Direct Connect

User Guide

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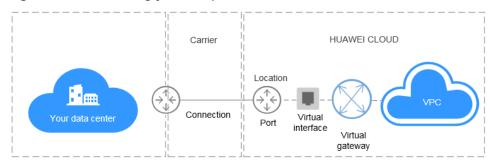
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Connections

1.1 Creating a Connection

Figure 1-1 shows how Direct Connects your on-premises data center to a VPC.

Figure 1-1 Connecting your on-premises data center to a VPC



Self-Service Connection

• Scenario

You need to create a connection to connect your on-premises data center to the Direct Connect location you have selected to build a hybrid cloud.

After you create a connection on the console, Huawei Cloud will provide you with a port for exclusive use. To establish the connection, you need to connect the leased line to the Direct Connect location you have selected. Figure 1-2 shows the process of connecting your on-premises data center to Huawei Cloud using Direct Connect.

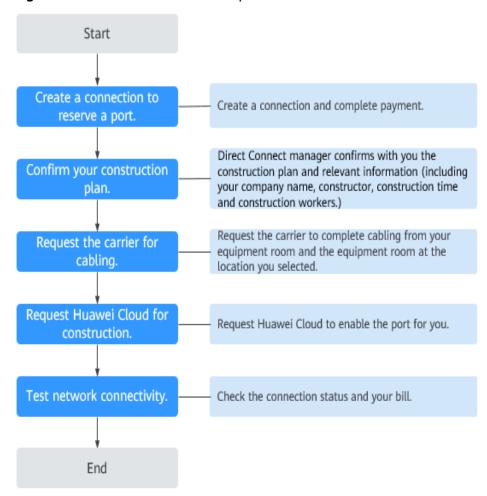


Figure 1-2 Self-service installation process

- a. Create a connection.
 - i. Log in to the management console.
 - ii. On the console homepage, click in the upper left corner and select the desired region and project.
 - iii. Hover on to display Service List and choose Networking > Direct Connect.
 - iv. In the navigation pane on the left, choose **Direct Connect** > **Connections**.
 - v. Click **Create Connection** in the upper right corner.
 - vi. On the **Create Connection** page, enter the equipment room details and select the Direct Connect location and port based on **Table 1-1**.

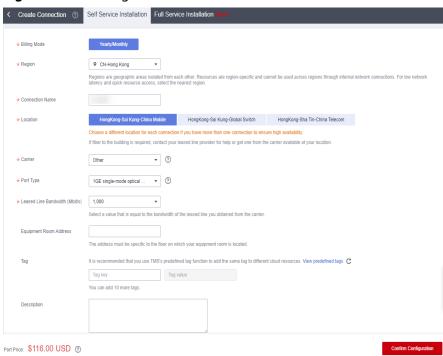


Figure 1-3 Creating a self-service connection

Table 1-1 Parameters required for creating a connection

Parameter	Description
Billing Mode	Specifies how you are charged for the connection. Currently, only Yearly/Monthly is supported.
Region	Specifies the region where the connection resides. You can also change the region in the upper left corner of the console.
Connection Name	Specifies the name of your connection.
Location	Specifies the Direct Connect location where your leased line can be connected to.
Carrier	Specifies the carrier that provides the leased line.
Port Type	Specifies the type of the port that the leased line is connected to: 1GE, 10GE, 40GE, and 100GE.
Leased Line Bandwidth	Specifies the bandwidth of the connection in the unit of Mbit/s. This is the bandwidth of the leased line you bought from the carrier.

Parameter	Description
Your Equipment Room Address	Specifies the address of your equipment room. The address must be specific to the floor on which your equipment room is located, for example, XX Equipment Room, XX Building, No. XX, Huajing Road, Pudong District, Shanghai.
Tag	Identifies the connection. A tag consists of a key and a value. You can add 10 tags to a connection.
	Tag keys and values must meet the requirements listed in Table 1-2.
	NOTE If a predefined tag has been created on Tag Management Service (TMS), you can directly select the corresponding tag key and value.
	For details about predefined tags, see Predefined Tag Overview.
	If you have configured tag policies for Direct Connect, you need to add tags to your connections based on the tag policies. If you add a tag that does not comply with the tag policies, connections may fail to be created. Contact the administrator to learn more about tag policies.
Description	Provides supplementary information about the connection.
Contact Person/ Phone Number/ Email	Specifies who is responsible for your connection. CAUTION If you do not provide any contact information, we will contact the person in your account information.
Required Duration	Specifies how long the connection will be used for.
Auto-renew	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	Provides a cloud resource management mode where cloud resources and members are centrally managed by project.

Parameter	Requirements
Key	Cannot be left blank.
	Must be unique for each resource.
	Can contain a maximum of 36 characters.
	 Can contain only letters, digits, hyphens, underscores, and Unicode characters from \u4e00 to \u9fff.
Value	Can be left blank.
	Can contain a maximum of 43 characters.
	 Can contain only letters, digits, period, hyphens, underscores, and Unicode characters from \u4e00 to \u9fff.

Table 1-2 Tag key and value requirements

vii. Click Next.

- viii. Confirm the connection information and click Pay Now.
- ix. Confirm the order, select a payment method, and click Confirm.
- b. Connect your on-premises data center to the cloud.
 - i. After you have paid for the order, the system automatically allocates a connection ID for you, and the connection information is displayed on the management console. The connection status is **Creating**, when you will be contacted to confirm the construction plan and relevant information (including your company name, constructor, expected construction time, and construction workers).
 - ii. 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.
 - In normal cases, Huawei resident engineers will connect the dedicated line to the Huawei Cloud gateway port within two working days.
 - iv. After the construction is complete, the connection status becomes **Normal**, indicating that the connection is ready.

◯ NOTE

Create a virtual gateway and associate the virtual gateway with the VPC.

Create a virtual interface to associate the connection with the created virtual gateway, and connect your on-premises data center to the VPC through the connection.

Full-Service Connection

Scenario

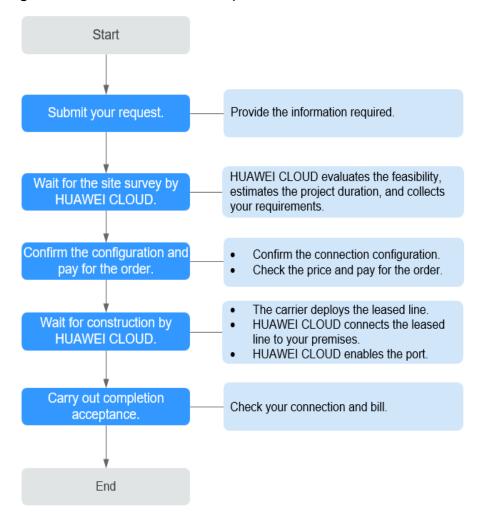
Huawei Cloud completes all operations required for connecting your onpremises data center to the cloud, including integrating the network resources and ports.

Figure 1-4 shows the entire process.

◯ NOTE

Full-service connections are now available in the following regions: CN-Hong Kong and CN South-Guangzhou.

Figure 1-4 Full-service installation process



- a. Submit your request.
 - Navigate to the Direct Connect console after login and click Create Connection. Click Full Service Installation in the navigation bar.
 - ii. Provide information about your equipment room and select a Huawei Cloud location. For details about the parameters, see Table 1-3.

