

Alibaba Cloud

Express Connect Virtual Border Router

Document Version: 20200914

Legal disclaimer

Alibaba Cloud reminds you to carefully read and fully understand the terms and conditions of this legal disclaimer before you read or use this document. If you have read or used this document, it shall be deemed as your total acceptance of this legal disclaimer.

1. You shall download and obtain this document from the Alibaba Cloud website or other Alibaba Cloud-authorized channels, and use this document for your own legal business activities only. The content of this document is considered confidential information of Alibaba Cloud. You shall strictly abide by the confidentiality obligations. No part of this document shall be disclosed or provided to any third party for use without the prior written consent of Alibaba Cloud.
2. No part of this document shall be excerpted, translated, reproduced, transmitted, or disseminated by any organization, company or individual in any form or by any means without the prior written consent of Alibaba Cloud.
3. The content of this document may be changed because of product version upgrade, adjustment, or other reasons. Alibaba Cloud reserves the right to modify the content of this document without notice and an updated version of this document will be released through Alibaba Cloud-authorized channels from time to time. You should pay attention to the version changes of this document as they occur and download and obtain the most up-to-date version of this document from Alibaba Cloud-authorized channels.
4. This document serves only as a reference guide for your use of Alibaba Cloud products and services. Alibaba Cloud provides this document based on the "status quo", "being defective", and "existing functions" of its products and services. Alibaba Cloud makes every effort to provide relevant operational guidance based on existing technologies. However, Alibaba Cloud hereby makes a clear statement that it in no way guarantees the accuracy, integrity, applicability, and reliability of the content of this document, either explicitly or implicitly. Alibaba Cloud shall not take legal responsibility for any errors or lost profits incurred by any organization, company, or individual arising from download, use, or trust in this document. Alibaba Cloud shall not, under any circumstances, take responsibility for any indirect, consequential, punitive, contingent, special, or punitive damages, including lost profits arising from the use or trust in this document (even if Alibaba Cloud has been notified of the possibility of such a loss).
5. By law, all the contents in Alibaba Cloud documents, including but not limited to pictures, architecture design, page layout, and text description, are intellectual property of Alibaba Cloud and/or its affiliates. This intellectual property includes, but is not limited to, trademark rights, patent rights, copyrights, and trade secrets. No part of this document shall be used, modified, reproduced, publicly transmitted, changed, disseminated, distributed, or published without the prior written consent of Alibaba Cloud and/or its affiliates. The names owned by Alibaba Cloud shall not be used, published, or reproduced for marketing, advertising, promotion, or other purposes without the prior written consent of Alibaba Cloud. The names owned by Alibaba Cloud include, but are not limited to, "Alibaba Cloud", "Aliyun", "HiChina", and other brands of Alibaba Cloud and/or its affiliates, which appear separately or in combination, as well as the auxiliary signs and patterns of the preceding brands, or anything similar to the company names, trade names, trademarks, product or service names, domain names, patterns, logos, marks, signs, or special descriptions that third parties identify as Alibaba Cloud and/or its affiliates.
6. Please directly contact Alibaba Cloud for any errors of this document.

Document conventions

Style	Description	Example
 Danger	A danger notice indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.	 Danger: Resetting will result in the loss of user configuration data.
 Warning	A warning notice indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.	 Warning: Restarting will cause business interruption. About 10 minutes are required to restart an instance.
 Notice	A caution notice indicates warning information, supplementary instructions, and other content that the user must understand.	 Notice: If the weight is set to 0, the server no longer receives new requests.
 Note	A note indicates supplemental instructions, best practices, tips, and other content.	 Note: You can use Ctrl + A to select all files.
>	Closing angle brackets are used to indicate a multi-level menu cascade.	Click Settings> Network> Set network type .
Bold	Bold formatting is used for buttons, menus, page names, and other UI elements.	Click OK .
Courier font	Courier font is used for commands	Run the <code>cd /d C:/window</code> command to enter the Windows system folder.
<i>Italic</i>	Italic formatting is used for parameters and variables.	<code>bae log list --instanceid</code> <i>Instance_ID</i>
[] or [a b]	This format is used for an optional value, where only one item can be selected.	<code>ipconfig [-all -t]</code>
{ } or {a b}	This format is used for a required value, where only one item can be selected.	<code>switch {active stand}</code>

Table of Contents

1.What is a Virtual Border Router?	05
2.Create a VBR	06
3.Configure BGP	08
4.Add route entries	12
5.Redundant leased line access	13

1. What is a Virtual Border Router?

Alibaba Cloud isolates the physical connection ports of its customers and abstracts these ports into Virtual Border Routers (VBRs) based on the three-layer overlay and switch virtualization technology of the Software Defined Network (SDN) architecture. A VBR is a router between the Customer-Premises Equipment (CPE) and the VPC, and functions as a data forwarding bridge from the VPC to the on-premises data center.

