

Direct Connect

Best Practices

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1 Accessing a VPC over a Single Connection Through Static Routes

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

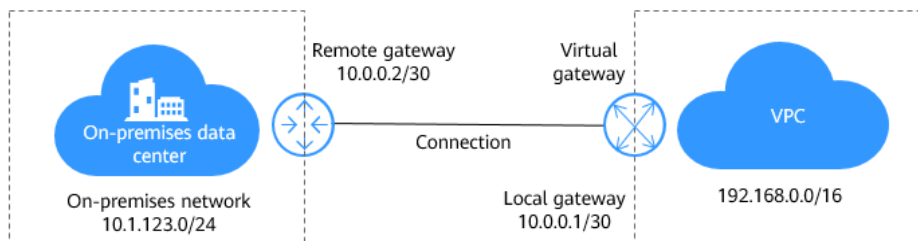
Your on-premises network is connected to a VPC over a single connection.

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

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

Table 1-1 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 1-1 Accessing a VPC over a connection through static routes

Procedure

Step 1 Create 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. Click **Create Connection**.
6. On the **Create Connection** page, enter the equipment room details and select the Direct Connect location and port based on [Table 1-2](#).

Table 1-2 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. There are four types of ports: 1GE, 10GE, 40GE, and 100GE.
Leased Line Bandwidth	Specifies the bandwidth of the leased line in the unit of Mbit/s.

Parameter	Description
Your Equipment Room Address	Specifies the address of your equipment room. The address must be specific to the floor your equipment room is on, 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 1-3 . NOTE If a predefined tag has been created on TMS, you can directly select the corresponding tag key and value. For details about predefined tags, see Predefined Tag Overview .
Description	Provides supplementary information about the connection.
Contact Person/ Phone Number/Email	Specifies who is responsible for your connection. 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.

Table 1-3 Tag key and value requirements

Parameter	Requirements
Key	<ul style="list-style-type: none">– 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.

Parameter	Requirements
Value	<ul style="list-style-type: none">- 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.

7. Click **Next**.
8. Confirm the connection information and click **Pay Now**.
9. Confirm the order, select a payment method, and click **Confirm**.

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 1-4](#).

Table 1-4 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.
VPC	Specifies the VPC to be associated with the virtual gateway.
Local Subnet	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 (,).
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. Click **Create Virtual Interface**.
3. Configure the parameters based on [Table 1-5](#).

Table 1-5 Parameters required 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. <ul style="list-style-type: none">- Standard connections: You need to configure the VLAN.- Hosted connections: The VLAN will be allocated by the carrier or partner. You do not need to configure the VLAN.
Bandwidth	Specifies the bandwidth that can be used by the virtual interface, in Mbit/s. The bandwidth cannot exceed that of the connection.
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.

Parameter	Description
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 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 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: <ul style="list-style-type: none">- Uppercase letters- Lowercase letters- Digits- Special characters ~!, .,:-_"(){}[]/@#\$ %^&*+ \ =
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 for resources in the regions to ensure normal communications.

Step 4 Wait for route propagation on the cloud.

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

Step 5 Configure a static route on your device.

(Here is a static route on a Huawei device.)

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

----End

2 Accessing a VPC over a Single Connection Through BGP Routes

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.
- Your device supports BGP and does not use ASN 64512, which is used by Huawei Cloud.

Typical Topology

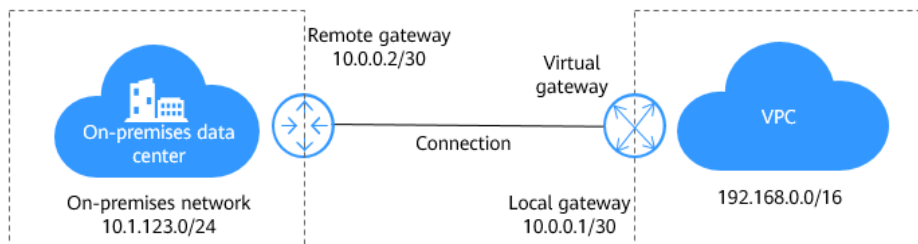
Your on-premises network is connected to a VPC over a single connection.