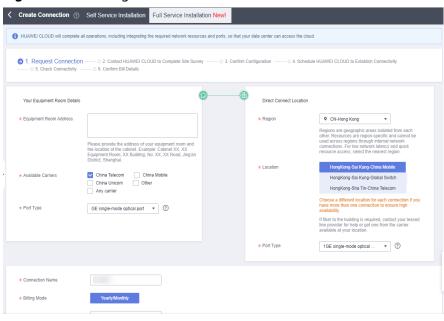


Figure 1-5 Creating a full-service connection

Table 1-3 Parameter description

Parameter	Description
Equipment Room Address	Specifies the address of your equipment room. The address must be specific to the room and cabinet number, for example, Cabinet XX, XX Equipment Room, XX Building, No. XX, Huajing Road, Pudong District, Shanghai.
Available Carriers	Specifies the carriers that are allowed to enter your equipment room.
Port Type	Specifies the type of port on the device in your equipment room for connecting to the leased line.
Region	Specifies the region where the connection resides. You can also change the region in the upper left corner of the console.
Location	Specifies the Direct Connect location where your leased line can be connected to.
Port Type	Specifies the type of the port that the leased line is connected to. There are four types of ports: 1GE, 10GE, 40GE, and 100GE.
Connection Name	Specifies the name of your connection.

Parameter	Description
Leased Line Bandwidth	Specifies the bandwidth of the connection in the unit of Mbit/s.
Billing Mode	Specifies how you are charged for the connection. Currently, only Yearly/ Monthly is supported.
Required Duration	Specifies how long the connection will be used for.
Enterprise Project	Provides a cloud resource management mode where cloud resources and members are centrally managed by project.
Contact Person	Specifies the name of the person who is responsible for connecting your onpremises data center to the cloud.
Phone Number	Specifies the phone number of the person who is responsible for connecting your onpremises data center to the cloud.
Email	Specifies the email address of the person who is responsible for connecting your onpremises data center to the cloud.

iii. Click Submit.

b. Wait for Huawei Cloud's site survey.

Huawei Cloud evaluates your requirements and the carrier's resources and confirms whether your requirements can be met. If your requirements can be met, Huawei Cloud will place an order to you.

Generally, the site survey takes three working days.

- c. Confirm and pay for the order.
 - i. On the **Connections** page, locate the target connection and click **Confirm Configuration** in the **Operation** column.
 - ii. Confirm the connection configuration and expenses, and then click Next.

■ NOTE

You need to read and agree to the **Full-Service Installation Statement** before paying for the order.

iii. On the purchase page, select a payment mode and click **Pay**.

□ NOTE

If you select **Download Contract and Pay**, download a contract on the contract page and then request your financial department to process the payment. Discounts, if any, will automatically apply.

- d. Wait for Huawei Cloud to complete the following work:
 - i. Contacts the carrier to deploy the leased line.
 - ii. Connects your on-premises data center to the cloud using the leased line.
 - iii. Contacts the carrier to complete in-building cabling.

□ NOTE

This step is required when you choose a full-service connection with a dedicated port and need cabling for your site.

- iv. Enables the port.
- e. Confirm that you want to enable Direct Connect.
 - i. On the **Connections** page, locate the target connection and click **Confirm Completion** in the **Operation** column.
 - ii. Click **OK**. Confirm that your connection is available for use, and the billing starts.

1.2 Viewing a Connection

Scenarios

After a connection is created, you can view its details.

Procedure

- 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. Hover on to display Service List and choose Networking > Direct Connect.
- 4. In the navigation pane on the left, choose **Direct Connect > Connections**.
- 5. Locate the connection you want to view and click its name to view the details.

1.3 Modifying a Connection

Scenarios

After creating a connection, you can modify its name, bandwidth, equipment room address, and description.

- 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. Hover on to display Service List and choose Networking > Direct
- 4. In the navigation pane on the left, choose **Direct Connect > Connections**.
- 5. Locate the connection you want to modify and click **Modify** in the **Operation** column.
- 6. Modify the connection and click **OK**.

1.4 Unsubscribing from a Connection

Scenarios

If you do not need to use a self-service connection any longer, you can unsubscribe from it.



You can only unsubscribe from connections that are in the **Normal** state. If a connection is being created, you can unsubscribe from it after the connection is created.

Procedure

- 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. Hover on to display **Service List** and choose **Networking** > **Direct Connect**.
- 4. In the navigation pane on the left, choose **Direct Connect > Connections**.
- 5. Locate the connection that you want to unsubscribe from and click **Unsubscribe** in the **Operation** column.
- 6. Locate the target connection and click **Unsubscribe from Resource** in the **Operation** column.
- 7. On the **Unsubscribe** page, select the reason for unsubscription, confirm the refund amount, and select **I understand a Handling fees will be charged for this unsubscription**.
- 8. Click Confirm.

1.5 Renewing a Connection

Scenarios

You can renew the subscription when a connection is about to expire.

Procedure

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. Hover on to display **Service List** and choose **Networking > Direct Connect**.
- 4. In the navigation pane on the left, choose **Direct Connect > Connections**.
- 5. Locate the connection you want to renew and choose **More** > **Renew** in the **Operation** column.
- 6. Set the duration that you want to renew the connection and click **Pay**. Then pay the order as prompted.

1.6 Managing Connection Tags

Scenarios

After a connection is created, you can view its tags or add, edit or delete a tag.

A tag is the identifier of a connection and consists of a key and a value. You can add a maximum of 10 tags to a connection.

□ NOTE

If a predefined tag has been created on Tag Management Service (TMS), you can directly select the corresponding tag key and value.

For details about predefined tags, see Predefined Tag Overview.

If you have configured tag policies for Direct Connect, you need to add tags to your connections based on the tag policies. If you add a tag that does not comply with the tag policies, connections may fail to be created. Contact the administrator to learn more about tag policies.

Adding a Tag

Add a tag to an existing connection.

- 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. Hover on to display **Service List** and choose **Networking > Direct Connect**.
- 4. In the navigation pane on the left, choose **Direct Connect > Connections**.
- 5. Locate the connection and click its name to switch to the **Summary** page.
- 6. Click Tags.
- 7. Click Add Tag.
- 8. In the displayed dialog box, enter a key and a value.

If you have configured tag policies for Direct Connect, you need to add tags to your connections based on the tag policies. If you add a tag that does not comply with the tag policies, connections may fail to be created. Contact the administrator to learn more about tag policies.

Table 1-4 describes the tag key and value requirements.

Table 1-4 Tag key and value requirements

Parameter	Requirements
Key	Cannot be left blank.
	Must be unique for each resource.
	Can contain a maximum of 36 characters.
	 Can contain only letters, digits, hyphens, underscores, and Unicode characters from \u4e00 to \u9fff.
Value	Can be left blank.
	Can contain a maximum of 43 characters.
	 Can contain only letters, digits, period, hyphens, underscores, and Unicode characters from \u4e00 to \u9fff.

9. Click OK.

Editing a Tag

Modify the value of a tag added to a connection.

- 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. Hover on to display **Service List** and choose **Networking** > **Direct Connect**.
- 4. In the navigation pane on the left, choose **Direct Connect > Connections**.
- 5. Locate the connection and click its name to switch to the **Summary** page.
- 6. Click Tags.
- 7. In the tag list, locate the tag you want to modify and click **Edit** in the **Operation** column.
- 8. Enter a new value.
- 9. Click OK.

Deleting a Tag

Delete a tag from a connection.



Deleted tags cannot be recovered.

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. Hover on to display Service List and choose Networking > Direct Connect.
- 4. In the navigation pane on the left, choose **Direct Connect > Connections**.
- 5. Locate the connection and click its name to switch to the **Summary** page.
- 6. Click Tags.
- 7. In the tag list, locate the tag you want to delete and click **Delete** in the **Operation** column.
- 8. Click Yes.