Similar to the VRouter in a VPC, a VBR also has a route table. You can configure route entries in the route table to forward VBR traffic.

Functions

VBR provides the following functions:

- Exchanges data packets between the VPC and the on-premises data center as an intermediate router.
- Attaches or identifies Virtual Local Area Network (VLAN) tags in Layer-3 sub-interface mode.
- Decides the port mode of the physical connection: Layer-3 route interface or VLAN-based Layer-3 sub-interface.
- Supports Border Gateway Protocol (BGP).

BGP is a dynamic routing protocol based on Transmission Control Protocol (TCP). It is mainly used to exchange routing information and network accessibility information among autonomous systems. You can use BGP to implement intranet connection between the on-premises data center and VBR for physical connections. BGP can help you build hybrid clouds in a more efficient, flexible, and reliable manner.

Limits

- Source address-based policy routing is not supported.
- Each VBR has only one route table.
- Each route table supports 48 custom route entries.
- VBR can establish BGP peers only with the peered on-premises data center of a physical connection. Static routing is still needed between the VBR and the VPC.
- The supported BGP version is BGP4.
- VBR supports IPv4 BGP, but does not support IPv6 BGP.
- Up to eight BGP peers can be created under each VBR.
- Up to 100 dynamic route entries can be added to a BGP peer.
- The Autonomous System Number (ASN) of Alibaba Cloud is 45104. It supports the transmission of 2-byte or 4-byte ASNs from the customer side.

2. Create a VBR

After you establish a physical connection, you need to create a Virtual Border Router (VBR), which works as a forwarding bridge for data from the VPC to your on-premises data center.

Context

VBR is a router between the VPC and the Custom-Premises Equipment (CPE) in your on-premises data center. The VBR has a route table. You can configure route entries in the route table to manage traffic forwarding in the VBR. VBR provides the following functions:

- Exchanges data packets as an intermediate router between the VPC and the on-premises data center.
- Decides the port mode of the physical connection: Layer-3 route interface mode or VLAN-based Layer-3 sub-interface mode.
- Attaches or identifies VLAN tags in Layer-3 sub-interface mode.
- Supports BGP dynamic routing.

Procedure


1. Log on to the [Express Connect](#) console.
2. In the left-side navigation pane, choose **Physical Connections > Virtual Border Routers (VBRs)**.
3. Click **Create VBR**.
4. Configure the VBR, and then click **OK**.

Configuration	Description
Account	Select whether to create a VBR for the current account or for a different account.
Account	If you create a VBR for a different account, enter the ID of the account.

Configuration	Description
VLAN ID	<p>Enter the VLAN ID of the VBR. Value range: 0 to 2999.</p> <ul style="list-style-type: none"> ◦ If the VLAN ID is 0, it indicates that the switch port of the VBR uses Layer-3 route interface mode instead of VLAN mode. In Layer-3 route interface mode, each physical connection corresponds to a VBR. ◦ If the VLAN ID is a value from 1 to 2999, it indicates that the switch port of the VBR uses VLAN-based Layer-3 sub-interface mode. In Layer-3 sub-interface mode, each VLAN ID corresponds to a VBR. In this mode, the physical connection of the VBR can connect the VPCs under multiple accounts. The VBRs of different VLANs are isolated from one another by the Layer-2 network. <p>For example, a company has multiple subdivisions or subsidiaries. Each has an independent Alibaba Cloud account, and each account has an independent VPC. If the company applies for a physical connection, it needs to plan a VLAN ID for each subdivision or subsidiary. When creating router interfaces, the company uses VLAN IDs to identify the subsidiaries or subdivisions that use the physical connection, isolating them from each other by using the Layer-2 network.</p>
Gateway IP Address on Alibaba Cloud Side	Enter the IP address of the gateway from the VPC to your on-premises data center.
Gateway IP Address on Customer Side	Enter the IP address of the gateway from your on-premises data center to the VPC.
Subnet Mask	Enter the subnet mask of the gateway IP address on the Alibaba Cloud side and the gateway IP address on the customer side. Only two IP addresses are required. Therefore, you can enter a longer subnet mask.

3. Configure BGP

This topic describes how to establish Border Gateway Protocol (BGP) routing between an on-premises data center and a Virtual Border Router (VBR). To do so, you only need to add BGP peers that communicate with the VBR to the corresponding BGP group, and then advertise the BGP CIDR blocks in the VBR.

