ensure normal communications.

**Step 4** Wait for route delivery from the cloud.

Direct Connect automatically delivers the routes after a connection is established between your on-premises network and the cloud network.

**Step 5** Configure routes on your on-premises network device.

Example route (A Huawei-developed device is used as an example.)

```
ip route-static 192.168.0.0 255.255.0.0 10.0.0.1
```

----End

# 3 Connecting an On-Premises Data Center to a VPC over a Single Connection and Using BGP Routing to Route Traffic

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## Overview

Connect your on-premises network to the cloud network and use BGP routes to route traffic between your on-premises network and the VPC.

## Prerequisites

- Your on-premises network must use a single-mode fiber with a 1GE, 10GE, 40GE, or 100GE optical module to connect to the access device in the cloud.
- Auto-negotiation for the port must be disabled. Port speed and full-duplex mode must be manually configured.
- 802.1Q VLAN encapsulation is supported on your on-premises network.
- On-premises devices must support BGP and cannot use ASN 64512, which is used by Huawei Cloud.

## Typical Topology

Your on-premises network is connected to a VPC over a single connection.

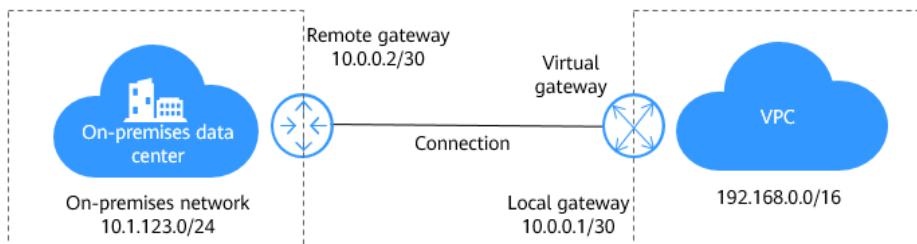
For details on how to create a VPC, see the [Creating a VPC](#).

The following table lists the CIDR blocks used in this example:

**Table 3-1** CIDR blocks


Item	CIDR Block
Your on-premises network	10.1.123.0/24
Local and remote gateways (addresses for interconnection)	10.0.0.0/30
VPC	192.168.0.0/16

**Figure 3-1** Accessing a VPC over a connection though BGP routes



## Procedure

### Step 1 Create a connection.

1. Go to the **Connections** page.
2. In the upper left corner of the page, click  and select a region and project.
3. In the upper right corner, click **Create Connection**.
4. On the **Create Connection** page, enter the equipment room details and select the Direct Connect location and port based on **Table 3-2**.

**Figure 3-2** Creating a connection

**Table 3-2** Parameters for creating a connection

Parameter	Example Value	Description
Billing Mode	Yearly/Monthly	Specifies how you will be billed for the connection. Currently, only <b>Yearly/Monthly</b> is supported.

Parameter	Example Value	Description
Region	EU-Dublin	Specifies the region where the connection resides. You can also change the region in the upper left corner of the console.
Connection Name	dc-123	Specifies the name of the connection.
Location	Dublin	Specifies the Direct Connect location where your leased line can be connected to.
Carrier	Other	Specifies the carrier that provides the leased line.
Port Type	1GE single-mode optical port	Specifies the type of the port: 1GE single-mode optical port, 10GE single-mode optical port, 40GE single-mode optical port, or 100GE single-mode optical port.
Leased Line Bandwidth (Mbit/s)	100	Specifies the bandwidth of the line you need to lease from the carrier.
Equipment Room Address	Room xx, xx building, xx road, xx district, xx city	Specifies the address of your equipment room. The address must be specific to the floor your equipment room is on.
Tag	example_key1 example_value1	Adds tags to help you identify your connection. You can change them after the connection is created.
Description	-	Provides supplementary information about the connection.
Required Duration	3 months	Specifies how long the connection will be used for.
Auto-renew	3 months	Specifies whether to automatically renew the subscription to ensure service continuity.  For example, if you select this option and the required duration is three months, the system automatically renews the subscription for another three months.
Enterprise Project	default	Specifies the enterprise project by which connections are centrally managed. Select an existing enterprise project.

5. Click **Confirm Configuration**.
6. Confirm the configuration and click **Pay Now**.
7. Confirm the order, select a payment method, and click **Confirm**.
8. After you have paid for the order, a connection ID is allocated to you automatically, and the connection information is displayed on the management console. You will be contacted to confirm the construction plan and relevant information (including your company name, constructor, expected construction time, and construction workers).
9. After having confirmed the construction plan, you can arrange the carrier to deploy the dedicated line and connect it to your equipment room based on your construction plan.
10. In normal cases, Huawei onsite engineers will connect the dedicated line to the Huawei Cloud gateway port within two working days.
11. Verify that the connection is in the **Normal** state, which means that the connection is ready, and the billing starts.

**Step 2** Create a virtual gateway.

1. In the navigation pane on the left, choose **Direct Connect > Virtual Gateways**.
2. Click **Create Virtual Gateway**.
3. Configure the parameters based on [Table 3-3](#).

**Figure 3-3** Creating a virtual gateway  
**Create Virtual Gateway**

\* Name

\* Enterprise Project  [Create Enterprise Project](#)

\* VPC  [Create VPC](#)

\* Local Subnet    
Enter one or more subnets using CIDR notation and separate each entry by a comma, for example, 192.168.52.0/24,192.168.54.0/24.

BGP ASN

Tag   
It is recommended that you use TMS's predefined tag function to add the same tag to different cloud resources. [View predefined tags](#)

You can add 20 more tags.

Description    
0/128

**Table 3-3** Parameters required for creating a virtual gateway

Parameter	Example Value	Description
Name	vgw-123	Specifies the virtual gateway name. The name can contain 1 to 64 characters.
Enterprise Project	default	Specifies the enterprise project by which virtual gateways are centrally managed. Select an existing enterprise project.
VPC	VPC-001	Specifies the VPC to be associated with the virtual gateway.

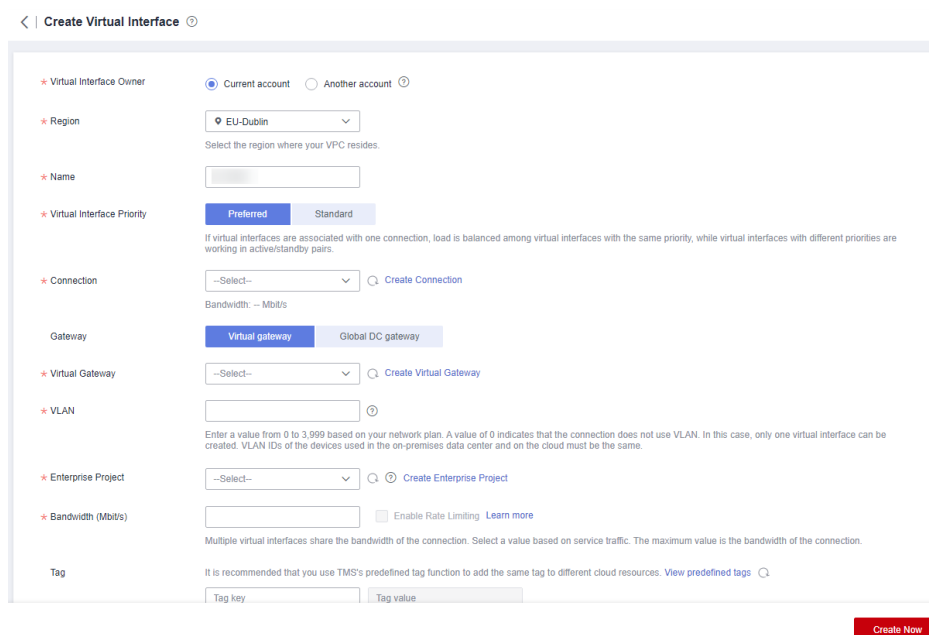
Parameter	Example Value	Description
Local Subnet	192.168.0.0/16	Specifies the CIDR blocks of the subnets in the VPC to be accessed using Direct Connect.  You can add one or more CIDR blocks. If there are multiple CIDR blocks, separate every entry with a comma (,).
BGP ASN	64512	Specifies the BGP ASN of the virtual gateway.
Tag	<b>example_key1</b> <b>example_value1</b>	Adds tags to help you identify your virtual gateway. You can change them after the virtual gateway is created.
Description	-	Provides supplementary information about the virtual gateway.

4. Click **OK**.

**Step 3** Create a virtual interface.

1. In the navigation pane on the left, choose **Direct Connect > Virtual Interfaces**.
2. In the upper right corner, click **Create Virtual Interface**.
3. Configure the parameters based on **Table 3-4**.

**Figure 3-4** Creating a virtual interface for your own account





**Table 3-4** Parameters for creating a virtual interface

Parameter	Example Value	Description
Virtual Interface Owner	Current account	Specifies the account that this virtual interface will be created for.
Region	EU-Dublin	Specifies the region where the connection resides. You can also change the region in the upper left corner of the console.
Name	vif-test	Specifies the virtual interface name. The name can contain 1 to 64 characters.
Virtual Interface Priority	Preferred	Specifies whether the virtual interface will be preferentially used over other virtual interfaces. There are two options: <b>Preferred</b> and <b>Standard</b> . If multiple virtual interfaces are associated with one Direct Connect device, the load is balanced among virtual interfaces with the same priority, while virtual interfaces with different priorities are working in active/standby pairs.
Connection	dc-test12	Specifies the connection you can use to connect your on-premises network to Huawei Cloud.
Gateway	vgw-test	Specifies the type of the gateway that the virtual interface connects to. You can select a virtual gateway or global DC gateway. In this example, select a virtual gateway.

