

Alibaba Cloud Express Connect

Product Introduction

Issue: 20200615









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Document conventions

Style	Description	Example
	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.
	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.
	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.
	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.
Italic	Italic formatting is used for parameters and variables.	<code>bae log list --instanceid Instance_ID</code>
[] or [a b]	This format is used for an optional value, where only one item can be selected.	<code>ipconfig [-all -t]</code>

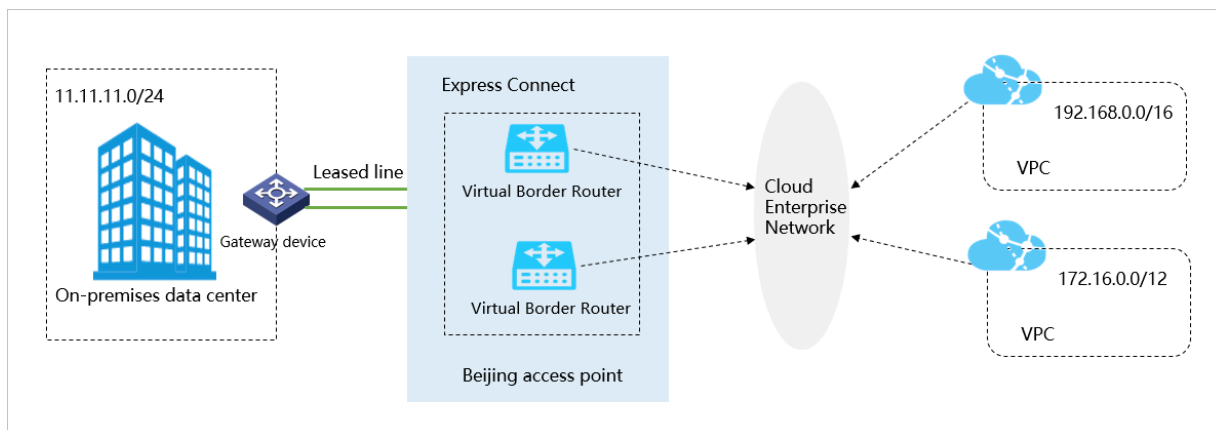
Style	Description	Example
{ } or {a b}	This format is used for a required value, where only one item can be selected.	switch {active stand}

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1 What is Express Connect?

Alibaba Cloud Express Connect helps you build internal network communication channels that feature enhanced cross-network communication speed, quality, and security. Express Connect also helps you mitigate network instability and data breaches.



Components

Express Connect consists of the following components:

- **Physical connection:** A dedicated connection built from your on-premises network to Alibaba Cloud access points. The following two connection types are available to choose:
 - **Dedicated connections**

A physical Ethernet connection that connects on-premises data center to Alibaba Cloud access points. You can apply for the dedicated connection from the console. The connection is dedicated to a single customer. For more information, see [Create a dedicated connection](#).
 - **Shared connections**

A physical Ethernet connection that is created by Alibaba Cloud Partners on behalf of customers. Alibaba Cloud Partners have created connections with Alibaba Cloud access points. You can request a hosted connection by contacting a partner. The connection is shared by carriers and customers. For more information, see [Create a shared connection](#).
- **Virtual border Router:** A VBR is a gateway that provides communication to a VPC for an on-premises data center.

Benefits

The benefits of Express Connect are as follows:

- High-speed interconnectivity

Powered by the network virtualization technology of Alibaba Cloud, Express Connect can connect different network environments so that both ends can directly communicate with each other through an internal network without the need for access to the Internet. A low-latency and high-bandwidth connection within an internal network can be achieved regardless of the distance between the connected network environments.

- Stability and reliability

Built on the state-of-the-art infrastructure of Alibaba Cloud, Express Connect guarantees stable and reliable communication between networks.

- Security

Express Connect implements cross-network communication at the network virtualization layer, where all data is transmitted through the infrastructure of Alibaba Cloud and tenants are isolated from each other. The risk of data theft is eliminated.

- Pay-as-you-go billing

Express Connect provides different bandwidth specifications. You only pay for the resources that you actually used.

