

Alibaba Cloud Express Connect

Product Introduction

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Generic conventions

Table -1: Style conventions

Style	Description	Example
	This warning information 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.
	This warning information 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 restore business.
	This indicates warning information, supplementary instructions, and other content that the user must understand.	 Note: Take the necessary precautions to save exported data containing sensitive information.
	This indicates supplemental instructions, best practices, tips, and other content that is good to know for the user.	 Note: You can use Ctrl + A to select all files.
>	Multi-level menu cascade.	Settings > Network > Set network type
Bold	It is used for buttons, menus, page names, and other UI elements.	Click OK .
Courier font	It is used for commands.	Run the <code>cd /d C:/windows</code> command to enter the Windows system folder.
<i>Italics</i>	It is used for parameters and variables.	<code>bae log list --instanceid Instance_ID</code>
[] or [a b]	It indicates that it is a optional value, and only one item can be selected.	<code>ipconfig [-all -t]</code>
{ } or {a b}	It indicates that it is a required value, and only one item can be selected.	<code>swich {stand / slave}</code>

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1 What is Express Connect

Express Connect creates private network channels between two VPCs and between a VPC and an on-premises IDC, enhancing the flexibility of network topology as well as the quality and security of cross-network communication. Express Connect also avoids unstable network quality common in public networks and prevents data leakage.

Functions

Express Connect provides the following functions:

- Build an intranet connection between two VPCs

Express Connect supports intranet communication between two VPCs in the same region or different regions, and under the same account or different accounts.

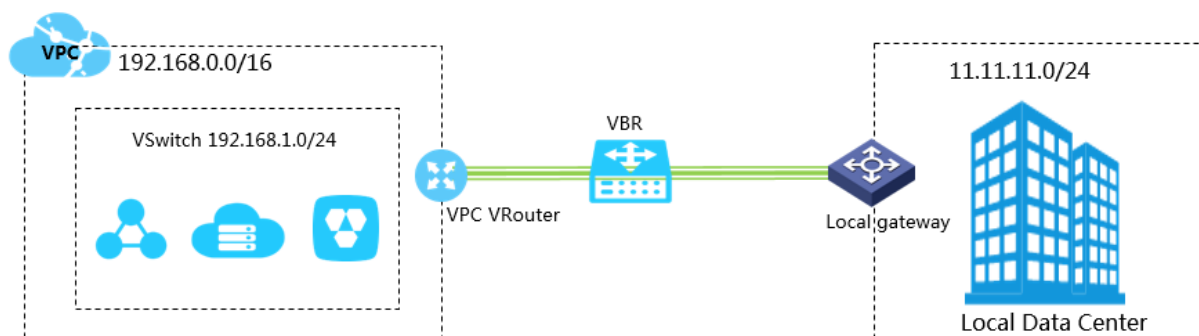
Alibaba Cloud creates a Route interface on the VRouter of each VPC. It then uses the two interfaces and its own backbone transmission network to build Express Connect, easily realizing secure, reliable, convenient, and fast communication between the two VPCs.

- Build an intranet connection between two a VPC and a local IDC

You can connect an on-premises IDC to a VPC through Physical connection on the physical layer, and create Virtual border router and Router interface to connect the on-premises IDC to the VPC.

Architecture

Based on the layer-3 overlay technology and switch virtualization technology under the Software Defined Network (SDN) architecture, Alibaba cloud isolates the ports of the physical leased lines of a customer and abstracts the ports into virtual border routers (VBRs). Using main-stream tunneling technology, Alibaba Cloud encapsulates the packets of the customer in VSwitches and then uses the tunneling technology to further encapsulate the packets and transmit them to the VPC.



Compare Express Connect with public network

VPC is an isolated network environment. Communication between two VPCs or between a VPC and local IDC is achieved by different networks.

The communication quality, cost, and security of the way by using a public network is inferior to those of the way by using Express Connect, as shown in the following table:

Items	Public network	Express Connect
Communication quality and availability	The quality of long-distance public network communication is affected by a variety of factors, making it hard to ensure latency stability and low packet loss rate.	Alibaba Cloud's high-quality infrastructure delivers enhanced link quality and availability: <ul style="list-style-type: none">• Delay jitter does not exceed 20%• Encapsulation success rate is not lower than 99.8%• Availability is not lower than 99.95 %• Packet loss rate is lower than 0.2 %
Cost	You must pay traffic fee or bandwidth fee for using a public network.	The fee for cross-region communication is more affordable. Additionally, same-region VPC intercommunication is free of charge.
Security	There is risk of data leakage on a public network.	Based on the virtualization technology of Alibaba Cloud, Express Connect isolates different communication links, so the security is enhanced.