Parameter	Example Value	Description
VLAN	30	<p>Specifies the ID of the VLAN for the virtual interface.</p> <ul style="list-style-type: none"> <li>- Standard connections: You need to configure the VLAN.</li> <li>- Hosted connections: The VLAN will be allocated by the partner. You do not need to configure the VLAN.</li> </ul>
Bandwidth (Mbit/s)	1,000	<p>Specifies the bandwidth that can be used by the virtual interface. The bandwidth cannot exceed that of the connection.</p>
Enable Rate Limiting	Not enabled	<p>Limits the highest bandwidth that can be used by the virtual interface. If this option is enabled, the rate limit gradients are as follows:</p> <ul style="list-style-type: none"> <li>- If the bandwidth is less than or equal to 100 Mbit/s, the rate limit gradient is 10 Mbit/s.</li> <li>- If the bandwidth is greater than 100 Mbit/s but is less than or equal to 1,000 Mbit/s, the rate limit gradient is 100 Mbit/s.</li> <li>- If the bandwidth is greater than 1,000 Mbit/s but is less than or equal to 100 Gbit/s, the rate limit gradient is 1 Gbit/s.</li> <li>- If the bandwidth is greater than 100 Gbit/s, the rate limit gradient is 10 Gbit/s.</li> </ul> <p>For example, if the bandwidth is 52 Mbit/s, the actual rate limit is 60 Mbit/s. If the bandwidth is 115 Mbit/s, the actual rate limit is 200 Mbit/s.</p>

Parameter	Example Value	Description
Enterprise Project	default	Specifies the enterprise project by which virtual interfaces are centrally managed. Select an existing enterprise project.
Tag	<b>example_key1</b> <b>example_value1</b>	Adds tags to help you identify your virtual interface. You can change them after the virtual interface is created.
IP Address Family	<b>IPv4</b>	Specifies the address type of the virtual interface. <b>IPv4</b> is selected by default.
Local Gateway	10.0.0.1/30	Specifies the IP address used by Huawei Cloud to connect to your on-premises network. After you configure <b>Local Gateway</b> on the console, the configuration will be automatically delivered to the gateway used by Huawei Cloud.
Remote Gateway	10.0.0.2/30	Specifies the IP address used by the on-premises data center to connect to Huawei Cloud. After you configure <b>Remote Gateway</b> on the console, you need to configure the IP address on the interface of the on-premises device. <b>CAUTION</b> The IP addresses of the local gateway and remote gateway must be in the same IP address range. Generally, an IP address range with a 30-bit mask is used. The IP addresses you plan cannot conflict with IP addresses used on your on-premises network. Plan an IP address range that will be used at both ends of the connection for network communication between your on-premises data center and the cloud.

Parameter	Example Value	Description
Remote Subnet	10.1.123.0/24	Specifies the subnets and masks of your on-premises network. If there are multiple subnets, use commas (,) to separate them.
Routing Mode	BGP	Specifies whether static routing or dynamic routing is used to route traffic between your on-premises network and the cloud network.  If there are or will be two or more connections, select BGP routing for higher availability.
BGP ASN	64510	Specifies the ASN of the BGP peer.  This parameter is required when BGP routing is selected.
BGP MD5 Authentication Key	<b>Qaz12345678</b>	Specifies the password used to authenticate the BGP peer using MD5.  This parameter can be set when BGP routing is selected, and the parameter values on both gateways must be the same.  The key contains 8 to 255 characters and must contain at least two types of the following characters: <ul style="list-style-type: none"><li>- Uppercase letters</li><li>- Lowercase letters</li><li>- Digits</li><li>- Special characters ~!,,:;-_ "(){ } [ ] / @ # \$ % ^ &amp; * + \   =</li></ul>
Description	-	Provides supplementary information about the virtual interface.

4. Click **Create Now**.

 **NOTE**

The default security group rule denies all the inbound traffic. Ensure that security group rules in both directions are correctly configured to ensure normal communications.

**Step 4** Wait for route advertisement from the cloud.

Direct Connect automatically delivers the routes after a connection is established between your on-premises network and the cloud network.

**Step 5** Configure routes on your on-premises network device.

Example route (A Huawei-developed device is used as an example.)

```
bgp 64510
peer 10.0.0.1 as-number 64512
peer 10.0.0.1 password simple 1234567
network 10.1.123.0 255.255.255.0
```

----End

# 4 Connecting an On-Premises Data Center to a VPC over Two Connections in Load Balancing Mode (Virtual Gateway)

---

## Solution Overview

### Scenario

Connect your on-premises network to the cloud over two connections that are terminated at different locations in the same region and work in load balancing mode. Use either static or BGP routes to route traffic between your on-premises network and the VPC you want to access.

### Solution Architecture

Your on-premises network is connected to the VPC over two connections, with one is terminated at A and the other one terminated at B.

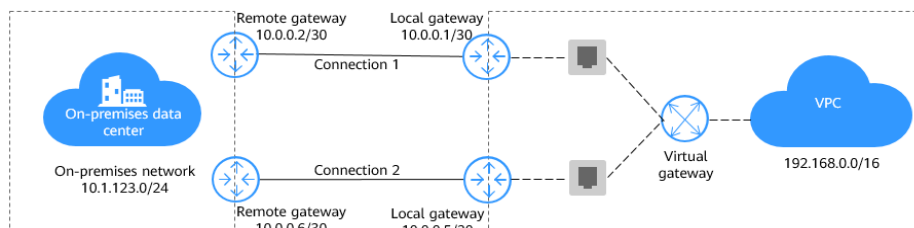
For details on how to create a VPC, see the [Creating a VPC](#).

The following table lists the CIDR blocks used in this example.

**Table 4-1** CIDR blocks

Item	CIDR Block
Your on-premises network	10.1.123.0/24
Local and remote gateways (addresses for interconnection)	10.0.0.0/30 and 10.0.0.4/30
VPC	192.168.0.0/16

**Figure 4-1** Accessing a VPC using two connections that are terminated at two locations and work in load balancing mode



### Advantages

- Multi-cloud architecture: You can access the cloud from any location that is closer to your on-premises data center or the third-party cloud and use Direct Connect to connect different clouds for backup.
- Secure and reliable: Computing is performed on the clouds with minimum data transmitted over the dedicated network connection, and your core data is still stored in your on-premises data center.

### Constraints

- Your on-premises network must use a single-mode fiber with a 1GE, 10GE, 40GE, or 100GE optical module to connect to the access device in the cloud.
- Auto-negotiation for the port must be disabled. Port speed and full duplex mode have been manually configured.
- 802.1Q VLAN encapsulation must be supported on your on-premises network.
- If BGP routing is used, on-premises devices must support BGP and cannot use 64512 as the ASN (which has been used by Huawei Cloud).

## Resource Planning

The following table describes the resources required for connecting an on-premises data center to a VPC using two connections that are terminated at different locations and working in load balancing mode.

**Table 4-2** Resource planning

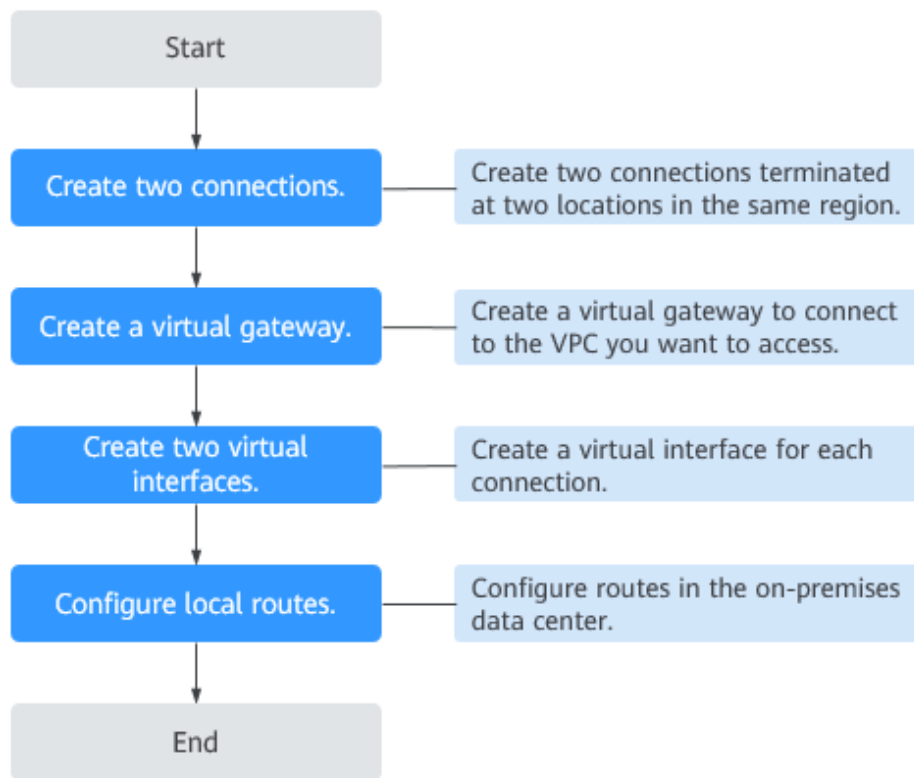
Region	Resource	Description	Quantity	Price
EU-Dublin	VPC	VPC CIDR block: 192.168.0.0/16	1	Free

Region	Resource	Description	Quantity	Price
	Connection	<p>Connection <b>dc-connect1</b> is associated with virtual gateway <b>vgw-test</b> and virtual interface <b>vif-test1</b>.</p> <ul style="list-style-type: none"> <li>Local subnet of virtual gateway <b>vgw-test</b>: 192.168.0.0/16</li> <li>Local gateway of virtual interface <b>vif-test1</b>: 10.0.0.1/30</li> <li>Remote gateway of virtual interface <b>vif-test1</b>: 10.0.0.2/30</li> <li>Remote subnet of virtual interface <b>vif-test1</b>: 10.1.123.0/24</li> </ul>	2	For details, see <a href="#">Direct Connect Pricing Details</a> .
		<p>Connection <b>dc-connect2</b> is associated with virtual gateway <b>vgw-test</b> and virtual interface <b>vif-test2</b>.</p> <ul style="list-style-type: none"> <li>Local subnet of virtual gateway <b>vgw-test</b>: 192.168.0.0/16</li> <li>Local gateway of virtual interface <b>vif-test2</b>: 10.0.0.5/30</li> <li>Remote gateway of virtual interface <b>vif-test2</b>: 10.0.0.6/30</li> <li>Remote subnet of virtual interface <b>vif-test2</b>: 10.1.123.0/24</li> </ul>		

## Process Flowchart

In this solution, your on-premises network connects to the cloud over two connections that are terminated at two locations in the same region, and either static or BGP routes are used to route traffic between your on-premises network and the VPC.





## Procedure

### Step 1 Create two connections: **dc-connect1** and **dc-connect2**.


1. Go to the **Connections** page.
2. In the upper left corner of the page, click  and select a region and project.
3. In the upper right corner, click **Create Connection**.
4. On the **Create Connection** page, enter the equipment room details and select the Direct Connect location and port based on **Table 4-3**.

Figure 4-2 Creating a connection

The screenshot shows the 'Create Connection' configuration page. At the top, there are tabs for 'Self Service Installation' and 'Full Service Installation New!'. The main configuration area includes the following fields and options:

- Billing Mode:** Yearly/Monthly
- Region:** EU-Dublin
- Connection Name:** (empty text input)
- Location:** Dublin
- Carrier:** Other
- Port Type:** 1GE single-mode optical ...
- Leased Line Bandwidth (Mbits):** 1,000
- Equipment Room Address:** (empty text input)
- Tag:** (empty text input for Tag key and Tag value)
- Description:** (empty text input)

At the bottom left, the 'Port Price' is listed as \$138.00 USD. At the bottom right, there is a red 'Confirm Configuration' button.

Table 4-3 Parameters for creating a connection

Parameter	Example Value	Description
Billing Mode	Yearly/Monthly	Specifies how you will be billed for the connection. Currently, only <b>Yearly/ Monthly</b> is supported.
Region	EU-Dublin	Specifies the region where the connection resides. You can also change the region in the upper left corner of the console.
Connection Name	dc-123	Specifies the name of your connection.
Location	Dublin	Specifies the Direct Connect location where your leased line can be connected to.
Carrier	Other	Specifies the carrier that provides the leased line.
Port Type	1GE	Specifies the type of the port that the leased line is connected to: 1GE, 10GE, 40GE, and 100GE.