Comparison between physical connections of Express Connect and VPN

Item	Physical connection	VPN
Network quality	Physical connections use dedicated lines and internal networks for communication, which features high quality, low latency, and low packet loss.	VPNs use the Internet for communication. However, there is a risk of high latency and packet loss.

Item	Physical connection	VPN
Security and reliability	Physical connections use dedicated lines, which have no risk of data theft and a high level of security . Physical connections can meet the needs of customers with high security requirements, such as finance and government enterprises.	VPNs use encrypted communication channels that are based on the Internet and can meet basic security requirements of customers.
Transmission bandwidth	A single link supports a bandwidth of up to 100 Gbit/s and can meet the needs of customers with large data volumes. Equal-cost multi-path routing (ECMP) is supported among multiple physical connections. The bandwidth can be increased to a TB level.	The network bandwidth depends on the bandwidth of the public IP address.

2 Scenarios

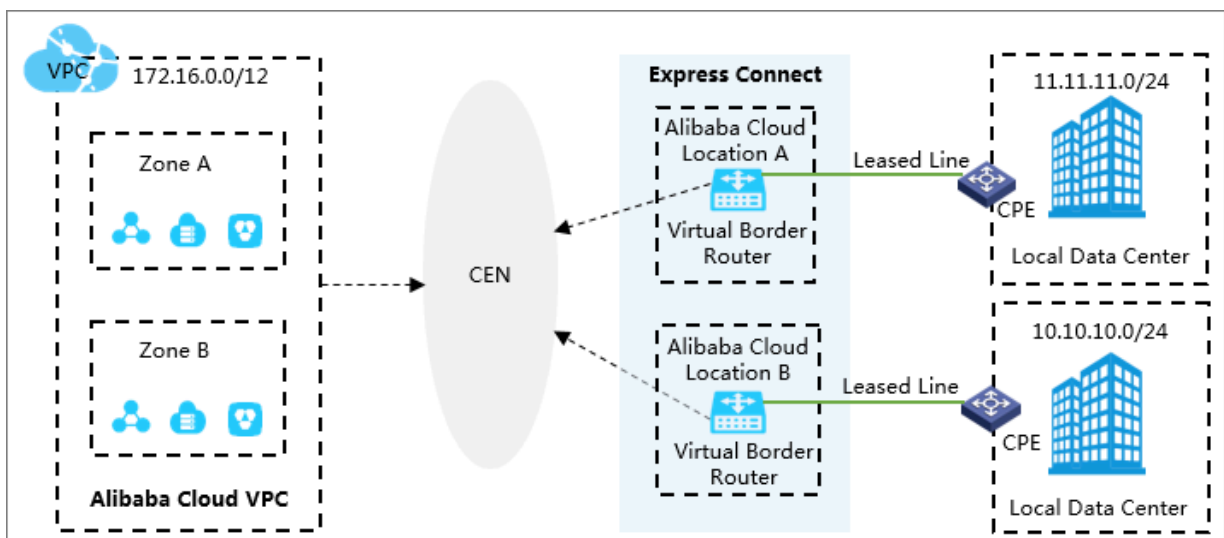
This topic describes the scenarios of Express Connect. If you want your on-premises data center to communicate with an Alibaba Cloud VPC through a private network, you can establish a physical connection by using a physical connection interface of Alibaba Cloud or using a pre-deployed leased line from a partner of Alibaba Cloud. Through physical connections, you can implement high-quality, highly reliable, and highly secure internal communication between your on-premises data center and the VPC.

Connect an on-premises data center to a VPC

If your on-premises data center needs to communicate with an Alibaba Cloud VPC through a private network, you can apply for a physical connection interface from Alibaba Cloud to establish a physical connection between the on-premises data center and the VPC. Through physical connections, you can implement high-quality, highly reliable, and highly secure internal communication between your on-premises data center and the VPC.