2 Physical connections

A physical connection is the abstraction of the network circuits established between an Alibaba Cloud access point and your on-premises data center. To establish a physical connection, you have to apply for a leased line. A leased line is a cable rented from a network carrier that connects your on-premises network to an Alibaba Cloud access point.

With this leased line in place, you can create a virtual border router (VBR) to connect your on-premises IDC to Alibaba Cloud to build a hybrid cloud environment. Therefore, the cloud resources can access your on-premises network bypassing the Internet over a private network connection.

The physical connection does not go through the Internet. It is more secure, reliable, and fast with lower latency than typical Internet connections.

Functions

The physical connection provides the following functions:

- Multiple connectivity models

You can choose to use a point-to-point Ethernet connection or an MPLS VPN connection. Physical connection supports Ethernet RJ45 electrical ports and LC-mode optical ports with 1 Mbps - 10 Gbps transmission rate.

- Redundant connections

Physical connection uses the equal-cost multi-path routing (ECMP) to achieve redundancy of two leased lines:

- If the two leased lines connect to different access points in a same region, then these two leased lines are redundant by default.
- If the two leased lines connect to the same access point in a same region, you can select the first leased line as the redundant connection when applying for the second leased line.

Limits

The following are physical connection limitations:

- Physical connections do not support SDH G.703 or V.35 interfaces.
- Alibaba Cloud provides one or more access points in each accessible region. Different access points have different carrier restrictions. Before applying for leased line access, you must open a ticket to obtain the access point and carrier restriction information.

3 Virtual border router

A virtual border router (VBR) is a product mapping of the leased line that you have applied to access a VSwitch. You can think of it as a router between your customer-premises equipment (CPE) and the VPC, which serves as a bridge for exchanging data between the on-premises IDC and the VPC.

Same as the VRouter in a VPC, VBR also has a route table. You can configure route entries for it to forward traffic.

Functions

VBR provides following functions:

- Exchange data between a VPC and an on-premises IDC as a router.
- In the layer-3 subinterface mode, VBR can identify or bind VLAN tags.
- Decide the port mode for the leased line: layer-3 interface or VLAN-based layer-3 subinterface.
- Support BGP routing.

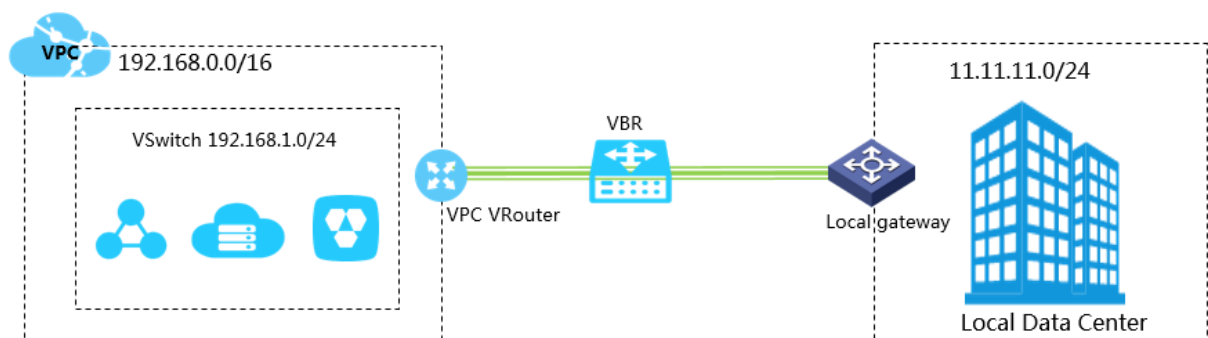
Limits

- Each VBR have only one routing table.
- The maximum number of custom routing entries in one routing table is 48.
- Source address-based policy routing is not supported.

4 Router interfaces

A router interface is a virtual device with the ability to set up a communication channel and control its working status.

Express Connect builds an intranet communication channel between two VPCs by creating two router interfaces individually for the VRouter of the VPCs. The VRouters can send messages to each other through the channel after the connection between the two router interfaces is established. Therefore, the resources in the two VPCs (such as ECS instances) can communicate over the intranet.