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 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 BGP routes

Procedure

Step 1 Create 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. Click **Create Connection**.
6. On the **Create Connection** page, enter the equipment room details and select the Direct Connect location and port based on [Table 2-2](#).

Table 2-2 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. There are four types of ports: 1GE, 10GE, 40GE, and 100GE.
Leased Line Bandwidth	Specifies the bandwidth of the leased line in the unit of Mbit/s.

Parameter	Description
Your Equipment Room Address	Specifies the address of your equipment room. The address must be specific to the floor your equipment room is on, 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 2-3 . NOTE If a predefined tag has been created on TMS, you can directly select the corresponding tag key and value. For details about predefined tags, see Predefined Tag Overview .
Description	Provides supplementary information about the connection.
Contact Person/Phone Number/Email	Specifies who is responsible for your connection. 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.

Table 2-3 Tag key and value requirements

Parameter	Requirements
Key	<ul style="list-style-type: none">- 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.

Parameter	Requirements
Value	<ul style="list-style-type: none">- 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.

7. Click **Next**.
8. Confirm the connection information and click **Pay Now**.
9. Confirm the order, select a payment method, and click **Confirm**.

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 2-4](#).

Table 2-4 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.
VPC	Specifies the VPC to be associated with the virtual gateway.
Local Subnet	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 (,).
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. Click **Create Virtual Interface**.
3. Configure the parameters based on [Table 2-5](#).

Table 2-5 Parameters required 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. <ul style="list-style-type: none">– Standard connections: You need to configure the VLAN.– Hosted connections: The VLAN will be allocated by the carrier or partner. You do not need to configure the VLAN.
Bandwidth	Specifies the bandwidth that can be used by the virtual interface, in Mbit/s. The bandwidth cannot exceed that of the connection.
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.

Parameter	Description
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 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 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: <ul style="list-style-type: none">- Uppercase letters- Lowercase letters- Digits- Special characters ~!, .;:_"(){}[]/@#\$ %^&*+\\ =
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 for resources in the regions to ensure normal communications.

Step 4 Wait for route propagation on the cloud.

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

Step 5 Configure a static route on your device.