Scenario 1: Implement disaster recovery for large and medium-sized enterprises

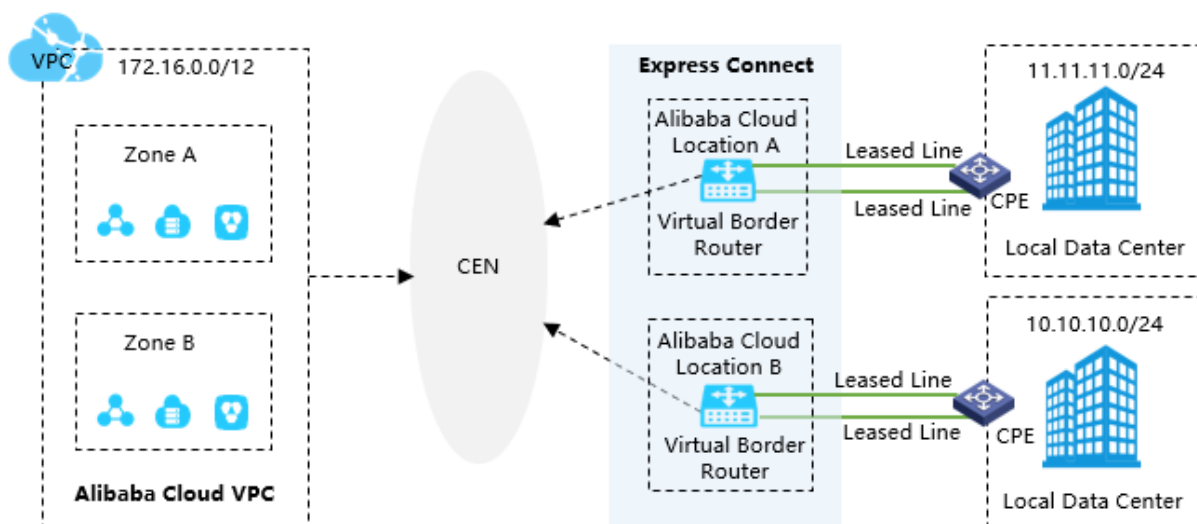
For key services that requires high availability, we recommend that you establish multiple physical connections at multiple access points. This topology guarantees the disaster recovery capability of your services in the case of connection failures caused by optical fiber disconnections, device faults, and access point failures. This topology applies whether you use a physical connection interface of Alibaba Cloud or use a shared pre-deployed leased line of a partner of Alibaba Cloud.



Scenario 2: Build high-elasticity and high-availability architecture for large enterprises

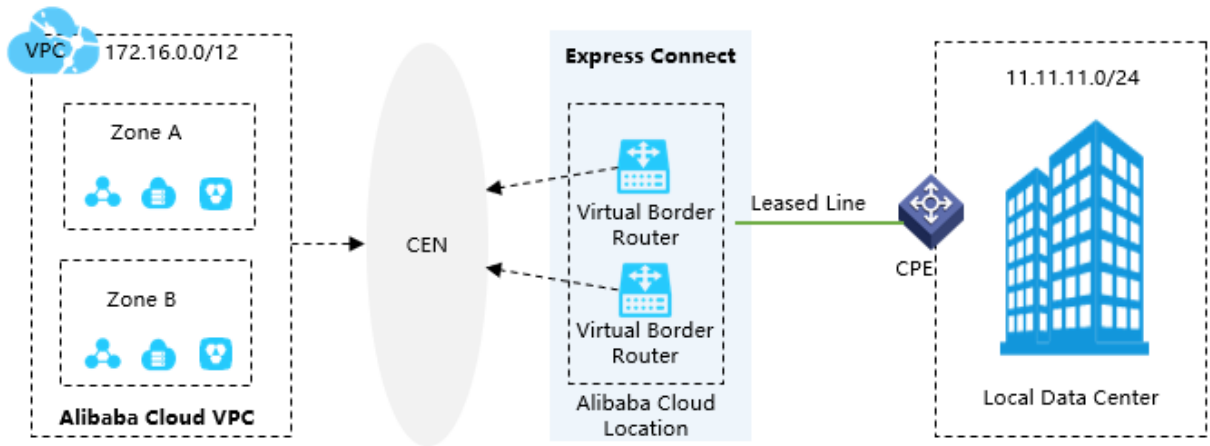
Assume that your company needs to increase its business operations because of increased sales. However, the current resources of your on-premises data center can no longer accommodate sufficient servers. You can use physical connections to connect the on-premises data center to Alibaba Cloud and use equal-cost multi-path routing (ECMP) to increase the bandwidth of leased lines. By doing so, you can handle T-level traffic in an elastic and easy way, and meet service needs. To use ECMP, open a ticket.