2 Virtual Gateways

2.1 Creating a Virtual Gateway

Scenarios

You can create a virtual gateway and associate it with the VPC or attach it to an enterprise router that you need to access.

Virtual gateways can be attached to enterprise routers in the following regions: CN North-Beijing4, CN East-Shanghai1, CN South-Guangzhou, CN-Hong Kong, AP-Bangkok, and AP-Singapore.

- 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. Hover on to display **Service List** and choose **Networking > Direct Connect**.
- 4. In the navigation pane on the left, choose **Direct Connect** > **Virtual Gateways**.
- 5. Click Create Virtual Gateway.
- 6. Configure the parameters based on Table 2-1.

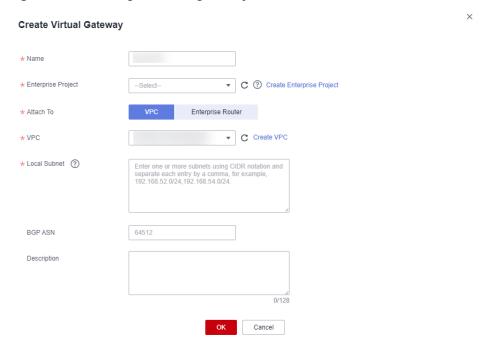


Figure 2-1 Creating a virtual gateway

Table 2-1 Parameters required for creating a virtual gateway

Parameter	Description
Name	Specifies the virtual gateway name. The name can contain 1 to 64 characters.
Enterprise Project	Provides a cloud resource management mode where cloud resources and members are centrally managed by project.
Attachment	Specifies whether the virtual gateway is associated with a VPC or attached to an enterprise router.
VPC	Specifies the VPC to be associated with the virtual gateway. This parameter is mandatory when you set Attachment to VPC .
Enterprise Router	Specifies the enterprise router that the virtual gateway is attached to. This parameter is displayed when you set Attachment to Enterprise Router .

Parameter	Description
Local Subnet	Specifies the CIDR blocks of the subnets in the VPC to be accessed using Direct Connect.
	This parameter is mandatory when you set Attachment to VPC .
	You can add one or more CIDR blocks. If there are multiple CIDR blocks, separate every entry with a comma (,).
BGP ASN	Specifies the BGP ASN of the virtual gateway.
	NOTE Generally, Huawei Cloud's BGP ASN is 64512. There are two special cases:
	 In the CN North-Beijing1 region, the default BGP ASN of Huawei Cloud is 65533.
	 In the AP-Bangkok region, the BGP ASN of some Direct Connect locations is 65535 by default. For details, contact the Direct Connect manager.
Description	Provides supplementary information about the virtual gateway.
Configuration Fee	Shows the prices of the enterprise router attachment and of the traffic used by the enterprise router.
	This parameter is displayed when you set Attachment to Enterprise Router .

7. Click **OK**.

Ensure that the virtual gateway is in the **Normal** state.

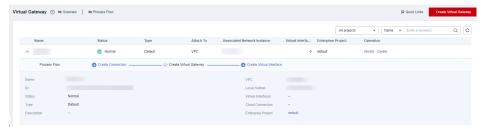
2.2 Viewing a Virtual Gateway

Scenarios

You can view details about a virtual gateway.

- 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. Hover on to display **Service List** and choose **Networking > Direct Connect**.
- 4. In the navigation pane on the left, choose **Direct Connect** > **Virtual Gateways**.
- 5. Locate the virtual gateway and click \checkmark on the left to view its details.

Figure 2-2 Viewing a virtual gateway



2.3 Modifying a Virtual Gateway

Scenarios

After creating a virtual gateway, you can modify its settings.

- 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. Hover on to display **Service List** and choose **Networking > Direct Connect**.
- 4. In the navigation pane on the left, choose **Direct Connect** > **Virtual Gateways**.
- 5. Locate the virtual gateway you want to modify and click **Modify** in the **Operation** column.
- 6. Modify the name, local subnet, and description, and then click **OK**.
 - If the virtual gateway is attached to a VPC, you can modify Name, Local Subnet, and Description of the virtual gateway.

Modify Virtual Gateway

* Name

* Local Subnet ②

Description

OK Cancel

Figure 2-3 Modifying a virtual gateway that is attached to a VPC

 If the virtual gateway is attached to an enterprise router, you can modify Name and Description of the virtual gateway.

Figure 2-4 Modifying a virtual gateway that is attached to an enterprise router



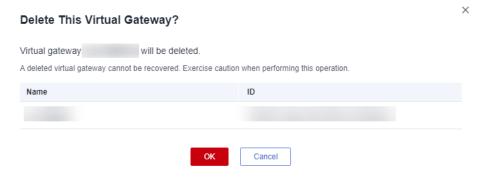
2.4 Deleting a Virtual Gateway

Scenarios

You can delete a virtual gateway if you do not need it any longer and there are no virtual interfaces associated with it.

- 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. Hover on to display **Service List** and choose **Networking > Direct Connect**.
- 4. In the navigation pane on the left, choose **Direct Connect** > **Virtual Gateways**.
- 5. Locate the virtual gateway you want to delete and click **Delete** in the **Operation** column.
- 6. Click Yes.

Figure 2-5 Deleting a virtual gateway



3 Virtual Interfaces

3.1 Creating a Virtual Interface

Scenarios

After the connection and the gateway are ready, you need to create a virtual interface so that your network can access the VPC.

- 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. Hover on to display Service List and choose Networking > Direct
- 4. In the navigation pane on the left, choose **Direct Connect** > **Virtual Interfaces**.
- Click Create Virtual Interface.
 Configure the parameters based on Table 3-1.

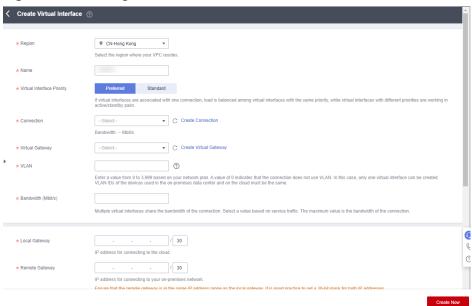


Figure 3-1 Creating a virtual interface

Table 3-1 Parameters for creating a virtual interface

Parameter	Description
Region	Specifies the region where the connection resides. You can also change the region in the upper left corner of the console.
Name	Specifies the virtual interface name. The name can contain 1 to 64 characters.
Virtual Interface Priority	Specifies whether the virtual interface will be used prior to other virtual interfaces. There are two options: Preferred and Standard.
	If multiple virtual interfaces are associated with one Direct Connect device, load is balanced among virtual interfaces with the same priority, while virtual interfaces with different priorities are working in active/standby pairs.
Connection	Specifies the connection you can use to connect your on-premises network to Huawei Cloud.
Virtual Gateway	Specifies the virtual gateway that the virtual interface connects to.
VLAN	Specifies the ID of the VLAN for the virtual interface. You need to configure the VLAN if you create a connection on your own. The VLAN for a hosted connection will be allocated by the carrier or partner. You do not need to configure the VLAN.