(Here is a static route on a Huawei device.)

```
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

3 Accessing a VPC over Two Connections Through BGP Routes

Overview

Scenarios

Connect your on-premises network to the cloud over two connections that are terminated at two locations in the same region and use BGP routes to route traffic between your on-premises network and the VPC. You can set priorities for the virtual interfaces to determine the active and standby connections.

Typical Topology

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

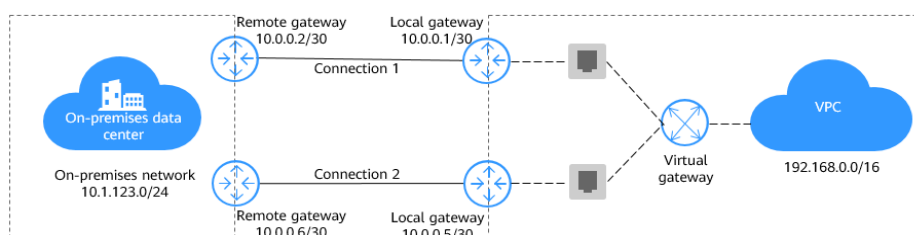
For details on how to create a VPC, see the [Creating a VPC](#).

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

Table 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 and 10.0.0.4/30
VPC	192.168.0.0/16

Figure 3-1 Accessing a VPC over two connections that use BGP routing



Advantages

- Multi-cloud architecture: You can access Huawei 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 devices in the cloud.
- Auto-negotiation for the ports must be disabled. Port speed and full-duplex mode must be manually configured.
- 802.1Q VLAN encapsulation is supported on your on-premises network.
- Your device supports BGP and does not use ASN 64512, which is used by Huawei Cloud.

Resource Planning

The following table describes the resource planning in the best practice.

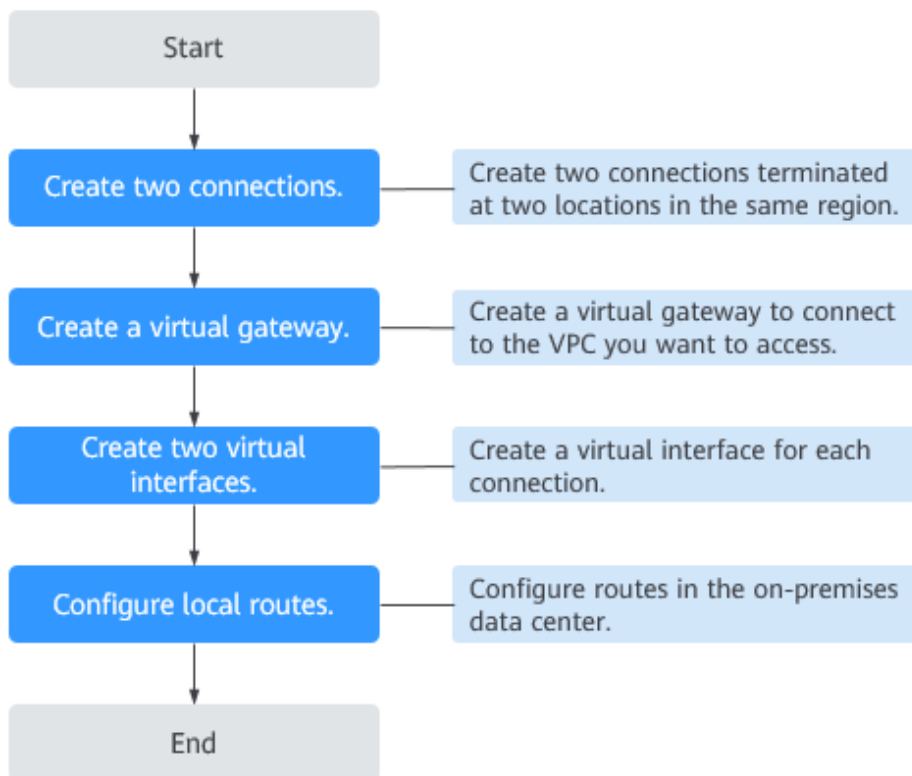
Table 3-2 Resource planning for accessing a VPC over two connections

Region	Resource	Description	Quantity	Price
EU-Dublin	VPC	VPC subnet: 192.168.0.0/16	1	Free
	Connection	Connection dc-connect1 is terminated at and associated with virtual gateway vgw-test and virtual interface vif-test1 . <ul style="list-style-type: none">• Local subnet of virtual gateway vgw-test: 192.168.0.0/16• Local gateway of virtual interface vif-test1: 10.0.0.1/30• Remote gateway of virtual interface vif-test1: 10.0.0.2/30• Remote subnet of virtual interface vif-test1: 10.1.123.0/24	2	For details, see Direct Connect Pricing Details .

Region	Resource	Description	Quantity	Price
		<p>Connection dc-connect2 is terminated at and associated with virtual gateway vgw-test and virtual interface vif-test2.</p> <ul style="list-style-type: none"> Local subnet of virtual gateway vgw-test: 192.168.0.0/16 Local gateway of virtual interface vif-test2: 10.0.0.5/30 Remote gateway of virtual interface vif-test2: 10.0.0.6/30 Remote subnet of virtual interface vif-test2: 10.1.123.0/24 		

Operation Process

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. 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. Click **Create Connection**.
6. On the **Create Connection** page, enter the equipment room details and select the Direct Connect location and port based on [Table 3-3](#).

Table 3-3 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. There are four types of ports: 1GE, 10GE, 40GE, and 100GE.
Leased Line Bandwidth	Specifies the bandwidth of the leased line in the unit of Mbit/s.
Your Equipment Room Address	Specifies the address of your equipment room. The address must be specific to the floor your equipment room is on, for example, XX Equipment Room, XX Building, No. XX, Huajing Road, Pudong District, Shanghai.