Parameter	Example Value	Description
Leased Line Bandwidth (Mbit/s)	100	Specifies the bandwidth of the leased line. This is the bandwidth of the leased line you have purchased from the carrier.
Equipment Room Address	Room xx, xx building, xx road, xx district, xx city	Specifies the address of your equipment room. The address must be specific to the floor your equipment room is on.
Tag	example_key1 example_value1	Adds tags to help you identify your connection. You can change them after the connection is created.
Description	-	Provides supplementary information about the connection.
Required Duration	3 months	Specifies how long the connection will be used for.
Auto-renew	3 months	Specifies whether to automatically renew the subscription to ensure service continuity.  For example, if you select this option and the required duration is three months, the system automatically renews the subscription for another three months.
Enterprise Project	default	Specifies the enterprise project by which connections are centrally managed. Select an existing enterprise project.

5. Click **Confirm Configuration**.
6. Confirm the configuration and click **Pay Now**.
7. Confirm the order, select a payment method, and click **Confirm**.
8. After you have paid for the order, a connection ID is allocated to you automatically, and the connection information is displayed on the management console. You will be contacted to confirm the construction plan and relevant information (including your company name, constructor, expected construction time, and construction workers).

9. After having confirmed the construction plan, you can arrange the carrier to deploy the dedicated line and connect it to your equipment room based on your construction plan.
10. In normal cases, Huawei onsite engineers will connect the dedicated line to the Huawei Cloud gateway port within two working days.
11. Verify that the connection is in the **Normal** state, which means that the connection is ready, and the billing starts.
12. Repeat the preceding steps to create connection **dc-connect2**.

## Step 2 Create a virtual gateway.

1. In the navigation pane on the left, choose **Direct Connect > Virtual Gateways**.
2. Click **Create Virtual Gateway**.
3. Configure the parameters based on [Table 4-4](#).

**Figure 4-3** Creating a virtual gateway  
**Create Virtual Gateway**

\* Name

\* Enterprise Project  [Create Enterprise Project](#)

\* VPC  [Create VPC](#)

\* Local Subnet

BGP ASN

Tag    
It is recommended that you use TMS's predefined tag function to add the same tag to different cloud resources. [View predefined tags](#)

You can add 20 more tags.

Description

**Table 4-4** Parameters required for creating a virtual gateway

Parameter	Example Value	Description
Name	vgw-123	Specifies the virtual gateway name. The name can contain 1 to 64 characters.
Enterprise Project	default	Specifies the enterprise project by which virtual gateways are centrally managed. Select an existing enterprise project.
VPC	VPC-001	Specifies the VPC to be associated with the virtual gateway.
Local Subnet	192.168.0.0/16	Specifies the CIDR blocks of the subnets in the VPC to be accessed using Direct Connect. You can add one or more CIDR blocks. If there are multiple CIDR blocks, separate every entry with a comma (,).
BGP ASN	64512	Specifies the BGP ASN of the virtual gateway.
Tag	example_key1 example_value1	Adds tags to help you identify your virtual gateway. You can change them after the virtual gateway is created.
Description	-	Provides supplementary information about the virtual gateway.

4. Click **OK**.

**Step 3** Create two virtual interfaces: **vif-test1** and **vif-test2**.

Use virtual interface **vif-test1** to connect virtual gateway **vgw-test** and connection **dc-connect1** and connect virtual interface **vif-test2** to connect virtual gateway **vgw-test** and connection **dc-connect2**.

1. In the navigation pane on the left, choose **Direct Connect > Virtual Interfaces**.
2. In the upper right corner, click **Create Virtual Interface**.
3. Configure the parameters based on [Table 4-5](#).

**Figure 4-4** Creating a virtual interface for your own account

< | Create Virtual Interface ⓘ

\* Virtual Interface Owner  Current account  Another account ⓘ

\* Region  ⓘ  
Select the region where your VPC resides.

\* Name

\* Virtual Interface Priority  Preferred  Standard  
If virtual interfaces are associated with one connection, load is balanced among virtual interfaces with the same priority, while virtual interfaces with different priorities are working in active/standby pairs.

\* Connection  ⓘ Create Connection  
Bandwidth: -- Mbit/s

Gateway  Virtual gateway  Global DC gateway

\* Virtual Gateway  ⓘ Create Virtual Gateway

\* VLAN  ⓘ  
Enter a value from 0 to 3,999 based on your network plan. A value of 0 indicates that the connection does not use VLAN. In this case, only one virtual interface can be created. VLAN IDs of the devices used in the on-premises data center and on the cloud must be the same.

\* Enterprise Project  ⓘ Create Enterprise Project

\* Bandwidth (Mbit/s)   Enable Rate Limiting [Learn more](#)  
Multiple virtual interfaces share the bandwidth of the connection. Select a value based on service traffic. The maximum value is the bandwidth of the connection.

Tag  ⓘ  
It is recommended that you use TMS's predefined tag function to add the same tag to different cloud resources. [View predefined tags](#) ⓘ  
Tag key  Tag value

**Create Now**

**Table 4-5** Parameters for creating a virtual interface

Parameter	Example Value	Description
Virtual Interface Owner	Current account	Specifies the account that this virtual interface will be created for.
Region	EU-Dublin	Specifies the region where the connection resides. You can also change the region in the upper left corner of the console.
Name	vif-test1	Specifies the virtual interface name. The name can contain 1 to 64 characters.

Parameter	Example Value	Description
Virtual Interface Priority	Preferred	<p>Specifies whether the virtual interface will be preferentially used over other virtual interfaces. There are two options: <b>Preferred</b> and <b>Standard</b>.</p> <p>If multiple virtual interfaces are associated with one Direct Connect device, the load is balanced among virtual interfaces with the same priority, while virtual interfaces with different priorities are working in active/standby pairs.</p> <p>Select <b>Preferred</b> for both virtual interfaces.</p> <p>For details about the solution using a pair of active/standby connections, see <a href="#">Connecting an On-Premises Data Center to a VPC over Two Connections in an Active/Standby Pair (Virtual Gateway)</a>.</p>
Connection	dc-connect1	<p>Specifies the connection you can use to connect your on-premises network to Huawei Cloud.</p>
Gateway	Virtual gateway	<p>Specifies the type of the gateway that the virtual interface connects to.</p> <p>You can select a virtual gateway or global DC gateway.</p> <p>In this example, select a virtual gateway.</p>
Virtual Gateway	vgw-123	<p>This parameter is mandatory when <b>Gateway</b> is set to <b>Virtual gateway</b>.</p> <p>Specifies the virtual gateway that the virtual interface connects to.</p>

Parameter	Example Value	Description
Global DC Gateway	dgw-123	This parameter is mandatory when <b>Gateway</b> is set to <b>Global DC gateway</b> . Specifies the global DC gateway that the virtual interface connects to.
VLAN	30	Specifies the ID of the VLAN for the virtual interface. You need to configure the VLAN if you create a standard connection. The VLAN for a hosted connection will be allocated by the partner. You do not need to configure the VLAN.
Bandwidth (Mbit/s)	1,000	Specifies the bandwidth that can be used by the virtual interface. The bandwidth cannot exceed that of the connection or LAG.



Parameter	Example Value	Description
Enable Rate Limiting	Not enabled	<p>Limits the highest bandwidth that can be used by the virtual interface. If this option is enabled, the rate limit gradients are as follows:</p> <ul style="list-style-type: none"> <li>- If the bandwidth is less than or equal to 100 Mbit/s, the rate limit gradient is 10 Mbit/s.</li> <li>- If the bandwidth is greater than 100 Mbit/s but is less than or equal to 1,000 Mbit/s, the rate limit gradient is 100 Mbit/s.</li> <li>- If the bandwidth is greater than 1,000 Mbit/s but is less than or equal to 100 Gbit/s, the rate limit gradient is 1 Gbit/s.</li> <li>- If the bandwidth is greater than 100 Gbit/s, the rate limit gradient is 10 Gbit/s.</li> </ul> <p>For example, if the bandwidth is 52 Mbit/s, the actual rate limit is 60 Mbit/s. If the bandwidth is 115 Mbit/s, the actual rate limit is 200 Mbit/s.</p>
Enterprise Project	default	Specifies the enterprise project by which virtual interfaces are centrally managed. Select an existing enterprise project.
Tag	example_key1 example_value1	Adds tags to help you identify your virtual interface. You can change them after the virtual interface is created.
IP Address Family	IPv4	Specifies the address type of the virtual interface. <b>IPv4</b> is selected by default.

Parameter	Example Value	Description
Local Gateway	10.0.0.1/30	Specifies the IP address used by Huawei Cloud to connect to your on-premises network. After you configure <b>Local Gateway</b> on the console, the configuration will be automatically delivered to the gateway used by Huawei Cloud.
Remote Gateway	<b>10.0.0.2/30</b>	Specifies the IP address used by the on-premises data center to connect to Huawei Cloud. After you configure <b>Remote Gateway</b> on the console, you need to configure the IP address on the interface of the on-premises device. <b>CAUTION</b> The IP addresses of the local gateway and remote gateway must be in the same IP address range. Generally, an IP address range with a 30-bit mask is used. The IP addresses you plan cannot conflict with IP addresses used on your on-premises network. Plan an IP address range that will be used at both ends of the connection for network communication between your on-premises data center and the cloud.
Remote Subnet	10.1.123.0/24	Specifies the subnets and masks of your on-premises network. If there are multiple subnets, use commas (,) to separate them.
Routing Mode	BGP	Specifies whether static routing or dynamic routing is used to route traffic between your on-premises network and the cloud network.

Parameter	Example Value	Description
BGP ASN	64510	Specifies the ASN of the BGP peer. This parameter is required when BGP routing is selected.
BGP MD5 Authentication Key	Qaz12345678	Specifies the password used to authenticate the BGP peer using MD5. This parameter can be set when BGP routing is selected, and the parameter values on both gateways must be the same. The key contains 8 to 255 characters and must contain at least two types of the following characters: <ul style="list-style-type: none"><li>- Uppercase letters</li><li>- Lowercase letters</li><li>- Digits</li><li>- Special characters ~!,,:-_"(){}/@#\$\$%^&amp;*+ \=</li></ul>
Description	-	Provides supplementary information about the virtual interface.

4. Click **Create Now**.
5. Repeat [Step 3.1](#) to [Step 3.4](#) to create virtual interface **vif-test2**.

 **NOTE**

- When you create virtual interface **vif-test2**, select connection **dc-connect2**, and set **Local Gateway** to **10.0.0.5/30** and **Remote Gateway** to **10.0.0.6/30**.
- Set different BGP ASNs and BGP MD5 authentication keys for the two virtual interfaces.
- The default security group rule denies all the inbound traffic. Ensure that security group rules in both directions are correctly configured to ensure normal communications.