This topology allows services to be recovered from device faults, leased line connection faults, and access point failures. This topology applies only when you use physical connection interfaces of Alibaba Cloud to establish physical connections.



Scenario 3: Establish a simple network architecture for non-critical services

For non-critical services that do not require high elasticity and availability, for example, the development and test environment, we recommend that you establish at least two physical connections at one access point and connect the two leased lines to different devices. This topology supports failovers in the case of failures of a single device, but does not support failovers in the case of access point failures. This topology applies only when you use a shared pre-deployed leased line of a partner.



3 Limits

This topic describes the limits of Express Connect. Before you use this service, we recommend that you understand these limits.

Item	Limit	How to apply for an exception to the limit
The maximum number of physical connections that can be assigned to an access point of each account	2	You can apply for an exception to the limit on the Quota Management page in the console.
The maximum number of Virtual Border Routers (VBRs) that can be created for each physical connection	7	You can submit a ticket.
The maximum number of idle VBRs without interfaces supported by each account	5	None.
The maximum number of VBRs that you can use your current account to create for each physical connection instance	5	You can submit a ticket. In low-bandwidth scenarios, you can use each physical connection instance to create up to five VBRs for your current account free of charge. Fees are incurred if the number of VBRs exceeds the upper limit.
The maximum number of VBRs that you can use your current account to create for other accounts	2	You can submit a ticket. In low-bandwidth scenarios , you can use your current account to create up to two VBRs for other accounts free of charge. More than two VBRs can be created for free in the regions within China . However, fees are incurred if more than two VBRs are created.

Item	Limit	How to apply for an exception to the limit
The maximum number of routes that can be added to each VBR	48	You can apply for an exception to the limit on the Quota Management page in the console.
The maximum number of Border Gateway Protocol (BGP) routes supported by each VBR	110	You can submit a ticket.
The maximum number of BGP routes that can be advertised on each VBR.	10	You can apply for an exception to the limit on the Quota Management page in the console.
We recommend that you use internal Classless Inter-Domain Routing (CIDR) blocks for communication between your on-premises data center and a VPC. The CIDR blocks cannot conflict with each other.		
If you use dual physical connections to connect an on-premises data center to a VPC, you must configure a source IP address and a destination IP address for each physical connection to enable health checks. The system regularly checks the status of both physical connections. If a physical connection fails, the system distributes network traffic to the other physical connection.		
By default, in the regions within China, you cannot use your current account to create VBRs for other accounts. The physical connection owner and the physical connection user must belong to the same enterprise. If you require special permissions, you can submit a ticket. The enterprise that owns the A26 license for telecommunication infrastructure service granted by China's Ministry of Industry and Information Technology (MIIT) can submit a ticket to create VBRs for other accounts.		
By default, in regions outside China, you cannot use your current account to create VBRs for other accounts. If you require special permissions, you can submit a ticket.		
By default, if you use your current account to create a VBR for other accounts, the VBR cannot be added to a CEN instance or connected to a VPC. The physical connection owner and the physical connection user must belong to the same enterprise. If you require special permissions, you can submit a ticket.		

Limits on communication

The communication between a VPC and an on-premises data center has the following limits:

- The maximum read/write speed for Object Storage Service (OSS) is 5 Gbit/s.

- To improve the reliability, the speed of a single hash stream from a VPC to a VBR is limited to 1/12, 1/4, 1/8, or 1/16 of the bandwidth assigned to a specified type of physical connection based on Alibaba Cloud Express Connect. For example, if the bandwidth level from the VBR to the VPC is set to large1, which means that the bandwidth of 1 Gbit/s is specified, the maximum bandwidth of a single hash stream is 85 Mbit/s.

A hash stream is a data stream that is defined by the combination of the source IP address, source port, transport layer protocol, destination IP address, and destination port. For example, 192.168.1.1 10000 TCP 121.14.88.76 80 forms a hash stream. In this hash stream, a terminal that is assigned the IP address 192.168.1.1 and port 1000 is connected to a terminal that is assigned the IP address 121.14.88.76 and port 80 over Transmission Control Protocol (TCP).