Parameter	Description
Tag	<p>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 3-4.</p> <p>NOTE If a predefined tag has been created on TMS, you can directly select the corresponding tag key and value. For details about predefined tags, see Predefined Tag Overview.</p>
Description	Provides supplementary information about the connection.
Contact Person/ Phone Number/Email	Specifies who is responsible for your connection. 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.

Table 3-4 Tag key and value requirements

Parameter	Requirements
Key	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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.

7. Click **Next**.

8. Confirm the connection information and click **Pay Now**.
9. Confirm the order, select a payment method, and click **Confirm**.
10. Repeat steps [Step 1.4](#) to [Step 1.9](#) to create connection **dc-connect2** and select **Langfang-Huawei** as its location.

Step 2 Create a virtual gateway named **vgw-test**.

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 3-5](#).

Table 3-5 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.
VPC	Specifies the VPC to be associated with the virtual gateway.
Local Subnet	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 (,).
Description	Provides supplementary information about the virtual gateway.

4. Click **OK**.

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

Associate virtual interface **vif-test1** with virtual gateway **vgw-test** and connection **dc-connect1** and virtual interface **vif-test2** with virtual gateway **vgw-test** and connection **dc-connect2**.

1. In the navigation pane on the left, choose **Direct Connect > Virtual Interfaces**.
2. Click **Create Virtual Interface**.
3. Configure the parameters based on [Table 3-6](#).

Table 3-6 Parameters required 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. For details, see Active/Standby Connections .
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. <ul style="list-style-type: none">- Standard connections: You need to configure the VLAN.- Hosted connections: The VLAN will be allocated by the carrier or partner. You do not need to configure the VLAN.
Bandwidth	Specifies the bandwidth that can be used by the virtual interface, in Mbit/s. The bandwidth cannot exceed that of the connection.
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.

Parameter	Description
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 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 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: <ul style="list-style-type: none">- Uppercase letters- Lowercase letters- Digits- Special characters ~!, .;:_()"{}[]/@#\$ %^&*+ \ =
Description	Provides supplementary information about the virtual interface.

4. Click **Create Now**.
5. Repeat steps [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 propagation on the cloud.

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

Step 5 Configure a static route on your device.

(Here is a static route on a Huawei device.)