 **Note** Express Connect allows you to establish BGP routing only between a VBR and an on-premises data center. In the VBR, you must add a route entry destined for the physical connection and a route entry destined for the Virtual Private Cloud (VPC). For more information, see [Add route entries](#).

BGP overview

BGP is a dynamic routing protocol based on TCP. It is mainly used to exchange routing and network accessibility information among Autonomous Systems (ASs). You can use BGP to connect an on-premises data center and a VBR through an internal network when you establish a physical connection. BGP can help you build a hybrid cloud in a more efficient, flexible, and reliable manner.

Before configuring BGP, you need to create a BGP group. A BGP group is used to simplify BGP configurations. Combining repeated configurations into a BGP group can make configurations easier. You only need to create a BGP group according to the Autonomous System Number (ASN) and add qualified BGP peers to the group. The added BGP peers will inherit the configurations of the BGP group. You do not need to configure the BGP peers separately.

Limits

BGP has the following limits:

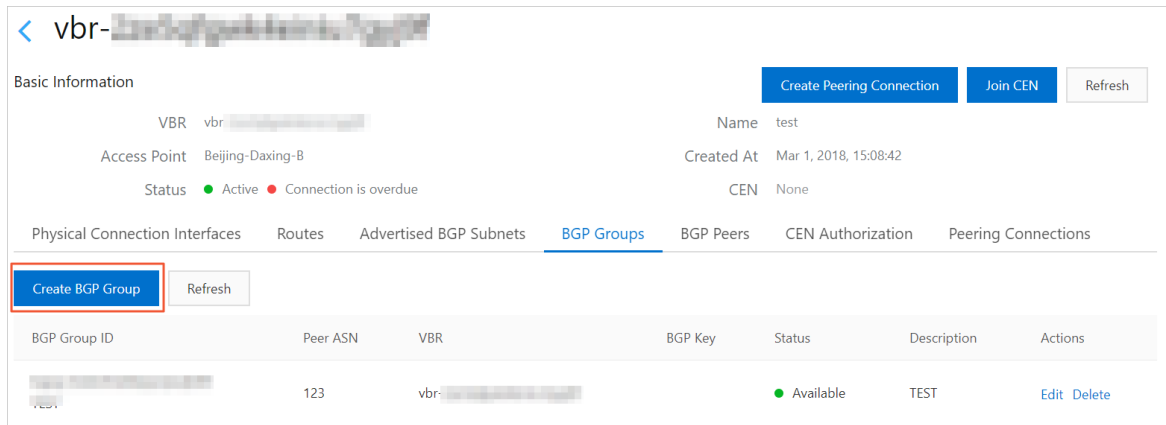
- VBR can establish BGP peers only with the peer on-premises data center. Static routing is required between the VBR and the VPC.
- The supported BGP version is BGP4.
- VBR supports IPv4 BGP, but does not support IPv6 BGP.
- Up to eight BGP peers can be established with a VBR.
- Up to 100 dynamic route entries can be added to a BGP peer.
- The ASN of Alibaba Cloud is 45104. It supports the transmission of 2-byte or 4-byte ASNs from the customer side.

Step 1: Create a BGP group

Before configuring BGP routing, you must create a BGP group based on the requested ASN.

To create a BGP group, follow these steps:

1. Log on to the [Express Connect](#) console.
2. In the left-side navigation pane, choose **Virtual Border Routers (VBRs) > Virtual Border Routers (VBRs)**.
3. Select a region, find the target VBR, and click the VBR ID.
4. Click the **BGP Groups** tab, and then click **Create BGP Group**.