**Step 4** Wait for route delivery from the cloud.

Direct Connect automatically delivers the routes after a connection is established between your on-premises network and the cloud network.

**Step 5** Configure routes on your on-premises network device.

Example static route (A Huawei-developed network device is used as an example.)

```
ip route-static 192.168.0.0 255.255.0.0 10.0.0.1
```

```
ip route-static 192.168.0.0 255.255.0.0 10.0.0.5
```

Example BGP route (A Huawei-developed network device is used as an example.)

```
bgp 64510
peer 10.0.0.1 as-number 64512
peer 10.0.0.1 password simple Qaz12345678
peer 10.0.0.5 as-number 64512
peer 10.0.0.5 password simple Qaz12345678
network 10.1.123.0 255.255.255.0
```

----End

## Helpful Links

- For details about how to troubleshoot connection faults, see [Network and Connectivity](#) and [Routing](#).
- For common problems about establishing network connectivity using Direct Connect, see [Leased Line](#).
- For common problems about Direct Connect interconnection, see [Interconnection with Cloud](#).

## Connectivity Verification

Ping an on-premises server from an ECS to verify that they can communicate with each other.

Disable the port for any connection and run the ping command again. If the ECS can still communicate with the on-premises server normally, the on-premises data center can access the cloud privately.

To view the specific path of a route, run the **tracert** command. The command varies according to the device type. For details, contact the device vendor.

```
CentOS Linux 8 (Core)
Kernel 4.18.0-240.10.1.el8_3.x86_64 on an x86_64

ecs-dc-test login: root
Password:
Last login: Fri Jul 30 14:15:12 on tty1

Welcome to Huawei Cloud Service

[root@ecs-dc-test ~]# ip ad
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether fa:16:3e:b5:89:93 brd ff:ff:ff:ff:ff:ff
    inet 192.168.47.102/16 brd 192.168.255.255 scope global dynamic noprefixroute eth0
        valid_lft 31535927sec preferred_lft 31535927sec
    inet6 fe80::f816:3eff:feb5:8993/64 scope link
        valid_lft forever preferred_lft forever

[root@ecs-dc-test ~]# ping 10.1.123.1
PING 10.1.123.1 (10.1.123.1) 56(84) bytes of data:
64 bytes from 10.1.123.1: icmp_seq=1 ttl=254 time=2.41 ms
64 bytes from 10.1.123.1: icmp_seq=2 ttl=254 time=1.92 ms
64 bytes from 10.1.123.1: icmp_seq=3 ttl=254 time=1.92 ms
64 bytes from 10.1.123.1: icmp_seq=4 ttl=254 time=1.109 ms
64 bytes from 10.1.123.1: icmp_seq=5 ttl=254 time=1.90 ms
64 bytes from 10.1.123.1: icmp_seq=6 ttl=254 time=1.90 ms
64 bytes from 10.1.123.1: icmp_seq=7 ttl=254 time=2.01 ms
64 bytes from 10.1.123.1: icmp_seq=8 ttl=254 time=1.91 ms
64 bytes from 10.1.123.1: icmp_seq=9 ttl=254 time=1.07 ms
64 bytes from 10.1.123.1: icmp_seq=10 ttl=254 time=2.07 ms
64 bytes from 10.1.123.1: icmp_seq=11 ttl=254 time=2.06 ms
64 bytes from 10.1.123.1: icmp_seq=12 ttl=254 time=1.70 ms
64 bytes from 10.1.123.1: icmp_seq=13 ttl=254 time=1.92 ms
64 bytes from 10.1.123.1: icmp_seq=14 ttl=254 time=2.20 ms
64 bytes from 10.1.123.1: icmp_seq=15 ttl=254 time=2.09 ms
64 bytes from 10.1.123.1: icmp_seq=16 ttl=254 time=2.04 ms
^C
--- 10.1.123.1 ping statistics ---
16 packets transmitted, 16 received, 0% packet loss, time 37ms
rtt min/avg/max/mdev = 1.779/1.999/2.406/0.150 ms
[root@ecs-dc-test ~]#
```

# 5 Connecting an On-Premises Data Center to a VPC over Two Connections in an Active/Standby Pair (Virtual Gateway)

---

## Solution Overview

### Scenario

You need two connections that are terminated at different Direct Connect locations in the same region to access the same VPC. The two connections work in an active/standby pair.

In this case, it is recommended that you use BGP routing. For the connections from the cloud, you can make them to work in an active/standby pair by setting the virtual interface priority. For the active/standby connections to the cloud, you can set their **Local\_Pref** on your on-premises device.

### Solution Architecture

Your on-premises network is connected to the VPC over two connections, with one is terminated at A and the other one terminated at B.

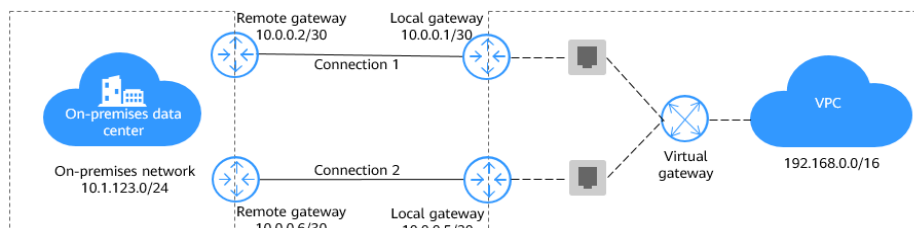
For details on how to create a VPC, see the [Creating a VPC](#).

The following table lists the CIDR blocks used in this example.

**Table 5-1** CIDR blocks

Item	CIDR Block
Your on-premises network	10.1.123.0/24
Local and remote gateways (addresses for interconnection)	10.0.0.0/30 and 10.0.0.4/30
VPC	192.168.0.0/16

**Figure 5-1** Accessing a VPC using two connections that are terminated at two locations and work in an active/standby pair



### Advantages

**Multi-cloud architecture:** You can access the cloud from any location that is closer to your on-premises data center or the third-party cloud and use Direct Connect to connect different clouds for backup.

**Secure and reliable:** Computing is performed on the clouds with minimum data transmitted over the dedicated network connection, and your core data is still stored in your on-premises data center.

### Constraints

- Your on-premises network must use a single-mode fiber with a 1GE, 10GE, 40GE, or 100GE optical module to connect to the access device in the cloud.
- Auto-negotiation for the port must be disabled. Port speed and full duplex mode have been manually configured.
- 802.1Q VLAN encapsulation must be supported on your on-premises network.
- On-premises devices must support BGP and cannot use ASN 64512, which is used by Huawei Cloud.

## Resource Planning

The following table describes the resources required for connecting an on-premises data center to a VPC using two connections that are terminated at different locations and working in active/standby pair.

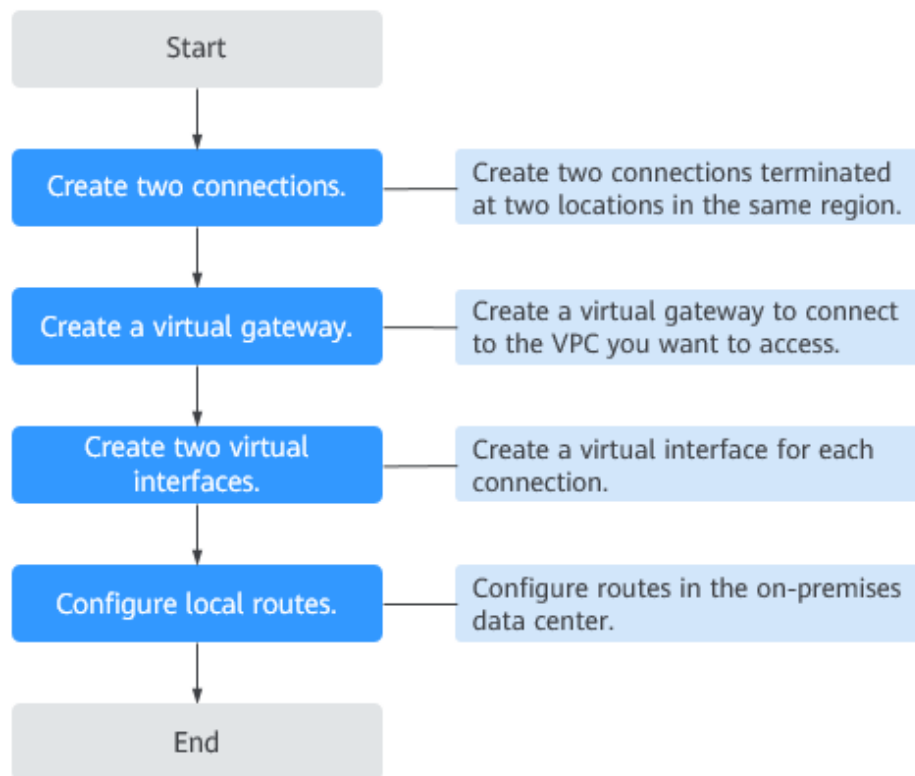
**Table 5-2** Resource planning

Region	Resource	Description	Quantity	Price
EU-Dublin	VPC	VPC CIDR block: 192.168.0.0/16	1	Free

Region	Resource	Description	Quantity	Price
	Connection	<p>Connection <b>dc-connect1</b> is associated with virtual gateway <b>vgw-test</b> and virtual interface <b>vif-test1</b>.</p> <p>Local subnet of virtual gateway <b>vgw-test</b>: 192.168.0.0/16</p> <p>Local gateway of virtual interface <b>vif-test1</b>: 10.0.0.1/30</p> <p>Remote gateway of virtual interface <b>vif-test1</b>: 10.0.0.2/30</p> <p>Remote subnet of virtual interface <b>vif-test1</b>: 10.1.123.0/24</p>	2	For details, see <a href="#">Direct Connect Pricing Details</a> .
		<p>Connection <b>dc-connect2</b> is associated with virtual gateway <b>vgw-test</b> and virtual interface <b>vif-test2</b>.</p> <p>Local subnet of virtual gateway <b>vgw-test</b>: 192.168.0.0/16</p> <p>Local gateway of virtual interface <b>vif-test2</b>: 10.0.0.5/30</p> <p>Remote gateway of virtual interface <b>vif-test2</b>: 10.0.0.6/30</p> <p>Remote subnet of virtual interface <b>vif-test2</b>: 10.1.123.0/24</p>		

## Process Flowchart

In this scenario, your on-premises network connects to the cloud over two connections that are terminated at two locations in the same region, and BGP routes are used to route traffic between your on-premises network and the VPC.



## Procedure

### Step 1 Create two connections: **dc-connect1** and **dc-connect2**.


1. Go to the **Connections** page.
2. In the upper left corner of the page, click  and select a region and project.
3. In the upper right corner, click **Create Connection**.
4. On the **Create Connection** page, enter the equipment room details and select the Direct Connect location and port based on **Table 5-3**.