```
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

Active/Standby Connections

By default, BGP automatically selects the active and standby connections. To specify the active connection, perform the following operations:

- **Setting the active connection for connecting to the cloud**

To set the connection terminated at as the active one, you can set **Local_Pref**.

The following is an example configuration:

```
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
peer 10.0.0.5 route-policy slave_direct_out export
network 10.1.123.0 255.255.255.0
route-policy slave_direct_in permit node 10
apply local-preference 90
```

- **Setting the active connection for connecting to the on-premises data center**

Assume that the connection terminated at is expected to be the active connection. There are two ways to configure this:

- Method 1: Setting the priority of each virtual interface

Set the priority of the virtual interface associated with the connection terminated at to **Preferred**, and that of the virtual interface associated with the connection terminated at to **Standard**. To switch the active connection, you only need to change the priority of each virtual interface on their basic information page.

For details, see [Creating a Virtual Interface](#).

- Method 2: Setting **AS_Path**

The following is an example configuration:

```
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
peer 10.0.0.5 route-policy slave_direct_out export
network 10.1.123.0 255.255.255.0
route-policy slave_direct_out permit node 10
apply as-path 64510 additive
```

NOTE

For the routes on the cloud, select the nearest Direct Connect gateway based on the location of the AZ.

Connectivity Verification

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

Disable any connection port 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=1.100 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 ~]#
```

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 Construction](#).
- For common problems about Direct Connect interconnection, see [Interconnection with Cloud](#).

4 Connecting to Multiple VPCs that Do Not Need to Communicate with Each Other

Scenarios

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](#).

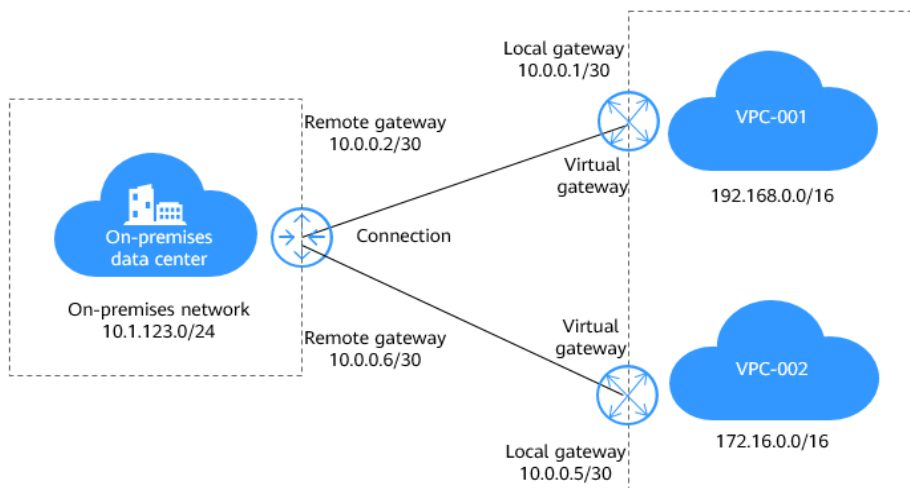
The following table lists the CIDR blocks used in this example.

Table 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

Item	CIDR Block
VPCs	VPC-001: 192.168.0.0/16 VPC-002: 172.16.0.0/16

Figure 4-1 Accessing multiple VPCs over one connection



Procedure

Step 1 Create a connection.

For details, see [Accessing a VPC over a Single Connection Through Static Routes](#).

Step 2 Create two virtual gateways.

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

Table 4-2 Parameters required for creating virtual gateway 1

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.
VPC	Specifies the VPC to be associated with the virtual gateway.
Local Subnet	Specifies the CIDR blocks of the VPC to be accessed. You can add one or more CIDR blocks. If there are multiple CIDR blocks, separate every entry with a comma (,).

Parameter	Description
Description	Provides supplementary information about the virtual gateway.

Table 4-3 Parameters required for creating virtual gateway 2

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.
VPC	Specifies the VPC to be associated with the virtual gateway.
Local Subnet	Specifies the CIDR blocks of the VPC to be accessed. You can add one or more CIDR blocks. If there are multiple CIDR blocks, separate every entry with a comma (,).
Description	Provides supplementary information about the virtual gateway.

Step 3 Create two virtual interfaces.

Connect each virtual interface with a virtual gateway 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.

Table 4-4 Parameters required for creating virtual interface 1

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.

Parameter	Description
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. <ul style="list-style-type: none"> Standard connections: You need to configure the VLAN. Hosted connections: The VLAN will be allocated by the carrier or partner. You do not need to configure the VLAN.
Bandwidth	Specifies the bandwidth that can be used by the virtual interface, in Mbit/s. The bandwidth cannot exceed that of the connection.
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 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 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: <ul style="list-style-type: none"> Uppercase letters Lowercase letters Digits Special characters ~!, .; - " () { } [] / @ # \$ % ^ & * + \ =

Parameter	Description
Description	Provides supplementary information about the virtual interface.

Table 4-5 Parameters required for creating virtual interface 2

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. <ul style="list-style-type: none">• Standard connections: You need to configure the VLAN.• Hosted connections: The VLAN will be allocated by the carrier or partner. You do not need to configure the VLAN.
Bandwidth	Specifies the bandwidth that can be used by the virtual interface in the unit of Mbit/s. The bandwidth cannot exceed that of the connection.
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.

Parameter	Description
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 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 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: <ul style="list-style-type: none"> • Uppercase letters • Lowercase letters • Digits • Special characters ~!, .; - " () { } [] / @ # \$ % ^ & * + \ =
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 propagation on the cloud.

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

Step 5 Configure a static route on your device.

(Here is a static route on a Huawei device.)