Parameter	Description
Bandwidth	Specifies the bandwidth that can be used by the virtual interface, in Mbit/s. The bandwidth cannot exceed that of the connection.
Enable Rate Limiting	Limits the highest bandwidth that can be used by the virtual interface. If this option is enabled, the rate limit gradients are as follows:
	If the bandwidth is less than or equal to 100 Mbit/s, the rate limit gradient is 10 Mbit/s.
	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.
	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.
	If the bandwidth is greater than 100 Gbit/s, the rate limit gradient is 10 Gbit/s.
	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.
	NOTE Bandwidth limiting of virtual interfaces is being and will be launched in each region. You can view the regions where the option is rolled out on the management console.
Enterprise Project	Provides a cloud resource management mode where cloud resources and members are centrally managed by project.
Local Gateway	Specifies the gateway on the Huawei Cloud network.
Remote Gateway	Specifies the gateway on your on-premises network. The remote gateway must be in the same IP address range as the local gateway. Generally, a subnet with a 30-bit mask is recommended.
Remote Subnet	Specifies the subnets and masks of your on-premises network. If there are multiple subnets, use commas (,) to separate them.
Routing Mode	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 to achieve higher availability.
BGP ASN	Specifies the autonomous system number (ASN) of the BGP peer.
	This parameter is required when BGP routing is selected.

Parameter	Description
BGP MD5 Authentication Key	Specifies the password used to authenticate the BGP peer using MD5.
	This parameter is mandatory 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:
	Uppercase letters
	Lowercase letters
	Digits
	• Special characters ~!, .:;"(){}[]/@#\$ %^&*+\ =
Description	Provides supplementary information about the virtual interface.

Ⅲ NOTE

When you configure the local and remote gateways, note the following:

- The local gateway is used by Huawei Cloud for connecting to your equipment room. After you configure **Local Gateway** on the console, the configuration will be automatically delivered to the gateway used by Huawei Cloud.
- The remote gateway is used by your equipment room for connecting to Huawei Cloud. After you configure **Remote Gateway** on the console, you also need to configure the gateway deployed in your equipment room.
- The local and remote gateways must use the same CIDR block and cannot conflict with service IP addresses on the network.
- 6. Click **Create Now**.

Ensure that the virtual interface is in the **Normal** state.

7. Ping the IP address of a server in the VPC from your on-premises data center to check network connectivity.

3.2 Viewing a Virtual Interface

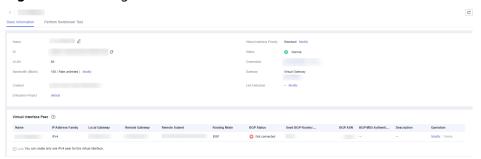
Scenarios

You can view details about a virtual interface.

- 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. Hover on to display Service List and choose Networking > Direct Connect.

- 4. In the navigation pane on the left, choose **Direct Connect** > **Virtual Interfaces**.
- 5. In the virtual interface list, click the name of the virtual interface you wan to view and go to the **Basic Information** page of the virtual interface.

Figure 3-2 Viewing a virtual interface



3.3 Modifying a Virtual Interface

Scenarios

After a virtual interface is created, you can modify its name, bandwidth, rate limiting, and priority as well as the name, remote subnet, and description of a virtual interface.

- 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. Hover on to display Service List and choose Networking > Direct Connect.
- 4. In the navigation pane on the left, choose **Direct Connect** > **Virtual Interfaces**.
- 5. Locate the virtual interface you want to modify and click **Modify** in the **Operation** column.

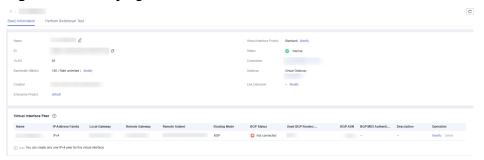
Figure 3-3 Modifying virtual interface 1



You can also click the name of the virtual interface to go to the **Basic Information** page of the virtual interface, where you can modify the name, bandwidth, rate limiting, priority, and peer of the virtual interface.

For details virtual interface peers, see Virtual Interface Peers.

Figure 3-4 Modifying virtual interface 2



□ NOTE

If multiple virtual interfaces are associated with one Direct Connect device, load is balanced among virtual interfaces with the same priority, while virtual interfaces with different priorities are working in active/standby pairs.

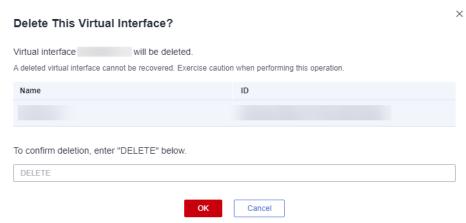
3.4 Deleting a Virtual Interface

Scenarios

You can delete a virtual interface if you do not need it any longer.

- 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. Hover on to display Service List and choose Networking > Direct Connect
- 4. In the navigation pane on the left, choose **Direct Connect** > **Virtual Interfaces**.
- 5. Locate the virtual interface you want to delete and click **Delete** in the **Operation** column.
- 6. In the displayed dialog box, enter **DELETE** and click **OK**.

Figure 3-5 Deleting a virtual interface



3.5 Virtual Interface Peers

Function

A virtual interface peer is a configuration of a virtual interface to support the IPv4/IPv6 dual stack and is used to connect the customer gateway to the virtual gateway. A virtual interface peer is automatically created when you create a virtual interface.

Constraints

A virtual interface has at least one virtual interface peer, and the last virtual interface peer cannot be deleted.

Viewing a Virtual Interface Peer

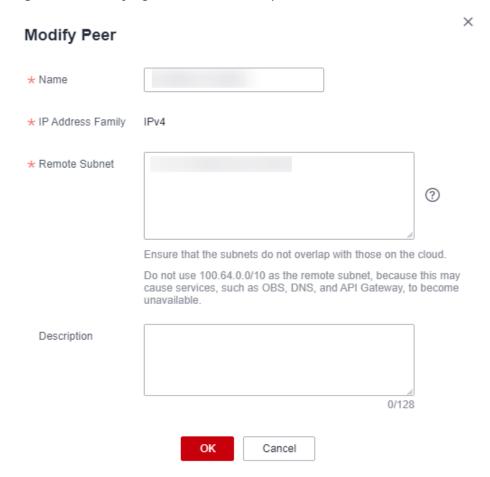
- 1. Log in to the management console.
- 2. On the console homepage, click in the upper left corner and select the desired region and project.
- 3. Hover on to display **Service List** and choose **Networking > Direct Connect**.
- 4. In the navigation pane on the left, choose **Direct Connect** > **Virtual Interfaces**.
- 5. Locate the virtual interface and click its name.
- 6. In the lower part of the page, locate the virtual interface peer you want to view and view its details.

Modifying a Virtual Interface Peer

- 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. Hover on to display Service List and choose Networking > Direct Connect
- 4. In the navigation pane on the left, choose **Direct Connect** > **Virtual Interfaces**.
- 5. Locate the virtual interface and click its name.
- 6. In the lower part of the page, locate the virtual interface peer you want to modify and click **Modify** in the **Operation** column.
- 7. Modify the virtual interface peer. An IPv4 virtual interface peer is used as an example here.

Figure 3-6 Modifying a virtual interface peer



8. Click OK.

4 Historical Connections

4.1 Viewing a Historical Connection

Scenarios

You can view details about a connection that was originally requested through email or on the phone rather than using the console.

Procedure

- 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. Hover on to display **Service List** and choose **Networking > Direct Connect**.
- 4. In the navigation pane on the left, choose **Direct Connect > Historical Connections**.
- 5. Locate the connection you want to view and click ★ before its name to view the details.

4.2 Modifying a Historical Connection

Scenarios

You can modify the name and remote subnets of a historical connection.

- 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. Hover on to display **Service List** and choose **Networking > Direct Connect**.
- 4. In the navigation pane on the left, choose **Direct Connect > Historical Connections**.
- 5. Locate the connection you want to modify and click **Modify** in the **Operation** column.
- 6. Modify the connection and then click **OK**.

5 Partner Connections

5.1 Operations Connections

Creating an Operations Connection

Scenarios

If you are a partner, you can create an operations connection.