5. Configure the BGP group according to the following information.

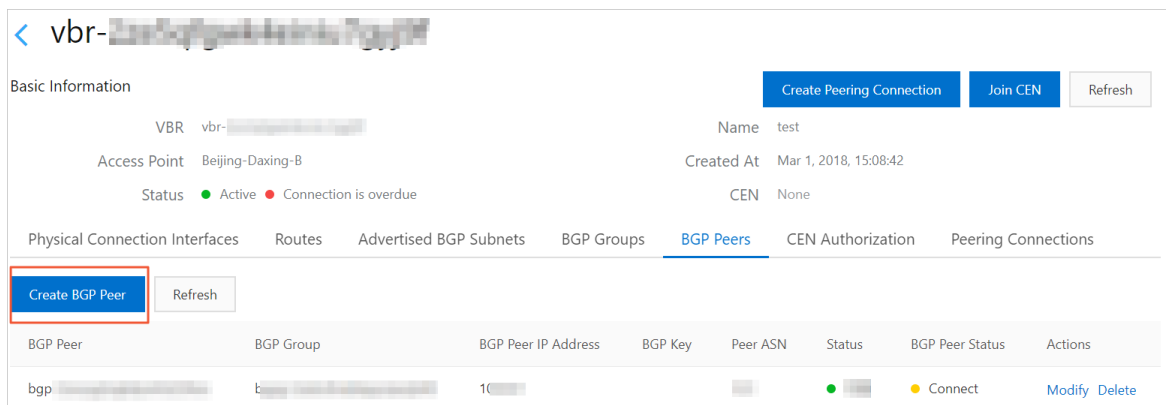
configuration	Description
Name	Enter a name for the BGP group to be created.
Peer ASN	Enter the AS number of the on-premises data center network.
BGP Key	Enter the Key of the BGP group.
Description	Enter a description of the BGP group.

6. Click OK.

Step 2: Add a BGP peer

To add a BGP peer, follow these steps:

1. Log on to the **Express Connect** console.
2. In the left-side navigation pane, choose **Virtual Border Routers (VBRs) > Virtual Border Routers (VBRs)**.
3. Select a region, find the target VBR, and click the VBR ID.
4. Click the **BGP Peers** tab, and then click **Create BGP Peer**.



5. Configure the BGP peer, and click OK.

Configuration	Description
BGP Group	Select the BGP group to which you want to add the BGP peer.
BGP Peer IP Address	Enter the IP address of the BGP peer.

BGP Peer	BGP Group	BGP Peer IP Address	BGP Key	Peer ASN	BGP Peer Status	Actions
bgp-██████████	bgpg-██████████	11.11.11.1		234	● Connect	Delete

A BGP peer can be in the following states:

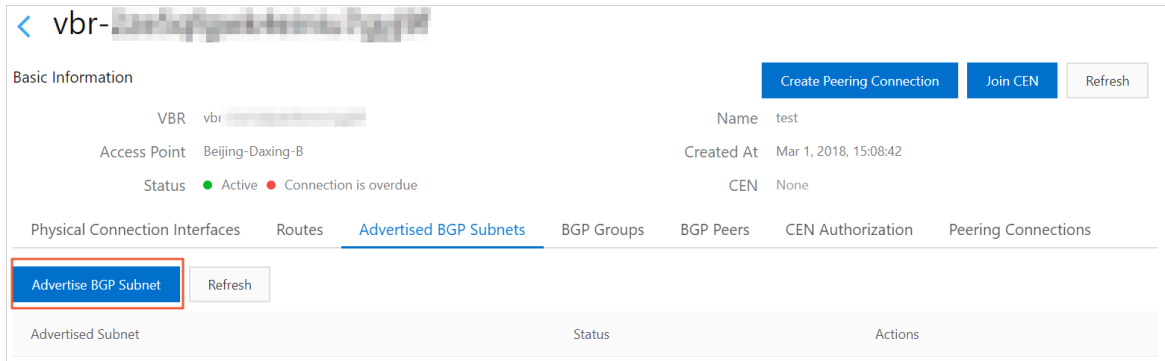
- **Idle:** Indicates that BGP is in the idle state, which is the first state that a newly added BGP peer enters. In the Idle state, BGP waits for a start event. After the start event appears, BGP initializes resources, resets the ConnectRetry timer, initiates a TCP connection, and then enters the Connect state.
- **Connect:** In the Connect state, BGP initiates the first TCP connection. If the ConnectRetry timer depletes before the TCP connection is established, a new TCP connection is initiated and the BGP peer remains in the Connect state.
 - If the new TCP connection is successful, the BGP peer enters the OpenSent state.
 - If the new TCP connection fails, the BGP peer enters the Active state.
- **Active:** In the Active state, BGP starts a new TCP connection. If the ConnectRetry timer depletes, the state moves to Connect.
 - If the TCP connection is successful, the BGP peer enters the OpenSent state.
 - If the TCP connection fails, the BGP peer remains in the Active state and a new TCP connection is initiated.
- **OpenSent:** In this state, an Open message has been sent. BGP is awaiting for an Open message from the peer. After the OPEN message is received from the peer, BGP checks both OPEN messages for errors.
 - If an error occurs, the system sends an error message and BGP returns to the Idle state.
 - If the Open messages do not have any errors, BGP sends a Keepalive message and resets the Keepalive timer. The connection state is moved to OpenConfirm.
- **OpenConfirm:** In this state, BGP waits for a Keepalive packet.
 - If BGP receives a Keepalive packet, the state changes to Established, which indicates that the BGP neighbor relationship is established.
 - If the TCP connection is interrupted, the BGP peer returns to the Idle state.
- **Established:** In this state, the BGP neighbor relationship is established. BGP peers exchange routes through Update messages. The Hold Timer is reset.
- **UnEstablished:** Indicates that the neighbor relationship is not established.