Initiator and receiver

When two router interfaces are interconnecting, one plays the role of the connection initiator and the other plays the role of the connection receiver. Only the initiator router interface can initiate a connection; the receiver router interface must wait for the initiator to start a connection. The initiator and receiver are only used to control the process of establishing connections. In the actual network communication, the communication link is bidirectional and there is no difference between the initiator and receiver.

For the VPC interconnection of a same account, Express Connect provides an option to create two router interfaces at the same time. In this situation, you do not need to manually initiate the connection, the system automatically initiates and establishes the connection. For the VPC interconnection of different accounts, you have to manually initiate a connection between the initiator router interface and the receiver router interface.

The following table is the comparison between the initiators and receivers.

Items	Initiator router interfaces	Receiver router interfaces
Is the interface charged when connecting two VPCs in the different regions?	Yes	No
Is configuring peer router interface information required before initiating a connection?	Yes	No
Is configuring peer router interface information required before initiating a connection?	Yes	Yes
Can the interface initiate a connection?	Yes	No
Can the interface send messages to the peer interface after the connection is established?	Yes	Yes
Can the role of router interfaces be modified after the router interfaces are created?	No	No

Connection process

An initiator router interface initiates a connection. Then, the receiver router interface accepts the connection. At last, establish the connection.

In different connection process and stage, the status of router interface is also different as shown in the following table. The initial state of the router interface after it is created is Not connected.



Note:

If you select create the initiator and receiver router interfaces at the same time, the system automatically initiates and establishes a connection. In this situation, the status of the router interfaces directly change to Activated.

Connection process	Initiator router interface	Receiver router interface
An initiator router interface initiates a connection	Connecting	Accepting connection
Connection is established	Activated	Activated
Freeze a connection	Freezing	Freezing
Connection is disconnected	Frozen	Frozen
Activate a frozen connection	Activating	Activating
Connection is established	Activated	Activated

Router interface specification

Express Connect provides three kinds of interface specifications: small (10 Mbps-50 Mbps), middle (100 Mbps-900 Mbps), and large (1 Gbps-4.5 Gbps).

The available router interface specifications are different in different connection scenarios and regions. Select an appropriate specification according to your configurations on the purchase page . The router interface specification used for same-region VPC interconnection is set to Large 2 (2 Gbps) by default.

The available specifications are as follows.

Specifications	Capacity
Small	Small 1=10, Small. 2=20, Small. 5=50
Medium	Middle. 1=100, Middle. 2=200, Middle. 5=500, Middle. 7=700, Middle. 4=400, Middle. 6=600, Middle. 7=700, Middle. 8=800, Middle. 9=900
Large	Large. 1=1000, Large. 1.1=1100, Large. 1.2=1200, Large. 1.3=1300, Large. 1.4=1400, Large. 1.5=1500, Large. 1.6=1600, Large. 1.7=1700, Large. 1.8=1800, Large. 1.9=1900, Large. 2=2000, Large. 2.5=2500, Large. 3=3000, Large. 3.5=3500, Large. 4=4000, Large. 4.5=4500, Large. 5=5000, Xlarge. 1=10000, Xlarge. 4=40000, Xlarge. 8=80000, Xlarge. 10=100000

Limits

- Only one pair of router interface connection is allowed between two VPCs.
- The connection role of a router interface cannot be modified after the router interface is created .
- Virtual border routers (VBRs) always act as the connection initiator.

5 Scenarios

Express Connect creates private network channels between two VPCs and between a VPC and a local IDC, enhancing the flexibility of network topology as well as the quality and security of cross-network communication.