Procedure

- 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. Hover on to display Service List and choose Networking > Direct Connect.
- 4. Click Create Operations Connection.
- 5. Configure the parameters and then click **Create Now**.
- 6. Confirm the order and click Pay.
- 7. Click Pay.

Viewing an Operations Connection

Scenarios

You can view details about an operations connection that you have created.

- 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. Hover on to display Service List and choose Networking > Direct Connect.
- 4. In the navigation pane on the left, choose **Direct Connect > Connections**.
- 5. Locate the operations connection you want to view and click its name.
- 6. View details about the operations connection.

Modifying an Operations Connection

Scenarios

You can modify the name, bandwidth, equipment room address, and description of an operations connection.

Procedure

- 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. Hover on to display Service List and choose Networking > Direct Connect.
- 4. In the navigation pane on the left, choose **Direct Connect > Connections**.
- Locate the operations connection you want to modify and click More > Modify in the Operation column.
- 6. Modify the connection and then click **OK**.

Unsubscribing from an Operations Connection

Scenarios

You can unsubscribe from an operations connection if you no longer need it.

Prerequisites

Delete the virtual gateway and virtual interface associated with your connection, delete the connection, and unsubscribe from the operations connection.

- 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. Hover on to display **Service List** and choose **Networking > Direct Connect**.
- 4. In the navigation pane on the left, choose **Direct Connect > Connections**.
- 5. Locate the operations connection that you want to unsubscribe from and choose **More** > **Unsubscribe** in the **Operation** column.
- 6. Locate the target operations connection and click **Unsubscribe from Resource** in the **Operation** column.

- 7. On the displayed **Unsubscribe** page, confirm the amount to be refunded.
- 8. Click Confirm.

Renewing an Operations Connection

Scenarios

You can renew the subscription if an operations connection is going to expire soon.

Procedure

- 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. Hover on to display Service List and choose Networking > Direct Connect.
- 4. In the navigation pane on the left, choose **Direct Connect > Connections**.
- 5. Locate the operations connection you want to renew and choose **More** > **Renew** in the **Operation** column.
- 6. Set the duration that you want to renew the connection and click **Pay**. Then pay the order as prompted.

5.2 Hosted Connections

Creating a Hosted Connection

Scenarios

If you are a partner, you can create a hosted connection for your user.

Procedure

- 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. Hover on to display Service List and choose Networking > Direct Connect.
- 4. Click Create Hosted Connection.
- 5. Configure the parameters and then click **OK**.

Viewing a Hosted Connection

Scenarios

You can view details about a hosted connection you have created as a partner.

- 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. Hover on to display **Service List** and choose **Networking** > **Direct Connect**.
- 4. In the navigation pane on the left, choose **Direct Connect > Connections**.
- 5. Locate the operations connection that the hosted connection depends on and click **Manage Hosted Connection** in the **Operation** column.
- 6. Locate the hosted connection you want to view and click on the left of its name to view the details.

Modifying a Hosted Connection

Scenarios

You can modify the name, bandwidth, equipment room address, and description of a hosted connection.

Procedure

- 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. Hover on to display Service List and choose Networking > Direct
- 4. In the navigation pane on the left, choose **Direct Connect > Connections**.
- 5. Locate the operations connection that the hosted connection depends on and click **Manage Hosted Connection** in the **Operation** column.
- 6. Locate the hosted connection you want to modify and click **Modify** in the **Operation** column.
- 7. Modify the hosted connection and click **OK**.

Deleting a Hosted Connection

Scenarios

You can delete a hosted operation if you do not need it any longer.

- 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. Hover on to display Service List and choose Networking > Direct Connect.

- 4. In the navigation pane on the left, choose **Direct Connect > Connections**.
- 5. Locate the operations connection that the hosted connection depends on and click **Manage Hosted Connection** in the **Operation** column.
- 6. Locate the hosted connection you want to delete and click **Delete** in the **Operation** column.
- 7. Click Yes.

6 Network Topology

Scenarios

After creating a connection, you can view the connection status and resource information in the Direct Connect network topology.

□ NOTE

The network topology function has been available in the following regions: CN North-Beijing4, CN East-Shanghai1, CN South-Guangzhou, CN Southwest-Guiyang1, CN-Hong Kong, AP-Bangkok, AP-Singapore, AF-Johannesburg, and LA-Mexico City2.

Procedure

- 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. Hover on to display **Service List** and choose **Networking** > **Direct Connect**.
- 4. In the navigation pane on the left, choose **Direct Connect** > **Network Topology**.
- 5. View your connections, their virtual gateways and virtual interfaces, and VPCs that can be accessed over these connections.

◯ NOTE

If a site survey is being performed, cabling is not complete, or the specification is being changed, the connection is displayed as abnormal in the network topology. You can check its status on the connection list page.

7 Monitoring

7.1 Overview

Monitoring is critical to ensuring the performance, reliability, and availability of a service. Monitoring data lets you keep track of the status of your resources. Cloud Eye collects and displays monitoring data for you in a convenient, visualized manner. You can use Cloud Eye to automatically monitor connections in real time and manage alarms and notifications, so that you can keep track of the performance of each connection.

To learn more information, see the following topics:

- Metrics
- Network Quality Metrics (Plug-ins Required)
- Setting Alarm Rules
- Viewing Monitoring Metrics

7.2 Metrics

Function

Table 7-1 describes the metrics reported by Direct Connect to Cloud Eye as well as their namespace and dimensions. You can use the management console to query the metrics of the monitored objects and alarms generated for Direct Connect.

□ NOTE

You can view metrics of standard connections, full-service connections (dedicated port), and hosted connections.

Namespace

SYS.DCAAS

Metrics

Table 7-1 Direct Connect metrics

ID	Metric	Description	Value Range	Monitored Object	Monitoring Interval
network_inc oming_bits_ rate	Network Incoming Bandwidth	Bit rate for inbound data to the Direct Connect side of a connection Unit: bit/s	≥ 0 bits/s	Connections and historical connections	1 minute
network_ou tgoing_bits_ rate	Networ k Outgoi ng Bandwi dth	Bit rate for outbound data from the Direct Connect side of a connection Unit: bit/s	≥ 0 bits/s	Connections and historical connections	1 minute
network_inc oming_byte s	Networ k Incomi ng Traffic	Number of bytes for inbound data to the Direct Connect side of a connection Unit: byte	≥ 0 bytes	Connections and historical connections	1 minute
network_ou tgoing_byte s	Networ k Outgoi ng Traffic	Number of bytes for outbound data from the Direct Connect side of a connection Unit: byte	≥ 0 bytes	Connections and historical connections	1 minute
network_inc oming_pack ets_rate	Networ k Incomi ng Packet Rate	Packet rate for inbound data to the Direct Connect side of a connection Unit: Packet/s	≥ 0 packets /s	Connections and historical connections	1 minute
network_ou tgoing_pack ets_rate	Networ k Outgoi ng Packet Rate	Packet rate for outbound data from the Direct Connect side of a connection Unit: Packet/s	≥ 0 packets /s	Connections and historical connections	1 minute

ID	Metric	Description	Value Range	Monitored Object	Monitoring Interval
network_inc oming_pack ets	Networ k Incomi ng Packets	Number of packets for inbound data to the Direct Connect side of a connection Unit: Packet	≥ 0 packets	Connections and historical connections	1 minute
network_ou tgoing_pack ets	Networ k Outgoi ng Packets	Number of packets for outbound data from the Direct Connect side of a connection Unit: Packet	≥ 0 packets	Connections and historical connections	1 minute
network_sta tus	Port Status	Status of the port used by a connection	0- DOWN 1-UP	Connections and historical connections	1 minute
bgp_receive _route_num _v4	IPv4 Routes	Number of IPv4 routes that a virtual interface learned through BGP	≥ 0	Virtual interface	1 minute
bgp_receive _route_num _v6	IPv6 Routes	Number of IPv6 routes that a virtual interface learned through BGP	≥ 0	Virtual interface	1 minute

Dimensions

Key	Value
direct_connect_id	Connection
virtual_interface_id	Virtual interface
history_direct_conne ct_id	Historical connection

7.3 Network Quality Metrics (Plug-ins Required)

The network quality of connections is monitored using two plug-ins, and there are two key metrics: network latency and packet loss rate.