Figure 5-2 Creating a connection

The screenshot shows the 'Create Connection' configuration page. At the top, there are tabs for 'Self Service Installation' and 'Full Service Installation New!'. The main configuration area includes the following fields and options:

- Billing Mode:** Yearly/Monthly
- Region:** EU-Dublin
- Connection Name:** (empty text input)
- Location:** Dublin
- Carrier:** Other
- Port Type:** 1GE single-mode optical ...
- Leased Line Bandwidth (Mbits):** 1,000
- Equipment Room Address:** (empty text input)
- Tag:** Tag key and Tag value (empty text inputs)
- Description:** (empty text input)

At the bottom left, the 'Port Price' is listed as \$138.00 USD. At the bottom right, there is a red 'Confirm Configuration' button.

Table 5-3 Parameters for creating a connection

Parameter	Example Value	Description
Billing Mode	Yearly/Monthly	Specifies how you will be billed for the connection. Currently, only <b>Yearly/ Monthly</b> is supported.
Region	EU-Dublin	Specifies the region where the connection resides. You can also change the region in the upper left corner of the console.
Connection Name	dc-123	Specifies the name of your connection.
Location	Dublin	Specifies the Direct Connect location where your leased line can be connected to.
Carrier	Other	Specifies the carrier that provides the leased line.
Port Type	1GE	Specifies the type of the port that the leased line is connected to: 1GE, 10GE, 40GE, and 100GE.

Parameter	Example Value	Description
Leased Line Bandwidth (Mbit/s)	100	Specifies the bandwidth of the leased line. This is the bandwidth of the leased line you have purchased from the carrier.
Equipment Room Address	Room xx, xx building, xx road, xx district, xx city	Specifies the address of your equipment room. The address must be specific to the floor your equipment room is on.
Tag	example_key1 example_value1	Adds tags to help you identify your connection. You can change them after the connection is created.
Description	-	Provides supplementary information about the connection.
Required Duration	3 months	Specifies how long the connection will be used for.
Auto-renew	3 months	Specifies whether to automatically renew the subscription to ensure service continuity.  For example, if you select this option and the required duration is three months, the system automatically renews the subscription for another three months.
Enterprise Project	default	Specifies the enterprise project by which connections are centrally managed. Select an existing enterprise project.

5. Click **Confirm Configuration**.
6. Confirm the configuration and click **Pay Now**.
7. Confirm the order, select a payment method, and click **Confirm**.
8. After you have paid for the order, a connection ID is allocated to you automatically, and the connection information is displayed on the management console. You will be contacted to confirm the construction plan and relevant information (including your company name, constructor, expected construction time, and construction workers).

9. After having confirmed the construction plan, you can arrange the carrier to deploy the dedicated line and connect it to your equipment room based on your construction plan.
10. In normal cases, Huawei onsite engineers will connect the dedicated line to the Huawei Cloud gateway port within two working days.
11. Verify that the connection is in the **Normal** state, which means that the connection is ready, and the billing starts.
12. Repeat the preceding steps to create connection **dc-connect2**.

**Step 2** Create a virtual gateway.

1. In the navigation pane on the left, choose **Direct Connect > Virtual Gateways**.
2. Click **Create Virtual Gateway**.
3. Configure the parameters based on [Table 5-4](#).

**Figure 5-3** Creating a virtual gateway  
**Create Virtual Gateway**

The screenshot shows the 'Create Virtual Gateway' configuration page. It features several input fields and buttons:

- Name:** A text input field.
- Enterprise Project:** A dropdown menu with '--Select--' and a 'Create Enterprise Project' link.
- VPC:** A dropdown menu with a 'Create VPC' link.
- Local Subnet:** A text area with a help icon and instructions: 'Enter one or more subnets using CIDR notation and separate each entry by a comma, for example, 192.168.52.0/24,192.168.54.0/24.'
- BGP ASN:** A text input field containing '64512'.
- Tag:** A section with a note: 'It is recommended that you use TMS's predefined tag function to add the same tag to different cloud resources. View predefined tags'. It includes 'Tag key' and 'Tag value' input fields.
- Description:** A large text area with a character count '0/128'.
- Buttons:** 'Cancel' and 'OK' buttons at the bottom right.

**Table 5-4** Parameters required for creating a virtual gateway

Parameter	Example Value	Description
Name	vgw-123	Specifies the virtual gateway name. The name can contain 1 to 64 characters.
Enterprise Project	default	Specifies the enterprise project by which virtual gateways are centrally managed. Select an existing enterprise project.
VPC	VPC-001	Specifies the VPC to be associated with the virtual gateway.
Local Subnet	192.168.0.0/16	Specifies the CIDR blocks of the subnets in the VPC to be accessed using Direct Connect. You can add one or more CIDR blocks. If there are multiple CIDR blocks, separate every entry with a comma (,).
BGP ASN	64512	Specifies the BGP ASN of the virtual gateway.
Tag	example_key1 example_value1	Adds tags to help you identify your virtual gateway. You can change them after the virtual gateway is created.
Description	-	Provides supplementary information about the virtual gateway.

4. Click **OK**.

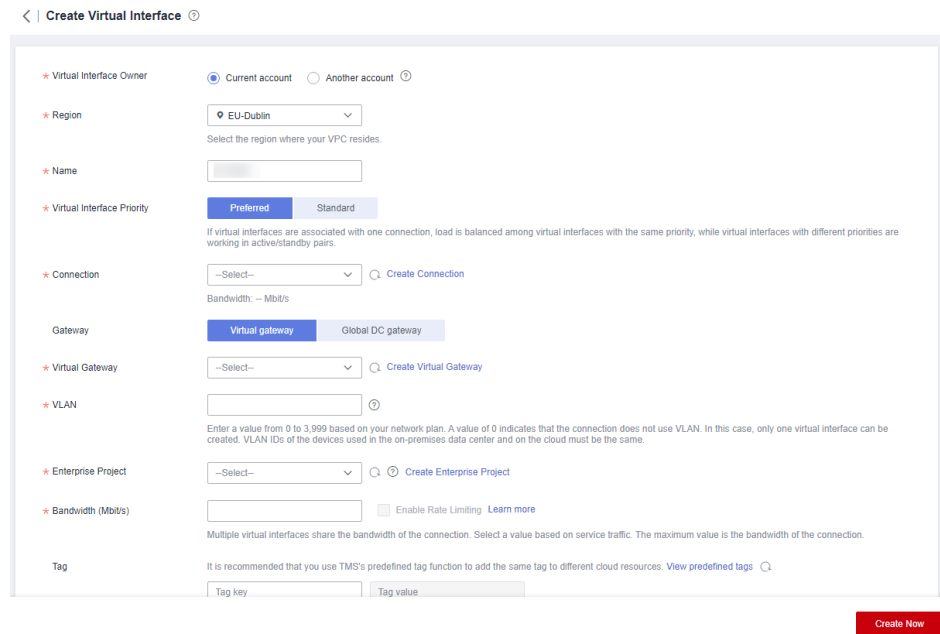
**Step 3** Create two virtual interfaces: **vif-test1** and **vif-test2**.

Use virtual interface **vif-test1** to connect virtual gateway **vgw-test** and connection **dc-connect1** and virtual interface **vif-test2** to connect virtual gateway **vgw-test** and connection **dc-connect2**. Set different priorities for the two virtual interfaces so the two connections can work in an active/standby pair.

1. In the navigation pane on the left, choose **Direct Connect > Virtual Interfaces**.
2. In the upper right corner, click **Create Virtual Interface**.

3. Configure the parameters based on [Table 5-5](#).

**Figure 5-4** Creating a virtual interface for your own account



**Table 5-5** Parameters for creating a virtual interface

Parameter	Example Value	Description
Virtual Interface Owner	Current account	Specifies the account that this virtual interface will be created for.
Region	EU-Dublin	Specifies the region where the connection resides. You can also change the region in the upper left corner of the console.
Name	vif-test1	Specifies the virtual interface name. The name can contain 1 to 64 characters.

Parameter	Example Value	Description
Virtual Interface Priority	Preferred	<p>Specifies whether the virtual interface will be preferentially used over other virtual interfaces. There are two options: <b>Preferred</b> and <b>Standard</b>.</p> <p>Virtual interfaces with different priorities are working in active/standby pairs.</p> <ul style="list-style-type: none"> <li>- Select <b>Preferred</b> for the virtual interface associated with the active connection.</li> <li>- Select <b>Standard</b> for the virtual interface associated with the standby connection.</li> </ul>
Connection	dc-connect1	Specifies the connection you can use to connect your on-premises network to Huawei Cloud.
Gateway	Virtual gateway	<p>Specifies the type of the gateway that the virtual interface connects to.</p> <p>You can select a virtual gateway or global DC gateway.</p> <p>In this example, select a virtual gateway.</p>
Virtual Gateway	vgw-123	<p>This parameter is mandatory when <b>Gateway</b> is set to <b>Virtual gateway</b>.</p> <p>Specifies the virtual gateway that the virtual interface connects to.</p>
Global DC Gateway	dgw-123	<p>This parameter is mandatory when <b>Gateway</b> is set to <b>Global DC gateway</b>.</p> <p>Specifies the global DC gateway that the virtual interface connects to.</p>

Parameter	Example Value	Description
VLAN	30	Specifies the ID of the VLAN for the virtual interface. You need to configure the VLAN if you create a standard connection. The VLAN for a hosted connection will be allocated by the partner. You do not need to configure the VLAN.
Bandwidth (Mbit/s)	1,000	Specifies the bandwidth that can be used by the virtual interface. The bandwidth cannot exceed that of the connection or LAG.
Enable Rate Limiting	Not enabled	Limits the highest bandwidth that can be used by the virtual interface. If this option is enabled, the rate limit gradients are as follows: <ul style="list-style-type: none"> <li>- If the bandwidth is less than or equal to 100 Mbit/s, the rate limit gradient is 10 Mbit/s.</li> <li>- If the bandwidth is greater than 100 Mbit/s but is less than or equal to 1,000 Mbit/s, the rate limit gradient is 100 Mbit/s.</li> <li>- If the bandwidth is greater than 1,000 Mbit/s but is less than or equal to 100 Gbit/s, the rate limit gradient is 1 Gbit/s.</li> <li>- If the bandwidth is greater than 100 Gbit/s, the rate limit gradient is 10 Gbit/s.</li> </ul> For example, if the bandwidth is 52 Mbit/s, the actual rate limit is 60 Mbit/s. If the bandwidth is 115 Mbit/s, the actual rate limit is 200 Mbit/s.

