Enterprise Router

User Guide

Issue 01

Date 2024-11-30

HUAWEI

HUAWEI CLOUD COMPUTING TECHNOLOGIES CO., LTD.

Trademarks and Permissions


and other Huawei trademarks are the property of Huawei Technologies Co., Ltd.
All other trademarks and trade names mentioned in this document are the property of their respective holders.

Notice

The purchased products, services and features are stipulated by the contract made between Huawei Cloud and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope. Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied.

The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

Huawei Cloud Computing Technologies Co., Ltd.

Address: Huawei Cloud Data Center Jiaoxinggong Road
Qianzhong Avenue
Gui'an New District
Gui Zhou 550029
People's Republic of China

Website: https://www.huaweicloud.com/intl/en-us/

Contents

1 Service Overview

1.1 What Is an Enterprise Router?

An enterprise router connects VPCs and on-premises networks to build a central hub network. It has high specifications, provides high bandwidth, and delivers high performance. Enterprise routers use the Border Gateway Protocol (BGP) to learn, dynamically select, or switch between routes, thereby ensuring the service continuity and significantly improving network scalability and O&M efficiency.

Figure 1-1 and **Figure 1-2** show the networks with and without enterprise routers, respectively. **Table 1-1** compares the two networks.

Figure 1-1 A network without enterprise routers

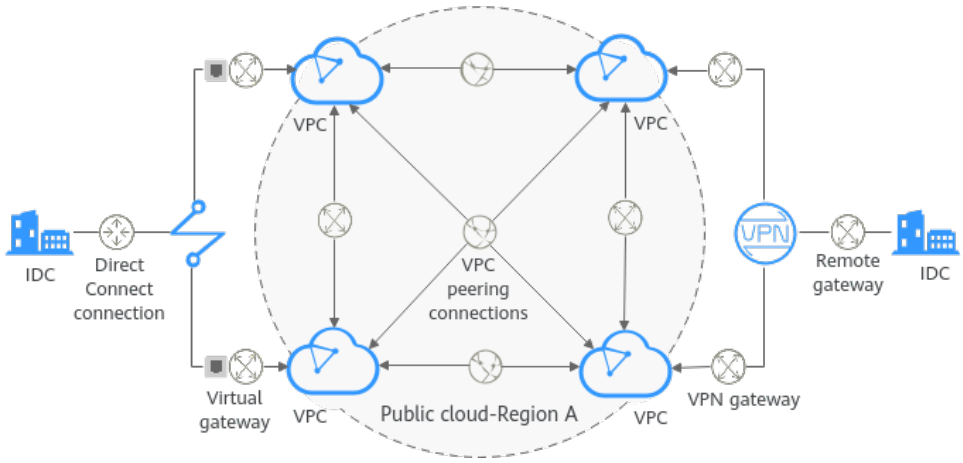


Figure 1-2 A network with enterprise routers

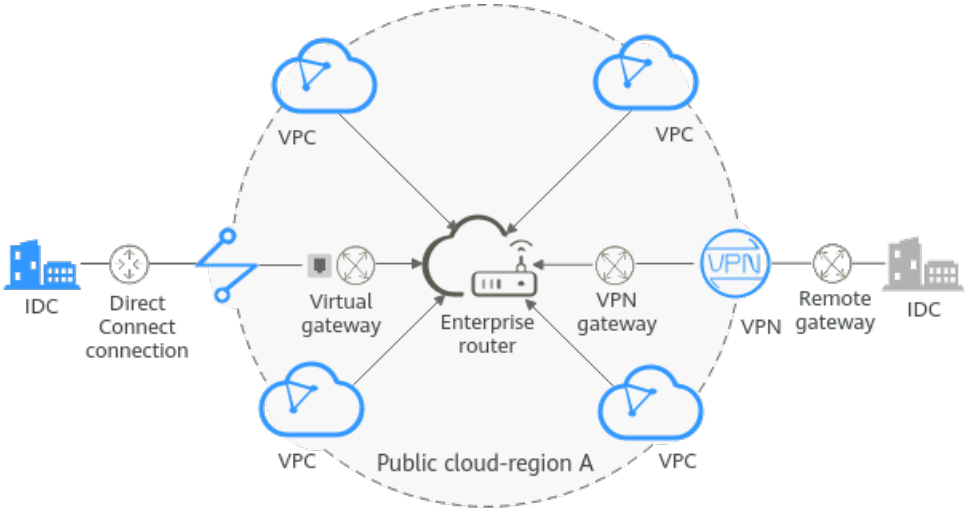


Table 1-1 Comparison between the networks with and without enterprise routers

Item	Without Enterprise Routers	With Enterprise Routers	Benefits of Using Enterprise Routers
Communications among VPCs in the same region	• Create six VPC peering connections between these four VPCs in the same region. • Add 12 routes, with three routes for each VPC to communicate with the other three VPCs.	• Attach the four VPCs to one enterprise router. This router can then handle the traffic from and to all the connected VPCs. • Add routes to the route tables of these four VPCs for routing traffic through the enterprise router. The enterprise router can automatically learn the VPC CIDR blocks and add them to its route table.	• There is no need to configure a large number of VPC peering connections. • Fewer routes need to be added, simplifying the maintenance.

Item	Without Enterprise Routers	With Enterprise Routers	Benefits of Using Enterprise Routers
Communications between an on-premises data center and VPCs	Establish Direct Connect or VPN connections between each VPC and the data center.	Attach the Direct Connect or VPN connection to the enterprise router. These VPCs can then share the connection.	• Route propagation simplifies the route configuration and the O&M. • Multiple lines work in load-sharing or active/standby mode to achieve higher availability.

The comparison shows that the network with enterprise routers is simpler and highly scalable and is also easier to maintain.

1.2 Why Using Enterprise Routers

Enterprise routers have the following advantages:

High Performance

Enterprise routers use exclusive resources and are deployed in clusters to deliver the highest possible performance for workloads on large-scale networks.

High Availability

Enterprise routers can be deployed in multiple availability zones to work in active-active or multi-active mode, thereby ensuring service continuity and real-time seamless switchovers.

Simplified Management

Enterprise routers can route traffic among instances, simplify network topology and network management, and improve network O&M efficiency. The network topology is simpler and the network is easier to manage and maintain.