```
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

5 Connecting to Multiple VPCs that Need to Communicate with Each Other

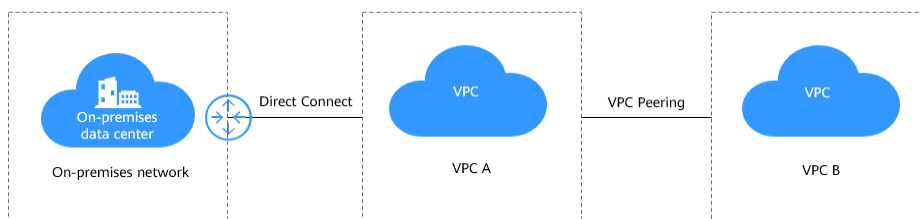
Scenarios

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 subnets of the VPCs 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. Hover on  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 5-1](#).

Table 5-1 Parameters required for creating a VPC peering connection

Parameter	Description
Name	Specifies the name of the VPC peering connection. The name contains a maximum of 64 characters, which consist of letters, digits, hyphens (-), and underscores (_).
Local VPC	Specifies the local VPC. Select VPC B from the drop-down list.
Local VPC CIDR Block	Specifies the CIDR block of the local VPC.
Account	Specifies whether the VPC to peer with is from your account or another user's account. <ul style="list-style-type: none">- My account: The VPC peering connection will connect two VPCs in your account.- Another account: The VPC peering connection will connect your VPC to another VPC in another account.
Peer Project	Specifies the project name. The name of the current project is used by default. You can log in to the management console, hover the cursor over account name in the upper right corner, and choose My Credentials . On the My Credentials page, view the project name and project ID.
Peer VPC	Specifies the peer VPC. Select VPC A from the drop-down list.
Peer VPC CIDR Block	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.
Description	Provides supplementary information about the VPC peering connection.

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. On the **Local Routes** tab page of the VPC peering connection, click **here** as prompted.

The **Summary** tab of the default route table for the local VPC is displayed.

[Table 5-2](#) lists the parameters.

7. Click **Add Route**.

Table 5-2 Parameters required for creating a VPC peering connection

Parameter	Description
Destination Type	Specifies the public IP address.
Destination	Specifies the CIDR block of the local VPC, a subnet CIDR block, or the private IP address of an ECS in the local VPC. For details, see VPC Peering Connection Examples .
Next Hop Type	Specifies the next hop type. Select VPC peering connection .
Next Hop	Specifies the next hop address. Select the created VPC peering connection.
Description	(Optional) Provides supplementary information about the route. Enter up to 255 characters. Angle brackets (< or >) are not allowed.

8. Click **OK**.
You can view the route in the route list.
9. Click the **Peer Routes** tab.
10. On the **Peer Routes** tab page of the VPC peering connection, click **here** as prompted.

The **Summary** tab of the default route table for the peer VPC is displayed.

[Table 5-2](#) lists the parameters.

Table 5-3 Parameters required for creating a VPC peering connection

Parameter	Description
Destination Type	Specifies the public IP address.
Destination	Specifies the CIDR block of the local VPC, a subnet CIDR block, or the private IP address of an ECS in the local VPC. For details, see VPC Peering Connection Examples .
Next Hop Type	Specifies the next hop type. Select VPC peering connection .
Next Hop	Specifies the next hop address. Select the created VPC peering connection.
Description	(Optional) Provides supplementary information about the route. Enter up to 255 characters. Angle brackets (< or >) are not allowed.

11. Click **OK**.

You can view the route in the route list.

----**End**

6 Enabling On-Premises Network to Access the Internet

You can use Direct Connect to connect your on-premises data center to Huawei 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 SNAT and DNAT Rules to Enable Inter-Cloud High-Speed Internet Access](#).