Parameter	Example Value	Description
Enterprise Project	default	Specifies the enterprise project by which virtual interfaces are centrally managed. Select an existing enterprise project.
Tag	<b>example_key1</b> <b>example_value1</b>	Adds tags to help you identify your virtual interface. You can change them after the virtual interface is created.
IP Address Family	<b>IPv4</b>	Specifies the address type of the virtual interface. <b>IPv4</b> is selected by default.
Local Gateway	10.0.0.1/30	Specifies the IP address used by Huawei Cloud to connect to your on-premises network. After you configure <b>Local Gateway</b> on the console, the configuration will be automatically delivered to the gateway used by Huawei Cloud.
Remote Gateway	<b>10.0.0.2/30</b>	Specifies the IP address used by the on-premises data center to connect to Huawei Cloud. After you configure <b>Remote Gateway</b> on the console, you need to configure the IP address on the interface of the on-premises device. <b>CAUTION</b> The IP addresses of the local gateway and remote gateway must be in the same IP address range. Generally, an IP address range with a 30-bit mask is used. The IP addresses you plan cannot conflict with IP addresses used on your on-premises network. Plan an IP address range that will be used at both ends of the connection for network communication between your on-premises data center and the cloud.



Parameter	Example Value	Description
Remote Subnet	10.1.123.0/24	Specifies the subnets and masks of your on-premises network. If there are multiple subnets, use commas (,) to separate them.
Routing Mode	BGP	Specifies whether static routing or dynamic routing is used to route traffic between your on-premises network and the cloud network.  If there are or will be two or more connections, select BGP routing for higher availability.
BGP ASN	64510	Specifies the ASN of the BGP peer.  This parameter is required when BGP routing is selected.
BGP MD5 Authentication Key	Qaz12345678	Specifies the password used to authenticate the BGP peer using MD5.  This parameter can be set when BGP routing is selected, and the parameter values on both gateways must be the same.  The key contains 8 to 255 characters and must contain at least two types of the following characters: <ul style="list-style-type: none"><li>- Uppercase letters</li><li>- Lowercase letters</li><li>- Digits</li><li>- Special characters ~!,,:;-_ "(){ } [ ] / @ # \$ % ^ &amp; * + \   =</li></ul>
Description	-	Provides supplementary information about the virtual interface.

4. Click **Create Now**.
5. Repeat steps [3.1](#) to [3.4](#) to create virtual interface **vif-test2**.

 NOTE

- When you create virtual interface **vif-test2**, select connection **dc-connect2**, and set **Local Gateway** to **10.0.0.5/30** and **Remote Gateway** to **10.0.0.6/30**.
- Set different BGP ASNs and BGP MD5 authentication keys for the two virtual interfaces.
- The default security group rule denies all the inbound traffic. Ensure that security group rules in both directions are correctly configured to ensure normal communications.

**Step 4** Wait for route delivery from the cloud.

Direct Connect automatically delivers the routes, and the active connection from the cloud has been specified through the priority of the associated virtual interface.

**Step 5** Configure routes on your on-premises network device.

Suppose you want the connection terminated at A to serve as the active connection to access the cloud, you can set **Local\_Pref** to lower the priority of the BGP routes for the connection terminated at Langfang-Huawei.

Example BGP route (A Huawei-developed network device is used as an example.)

```
bgp 64510
peer 10.0.0.1 as-number 64512
peer 10.0.0.1 password simple Qaz12345678
peer 10.0.0.5 as-number 64512
peer 10.0.0.5 password simple Qaz12345678
peer 10.0.0.5 route-policy slave_direct_in import
network 10.1.123.0 255.255.255.0
route-policy slave_direct_in permit node 10
apply local-preference 90
```

----End

## Connectivity Verification

Ping an on-premises server from an ECS to verify that the ECS can communicate with the on-premises server normally.

Disable the port for any connection and run the ping command again. If the ECS can still communicate with the on-premises server normally, the on-premises data center can access the cloud privately.

To view the specific path of a route, run the **tracert** command. The command varies according to the device type. For details, contact the device vendor.

```
CentOS Linux 8 (Core)
Kernel 4.18.0-240.10.1.el8_3.x86_64 on an x86_64

ecs-dc-test login: root
Password:
Last login: Fri Jul 30 14:15:12 on tty1

Welcome to Huawei Cloud Service

[root@ecs-dc-test ~]# ip ad
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether fa:16:3e:b5:89:93 brd ff:ff:ff:ff:ff:ff
    inet 192.168.47.182/16 brd 192.168.255.255 scope global dynamic noprefixroute eth0
        valid_lft 31535927sec preferred_lft 31535927sec
    inet6 fe80::f816:3eff:feb5:8993/64 scope link
        valid_lft forever preferred_lft forever
[root@ecs-dc-test ~]# ping 10.1.123.1
PING 10.1.123.1 (10.1.123.1) 56(84) bytes of data:
64 bytes from 10.1.123.1: icmp_seq=1 ttl=254 time=2.41 ms
64 bytes from 10.1.123.1: icmp_seq=2 ttl=254 time=1.92 ms
64 bytes from 10.1.123.1: icmp_seq=3 ttl=254 time=1.92 ms
64 bytes from 10.1.123.1: icmp_seq=4 ttl=254 time=1.188 ms
64 bytes from 10.1.123.1: icmp_seq=5 ttl=254 time=1.98 ms
64 bytes from 10.1.123.1: icmp_seq=6 ttl=254 time=1.98 ms
64 bytes from 10.1.123.1: icmp_seq=7 ttl=254 time=2.01 ms
64 bytes from 10.1.123.1: icmp_seq=8 ttl=254 time=1.91 ms
64 bytes from 10.1.123.1: icmp_seq=9 ttl=254 time=1.87 ms
64 bytes from 10.1.123.1: icmp_seq=10 ttl=254 time=2.07 ms
64 bytes from 10.1.123.1: icmp_seq=11 ttl=254 time=2.06 ms
64 bytes from 10.1.123.1: icmp_seq=12 ttl=254 time=1.78 ms
64 bytes from 10.1.123.1: icmp_seq=13 ttl=254 time=1.92 ms
64 bytes from 10.1.123.1: icmp_seq=14 ttl=254 time=2.28 ms
64 bytes from 10.1.123.1: icmp_seq=15 ttl=254 time=2.09 ms
64 bytes from 10.1.123.1: icmp_seq=16 ttl=254 time=2.04 ms
^C
--- 10.1.123.1 ping statistics ---
16 packets transmitted, 16 received, 0% packet loss, time 37ms
rtt min/avg/max/mdev = 1.779/1.999/2.406/0.158 ms
[root@ecs-dc-test ~]#
```

## Helpful Links

- For details about how to troubleshoot connection faults, see [Network and Connectivity](#) and [Routing](#).
- For common problems about establishing network connectivity using Direct Connect, see [Leased Line](#).
- For common problems about Direct Connect interconnection, see [Interconnection with Cloud](#).

# 6 Connecting an On-Premises Data Center to Multiple VPCs that Do Not Need to Communicate with Each Other

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## Scenario

Connect your on-premises network to two or more VPCs over one connection and use static routes to route traffic between your on-premises network and the VPCs. These VPCs do not need to communicate with each other. In this example, there are two VPCs.

### NOTE

Standard connections are used to provide dedicated ports for exclusive use.

## Prerequisites

- Your on-premises network must use a single-mode fiber with a 1GE, 10GE, 40GE, or 100GE optical module to connect to the access device in the cloud.
- Auto-negotiation for the port must be disabled. Port speed and full-duplex mode must be manually configured.
- 802.1Q VLAN encapsulation is supported on your on-premises network.

## Typical Topology

Your on-premises network is connected to two VPCs over a single connection.

For details on how to create a VPC, see the [Creating a VPC](#).

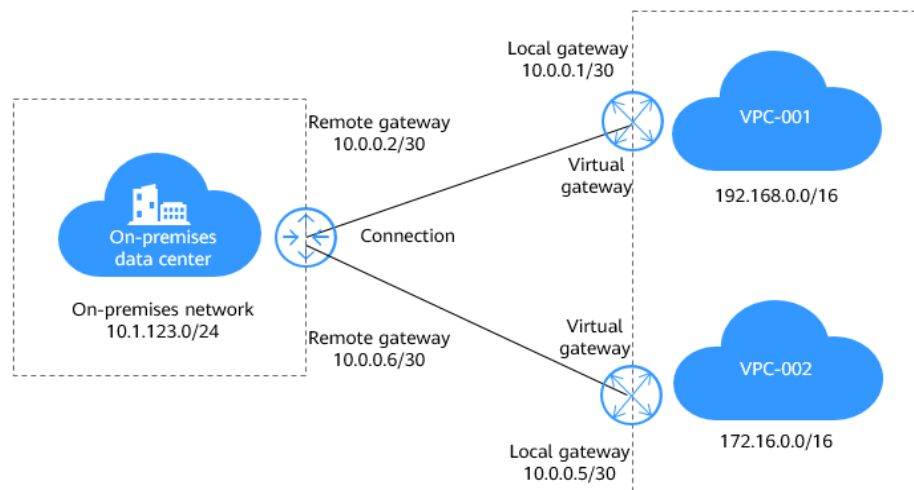
The following table lists the CIDR blocks used in this example.

**Table 6-1** CIDR blocks

Item	CIDR Block
Your on-premises network	10.1.123.0/24

Item	CIDR Block
Local and remote gateways (addresses for interconnection)	10.0.0.0/30 and 10.0.0.4/30
VPCs	VPC-001: 192.168.0.0/16 VPC-002: 172.16.0.0/16

**Figure 6-1** Accessing multiple VPCs over one connection



## Procedure

**Step 1** Create a connection.

For details, see [Connecting an On-Premises Data Center to a VPC over a Single Connection and Using Static Routing to Route Traffic](#).

**Step 2** Create two virtual gateways.

Associate one virtual gateway with **VPC-001** and the other one with **VPC-002**.

**Figure 6-2** Creating a virtual gateway  
**Create Virtual Gateway**

\* Name

\* Enterprise Project  [Create Enterprise Project](#)

\* VPC  [Create VPC](#)

\* Local Subnet 
  
Enter one or more subnets using CIDR notation and separate each entry by a comma, for example, 192.168.52.0/24,192.168.54.0/24.

BGP ASN

Tag It is recommended that you use TMS's predefined tag function to add the same tag to different cloud resources. [View predefined tags](#)
  
 
  
You can add 20 more tags.

Description 
  
0/128

**Table 6-2** Parameters required for creating virtual gateway 1

Parameter	Example Value	Description
Name	vgw-test	Specifies the virtual gateway name. The name can contain 1 to 64 characters.
Enterprise Project	default	Specifies the enterprise project by which virtual gateways are centrally managed. Select an existing enterprise project.
VPC	VPC-001	Specifies the VPC to be associated with the virtual gateway.

Parameter	Example Value	Description
Local Subnet	192.168.0.0/16	Specifies the CIDR blocks of the subnets in the VPC to be accessed using Direct Connect.  You can add one or more CIDR blocks. If there are multiple CIDR blocks, separate every entry with a comma (,).
BGP ASN	64512	Specifies the BGP ASN of the virtual gateway.
Tag	<b>example_key1</b> <b>example_value1</b>	Adds tags to help you identify your virtual gateway. You can change them after the virtual gateway is created.
Description	-	Provides supplementary information about the virtual gateway.