- For cross-VPC communications, you only need to maintain the route tables on the VPCs without requiring so many VPC peering connections.
- For communications between VPCs and an on-premises data center, multiple VPCs can connect to an enterprise router and then communicate with the data center over one Direct Connect or VPN connection. You do not need to establish a Direct Connect or VPN connection between the data center and each of the VPCs.
- Enterprise routers can automatically learn, update, and synchronize routes, eliminating the need to manually configure or update routes whenever the network topology changes.

Seamless Failover Between Lines

Enterprise routers use the Border Gateway Protocol (BGP) to select the best path from multiple lines working in load-sharing or active/standby mode. If a single line fails, services can be failed over to another functioning line within seconds to ensure service continuity.

1.3 Functions

An enterprise router provides the functions listed in **Table 1-2**, allowing you to:

Table 1-2 Enterprise router functions

Function	Description	Reference
Enterprise routers	An enterprise router is a high-performance centralized router that supports route learning. When creating an enterprise router, you can set parameters such as its region, AZ, and name. After an enterprise router is created, you can still change its parameters based on service requirements.	**Creating an Enterprise Router**
Attachments	You can attach network instances to the enterprise router. Network instances are attached to the enterprise router in different ways. • VPCs are attached to the enterprise router on the Enterprise Router console. • Virtual gateways are attached through the Direct Connect console. • VPN gateways are attached through the VPN console. • Global DC gateways are attached through the Direct Connect console.	**Attachment Overview**
Route tables	Route tables are used by enterprise routers to forward packets. Route tables contain associations, propagations, and routes. An enterprise router can have multiple route tables. You can associate attachments with different route tables to enable communication or isolation between network instances.	**Route Table Overview**

Function	Description	Reference
Associations	Associations are created manually or automatically to associate attachments with enterprise router route tables. • Manually: Select a route table and create an association for an attachment in the route table. • Automatically: You just need to enable **Default Route Table Association** and specify the default route table. The system automatically creates an association for an attachment in the default route table.	**Association Overview**
Propagations	A propagation is created manually or automatically to enable an enterprise router to learn the routes to an associated attachment. • Manually: Select a route table and create a propagation for an attachment in the route table. • Automatically: You just need to enable **Default Route Table Propagation** and specify the default route table. A propagation is automatically created for an attachment in the default propagation route table.	**Propagation Overview**
Routes	A route consists of information such as the destination address, next hop, and route type. There are two types of routes: • Propagated routes • Static routes	**Route Overview**
Sharing	You are the owner of the enterprise router, and other accounts are the users of your enterprise router. After you share your enterprise router with other accounts, these other users can attach their network instances to your enterprise router, so that their network instances can access your enterprise router. This allows VPCs in the same region but different accounts to be attached to the same enterprise router.	**Sharing Overview**

Function	Description	Reference
Flow logs	A flow log records traffic of attachments on enterprise routers in real time. The logs allow you to monitor the network traffic of attachments and analyze network attacks, improving the O&M efficiency. Flow logs can capture traffic of the following types of attachments: • VPC • Virtual gateway • VPN gateway • Global DC gateway	**Flow Log Overview**
Monitoring	You can use Cloud Eye to monitor the network status of enterprise routers and their attachments.	**Supported Metrics**
Permissions	You can use Identity and Access Management (IAM) to set different permissions for employees in your enterprise to control their access to enterprise routers.	**Creating a User and Granting Permissions**
Quotas	Quotas can limit the number or amount of resources available to users, for example, how many enterprise routers can be created, how many attachments can be created for each enterprise router, and how many routes can be added to each route table.	**Overview**

1.4 How Enterprise Routers Work

You can attach your network connections to an enterprise router to quickly construct diversified networks and meet various service requirements. **Figure 1-3** shows the process of using an enterprise router, including creating an enterprise router, adding attachments to the enterprise router, and configure routes.

Enterprise routers support the following attachments:

- **VPC attachment**: Attach a VPC from the same region as that of an enterprise router.
- **Virtual gateway attachment**: Attach a Direct Connect virtual gateway from the same region as that of an enterprise router.
- **VPN gateway attachment**: Attach a VPN gateway from the same region as that of an enterprise router.
- **Global DC gateway attachment**: Attach a Direct Connect global DC gateway in the same region.

Figure 1-3 Processing of using an enterprise router

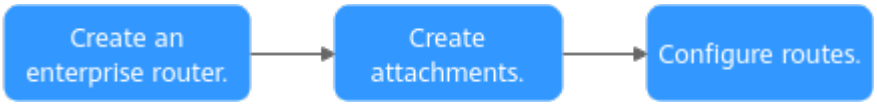


Figure 1-4 shows how an enterprise router works. Table 1-4 describes the traffic flows in detail if an enterprise router is used for networking.

Figure 1-4 How an enterprise router works

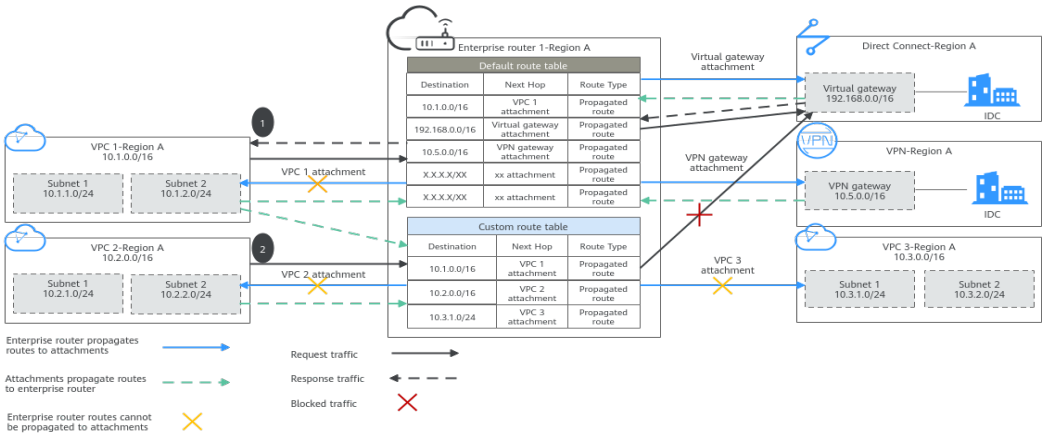


Table 1-3 Network traffic flows

No.	Route	Description
1	Request from VPC 1 to Direct Connect virtual gateway	After receiving requests from VPC 1 to the virtual gateway, enterprise router 1 searches the default route table for the route to the virtual gateway and forwards the requests through this route.
	Response from Direct Connect virtual gateway to VPC 1	After receiving responses from the virtual gateway to VPC 1, enterprise router 1 searches the default route table for the route to VPC 1 and forwards the responses through this route.
2	Request from VPC 2 to Direct Connect virtual gateway	Enterprise router 1 cannot forward requests from VPC 2 to the virtual gateway because the custom route table of enterprise router 1 that is associated with VPC 2 does not contain the route to this virtual gateway.