The following are the two plug-ins:

- dc-nqa-collector: monitors the connections requested using the Direct Connect console.
- history-dc-nga-collector: monitors historical connections.

For details, see Installing the Direct Connect Metric Collection Plug-ins.

□ NOTE

- Automated connections are requested using the console and can be self-service or fullservice connections. Each connection has at least a virtual gateway and a virtual interface, and their routes are automatically advertised. Connections in most regions are automated connections.
- Historical connections requested by email or phone do not have virtual gateways and virtual interfaces, and their routes must be configured manually. This type of connection is only available in some regions.

Metrics

Table 7-2 Network quality metrics

ID	Metric Name	Description	Value Range	Monitored Object	Monitorin g Interval
latency	Latency	Network latency of a connection Unit: ms	≥ 0 ms	Connection s and historical connection s	1 minute
packet_l oss_rate	Packet Loss Rate	Packet loss rate of a connection Unit: Percentage	0-100%	Connection s and historical connection s	1 minute

Dimensions

Key	Value
virtual_interface_id	Virtual interface (associated with an automated connection)
history_direct_conne ct_id	Historical connection

7.4 Configuring Alarm Rules

Scenarios

You can configure alarm rules to customize monitored objects and notification policies and to learn connection status at any time.

Procedure

- 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. Hover on = to display Service List and choose Management & Governance > Cloud Eye.
- 4. In the navigation pane on the left, choose **Alarm Management > Alarm Rules**.
- 5. On the Alarm Rules page, click Create Alarm Rule.
- 6. After configuring the parameters, click **Create**.

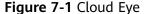
After the alarm rule is created, the system automatically notifies you when an alarm is triggered.

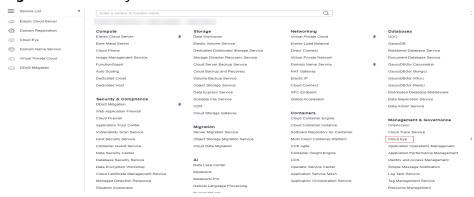
□ NOTE

For more examples of creating alarm rules, see Cloud Eye User Guide.

7.5 Viewing Metrics

- 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. Hover on to display Service List and choose Management & Governance > Cloud Eye.





- 4. In the navigation pane on the left, choose **Cloud Service Monitoring > Direct Connect**.
- 5. Locate the connection and click **View Metric** in the **Operation** column. You can view data of the last 1, 3, 12, or 24 hours, or last 7 days. You can also specify a time period.

8 Permissions Management

8.1 Creating a User and Granting Permissions

Use IAM to implement fine-grained permissions control for your Direct Connect resources. With IAM, you can:

- Create IAM users for employees based on the organizational structure of your enterprise. Each IAM user has their own security credentials, providing access to cloud resources.
- Grant only the permissions required for users to perform a task.
- Entrust an account or cloud service to perform professional and efficient O&M on your cloud resources.

Skip this part if your account does not require individual IAM users.

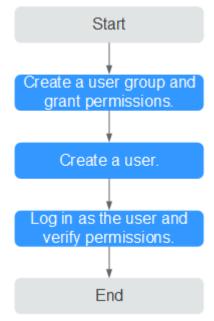
Figure 8-1 shows the process for granting permissions.

Prerequisites

Before you assign permissions to a user group, you need to understand Direct Connect permissions that can be assigned to the user group and select permissions based on actual requirements. For details about the system permissions of Direct Connect, see **Permissions**. For the system policies of other services, see **System Permissions**.

Process Flow

Figure 8-1 Process for granting Direct Connect permissions



1. Create a user group and assign permissions.

Create a user group on the IAM console and assign the **Direct Connect Administrator** policy to the group.

- 2. Create a user and add the user to the user group
 - Create a user on the IAM console and add the user to the group created in 1.
- 3. Log in to the management console as the created user.

Log in to the Direct Connect console using the created user, and verify that the user has read-only permissions for Direct Connect.

- In the service list, choose Networking > Direct Connect. Click Create
 Connection in the upper right corner. If the connection is successfully
 created, the Direct Connect Administrator policy has already taken
 effect.
- Choose any other service in the Service List. A message will appear indicating that you have no sufficient permissions to access the service.

8.2 Example Custom Policies

Custom policies can be created to supplement the system-defined policies of Direct Connect.

You can create custom policies in either of the following ways:

- Visual editor: Select cloud services, actions, resources, and request conditions.
 This does not require knowledge of policy syntax.
- JSON: Edit JSON policies from scratch or based on an existing policy.

For details, see **Creating a Custom Policy**. The following are examples custom policies created for Direct Connect.

Example Custom Policies

Example 1: Allowing users to update a virtual gateway

• Example 2: Denying users to delete a connection

A deny policy must be used together with other policies. If permissions assigned to a user contain both Allow and Deny actions, the Deny action takes precedence over the Allow action.

The following method can be used if you need to assign permissions of the **DCAAS FullAccess** policy to a user but also forbid the user from deleting connections. Create a custom policy for denying connection deletion, and assign both policies to the group the user belongs to. Then the user can perform all operations on Direct Connect except deleting connections.

The following is an example of a deny policy:

• Example 3: Defining permissions for multiple services in a policy

A custom policy can contain the actions of multiple services that are of the global or project-level type.

The following is an example policy containing actions of multiple services:

```
"Version": "1.1",
"Statement": [
      "Effect": "Allow",
      "Action": [
         "vpc:vpcs:list",
         "vpc:subnets:get",
         "vpc:routes:list"
      1
   },
      "Effect": "Allow",
      "Action": [
         "dcaas:vif:list",
         "dcaas:vgw:list",
         "dcaas:directConnect:list"
   }
]
```

9 Interconnecting with CTS

9.1 Key Operations Recorded by CTS

With CTS, you can record operations associated with Direct Connect for later query, audit, and backtrack operations.

Table 9-1 lists the operations that can be recorded by CTS.

Table 9-1 Direct Connect operations that can be recorded by CTS

Operation	Resource Type	Trace Name
Creating a connection	dcaasConnection	createConnection
Modifying a connection	dcaasConnection	modifyConnection
Deleting a connection	dcaasConnection	deleteConnection
Creating a virtual gateway	dcaasVirtualGateway	createVirtualGateway
Modifying a virtual gateway	dcaasVirtualGateway	modifyVirtualGateway
Deleting a virtual gateway	dcaasVirtualGateway	deleteVirtualGateway
Creating a virtual interface	dcaasVirtualInterface	createVirtualInterface
Modifying a virtual interface	dcaasVirtualInterface	modifyVirtualInterface
Deleting a virtual interface	dcaasVirtualInterface	deleteVirtualInterface

9.2 Viewing Traces

Scenarios

After you enable CTS, the system starts recording operations on cloud resources. You can view traces of the last seven days on the CTS console.

This topic describes how to query these records.