Step 3: Advertise the BGP CIDR block

After configuring the BGP peer, you must advertise the CIDR block of the VPC. After BGP configuration is completed, the VBR automatically learns the CIDR block of the on-premises data center.

To advertise the CIDR block of the VPC, follow these steps:

1. Log on to the **Express Connect** console.
2. In the left-side navigation pane, choose **Virtual Border Routers (VBRs) > Virtual Border Routers (VBRs)**.
3. Select a region, find the target VBR, and click the VBR ID.
4. Click the **Advertised BGP Subnets** tab, and then click **Advertise BGP Subnet**.



5. Enter the CIDR block to be advertised, and click **OK**.

Configure BGP for the on-premises data center

After you complete the BGP configuration in Alibaba Cloud by performing the preceding steps, you must configure BGP and advertise corresponding routes on the network device at the on-premises data center. For more information about the configuration command, consult the manufacturer of the network device.

4. Add route entries

VBR has a route table. You can configure route entries in the route table to forward traffic.

Context

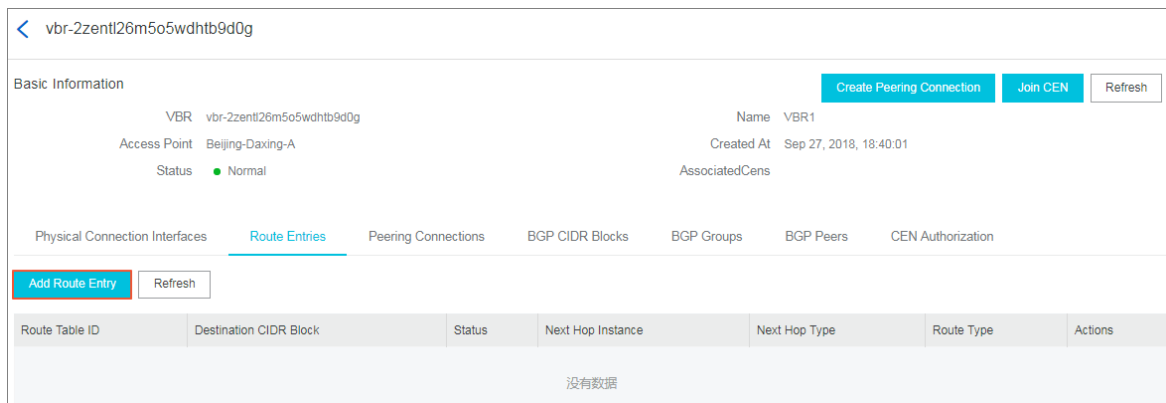
In the VBR, you must add one route entry directed to the physical connection and another route entry directed to the VPC to forward the traffic between the VPC and the on-premises data center. VBR allows you to configure BGP routing for the on-premises data center. For more information, see [Configure BGP](#).

When you manage the route entries of VBR, pay attention to the following restrictions:

- Each route table supports up to 48 custom route entries.
- Source address policy routing is not supported.

Procedure

1. Log on to the [Express Connect](#) console.
2. In the left-side navigation pane, choose **Physical Connections > Virtual Border Routers (VBRs)**.
3. Select the region of the VBR and then click the VBR ID.
4. Click the **Routes** tab and then click **Add Route**.



5. Configure the route entry and then click **OK**.

Configuration	Description
Destination Subnet	Enter the destination CIDR block.
Next Hop Type	Select the type of the next hop: <ul style="list-style-type: none"> ○ VPC: Forwards data to the selected VPC. ○ Physical Connection Interface: Forwards data to the selected physical connection interface.
Next Hop	Select the next hop instance that receives the data, based on the next hop type.