Table 1-4 Working principles of an enterprise router

No.	Action	Description
1	Add **attachments** to the enterprise router.	Attach network instances to enterprise router 1 in region A. • Network instances from the same region – **VPC attachments**: VPC 1, VPC 2, and VPC 3 – **Virtual gateway attachment**: Virtual gateway – **VPN gateway attachment**: VPN gateway
2	Associate the **attachments** with the **route tables** of the enterprise router. Each attachment can only be associated with one route table.	• Associate VPC 1 with the default route table of enterprise router 1 and create a propagation to propagate the routes learned from VPC 1 attachment to the default route table and custom route table of enterprise router 1. • Associate VPC 2 with the custom route table of enterprise router 1 and create a propagation to propagate the routes learned from VPC 2 to the custom route table. • Associate VPC 3 with the custom route table of enterprise router 1, and add static routes for VPC 3 to this custom route table. • Associate the Direct Connect virtual gateway with the default route table of enterprise router 1 and create a propagation to propagate the routes learned from the virtual gateway attachment to the default route table. • Associate the VPN gateway with the default route table of enterprise router 1 and create a propagation to propagate the routes learned from the VPN gateway attachment to the default route table.
3	Create **propagation** for the attachments to propagate the **routes** to the enterprise router's **route tables**. You can create multiple propagation records for the same attachment.	

Attachments

If you want to attach a network instance to an enterprise router, you need to add an attachment of a specific type to the enterprise router. The attachment type varies by type of the network instance, as listed in **Table 1-5**.

Table 1-5 Attachments

Attachment Type	Network Instance
VPC attachment	VPC
Virtual gateway attachment	Virtual gateway of Direct Connect

Attachment Type	Network Instance
VPN gateway attachment	VPN gateway
Global DC gateway attachment	Global DC gateway in Direct Connect

Route Tables

Route tables are used by enterprise routers to forward packets. Route tables contain associations, propagations, and routes. Route tables are classified into custom and default route tables, as detailed in **Table 1-6**.

Table 1-6 Route tables

Route Table Type	Description
Custom route table	You can create multiple custom route tables on an enterprise router and use different routes for flexible communication and isolation between network instances.
Default route table	If you enable **Default Route Table Association** and **Default Route Table Propagation**, the system then automatically associates and propagates new attachments with the default route table. You can specify a custom route table as the default route table. If you do not specify any route table as the default route table, the system automatically creates a default route table.

Associations

Each attachment can be associated with one route table for:

- Packet forwarding: Packets from the attachment are forwarded through the routes specified in the associated route table.
- Route propagation: The routes in the associated route tables are automatically propagated to the route table of the attachment.

Not all attachments can propagate routes. For details, see **Table 1-7**.

Table 1-7 Associations

Attachment Type	Route Learning
VPC	Not supported
Virtual gateway	Supported
VPN gateway	Supported

Attachment Type	Route Learning
Global DC gateway	Supported

Route Propagation

You can create a propagation for each attachment to propagate routes to one or more route tables on an enterprise router.

For VPC attachments, their CIDR blocks are propagated to the enterprise router. For other attachments, all routes are propagated to the enterprise router. For details, see **Table 1-8**.

Table 1-8 Propagation

Attachment Type	Propagated Routes to Enterprise Router
VPC	VPC CIDR blocks
Virtual gateway	All routes
VPN gateway	All routes
Global DC gateway	All routes

Routes

Routes are used to forward packets. A route contains information such as the destination, next hop, and route type. **Table 1-9** describes the routes of different types.

Table 1-9 Routes

Route Type	Description	Attachment
Propagated routes	Propagated routes are automatically learned through propagation and cannot be modified or deleted.	• VPC • Virtual gateway • VPN gateway • Global DC gateway
Static routes	Static routes are manually created and can be modified or deleted.	• VPC

1.5 Permissions

If you need to assign different permissions to employees in your enterprise to control their access to your cloud resources, you can use the Identity and Access

Management (IAM) for fine-grained permissions management. IAM provides functions such as identity authentication, permissions management, and access control.

On the IAM console, you can create IAM users and assign permissions to control their access to specific resources. For example, you can create IAM users for software developers and assign permissions to allow them to use enterprise router resources but disallow them from performing any high-risk operations such as deleting such resources.

IAM is free of charge.

For more information, see section "IAM Service Overview" in the *Identity and Access Management Service User Guide*.

Enterprise Router Permissions

By default, new IAM users do not have any permissions assigned. You need to add them to one or more groups and attach policies or roles to these groups so that these users can inherit permissions from the groups and perform specified operations on cloud services.

An enterprise router is a project-level service deployed in a specific region. You need to select a project for which the permissions will be granted. If you select **All projects**, the permissions will be granted for all the projects. You need to switch to the authorized region before accessing an enterprise router.

Table 1-10 lists all the system-defined policies on enterprise routers.

Table 1-10 System-defined policies on enterprise routers

System Policy	Description	Type	Dependency
ER FullAccess	Administrator permissions for enterprise routers. Users with such permissions can operate and use all resources on enterprise routers.	System-defined policy	None
ER ReadOnlyAccess	Read-only permissions for enterprise routers. Users with such permissions can only view data on enterprise routers.	System-defined policy	None

Table 1-11 lists the common operations supported by each system-defined policy. You can select a proper one as required.