- 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. Hover on to display Service List and choose Management & Governance > Cloud Trace Service.
- 4. In the navigation pane on the left, choose **Trace List**.
- 5. Specify filtering criteria. The following filters are available:
 - Trace Type, Trace Source, Resource Type, and Search By
 Select a filter criterion from the drop-down list.
 - If you select Trace name for Search By, you need to specify a trace name.
 - If you select Resource ID for Search By, you need to specify a resource ID.
 - If you select Resource name for Search By, you need to specify a resource name.
 - **Operator**: Select a user who performs operations.
 - Trace Status: Select All trace statuses, Normal, Warning, or Incident.
 - Time range: You can specify the time period to query traces.
- 6. Click on the left of the record to be queried to extend its details.
- 7. Locate a trace and click **View Trace** in the **Operation** column.

$10_{\rm Quotas}$

What Is Quota?

Quotas can limit the number or amount of resources available to users, such as the maximum number of ECSs or EVS disks that can be created.

If the existing resource quota cannot meet your service requirements, you can apply for a higher quota.

How Do I View My Quotas?

- 1. Log in to the management console.
- 2. Click \bigcirc in the upper left corner and select the desired region and project.
- In the upper right corner of the page, choose Resources > My Quotas.
 The Service Quota page is displayed.

Figure 10-1 My Quotas



4. View the used and total quota of each type of resources on the displayed page.

If a quota cannot meet service requirements, apply for a higher quota.

How Do I Apply for a Higher Quota?

1. Log in to the management console.

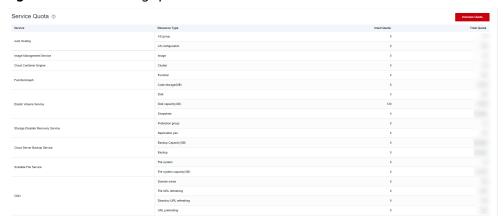
In the upper right corner of the page, choose Resources > My Quotas.
 The Service Quota page is displayed.

Figure 10-2 My Quotas



3. Click **Increase Quota** in the upper right corner of the page.

Figure 10-3 Increasing quota



- On the Create Service Ticket page, configure parameters as required.
 In the Problem Description area, fill in the content and reason for adjustment.
- 5. After all necessary parameters are configured, select I have read and agree to the Ticket Service Protocol and Privacy Statement and click Submit.

11 Appendixes

11.1 Dual-Connection Switchover Test

Function

Dual-connection access ensures high SLA. To achieve this, dual-connection automatic switchover needs to be supported. Before O&M of dual-connection access, you can perform switchover tests on the console to verify connectivity and simplify the delivery process.

□ NOTE

This function is available in the following regions: CN North-Beijing1, CN North-Beijing4, CN North-Ulanqab1, CN East-Shanghai1, CN East-Shanghai2, CN South-Guangzhou, CN Southwest-Guiyang1, CN-Hong Kong, AP-Bangkok, and AP-Singapore.

Application Scenarios

Perform the dual-connection switchover test before the connections are used for network connectivity.

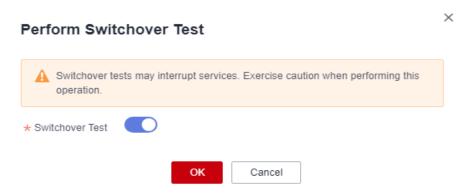
Prerequisites

There are two connections, with each having a virtual interface associated.

- 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. Hover on to display **Service List** and choose **Networking > Direct Connect**.
- 4. In the navigation pane on the left, choose **Direct Connect** > **Virtual Interfaces**.

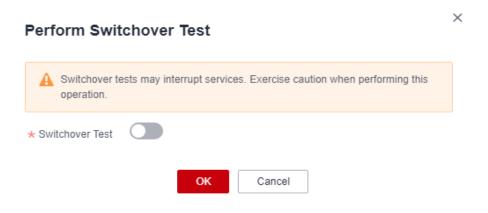
- 5. Enable the switchover test for the virtual interface associated with one connection, for example, connection 1 and check the connectivity between an ECS and the on-premises data center.
 - a. On the **Virtual Interfaces** page, click the name of the target virtual interface.
 - b. On the **Switchover Test** page of the virtual interface, click **Switchover Test**
 - c. In the **Perform Switchover Test** dialog box, enable the switchover test and click **OK**

Figure 11-1 Enabling switchover test



- d. Refresh the page. On the **Basic Information** page of the virtual interface, ensure that its status is **Disabled manually**.
- e. Run the **ping** command on an ECS to verify the connectivity between the ECS and the on-premises data center. If a response packet is received, the switchover test is successful.
- 6. Disable the switchover test for the virtual interface associated with connection 1 to restore access over dual connections.
 - a. On the **Switchover Test** page of the virtual interface, click **Switchover Test**.
 - b. In the **Perform Switchover Test** dialog box, disable the switchover test and click **OK**

Figure 11-2 Disabling switchover test



- c. Refresh the page. On the **Basic Information** page of the virtual interface, ensure that its status is **Normal**.
- d. Run the **ping** command on the ECS to verify the connectivity between the ECS and the on-premises data center. If a response packet is received, the switchover test is successful.
- 7. Repeat 5 and 6 to perform a switchover test on the virtual interface associated with connection 2.

○ NOTE

In the switchover test record, if the operation type is displayed as **Enable**, the **shutdown** command is executed, and the virtual interface is disabled. If the operation type is displayed as **Disable**, the **undo shutdown** command is executed, and the virtual interface is enabled.

11.2 Connection Bandwidth Testing Methods

Scenarios

After your on-premises data center is connected to the cloud, you need to test the link performance to ensure that the connection can meet your service requirements. This section describes how you can use iPerf3 to test the bandwidth of a connection.

Prerequisites

- Network connectivity between your on-premises data center and the cloud has been established, and the routes have been configured.
- A network access device is available in the on-premises data center as the client or server in the iPerf3 tests.
 - The IP address of the network access device is 192.168.0.1.
- Six ECSs that can access the Internet are available as the clients or servers in the iPerf3 tests. The ECSs establish control connections with the on-premises network access device for transmitting test information and test results.
 - In this example, the six ECSs use the c7.large.2 flavor and image CentOS 8.2 64bit (40 GB), and their IP addresses are from 172.16.0.2 to 172.16.0.7.

Procedure

Step 1 Install iPerf3 and set up the test environment.

Install iPerf3 on the on-premises network access device and on the six ECSs. The following describes how to install iPerf3 on an ECS.

- 1. Log in to the ECS.
- 2. Install iPerf3.
 - a. Download iPerf3. yum install iperf3
 - b. Check whether the installation is successful. iperf3 -v

The installation is successful when the system displays the following information:

Step 2 Use iPerf3 to test the bandwidth of a connection.

Table 11-1 describes the parameters related to iPerf3.

Table 11-1 iPerf3 parameter description

Paramete r	Description
-S	A server-specific parameter. It indicates that iPerf3 runs in server mode.
-c	A client-specific parameter. It indicates that iPerf3 runs in client mode.
-i	The interval between reports, in seconds.
-p	• Server: The listening port on the server. The default value is 5201. Both TCP and UDP are listened on.
	Client: The port for the client to connect to the server. The default value is 5201. If the -u parameter also exists, the connection is initiated through UDP. Otherwise, a TCP connection is used by default.
-u	UDP is used to send packets. If this parameter is not specified, TCP is used.
-l	The length of the read/write buffer. It is recommended that you set this parameter to 16 when testing the packet forwarding performance and to 1400 when testing the bandwidth.
-b	The bandwidth (in bit/s) used if a UDP connection is established.
-t	The total transmission time, in seconds. It is the duration for iPerf3 to repeatedly send data packets of a specified length within a specified period. The default value is 10 seconds.
-A	CPU affinity. You can bind the iPerf3 process to the logical CPU with the corresponding number to prevent the iPerf3 process from being scheduled among different CPUs.