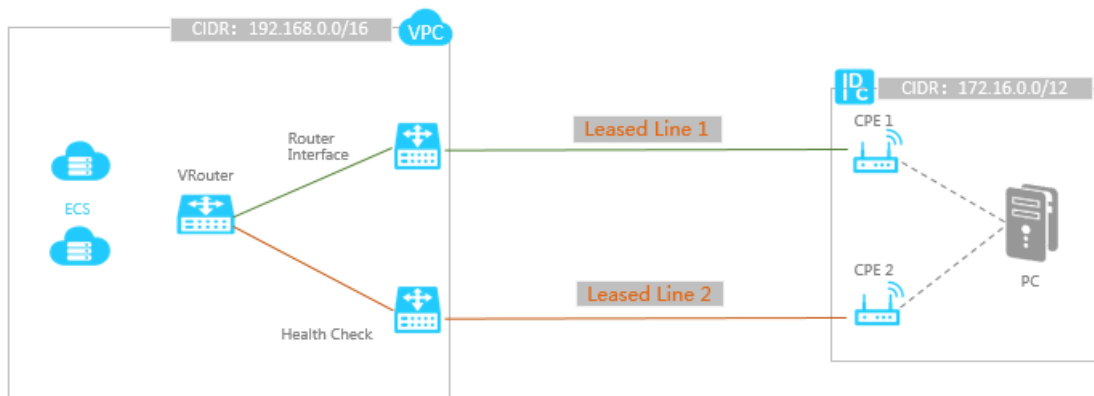
5.Redundant leased line access

You can use redundant leased lines to connect your local data center to your VPC. Redundant physical connection provides intranet communication featuring high quality and high reliability. Alibaba Cloud supports up to four leased lines to achieve ECMP.

Scenarios

This tutorial uses the following scenario to illustrate how to connect a local data center to a VPC on Alibaba Cloud by using redundant leased lines:

A company has a local data center (CIDR block: 172.16.0.0/12) in Beijing, and has a VPC (CIDR block: 192.168.0.0/16) in the region of China (Hangzhou) (CIDR block: 192.168.0.0/16). To solve single point of failure (SPOF), the company plans to apply for two leased lines provided by two different carriers separately to connect the local data center to the access point of Alibaba Cloud in Beijing.



Step 1 Apply for the first physical line

Follow these steps to apply for the first leased line:


1. Log on to the [Express Connect console](#).
2. In the left-side navigation pane, select **Physical Connection > Leased Line**.
3. Click **Apply for Leased Line Access**.
4. Configure the leased line. The following are configurations used in this tutorial. For more information, see [Apply for leased line access](#).
 - **Leased Line Name:** Enter a name for the leased line. In this tutorial, `Beijing_Local_1` is entered.
 - **Access Point:** Select the access point closest to the local data center. In this tutorial, select **China North 2 (Beijing) > ap-cn-beijing-dx-A**.
 - **Carrier:** Select the carrier that provides the leased line. In this tutorial, **Other (China)** is selected.
 - **Access Port Type:** Select a port used by the leased line. In this tutorial, **100Base-LR-10G Single-Mode Optical Port (10km)** is selected.
 - **Bandwidth for Access:** Select a bandwidth for the leased line. In this tutorial, **100** is entered.
 - **Peer Address of Leased Line:** Enter the address of your local data center. For example, `No.`

- XX, XX Street, XX District, Beijing.
- **Redundant Leased Line:** You do not need to select because this is the first leased line.
5. Click **Apply**. On the **Leased Line** page, the status of the leased line is **Application in Progress**.
- Alibaba Cloud will examine and approve your application, which is generally approved the next workday. After the application is approved, the leased line status changes to **Approved**.
6. After the application is approved, click **Pay Access Fee**. Then the system automatically assigns you a port and a leased line ID. In this tutorial, the leased line ID is "pc- 123xyz" .

Step 2 Apply for the second leased line

Follow these steps to apply for the second leased line:

1. Log on to the [Express Connect console](#).
2. In the left-side navigation pane, select **Physical Connection > Leased Line**.
3. Click **Apply for Leased Line Access**.
4. Configure the second leased line. The following are configurations used in this tutorial. For more information, see [Apply for leased line access](#).
 - **Leased Line Name:** Enter a name for the leased line. In this tutorial, `Beijing_Local_2` is entered.
 - **Access Point:** Select the access point closest to the local data center. In this tutorial, select **China North 2 (Beijing) > ap-cn-beijing-dx-A**.
 - **Carrier:** Select the carrier that provides the leased line. In this tutorial, **Other (China)** is selected.
 - **Access Port Type:** Select a port used by the leased line. In this tutorial, **100Base-LR-10G Single-Mode Optical Port (10km)** is selected.
 - **Bandwidth for Access:** Select a bandwidth for the leased line. In this tutorial, **100** is entered.
 - **Peer Address of Leased Line:** Enter the address of your local data center. For example, No. XX, XX Street, XX District, Beijing.
 - **Redundant Leased Line:**

 **Note** You can select any access point in the same region as the first leased line. If you select the same access point as the first leased line, select the first leased line as the redundant leased line (Make sure that the installation fee of the first leased line has been paid); If you select an access point different from that of the first leased line, the two lines are naturally redundant and you do not need to select the Redundant Leased Line.