Table 1-11 Common operations supported by each system policy

Operation	Tenant Administrator	Tenant Guest	ER FullAccess	ER ReadOnlyAccess
Creating an enterprise router	√	x	√	x
Modifying an enterprise router	√	x	√	x
Viewing an enterprise router	√	√	√	√
Deleting an enterprise router	√	x	√	x
Adding a Virtual Private Cloud (VPC) to an enterprise router	√	x	√	x
Deleting a VPC attachment	√	x	√	x
Viewing attachments of all types	√	√	√	√
Creating a route table	√	x	√	x
Renaming a route table	√	x	√	x
Viewing a route table	√	√	√	√
Deleting a route table	√	x	√	x
Creating an association for an attachment in a route table	√	x	√	x
Viewing associations in a route table	√	√	√	√
Deleting an association from a route table	√	x	√	x

Operation	Tenant Administrator	Tenant Guest	ER FullAccess	ER ReadOnlyAccess
Creating a propagation for an attachment in the route table	√	x	√	x
Viewing a propagation in a route table	√	√	√	√
Deleting a propagation from a route table	√	x	√	x
Creating a static route	√	x	√	x
Modifying a static route	√	x	√	x
Viewing a route	√	√	√	√
Deleting a static route	√	x	√	x
Creating a flow log	√	x	√	x
Viewing a VPC flow log	√	√	√	√
Disabling a flow log	√	x	√	x
Enabling a flow log	√	x	√	x
Deleting a flow log	√	x	√	x

1.6 Notes and Constraints

Specifications

Table 1-12 lists the specifications of the enterprise router.

Table 1-12 Enterprise router specifications

Item	Default Setting	Adjustable
Maximum number of enterprise routers that can be created by each account	1	Contact technical support.

Item	Default Setting	Adjustable
Maximum forwarding capability supported by each enterprise router	100 Gbit/s	Contact technical support.

Constraints

There are some constraints on using enterprise routers, as described in **Table 1-13**. You can follow our suggestions to handle these issues.

Table 1-13 Constraints on enterprise routers

Constraint	Suggestion
If a service VPC is being used by ELB, VPC Endpoint, NAT Gateway (private NAT gateway), Distributed Cache Service (DCS), or hybrid DNS, this VPC cannot be attached to an enterprise router. **NOTICE** If you attach a service VPC to an enterprise router when Elastic Load Balance (ELB), VPC Endpoint, or DCS is being used together with Enterprise Router, persistent connections may be intermittently interrupted during service reliability assurance, such as a DR switchover, an upgrade, or elastic scaling. Ensure that the clients are capable of automatic reconnection in case of intermittent disconnection.	Contact technical support to confirm the service compatibility. A transit VPC is preferred for networking. For details, see scheme 2 in "Selecting a Networking Scheme" in "Getting Started".

Constraint	Suggestion
Traffic cannot be forwarded from a VPC to the enterprise router that the VPC is attached to if you set the destination of a route whose next hop is the enterprise router to 0.0.0.0/0 in the VPC route table and if: • An ECS in the VPC has an EIP bound. • The VPC is being used by ELB (either dedicated or shared load balancers), NAT Gateway, VPC Endpoint, and DCS.	• Suggestion 1: Change the destination address of the route. For details, see the FAQ "Why Traffic Can't Be Forwarded from a VPC with a Route Destination of 0.0.0.0/0 to Its Enterprise Router?" • Suggestion 2: Use a transit VPC for networking. For details, see scheme 2 in "Selecting a Networking Scheme" in "Getting Started".
If a VPC attached to an enterprise router has a NAT gateway associated and **Scenario** of the SNAT or DNAT rules is set to **Direct Connect**, the network from the on-premises data center to the VPC is disconnected.	Use a transit VPC for networking. For details, see scheme 2 in "Selecting a Networking Scheme" in "Getting Started".

1.7 Enterprise Router and Other Services

Table 1-14 Interactions between an enterprise router and other cloud services

Service	Interaction
Virtual Private Cloud (VPC)	You can attach VPCs to an enterprise router to enable communication between multiple VPCs without configuring a large number of VPC peering connections.
Direct Connect	You can attach a Direct Connect virtual gateway to an enterprise router to connect VPCs to an on-premises data center through one Direct Connect connection.
Virtual Private Network (VPN)	You can attach a VPN gateway to an enterprise router to connect VPCs to an on-premises data center through a shared VPN connection.

Service	Interaction
Identity and Access Management (IAM)	You can use IAM to assign different permissions to different users to control their access to enterprise router resources.
Cloud Eye	You can use Cloud Eye to monitor the network status of enterprise routers and their attachments, and report alarms when exceptions occur, ensuring smooth service running.

1.8 Region and AZ

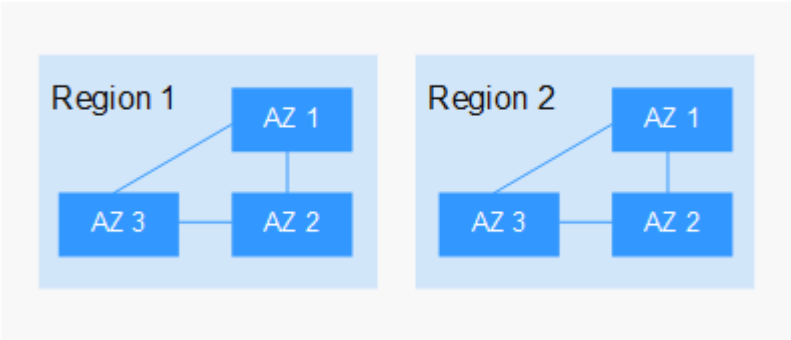
Concept

A region and availability zone (AZ) identify the location of a data center. You can create resources in a specific region and AZ.

- A region is a physical data center, which is completely isolated to improve fault tolerance and stability. The region that is selected during resource creation cannot be changed after the resource is created.
- An AZ is a physical location where resources use independent power supplies and networks. A region contains one or more AZs that are physically isolated but interconnected through internal networks. Because AZs are isolated from each other, any fault that occurs in one AZ will not affect others.

Figure 1-5 shows the relationship between regions and AZs.

Figure 1-5 Regions and AZs



Selecting a Region

Select a region closest to your target users for lower network latency and quick access.

Selecting an AZ

When deploying resources, consider your applications' requirements on disaster recovery (DR) and network latency.

- For high DR capability, deploy resources in different AZs within the same region.
- For lower network latency, deploy resources in the same AZ.

Regions and Endpoints

Before you use an API to call resources, specify its region and endpoint. For more details, see **Regions and Endpoints**.

2 Getting Started

2.1 Selecting a Networking Scheme

You can use enterprise routers to build a central network and to simplify the network architecture. There are two typical schemes to use Enterprise Router together with Direct Connect to allow an on-premises data center to access multiple VPCs.