Limits on access points

Before you migrate data on the premises to Alibaba Cloud through the Express Connect service, you must specify access points for physical connections. The access points have the following limits:

- Multiple access points from different locations are provided in one region. The network latency between two access points that are located in different zones of the same region is less than five milliseconds.
- If you want to minimize the network latency, you can select an access point that is closest to the zone where your Elastic Compute Service (ECS) instance is located. To enable this access point, you can submit a ticket.

Limits on physical connections

Physical connections have the following limits:

- Before you use Express Connect, you must allocate appropriate CIDR blocks to the connections between a VPC and an on-premises data center. Make sure that the CIDRs of the VPC and the on-premises data center do not overlap with each other.
- The cloud services in VPCs use 100.64.0.0/10 as the service address. On-premises data centers that are connected to VPCs through Express Connect cannot use CIDR blocks that overlap with 100.64.0.0/10.
- Alibaba Cloud provides optical modules with 1 GB and 10 GB ports free of charge, and the transmission distance is 10 km. If you require a longer transmission distance or a 40 GB or 100 GB port, you must purchase the optical module yourself.

Limits on cable installation at the data center of Alibaba Cloud

Before you instruct the cable installation company to go to the data center of Alibaba Cloud, you must understand the following limits:

- The cable installation company must follow the construction rules stipulated by the data center provider and Alibaba Cloud engineers. The cable installation company that fails to follow the rules is not allowed to install cables at the data center.
- If you purchase optical ports, make sure that the service provider connects an optical fiber to the port of Alibaba Cloud.
- If you purchase electrical ports, make sure that the service provider connects an electrical cable to the port of Alibaba Cloud.
- Alibaba Cloud data centers do not support the hosting of fiber optical transceivers. The cable installation company cannot install any fiber optical transceivers at data centers of Alibaba Cloud.
- The leased line installation schedule is subject to data center lockdowns required by local authorities or Alibaba Cloud. You can learn about the lockdown duration required by Alibaba Cloud by consulting customer service.
- The data centers where Alibaba Cloud access points are located are rent from telecom service providers. Therefore, you may be charged by the service providers for cable connections to the data center building and leased indoor cables.

Limits on redundant physical connections

Redundant physical connections have the following limits:

- Alibaba Cloud only guarantees the service availability of redundant physical connections that connect to different access points. If there are multiple connections to the same access point or there is only one connection to an access point, the service availability cannot be guaranteed.
- If you use dual physical connections to connect to Alibaba Cloud, we recommend that you configure health checks to perform failovers and guarantee high availability of the Express Connect service.



Limits on shared physical connections

You can also use a leased line deployed by an Alibaba Cloud partner to establish a physical connection. The shared physical connections have the following limits:

- Configurations of ports are fixed. Alibaba Cloud cannot adjust port configurations even if you have special requirements.
- Equal-cost multi-path (ECMP) link aggregation is not supported.

Time spans for leased line construction

The following table shows the limits on time spans for different stages that Alibaba Cloud requires to install a leased line.

Item	Limit
Review of the application to enter an Alibaba Cloud data center and perform site surveys for leased line installation	Two workdays
Review of the application for a Letter of Authorization (LOA)	Two workdays
Fiber pigtail installation	<p>If Alibaba Cloud provides optical modules:</p> <ul style="list-style-type: none"> • Two workdays for the installation within China • Three workdays for the installation outside China <p> Note: Four workdays are required for access points in Japan.</p> <p>If the customer provides optical modules:</p> <ul style="list-style-type: none"> • Within China: two workdays after Alibaba Cloud receives the optical module • Outside China: three workdays after Alibaba Cloud receives the optical module <p> Note: Four workdays are required for access points in Japan.</p>
Review of the application to enter an Alibaba Cloud data center and maintain a leased line	Two workdays