5. Next, complete the application and wait for approval, just as for the first line. After the approval, pay the fee to receive the port location.

Step 3 Complete leased line construction

Follow these steps to complete the construction of the two leased lines:

1. After the system complete port allocation and the status of the leased lines change to

Access Construction in Progress, click **View** on the right side to view information about leased line construction, such as data center location, network cabinet location, and port information.

2. Inform your carrier of the port information and ask the carrier to connect the leased line. After completing investigation, the carrier will provide you a file containing names of personnel dispatched to the data center of the access point and related information, time of on-site construction, leased line ID and so on. At this time, you need to submit a ticket to inform Alibaba Cloud aftersales personnel of information about leased line laying by the construction personnel of the carrier.

In the following workday, Alibaba Cloud after sales staff will schedule an appointment at the data center for the carrier staff, and inform you of the contact information of the reception personnel in the data center on that day. Inform the carrier of the appointment information. After the carrier completes deployment in the Alibaba Cloud data center, Alibaba Cloud after sales staff changes the leased line status to **Awaiting Confirmation**.

3. Click **Confirm** when the carrier informs you that the leased line construction has been completed. The leased line access is completed when the leased line status changes to **Normal**.

Step 4 Create a VBR for each leased line

Complete these steps to create a VBR for each leased line:

1. Log on to the [Express Connect console](#).
2. In the left-side navigation pane, select **Physical Connection > Virtual Border Router**.
3. Click **Create VBR**.
4. Create a VBR for the first leased line. The following configurations are used in this tutorial. For more information, see [Create a virtual border router](#).

VBR 1:

- **Object:** Select **This Account**.
- **Name:** VBR_1
- **Description:** Leased_Line_1
- **Leased Line:** Select the first leased line. In this tutorial, select **pc-123xyz**.
- **VLAN ID:** 0 (0 indicates that layer-3 router interfaces are directly used)
- **Circuit Code:** Enter the circuit code provided by the carrier.
- **IP Address:** Set according to the following information:

Alibaba Cloud-Side: Enter the IP address used as the gateway to connect to the local data center. In this tutorial, enter 10.100.0.1.

Customer-Side: Enter the IP address used as the gateway to connect to the VPC. In this tutorial, enter 10.100.0.10.

Subnet Mask: The subnet mask for the Alibaba-side IP address and the customer-side IP address. In this tutorial, enter 255.255.255.0.

5. Repeat the preceding steps to create a VBR for the second leased line, namely "VBR_2" .

Step 5 Create router interfaces

To achieve redundant leased line access, you need to create a pair of router interfaces between each pair of VBR and VPC, so that the VPC and the VBR can forward messages to each other through the router interfaces. Follow these steps to create router interfaces:

1. Log on to the [Express Connect console](#).
2. In the left-side navigation pane, click **VPC Connection > Router Interface**.
3. Click **Create Router Interface**.
4. Create a router interface for VBR_1 and the VPC according to the following information.
 - **Billing Method:** Select a billing method. In this tutorial, select **Pay-As-You-Go**
 - **Scenario:** Select **Physical Access**.
 - **Router Creation:** Select **Create Initiator and Receiver**. The system sets the router interface of the local side as the initiator, and automatically connects the initiator to the receiver.
 - **Local Region:** Select the region where the access point of the leased line is located. In this tutorial, select **China (Beijing)**.
 - **Access Point:** Select the access point of the leased line. In this tutorial, select **Beijing-Daxing-A**.
 - **VBR ID:** Select VBR_1.
 - **Peer Region:** Select the region where your VPC is located. In this tutorial, select **China (Hangzhou)**.
 - **Peer VPC ID:** Select your VPC.


After the router interface is created, the system creates a router interface for the VRouter of the VPC and VBR_1 respectively and initiates the connection.

Repeat the preceding steps to create a router interface for VBR_2 and the VRouter of the VPC respectively.

Step 6 Configure IP addresses for health check

The strategy for health check of redundant leased lines is: Alibaba Cloud sends a ping message from each source IP address to the customer-side IP address of each VBR every two seconds. If eight ping packets on one leased line consecutively fail to receive response, the traffic will be forwarded to the other leased line. Complete these steps to configure the source IP address for health check in the router interface of VPC.