Figure 2-1 Networking for allowing an on-premises data center to access two service VPCs directly (scheme 1)

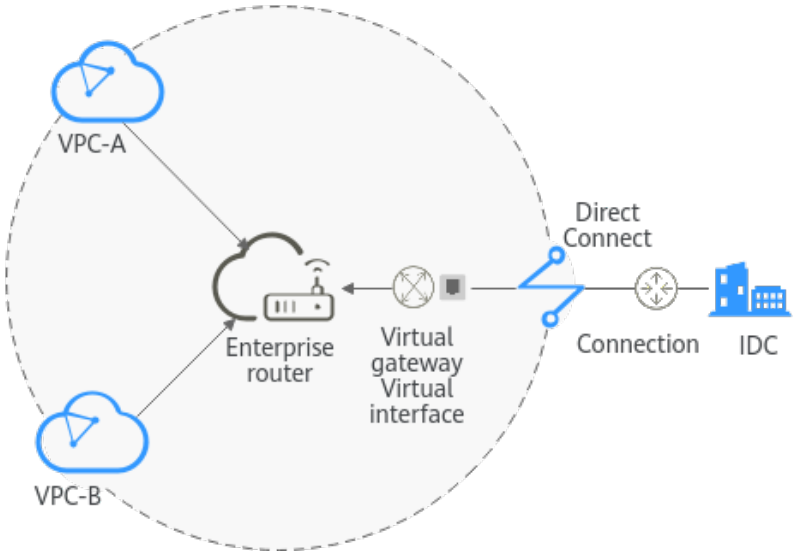


Figure 2-2 Networking for allowing an on-premises data center to access two service VPCs over a transit VPC (scheme 2)

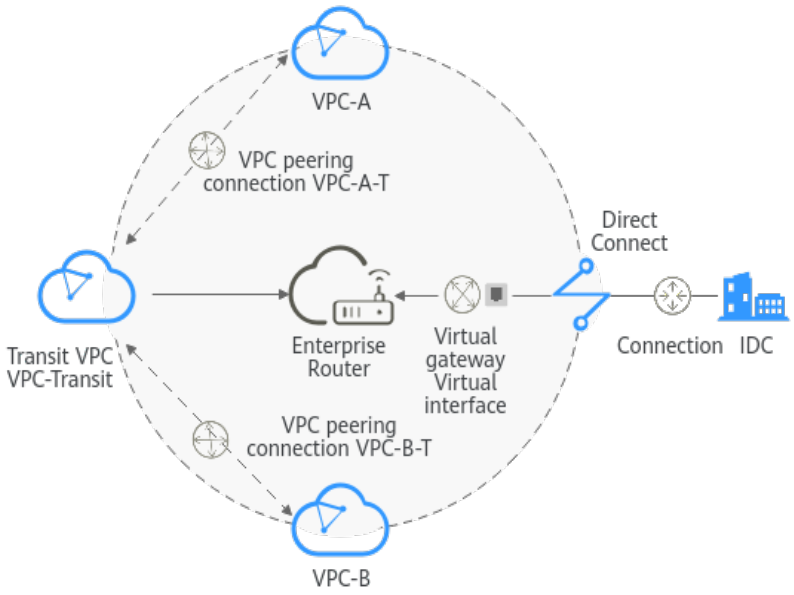


Table 2-1 Comparison between the two schemes

Scheme	Networking Architecture	Network Path Description	Remarks
Scheme 1	In **Figure 2-1**: Two service VPCs (VPC-A and VPC-B) and the Direct Connect virtual gateway are attached to an enterprise router.	• The enterprise router enables the two VPCs to communicate with each other. • Direct Connect enables the on-premises data center to access the cloud, and the enterprise router connects the on-premises data center to both VPCs.	For details, see **How Do I Select a Networking Scheme?**
Scheme 2	In **Figure 2-2**: The two service VPCs (VPC-A and VPC-B) are not attached to the enterprise router. Instead, a transit VPC (VPC-Transit) is used. The transit VPC and the Direct Connect virtual gateway are attached to the enterprise router.	• Each service VPC is connected to the transit VPC over a VPC peering connection. • Direct Connect enables the on-premises data center to access the cloud, and the enterprise router connects the on-premises data center to the two service VPCs.	

How Do I Select a Networking Scheme?

In scheme 1, the service VPCs are directly attached to the enterprise router. In scheme 2, a transit VPC is used and attached to the enterprise router. Each service VPC is connected to the transit VPC over a VPC peering connection. Compared with scheme 1, scheme 2 costs less and eliminates some constraints, as detailed below:

- Scheme 2 frees you from the following constraints that scheme 1 has on attaching service VPCs to an enterprise router:
  - If a service VPC is used by ELB, VPC Endpoint, NAT Gateway (private NAT gateways), or DCS, contact technical support to confirm the service compatibility and preferentially use a transit VPC for networking.
  - Traffic cannot be forwarded from a VPC to the enterprise router if you set the destination of a route to 0.0.0.0/0 in the VPC route table and:
    - An ECS in the VPC has an EIP bound.
    - The VPC is being used by ELB (either dedicated or shared load balancers), NAT Gateway, VPC Endpoint, and DCS.
  - If a VPC attached to an enterprise router has a NAT gateway associated and **Scenario** of the SNAT or DNAT rules is set to **Direct Connect**, the network from the on-premises data center to the VPC is disconnected.

NOTICE

If you still want to use scheme 1 to attach service VPCs to an enterprise router, contact technical support to evaluate the feasibility.

2.2 Using an Enterprise Router to Enable Communications Between VPCs in the Same Region

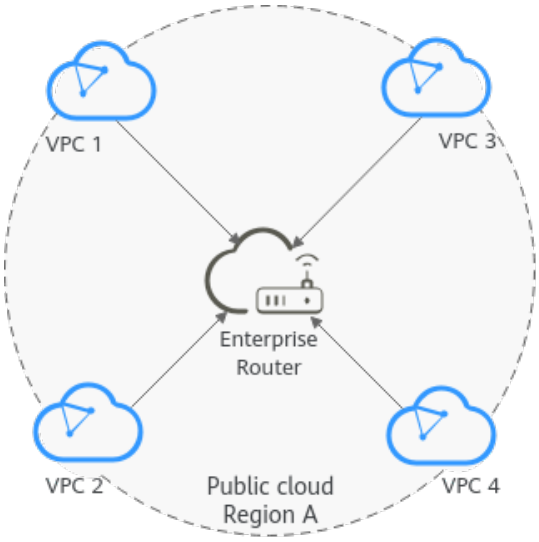
2.2.1 Overview

Solution

Four VPCs are created in region A on and they need to communicate with each other.