Connect two VPCs

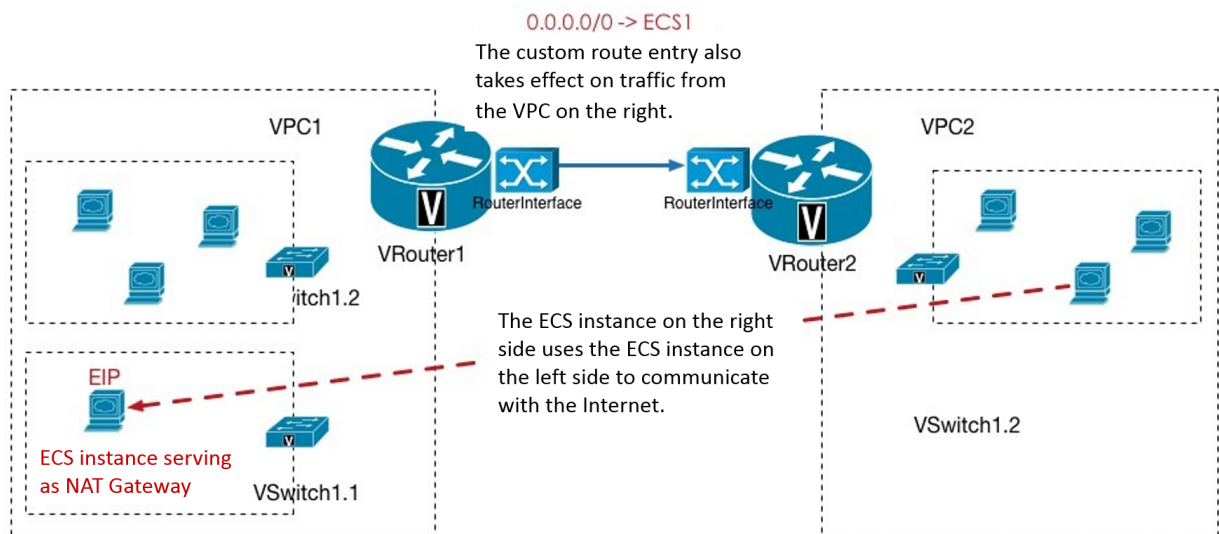
You can use Express Connect to achieve private-network communication between two VPCs. Express Connect can avoid the network instability caused by bypassing the public network and eliminate the risk of data theft during transmission.. For more information, see [Establish an intranet connection between VPCs under the same account](#) and [Establish an intranet connection between VPCs under different accounts](#).

Connect a local IDC with a VPC

If your local IDC needs to communicate with a VPC through a private network, you can use the physical connection function of Express Connect to implement private-network communication on both sides. You can build a physical connection by yourself or contact an Alibaba partner to help you build a physical connection. The communication between the on-premises IDC and the VPC by using the physical connection features high quality, high reliability, and high security. 您可以使用高速通道实现两个VPC间的私网通信需求，既可以避免绕行公网带来的网络质量不稳定问题，也可以免去数据在传输过程中被窃取的风险。 For more information, see [Connect a local data center to a VPC through a physical connection](#).

Two vpcs shared Nat gateways

If two VPCs need to use the same NAT gateway to access a public network, you can also use Express Connect.



6 Limits

- The router interfaces created for the same VRouter cannot be connected.
- The router interface created for a virtual border router (VBR) must be the connection initiator.
- Only one pair of router interfaces can be created for a VPC.
- The maximum number of VBRs per leased line: 50
- The maximum number of router interfaces per account: 5
- The maximum number of router interfaces per VRouter: 5
- The maximum number of leased lines that an account can apply for an access point: 2
- The maximum number of idle VBRs (the VBRs that have no router interfaces configured) per account: 2

7 Terms

Term	Description
Express Connect	A data transmission channel powered by Alibaba Cloud infrastructure . It provides secure and reliable intranet-like connections between different networks, such as between VPCs, or between VPCs and on-premises IDCs.
Virtual Private Cloud (VPC)	A customized private network established on Alibaba Cloud. VPCs are logically isolated from each other. You can create and manage instances, such as ECS, Server Load Balancer, and RDS instances, in a VPC.
Physical connection	The abstraction of a physical line used to directly connect an on-premises IDC to Alibaba Cloud. Each line a customer uses to access Alibaba Cloud corresponds to a physical connection object.
VRouter	The hub of a VPC, connecting all VSwitches in a VPC and serving as a gateway device that connects the VPC to other networks. It forwards network traffic according to route entries.
Virtual border router (VBR)	You can create multiple virtual border routers on a physical connection . Each VBR is responsible for forwarding the data of a VLAN in Alibaba Cloud. With VBR, you can transmit your data directly to any region of Alibaba Cloud.
Router interface (RI)	A router interface (or VRouter interface) is a virtual network device. It can be attached to a VRouter to create an Express Connect with another VRouter interface, delivering an intranet connection between different networks.
Route table	A route table refers to a list of route entries on the VRouter.
Route Entry	Each item in a route table is a route entry. It defines the next hop address of the network.
Access point	The geographical location of the end, to which the physical leased line connects, on Alibaba Cloud. An access point belongs to a certain region and has two access devices. When a single region has multiple access points, any of these can be used to access Alibaba Cloud VPCs.