1. Log on to the [Express Connect console](#).
2. In the left-side navigation pane, click **VPC Connection > Router Interface**.
3. Find the router interface of VPC created in step 4. Click **More > Health Check** in the **Actions** column.
4. Click **Configuration**, configure the following information in the displayed dialog box, and click **OK**.
 - **SourceIp:** Enter a free IP address of the VPC as the health check IP address.
 - **TargetIp:** Enter the customer-side IP address of the local data center.
5. Repeat the preceding steps to configure the health check IP address for the other router interface.

 **Note** In multi-VPC scenarios, you must configure health check IP addresses for router interfaces of all VPCs connected to redundant leased lines to guarantee smooth switch between the redundant leased lines.

Step 7 Configure routes

After creating the router interfaces, you need to configure a route pointing to the on-premises IDC for the router interfaces newly created on the VPC, and configure routes pointing to the VPC and the corresponding leased line respectively for each newly created router interface on the two VBRs. At last you need to add a route pointing to the VPC on the access device of the on-premises IDC. Therefore, the interconnection between the on-premises IDC and the VPC is achieved.

Configure the route on the VPC

Follow these steps to forward traffic destined for on-premises IDC (CIDR block: 172.16.0.0/12) to the VBR:

1. Log on to the [Express Connect console](#).
2. Select the region where the VPC is located.
3. Click **Route Configuration** in the **Actions** column of the target router interface. Click **Add Route Entry** on the page of VBR details.
4. In the displayed dialog box, configure the route according to the following information. For more information, see [Add a route entry](#).
 - **Destination CIDR Block:** The CIDR Block of the local data center. In this example, enter 172.16.0.0/12.
 - **Next Hop Type:** Select **Router Interface (To VBR)**.
 - **Route Type:** Select **ECMP Routing**.
 - **Router Interface:** Select the two router interfaces created on the VPC in step 4.
5. Click **OK**.

Configure routes on the VBR

Add a route pointing to the leased line

Follow these steps to route the traffic destined for the IDC (CIDR Block: 172.16.0.0/12) to the leased line:

1. Log on to the [Express Connect console](#).
2. In the left-side navigation pane, click **Physical Connection > Virtual Border Router**.
3. Select the region where the VBR is located.
4. Click **Manage** in the **Actions** column of VBR_1 to enter the page of VBR details. Click **Add Route Entry**.
5. In the displayed dialog box, configure the route entry according to the following information. For more information, see [Add a route entry](#).
 - **Destination CIDR Block:** The CIDR Block of the local data center. In this tutorial, enter 172.16.0.0/12.
 - **Next Hop Direction:** Select **To Leased Line**.
 - **Next Hop:** Select the router interface pointing to the local data center created in step 4.

6. Click **OK** to complete the configuration. Then you can access the Alibaba-side IP address 10.100.0.1 from the local data center.

Add a route entry pointing to the VPC

Follow these steps to route the traffic destined for the VPC (CIDR Block: 192.168.0.0/16) to the VPC:

1. Log on to the [Express Connect console](#).
2. In the left-side navigation pane, click **Physical Connection > Virtual Border Router**.
3. Select the region where the VBR is located.
4. Click **Manage** in the **Actions** column of VBR_1 to enter the page of VBR details. Click **Add Route Entry**.
5. In the displayed dialog box, configure the route entry according to the following information. For more information, see [Add a route entry](#).
 - **Destination CIDR Block:** The CIDR Block of the VPC. In this tutorial, enter 192.168.0.0/16.
 - **Next Hop Direction:** Select **To VPC**.
 - **Next Hop:** Select the router interface pointing to the VPC created in step 4.

Repeat the preceding steps to configure routes pointing to the VPC and the local data center respectively for VBR_2.

Configure the route on the local data center

Till now, the route configuration on Alibaba Cloud has been completed. However, to establish the connection from the IDC to the VPC, you must add a route entry for the gateway of you IDC to route traffic destined for the VPC to the IP address of the Alibaba Cloud side. You can configure a static route or BGP dynamic routing to forward data in the local data center to VBR:

- **Static routes**


Example:

```
ip route 192.168.0.0/16 10.100.0.1
ip route 192.168.0.0/16 10.100.1.1
```

- **Dynamic routes**

You can also use BGP to connect the VBR and the local data center.

- i. Create a BGP peer group.
- ii. Add BGP peers to the BGP group.
- iii. Advertise the BGP network in the VBR.

 **Note** Ensure the destination CIDR block of the BGP route entry is the static route that you have configured. In this tutorial, it is 192.168.0.0/16.

Step 8 Test the performance

After the VPC is connected to the local data center, test the speed of the leased lines to ensure that they can meet service needs. For more information, see [Test the network performance of a physical connection](#).