You can create an enterprise router in region A and attach the four VPCs to the enterprise router. The enterprise router can route traffic among the VPCs so that they can communicate with each other.

Figure 2-3 Communications among VPCs in the same region



NOTE

This document describes how to use an enterprise router to quickly allow multiple VPCs in the same region to communicate with each other.

You can share an enterprise router with different accounts to attach VPCs of these accounts to the same enterprise router for communication.

Procedure

Figure 2-4 shows the procedure for using an enterprise router to allow multiple VPCs in the same region to communicate with each other.

Figure 2-4 Flowchart for connecting VPCs in the same region

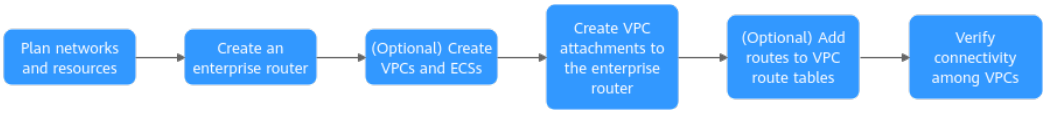


Table 2-2 Steps for connecting VPCs in the same region

Step	Description
Step 1: Plan Networks and Resources	Plan CIDR blocks and the number of resources.
Step 2: Create an Enterprise Router	Create one enterprise router for connecting VPCs in the same region.
Step 3: (Optional) Create VPCs and ECSs	Create four VPCs and four ECSs. You can change the resource quantity and specifications as needed. If you already have these resources, skip this step.
Step 4: Create VPC Attachments for the Enterprise Router	Attach the four VPCs to the enterprise router.

Step	Description
Step 5: (Optional) Add Routes to VPC Route Tables	Add routes to the route tables of the VPCs for communication with the enterprise router. • If you enable **Auto Add Routes** when creating a VPC attachment, you do not need to manually add static routes to the VPC route table. Instead, the system automatically adds routes (with this enterprise router as the next hop and 10.0.0.0/8, 172.16.0.0/12, and 192.168.0.0/16 as the destinations) to all route tables of the VPC. • If an existing route in the VPC route tables has a destination to 10.0.0.0/8, 172.16.0.0/12, or 192.168.0.0/16, the routes will fail to be added. In this case, do not enable **Auto Add Routes**. After the attachment is created, manually add routes.
Step 6: Verify Connectivity Among VPCs	Log in to the ECS and run the **ping** command to verify the connectivity among VPCs.

2.2.2 Step 1: Plan Networks and Resources

To use an enterprise router to connect VPCs in the same region, you need to:

- **Network Planning**: Plan CIDR blocks of VPCs and subnets, and route tables of VPCs and the enterprise router.
- **Resource Planning**: Plan the quantity, names, and parameters of cloud resources, including VPCs, ECSs, and the enterprise router.

Network Planning

Figure 2-5 and **Table 2-4** show the network planning and its description for communications among VPCs in the same region.

Figure 2-5 Network planning for communications among VPCs in the same region

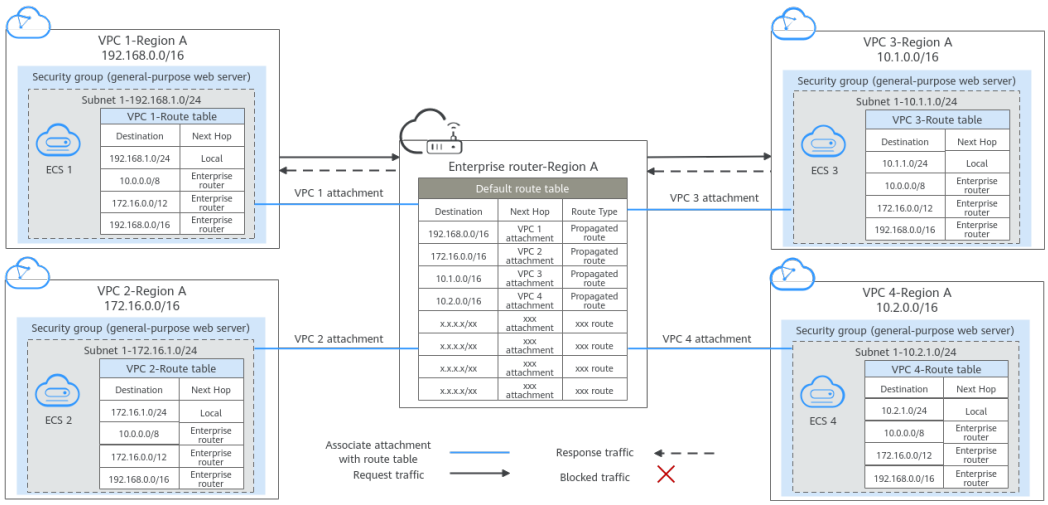


Table 2-3 Network traffic flows

Scenario	Description
Request from VPC 1 to VPC 3	1. The route table of VPC 1 has a route with next hop set to the enterprise router to forward traffic from VPC 1 to the enterprise router. 2. The route table of the enterprise router has a propagated route with next hop set to the VPC 3 attachment to forward traffic from the enterprise router to VPC 3.
Response from VPC 3 to VPC 1	1. The route table of VPC 3 has a route with next hop set to the enterprise router to forward traffic from VPC 3 to the enterprise router. 2. The route table of the enterprise router has a propagated route with next hop set to the VPC 1 attachment to forward traffic from the enterprise router to VPC 1.

Table 2-4 Network planning for communications among VPCs in the same region

Resource	Description
VPC	• The CIDR blocks of the VPCs to be connected cannot overlap with each other. In this example, the CIDR blocks of the VPCs are propagated to the enterprise router route table as the destination in routes. The CIDR blocks cannot be modified and overlapping CIDR blocks may cause route conflicts. If your existing VPCs have overlapping CIDR blocks, do not use propagated routes. Instead, you need to manually add static routes to the route table of the enterprise router. The destination can be VPC subnet CIDR blocks or smaller ones. • Each VPC has a default route table. • Routes in the default route table can be: – Local: a system route for communications between subnets in a VPC. – Enterprise router: custom routes with 10.0.0.0/8, 172.16.0.0/12, and 192.168.0.0/16 as the destinations for routing traffic from a VPC subnet to the enterprise router. See **Table 2-5** for route details.