- 1. Test the bandwidth of the connection with the on-premises network access device functioning as the server.
 - a. Run the following commands on the on-premises network access device to start the iPerf3 process in server mode and specify different ports:

```
iperf3 -s -i 1 -p 16001
iperf3 -s -i 1 -p 16002
iperf3 -s -i 1 -p 16003
iperf3 -s -i 1 -p 16004
iperf3 -s -i 1 -p 16005
iperf3 -s -i 1 -p 16006
```

b. Run the **iperf3 -u -l 16 -b 100m -t 120 -c server_ip -i 1 -p port** command on each ECS to start the iPerf3 process in client mode and specify different ports of the on-premises network access device. Example commands are as follows:

```
iperf3 -u -l 16 -b 100m -t 120 -c 192.168.0.1 -i 1 -p 16001 #First ECS iperf3 -u -l 16 -b 100m -t 120 -c 192.168.0.1 -i 1 -p 16002 #Second ECS iperf3 -u -l 16 -b 100m -t 120 -c 192.168.0.1 -i 1 -p 16003 #Third ECS iperf3 -u -l 16 -b 100m -t 120 -c 192.168.0.1 -i 1 -p 16004 #Fourth ECS iperf3 -u -l 16 -b 100m -t 120 -c 192.168.0.1 -i 1 -p 16005 #Fifth ECS iperf3 -u -l 16 -b 100m -t 120 -c 192.168.0.1 -i 1 -p 16006 #Sixth ECS
```

- 2. Test the bandwidth of the connection with the on-premises network access device as a client.
 - a. Run the **iperf3 -s -i 1 -p 16001** command on each ECS to start the iPerf3 process in server mode and specify the port.
 - b. Run the following commands on the on-premises network access device to start six iPerf3 processes in client mode:

```
iperf3 -u -l 16 -b 100m -t 120 -c 172.16.0.2 -i 1 -p 16001
iperf3 -u -l 16 -b 100m -t 120 -c 172.16.0.3 -i 1 -p 16001
iperf3 -u -l 16 -b 100m -t 120 -c 172.16.0.4 -i 1 -p 16001
iperf3 -u -l 16 -b 100m -t 120 -c 172.16.0.5 -i 1 -p 16001
iperf3 -u -l 16 -b 100m -t 120 -c 172.16.0.6 -i 1 -p 16001
iperf3 -u -l 16 -b 100m -t 120 -c 172.16.0.7 -i 1 -p 16001
```

3. Analyze the test result.

After the iPerf3 process on the client is executed, the following information is displayed. The packets per second (PPS) of the tested link can be calculated using the formula: PPS = Number of packets received by the peer end/Time.

[ID] Interval Transfer Bandwidth Jitter Lost/Total Datagrams [4] 0.00-10.00 sec 237 MBytes 199 Mbits/sec 0.027 ms 500/30352 (1.6%) [4] Sent 30352 datagrams

The following table describes the fields in the command output.

Field	Description
Transfer	Transmitted data volume
Bandwidth	Bandwidth of the connection
Jitter	Jitter
Lost/Total Datagrams	Number of lost packets/Total number of packets (packet loss rate)

----End

12 Change History

Release On	Description
2023-10-30	This issue is the twenty-fifth official release, which incorporates the following changes:
	Added bgp_receive_route_num_v4 and bgp_receive_route_num_v6 in Table 7-1.
2023-06-15	This issue is the twenty-fourth official release, which incorporates the following changes:
	Added the Virtual Interface Priority parameter to the parameter table for creating a virtual interface.
	 Added the Virtual Interface Priority parameter to the parameter table for creating a virtual interface in Accessing a VPC over a Single Connection Through Static Routes, Accessing a VPC over a Single Connection Through BGP Routes, Accessing a VPC over Two Connections Through BGP Routes, and Connecting to Multiple VPCs that Do Not Need to Communicate with Each Other.
2023-05-05	This issue is the twenty-third official release, which incorporates the following changes:
	Added Dual-Connection Switchover Test.
	Added Connection Bandwidth Testing Methods.
2022-11-30	This issue is the twenty-second official release, which incorporates the following changes:
	Getting Started: Updated the connection configuration process in "Overview", "Preparations", and "Creating a Connection."
2022-08-30	This issue is the twenty-first official release, which incorporates the following changes:
	Added Network Topology.
2022-06-30	This issue is the twentieth official release, which incorporates the following changes:
	Tags can be used to identify connections.

Release On	Description	
2021-05-30	This issue is the nineteenth official release, which incorporates the following changes:	
	Optimized the entire document.	
2021-01-30	This issue is the eighteenth official release, which incorporates the following changes:	
	 Added parameter configuration descriptions in section "Creating a Virtual Port" in chapter "Getting Started". 	
	Added FAQ "What Are 1GE and 10GE?"	
	Optimized the entire document.	
2020-06-30	This issue is the seventeenth official release, which incorporates the following changes:	
	• Updated Step 1: Create a Connection in chapter "Getting Started".	
	Updated chapter "Best Practices".	
	Modified some FAQ.	
2020-05-30	This issue is the sixteenth official release, which incorporates the following changes:	
	Updated section "Direct Connect Locations" in chapter "Service Overview".	
	 Modified sections "Process Description" and "Preparations" in chapter "Getting Started". 	
	Modified section "Monitoring" in chapter "User Guide".Classified FAQ.	
2020-04-30	This issue is the fifteenth official release, which incorporates the following changes:	
	 Added sections "Network Planning" and "Billing" in chapter "Service Overview". 	
	Added new FAQ.	
2020-03-30	This issue is the fourteenth official release, which incorporates the following changes:	
	 Updated chapter "Service Overview", section "Network Planning", and chapter "Monitoring". 	
	Added sections "Billing" and "Preparations".	
	Optimized the entire document.	
2020-02-29	This issue is the thirteenth official release, which incorporates the following changes:	
	Optimized the entire document.	
	Updated some FAQ.	

Release On	Description
2019-12-30	This issue is the twelfth official release, which incorporates the following changes: Optimized the entire document.
2019-11-30	This issue is the eleventh official release, which incorporates the following changes: Updated chapters "Getting Started" and "User Guide".
2019-10-30	This issue is the tenth official release, which incorporates the following changes: Updated the process for creating the connection. Optimized best practices.
2019-09-30	This issue is the ninth official release, which incorporates the following changes: Optimized the entire document. Updated some FAQ.
2019-07-30	This issue is the eighth official release, which incorporates the following changes: Updated the operation process.
2019-05-07	This issue is the seventh official release, which incorporates the following changes: Optimized the entire document.
2018-08-30	This issue is the sixth official release, which incorporates the following changes: Added content about automatic connection creation.
2018-05-30	This issue is the fifth official release, which incorporates the following changes: Added chapter "Interconnecting with CTS."
2017-10-30	This issue is the fourth official release, which incorporates the following changes: Updated the steps for viewing details about and modifying a connection based on the latest management console.
2017-07-30	This issue is the third official release, which incorporates the following changes: Added parameter Project Name for enabling Direct Connect.

Release On	Description	
2017-04-28	This issue is the second official issue, which incorporates the following changes:	
	Added the following FAQs:	
	Can I Renew My Connections? How Can I Renew My Subscriptions?	
	How Can I Unsubscribe from Direct Connect?	
	Is a Connection Still Available After Being Frozen?	
2016-10-19	This issue is the first official release.	