**Figure 6-3** Creating a virtual gateway  
**Create Virtual Gateway**

\* Name

\* Enterprise Project  [Create Enterprise Project](#)

\* VPC  [Create VPC](#)

\* Local Subnet

BGP ASN

Tag   
 It is recommended that you use TMS's predefined tag function to add the same tag to different cloud resources. [View predefined tags](#)

You can add 20 more tags.

Description

**Table 6-3** Parameters required for creating virtual gateway 2

Parameter	Example Value	Description
Name	vgw-c413	Specifies the virtual gateway name. The name can contain 1 to 64 characters.
Enterprise Project	default	Specifies the enterprise project by which virtual gateways are centrally managed. Select an existing enterprise project.
VPC	VPC-001	Specifies the VPC to be associated with the virtual gateway.
Local Subnet	172.16.0.0/16	Specifies the CIDR blocks of the subnets in the VPC to be accessed using Direct Connect. You can add one or more CIDR blocks. If there are multiple CIDR blocks, separate every entry with a comma (,).
BGP ASN	64512	Specifies the BGP ASN of the virtual gateway.
Tag	<b>example_key2</b> <b>example_value</b> <b>2</b>	Adds tags to help you identify your virtual gateway. You can change them after the virtual gateway is created.
Description	-	Provides supplementary information about the virtual gateway.

**Step 3** Create two virtual interfaces.

Connect each virtual interface with a virtual gateway associated so that your on-premises network can access **VPC-001** through 10.0.0.0/30 and **VPC-002** through 10.0.0.4/30.



**Figure 6-4** Creating a virtual interface for your own account

The screenshot shows the 'Create Virtual Interface' configuration page. Key settings include:
 

- Virtual Interface Owner:** Current account (selected)
- Region:** EU-Dublin
- Name:** vif-test
- Virtual Interface Priority:** Preferred
- Connection:** dc-test12
- Gateway:** Virtual gateway
- Virtual Gateway:** (empty)
- VLAN:** (empty)
- Enterprise Project:** (empty)
- Bandwidth (Mbit/s):** (empty)
- Tag:** (empty)

 A red 'Create Now' button is located at the bottom right of the form.

**Table 6-4** Parameters required for creating virtual interface 1

Parameter	Example Value	Description
Virtual Interface Owner	Current account	Specifies the account that this virtual interface will be created for.
Region	EU-Dublin	Specifies the region where the connection resides. You can also change the region in the upper left corner of the console.
Name	vif-test	Specifies the virtual interface name. The name can contain 1 to 64 characters.
Virtual Interface Priority	Preferred	Specifies whether the virtual interface will be preferentially used over other virtual interfaces. There are two options: <b>Preferred</b> and <b>Standard</b> .  If multiple virtual interfaces are associated with one Direct Connect device, the load is balanced among virtual interfaces with the same priority, while virtual interfaces with different priorities are working in active/standby pairs.
Connection	dc-test12	Specifies the connection you can use to connect your on-premises network to Huawei Cloud.

Parameter	Example Value	Description
Gateway	Virtual gateway	Specifies the type of the gateway that the virtual interface connects to. You can select a virtual gateway or global DC gateway. In this example, select a virtual gateway.
Virtual Gateway	vgw-123	Specifies the virtual gateway that the virtual interface connects to. This parameter is mandatory when <b>Gateway</b> is set to <b>Virtual gateway</b> .
Global DC Gateway	dgw-123	Specifies the global DC gateway that the virtual interface connects to. This parameter is mandatory when <b>Gateway</b> is set to <b>Global DC gateway</b> .
VLAN	30	Specifies the ID of the VLAN for the virtual interface. <ul style="list-style-type: none"><li>• Standard connections: You need to configure the VLAN.</li><li>• Hosted connections: The VLAN will be allocated by the partner. You do not need to configure the VLAN.</li></ul>
Bandwidth (Mbit/s)	500	Specifies the bandwidth that can be used by the virtual interface. The bandwidth cannot exceed that of the connection.

Parameter	Example Value	Description
Enable Rate Limiting	Not enabled	Limits the highest bandwidth that can be used by the virtual interface. If this option is enabled, the rate limit gradients are as follows: <ul style="list-style-type: none"><li>• If the bandwidth is less than or equal to 100 Mbit/s, the rate limit gradient is 10 Mbit/s.</li><li>• If the bandwidth is greater than 100 Mbit/s but is less than or equal to 1,000 Mbit/s, the rate limit gradient is 100 Mbit/s.</li><li>• If the bandwidth is greater than 1,000 Mbit/s but is less than or equal to 100 Gbit/s, the rate limit gradient is 1 Gbit/s.</li><li>• If the bandwidth is greater than 100 Gbit/s, the rate limit gradient is 10 Gbit/s.</li></ul> For example, if the bandwidth is 52 Mbit/s, the actual rate limit is 60 Mbit/s. If the bandwidth is 115 Mbit/s, the actual rate limit is 200 Mbit/s.
Enterprise Project	default	Specifies the enterprise project by which virtual interfaces are centrally managed. Select an existing enterprise project.
Tag	<b>example_key1</b> <b>example_value1</b>	Adds tags to help you identify your virtual interface. You can change them after the virtual interface is created.
IP Address Family	<b>IPv4</b>	Specifies the address type of the virtual interface. <b>IPv4</b> is selected by default.
Local Gateway	10.0.0.1/30	Specifies the IP address used by Huawei Cloud to connect to your on-premises network. After you configure <b>Local Gateway</b> on the console, the configuration will be automatically delivered to the gateway used by Huawei Cloud.

Parameter	Example Value	Description
Remote Gateway	10.0.0.2/30	<p>Specifies the IP address used by the on-premises data center to connect to Huawei Cloud. After you configure <b>Remote Gateway</b> on the console, you need to configure the IP address on the interface of the on-premises device.</p> <p><b>CAUTION</b></p> <p>The IP addresses of the local gateway and remote gateway must be in the same IP address range. Generally, an IP address range with a 30-bit mask is used. The IP addresses you plan cannot conflict with IP addresses used on your on-premises network. Plan an IP address range that will be used at both ends of the connection for network communication between your on-premises data center and the cloud.</p>
Remote Subnet	10.1.123.0/24	<p>Specifies the subnets and masks of your on-premises network. If there are multiple subnets, use commas (,) to separate them.</p>
Routing Mode	Static	<p>Specifies whether static routing or dynamic routing is used to route traffic between your on-premises network and the cloud network.</p> <p>If there are or will be two or more connections, select BGP routing for higher availability.</p>
BGP ASN	-	<p>Specifies the ASN of the BGP peer.</p> <p>This parameter is required when BGP routing is selected.</p>
BGP MD5 Authentication Key	-	<p>Specifies the password used to authenticate the BGP peer using MD5.</p> <p>This parameter can be set when BGP routing is selected, and the parameter values on both gateways must be the same.</p> <p>The key contains 8 to 255 characters and must contain at least two types of the following characters:</p> <ul style="list-style-type: none"><li>• Uppercase letters</li><li>• Lowercase letters</li><li>• Digits</li><li>• Special characters ~!,,:;_-"}{[]/@#\$%^&amp;*+ \=</li></ul>

Parameter	Example Value	Description
Description	-	Provides supplementary information about the virtual interface.

**Figure 6-5** Creating a virtual interface for your own account

The screenshot shows the 'Create Virtual Interface' configuration page. Key fields include:
 

- Virtual Interface Owner:** Radio buttons for 'Current account' (selected) and 'Another account'.
- Region:** A dropdown menu set to 'EU-Dublin'.
- Name:** An empty text input field.
- Virtual Interface Priority:** Radio buttons for 'Preferred' (selected) and 'Standard'.
- Connection:** A dropdown menu set to '--Select--' with a 'Create Connection' link.
- Gateway:** Radio buttons for 'Virtual gateway' (selected) and 'Global DC gateway'.
- Virtual Gateway:** A dropdown menu set to '--Select--' with a 'Create Virtual Gateway' link.
- VLAN:** An empty text input field with a help icon.
- Enterprise Project:** A dropdown menu set to '--Select--' with a 'Create Enterprise Project' link.
- Bandwidth (Mbit/s):** An empty text input field with an 'Enable Rate Limiting' checkbox and a 'Learn more' link.
- Tag:** Fields for 'Tag key' and 'Tag value'.

 A red 'Create Now' button is located at the bottom right of the form.

**Table 6-5** Parameters required for creating virtual interface 2

Parameter	Example Value	Description
Virtual Interface Owner	Current account	Specifies the account that this virtual interface will be created for.
Region	EU-Dublin	Specifies the region where the connection resides. You can also change the region in the upper left corner of the console.
Name	vif-c413	Specifies the virtual interface name. The name can contain 1 to 64 characters.

Parameter	Example Value	Description
Virtual Interface Priority	Preferred	Specifies whether the virtual interface will be preferentially used over other virtual interfaces. There are two options: <b>Preferred</b> and <b>Standard</b> . If multiple virtual interfaces are associated with one Direct Connect device, the load is balanced among virtual interfaces with the same priority, while virtual interfaces with different priorities are working in active/standby pairs.
Connection	dc-test12	Specifies the connection you can use to connect your on-premises network to Huawei Cloud.
Gateway	Virtual gateway	Specifies the type of the gateway that the virtual interface connects to. You can select a virtual gateway or global DC gateway. In this example, select a virtual gateway.
Virtual Gateway	vgw-123	This parameter is mandatory when <b>Gateway</b> is set to <b>Virtual gateway</b> . Specifies the virtual gateway that the virtual interface connects to.
Global DC Gateway	dgw-123	Specifies the global DC gateway that the virtual interface connects to. This parameter is mandatory when <b>Gateway</b> is set to <b>Global DC gateway</b> .
VLAN	31	Specifies the ID of the VLAN for the virtual interface. <ul style="list-style-type: none"><li>• Standard connections: You need to configure the VLAN.</li><li>• Hosted connections: The VLAN will be allocated by the partner. You do not need to configure the VLAN.</li></ul>
Bandwidth (Mbit/s)	500	Specifies the bandwidth that can be used by the virtual interface. The bandwidth cannot exceed that of the connection.

Parameter	Example Value	Description
Enable Rate Limiting	Not enabled	Limits the highest bandwidth that can be used by the virtual interface. If this option is enabled, the rate limit gradients are as follows: <ul style="list-style-type: none"><li>• If the bandwidth is less than or equal to 100 Mbit/s, the rate limit gradient is 10 Mbit/s.</li><li>• If the bandwidth is greater than 100 Mbit/s but is less than or equal to 1,000 Mbit/s, the rate limit gradient is 100 Mbit/s.</li><li>• If the bandwidth is greater than 1,000 Mbit/s but is less than or equal to 100 Gbit/s, the rate limit gradient is 1 Gbit/s.</li><li>• If the bandwidth is greater than 100 Gbit/s, the rate limit gradient is 10 Gbit/s.</li></ul> For example, if the bandwidth is 52 Mbit/s, the actual rate limit is 60 Mbit/s. If the bandwidth is 115 Mbit/s, the actual rate limit is 200 Mbit/s.
Enterprise Project	default	Specifies the enterprise project by which virtual interfaces are centrally managed. Select an existing enterprise project.
Tag	<b>example_key2</b> <b>example_value</b> <b>2</b>	Adds tags to help you identify your virtual interface. You can change them after the virtual interface is created.
IP Address Family	<b>IPv4</b>	Specifies the address type of the virtual interface. <b>IPv4</b> is selected by default.
Local Gateway	10.0.0.5/30	Specifies the IP address used by Huawei Cloud to connect to your on-premises network. After you configure <b>Local Gateway</b> on the console, the configuration will be automatically delivered to the gateway used by Huawei Cloud.