Resource	Description
Enterprise router	After **Default Route Table Association** and **Default Route Table Propagation** are enabled and a VPC attachment is created, the system will automatically: • Associate VPC attachments with the default route table of the enterprise router. • Propagate VPC attachments with the default route table of the enterprise router. The route table automatically learns the VPC CIDR block as the destination of routes. For details, see **Table 2-6**.
ECS	The four ECSs are in different VPCs. If the ECSs are associated with different security groups, add rules to their security groups to allow access to each other.

Table 2-5 VPC route table

Destination	Next Hop	Route Type
10.0.0.0/8	Enterprise router	Static route (custom)
172.16.0.0/12	Enterprise Router	Static route (custom)
192.168.0.0/16	Enterprise Router	Static route (custom)

NOTE

- If you enable **Auto Add Routes** when creating a VPC attachment, you do not need to manually add static routes to the VPC route table. Instead, the system automatically adds routes (with this enterprise router as the next hop and 10.0.0.0/8, 172.16.0.0/12, and 192.168.0.0/16 as the destinations) to all route tables of the VPC.
- If an existing route in the VPC route tables has a destination to 10.0.0.0/8, 172.16.0.0/12, or 192.168.0.0/16, the routes will fail to be added. In this case, do not enable **Auto Add Routes**. After the attachment is created, manually add routes.
- Do not set the destination of a route (with an enterprise router as the next hop) to 0.0.0.0/0 in the VPC route table. If an ECS in the VPC has an EIP bound, the VPC route table will have a policy-based route with 0.0.0.0/0 as the destination, which has a higher priority than the route with the enterprise router as the next hop. In this case, traffic is forwarded to the EIP and cannot reach the enterprise router.

Table 2-6 Enterprise router route table

Destination	Next Hop	Route Type
VPC 1 CIDR block: 192.168.0.0/16	VPC 1 attachment: er-attach-01	Propagated route
VPC 2 CIDR block: 172.16.0.0/16	VPC 2 attachment: er-attach-02	Propagated route

Destination	Next Hop	Route Type
VPC 3 CIDR block: 10.1.0.0/16	VPC 3 attachment: er-attach-03	Propagated route
VPC 4 CIDR block: 10.2.0.0/16	VPC 4 attachment: er-attach-04	Propagated route

Resource Planning

The enterprise router, VPCs, and ECSs must be in the same region. You can select any AZ within the region.

NOTE

The following resource details are only examples. You can modify them as required.

- One enterprise router

Table 2-7 Enterprise router details

Enterprise Router Name	ASN	Default Route Table Association	Default Route Table Propagation	Association Route Table	Propagation Route Table	Attachment
er-test-01	64800	Enable	Enable	Default route table	Default route table	er-attach-01
						er-attach-02
						er-attach-03
						er-attach-04

- Four VPCs, each with a unique CIDR block

Table 2-8 VPC details

VPC Name	VPC CIDR Block	Subnet Name	Subnet CIDR Block	Association Route Table
vpc-demo-01	192.168.0.0/16	subnet-demo-01	192.168.1.0/24	Default route table
vpc-demo-02	172.16.0.0/16	subnet-demo-02	172.16.1.0/24	Default route table

VPC Name	VPC CIDR Block	Subnet Name	Subnet CIDR Block	Association Route Table
vpc-demo-03	10.1.0.0/16	subnet-demo-03	10.1.1.0/24	Default route table
vpc-demo-04	10.2.0.0/16	subnet-demo-04	10.2.1.0/24	Default route table

- An ECS in each VPC, a total of four ECSs

  Table 2-9 ECS details

ECS	Image	VPC	Subnet	Security Group	Private IP Address
ecs-demo-01	Public image: EulerOS 2.56	vpc-demo-01	subnet-demo-01	sg-demo (general-purpose web server)	192.168.1.12
ecs-demo-02		vpc-demo-02	subnet-demo-02		172.16.1.189
ecs-demo-03		vpc-demo-03	subnet-demo-03		10.1.1.105
ecs-demo-04		vpc-demo-04	subnet-demo-04		10.2.1.83

2.2.3 Step 2: Create an Enterprise Router

To connect VPCs in the same region, you only need to create one enterprise router. Perform the following operations to create an enterprise router:

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Click **Create Enterprise Router** in the upper right corner.

The **Create Enterprise Router** page is displayed.

Step 5 Configure the parameters based on **Table 2-10**.

Table 2-10 Parameters for creating an enterprise router

Parameter	Setting	Example Value
Region	Select the region nearest to your target users. Once the enterprise router is created, the region cannot be changed.	-
AZ	Select two AZs to deploy your enterprise router. You can change them after the enterprise router is created.	AZ1 AZ2
Name	Specify the enterprise router name. You can change it after the enterprise router is created.	er-test-01
ASN	Enter an ASN based on your network plan. It cannot be changed after the enterprise router is created.	64800
Default Route Table Association	If you select this option, you do not need to create route tables or associations. You can change your option after the enterprise router is created.	Enable
Default Route Table Propagation	If you select this option, you do not need to create route tables, propagations, or routes. You can change your option after the enterprise router is created.	Enable
Auto Accept Shared Attachments	If you do not select this option, you must accept the requests for creating attachments to this enterprise router from other users with whom this enterprise router is shared.	Disable
Description	Provide supplementary information about the enterprise router. You can change it after the enterprise router is created.	-

Step 6 Click **Create Now**.

Step 7 Confirm the enterprise router configurations and click **Submit**.

The enterprise router list is displayed.

Step 8 Check the enterprise router status.

If the status changes from **Creating** to **Normal**, the enterprise router is successfully created.

----End

2.2.4 Step 3: (Optional) Create VPCs and ECSs

Perform the following operations to create VPCs and ECSs. If you already have VPCs and ECS, skip this step.

Notes and Constraints

- The CIDR blocks of the VPCs to be connected cannot overlap with each other.

  In this example, the CIDR blocks of the VPCs are propagated to the enterprise router route table as the destination in routes. The CIDR blocks cannot be modified and overlapping CIDR blocks may cause route conflicts.