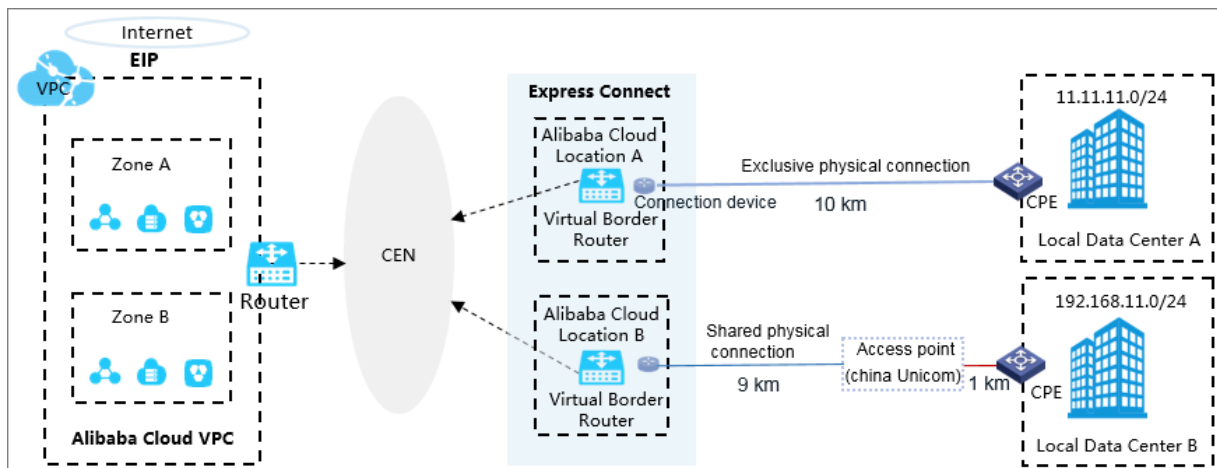
Peering connection limits

- If multiple VBRs are connected to one VPC, the VBRs cannot communicate with each other through the VPC.
- If multiple VPCs are connected to one VBR, the VPCs cannot communicate with each other through the VBR.

4 Terms

This topic describes the terms commonly used in Express Connect.

The following figure shows the networking architecture of using physical connections to connect on-premises data centers to Alibaba Cloud.



Note:

Alibaba Cloud provides multiple physical connection solutions. For more information, see [#unique_9](#).

The following table lists basic terms of physical connections.

Term	Description
Express Connect	An Alibaba Cloud service that helps you build private network communication channels between VPCs or between VPCs and on-premises data centers. It provides features that increase network topology flexibility and enhance cross-network communication quality and security.
Virtual Private Cloud (VPC)	A custom private network created in Alibaba Cloud. VPCs are logically isolated from each other. You can create and manage your cloud instances, such as Elastic Compute Service (ECS) instances, Server Load Balancer (SLB) instances, and ApsaraDB for RDS (RDS) instances in your VPC.
Virtual Border Router (VBR)	A router between your Customer-Premises Equipment (CPE) and the VPC. It serves as a bridge for data exchange between your on-premises data center and the VPC.

Term	Description
VRouter	A hub that connects all VSwitches in a VPC and serves as a gateway to connect the VPC with other networks.
Cloud Enterprise Network (CEN)	<p>An Alibaba Cloud service that helps you build private network communication channels between VPCs or between VPCs and on-premises data centers. It features automatic route distribution and learning, faster convergence, and improved quality and security of cross-network communication. By using CEN, you can connect all your network resources and build a network and communication capabilities at an enterprise scale.</p> <p>Also, you do not need to set routes for VPCs that are connected through CEN, which simplifies network operation and maintenance. For more information, see #unique_10</p>
Physical connection interface	A physical interface through which a leased physical line accesses an Alibaba Cloud access point.
Access point	A geographical location where the leased line is connected to Alibaba Cloud. Each access point has two access devices. Each region has one or more access points, any of which can be used to access Alibaba Cloud VPCs.
Border Gateway Protocol (BGP)	A routing protocol designed to exchange routing and reachability information among gateways and autonomous systems.
Equal-cost multi-path (ECMP) link aggregation	A method that is used to increase the bandwidth of physical connections through ECMP routing, specifically, by connecting multiple leased lines to the same device and associating the multiple physical connections with the same VBR.
Exclusive physical connection	A physical connection solution where a dedicated physical port of Alibaba Cloud and a dedicated leased line of a third-party service provider are used to connect an on-premises data center to an Alibaba Cloud access point.
Shared physical connection	A physical connection solution where customers connect an on-premises data center to Alibaba Cloud through a leased line and the network of a third-party service provider. In this solution, the third-party service provider establishes the link between their access point and an Alibaba Cloud access point that can be shared by multiple customers.