Parameter	Example Value	Description
Remote Gateway	10.0.0.6/30	Specifies the IP address used by the on-premises data center to connect to Huawei Cloud. After you configure <b>Remote Gateway</b> on the console, you need to configure the IP address on the interface of the on-premises device. <b>CAUTION</b> The IP addresses of the local gateway and remote gateway must be in the same IP address range. Generally, an IP address range with a 30-bit mask is used. The IP addresses you plan cannot conflict with IP addresses used on your on-premises network. Plan an IP address range that will be used at both ends of the connection for network communication between your on-premises data center and the cloud.
Remote Subnet	10.1.123.0/24	Specifies the subnets and masks of your on-premises network. If there are multiple subnets, use commas (,) to separate them.
Routing Mode	Static	Specifies whether static routing or dynamic routing is used to route traffic between your on-premises network and the cloud network. If there are or will be two or more connections, select BGP routing for higher availability.
BGP ASN	-	Specifies the ASN of the BGP peer. This parameter is required when BGP routing is selected.
BGP MD5 Authentication Key	-	Specifies the password used to authenticate the BGP peer using MD5. This parameter can be set when BGP routing is selected, and the parameter values on both gateways must be the same. The key contains 8 to 255 characters and must contain at least two types of the following characters: <ul style="list-style-type: none"> <li>• Uppercase letters</li> <li>• Lowercase letters</li> <li>• Digits</li> <li>• Special characters ~!,,:;_-"}{[]/@#\$%^&amp;*+ =</li> </ul>
Description	-	Provides supplementary information about the virtual interface.



 **NOTE**

The default security group rule denies all the inbound traffic. Ensure that security group rules in both directions are correctly configured to ensure normal communications.

**Step 4** Wait for route delivery from the cloud.

Direct Connect automatically delivers the routes after a connection is established between your on-premises network and the cloud network.

**Step 5** Configure routes on your on-premises network device.

Example route (A Huawei-developed device is used as an example.)

```
ip route-static 192.168.0.0 255.255.0.0 10.0.0.1  
ip route-static 172.16.0.0 255.255.0.0 10.0.0.5
```

----**End**

# 7 Connecting an On-Premises Data Center to Multiple VPCs in the Same Region Using Direct Connect and VPC Peering

## Scenario

Connect your on-premises network to the cloud and use VPC Peering to connect the VPCs in the same region so that your on-premises network can access all these VPCs.

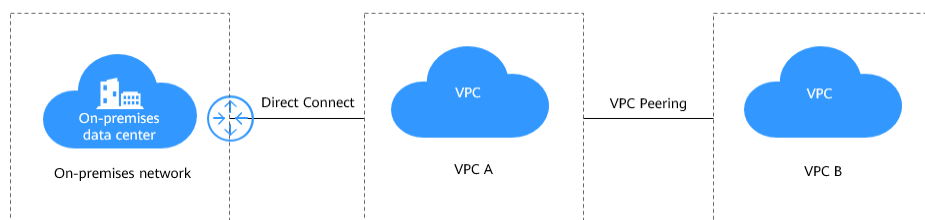
---

**CAUTION**

The CIDR block of each VPC must be unique.

---

## Typical Topology





## Procedure

**Step 1** Configure Direct Connect to connect your on-premises data center to **VPC A**.

1. **Create a connection.**
2. **Create a virtual gateway.**  
When creating the virtual gateway, select VPC A and add the CIDR block of VPC B to the local subnet.
3. **Create a virtual interface.**

**Step 2** Create a VPC peering connection between VPC A and VPC B.

1. Log in to the management console.
2. On the console homepage, click  in the upper left corner and select the desired region and project.
3. Click  to display **Service List** and choose **Networking > Virtual Private Cloud**.
4. In the navigation pane on the left, click **VPC Peering Connections**.
5. Click **Create VPC Peering Connection**.
6. Configure the parameters based on [Table 7-1](#).

**Figure 7-1** Creating a VPC peering connection

The screenshot shows the 'Create VPC Peering Connection' interface. At the top, there is a breadcrumb trail: '< | Create VPC Peering Connection'. Below this is an information banner with a blue background and a white icon, containing text about VPC peering connections and links to 'Learn more'. The main configuration area is divided into three sections:
 

- Basic Configuration:** Contains a 'Region' dropdown menu, a 'VPC Peering Connection Name' text input field, and a 'Description (Optional)' text area with a character count of 0/255.
- Local VPC Settings:** Contains a 'Local VPC' dropdown menu with a search icon and a 'Local VPC CIDR Block' text input field.
- Peer VPC Settings:** Contains two radio buttons for 'Account' selection: 'My account' (selected) and 'Another account'. Below this is a 'Peer Project' dropdown menu. A small note at the bottom of this section states: 'If you select My account, the project is filled in by default.'

 A red 'Create Now' button is positioned at the bottom right of the form.

**Table 7-1** Parameters required for creating a VPC peering connection

Parameter	Example Value	Description
Region	EU-Dublin	Region where the VPC peering connection will be used.  Region where the supplementary network interface will be created. Select the region nearest to you to ensure the lowest latency possible.

Parameter	Example Value	Description
VPC Peering Connection Name	peering-001	Specifies the name of the VPC peering connection. The name contains a maximum of 64 characters, which consist of letters, digits, hyphens (-), and underscores (_).
Description	-	Provides supplementary information about the VPC peering connection.
Local VPC	VPC B	Specifies the local VPC. Select <b>VPC B</b> from the drop-down list.
Local VPC CIDR Block	192.168.2.0/24	Specifies the CIDR block of the local VPC.
Account	My account	Specifies whether the VPC to peer with is from your account or another user's account. <ul style="list-style-type: none"><li>- <b>My account:</b> The VPC peering connection will connect two VPCs in your account.</li><li>- <b>Another account:</b> The VPC peering connection will connect your VPC to another VPC in another account.</li></ul>
Peer Project	eu-west-101	The project is selected in by default if <b>Account</b> is set to <b>My account</b> . In this example, VPC A and VPC B are created in region A, and the corresponding project of the account in region A is selected by default.
Peer VPC	VPC A	Specifies the peer VPC. Select <b>VPC A</b> from the drop-down list.

Parameter	Example Value	Description
Peer VPC CIDR Block	192.168.10.0/24	Specifies the CIDR block of the peer VPC. The local and peer VPCs cannot have matching or overlapping CIDR blocks. Otherwise, the routes added for the VPC peering connection may not take effect.

7. Click **OK**.

**Step 3** Add routes for the VPC peering connection.

1. Under **Networking**, click **Virtual Private Cloud**.
2. In the navigation pane on the left, click **VPC Peering Connections**.
3. Locate the VPC peering connection in the connection list.
4. Click the name of the VPC peering connection to switch to the page showing details about the connection.
5. Click the **Local Routes** tab.
6. Add routes in the default route table. For details about the parameters, see [Table 7-2](#).

**Table 7-2** Parameters required for adding routes for a VPC peering connection

Parameter	Example Value	Description
VPC	VPC B	Specifies a VPC that is connected by the VPC peering connection.

Parameter	Example Value	Description
Route Table	rtb-VPC-B (default)	<p>Specifies the route table of the VPC. The routes will be added to this route table.</p> <p>Each VPC comes with a default route table to control the outbound traffic from the subnets in the VPC. In addition to the default route table, you can also create a custom route table and associate it with the subnets in the VPC. Then, the custom route table controls outbound traffic of the subnets.</p> <ul style="list-style-type: none"><li>- If there is only the default route table in the drop-down list, select the default route table.</li><li>- If there are both default and custom route tables in drop-down list, select the route table associated with the subnet connected by the VPC peering connection.</li></ul>
Destination	VPC A CIDR block: 192.168.10.0/24	<p>Specifies the CIDR block of the peer VPC, a subnet, or the private IP address of an ECS in the peer VPC.</p> <p>For details, see <a href="#">VPC Peering Connection Examples</a>.</p>
Next Hop	peering-001	<p>The default value is the current VPC peering connection. You do not need to specify this parameter.</p>
Description	-	<p>(Optional) Provides supplementary information about the route.</p> <p>Enter up to 255 characters. Angle brackets (&lt; or &gt;) are not allowed.</p>

Parameter	Example Value	Description
Add a route for the other VPC	Selected	<p>If you select this option, you can also add a route for the other VPC connected by the VPC peering connection.</p> <p>To enable communications between VPCs connected by a VPC peering connection, you need to add forward and return routes to the route tables of the VPCs.</p>
VPC	VPC A	By default, the other VPC connected by the VPC peering connection is selected. You do not need to specify this parameter.
Route Table	rtb-VPC-A (default)	<p>Specifies the route table of the VPC. The routes will be added to this route table.</p> <p>Each VPC comes with a default route table to control the outbound traffic from the subnets in the VPC. In addition to the default route table, you can also create a custom route table and associate it with the subnets in the VPC. Then, the custom route table controls outbound traffic of the subnets.</p> <ul style="list-style-type: none"><li>- If there is only the default route table in the drop-down list, select the default route table.</li><li>- If there are both default and custom route tables in drop-down list, select the route table associated with the subnet connected by the VPC peering connection.</li></ul>
Destination	VPC B CIDR block: 192.168.2.0/24	IP address in the VPC at the other end of the VPC peering connection. The value can be VPC CIDR block, subnet CIDR block, or ECS IP address.

Parameter	Example Value	Description
Next Hop	peering-001	The default value is the current VPC peering connection. You do not need to specify this parameter.
Description	-	(Optional) Provides supplementary information about the route. Enter up to 255 characters. Angle brackets (< or >) are not allowed.

7. Click **OK**.  
You can view the route in the route list.

----End



# 8 Using a Public NAT Gateway and Direct Connect to Accelerate Internet Access

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You can use Direct Connect to connect your on-premises data center to the cloud and then buy a public NAT gateway to allow on-premises servers to access the Internet or provide publicly accessible services. Use SNAT rules to allow on-premises servers to send outbound traffic to the Internet, while preventing the Internet from establishing connections to the servers. Use DNAT rules to allow a service in the on-premises network to be publicly accessible. This is widely used in scenarios such as gaming, e-commerce, and finance.

For details, see [Using a Public NAT Gateway and Direct Connect to Accelerate Internet Access](#).