  If your existing VPCs have overlapping CIDR blocks, do not use propagated routes. Instead, you need to manually add static routes to the route table of the enterprise router. The destination can be VPC subnet CIDR blocks or smaller ones.
- Four ECSs must be in the same security group. If your ECSs are in different security groups, add rules to their security groups to allow access to each other.

Procedure

Step 1 Create four VPCs with subnets.

For details, see "Creating a VPC" in the *Virtual Private Cloud User Guide*.

For VPC and subnet details in this example, see **Table 2-8**.

Step 2 Create four ECSs.

For details, see "Creating an ECS" in the *Elastic Cloud Server User Guide*.

For ECS details in this example, see **Table 2-9**.

----End

2.2.5 Step 4: Create VPC Attachments for the Enterprise Router

Perform the following operations to attach the four VPCs to the enterprise router:

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Attachments** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Attachment**.
- Click the enterprise router name and click **Attachments**.

Step 6 On the **Attachments** tab, click **Create Attachment**.

The **Create Attachment** page is displayed.

Step 7 Configure the parameters based on **Table 2-11**.

Table 2-11 Parameter description

Parameter	Setting	Example Value
Name	Specify the name of the VPC attachment. You can change it after the attachment is created.	er-attach-01
Attachment Type	Select **VPC**. The type cannot be changed after the attachment is created.	VPC
Attached Resource	1. Select the VPC to be attached to the enterprise router from the drop-down list. The VPC cannot be changed after the attachment is created. 2. Select the subnet to be attached to the enterprise router from the drop-down list. The subnet cannot be changed after the attachment is created.	• VPC: vpc-demo-01 • Subnet: subnet-demo-01
Auto Add Routes	• If you enable **Auto Add Routes** when creating a VPC attachment, you do not need to manually add static routes to the VPC route table. Instead, the system automatically adds routes (with this enterprise router as the next hop and 10.0.0.0/8, 172.16.0.0/12, and 192.168.0.0/16 as the destinations) to all route tables of the VPC. • If an existing route in the VPC route tables has a destination to 10.0.0.0/8, 172.16.0.0/12, or 192.168.0.0/16, the routes will fail to be added. In this case, do not enable **Auto Add Routes**. After the attachment is created, manually add routes. • Do not set the destination of a route (with an enterprise router as the next hop) to 0.0.0.0/0 in the VPC route table. If an ECS in the VPC has an EIP bound, the VPC route table will have a policy-based route with 0.0.0.0/0 as the destination, which has a higher priority than the route with the enterprise router as the next hop. In this case, traffic is forwarded to the EIP and cannot reach the enterprise router.	Enable
Description	Provide supplementary description about the attachment. You can change it after the attachment is created.	-

Step 8 Click **Create Now**.

The attachment list is displayed.

Step 9 Check the attachment status.

If the status changes from **Creating** to **Normal**, the attachment is successfully created.

Step 10 Repeat **Step 5** to **Step 9** to attach the other three VPCs to the enterprise router.

NOTICE

In the example given, **Default Route Table Association** and **Default Route Table Propagation** are enabled when you create the enterprise router. After the VPCs are attached to the enterprise router, the system will automatically:

- Associate VPC attachments with the route table of the enterprise router.
- Propagate VPC attachments to the route table of the enterprise router. The CIDR blocks of the VPCs are propagated to the route table.

----End

2.2.6 Step 5: (Optional) Add Routes to VPC Route Tables

Perform the following operations to configure the routes for the enterprise router in the VPC route table:

NOTE

- If you enable **Auto Add Routes** when creating a VPC attachment, you do not need to manually add static routes to the VPC route table. Instead, the system automatically adds routes (with this enterprise router as the next hop and 10.0.0.0/8, 172.16.0.0/12, and 192.168.0.0/16 as the destinations) to all route tables of the VPC.
- If an existing route in the VPC route tables has a destination to 10.0.0.0/8, 172.16.0.0/12, or 192.168.0.0/16, the routes will fail to be added. In this case, do not enable **Auto Add Routes**. After the attachment is created, manually add routes.

Notes and Constraints

- If your VPC only has a default route table, all subnets in it are associated with the default route table. You only need to add routes to the default route table for traffic to route through the enterprise router.
- If your VPC has multiple custom route tables and different subnets in the VPC are associated with different route tables, you need to add routes to each route table associated with the subnets for traffic to route through the enterprise router.

Procedure

Step 1 Log in to the management console.

Step 2 Click in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Attachments** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Attachment**.
- Click the enterprise router name and click **Attachments**.

Step 6 Locate the target attachment and click the VPC in the **Attached Resource** column.

The VPC basic information page is displayed.

Step 7 In the **Networking Components** area, click the number next to **Subnets**.

The **Subnets** page is displayed.

Step 8 Locate the target subnet and click the route table name in the **Route Table** column.

The route table details page is displayed.

Step 9 Under **Routes**, click **Add Route**.

The **Add Route** dialog box is displayed.

Step 10 Configure the parameters based on **Table 2-12**.

Table 2-12 Parameter description

Parameter	Setting	Example Value
Destination Type	The destination can only be **IP address**. You can set a single IP address or network segment.	IP address
Destination	The destination is used to route traffic from this VPC to other VPCs attached to the enterprise router. You can change it after the route is created. • Set the destination to the CIDR blocks of VPCs or their subnets that your VPC need to communicate with. • Do not set the destination of a route (with an enterprise router as the next hop) to 0.0.0.0/0 in the VPC route table. If an ECS in the VPC has an EIP bound, the VPC route table will have a policy-based route with 0.0.0.0/0 as the destination, which has a higher priority than the route with the enterprise router as the next hop. In this case, traffic is forwarded to the EIP and cannot reach the enterprise router.	10.0.0.0/8
Next Hop Type	Select **Enterprise Router**. You can change it after the route is created.	Enterprise Router
Next Hop	Select the target enterprise router. You can change it after the route is created.	er-test-01

Parameter	Setting	Example Value
Description	Provide supplementary information about the route. You can change the route after it is created.	-

Step 11 Click **OK**.

You can view the route in the route list.

Step 12 Repeat **Step 6** to **Step 11** to add routes to route tables of other VPCs.

----End

2.2.7 Step 6: Verify Connectivity Among VPCs

Perform the following operations to log in to each ECS and verify the network connectivity between VPCs:

Procedure

Step 1 Log in to an ECS.

In this example, use VNC provided on the management console to log in to an ECS.

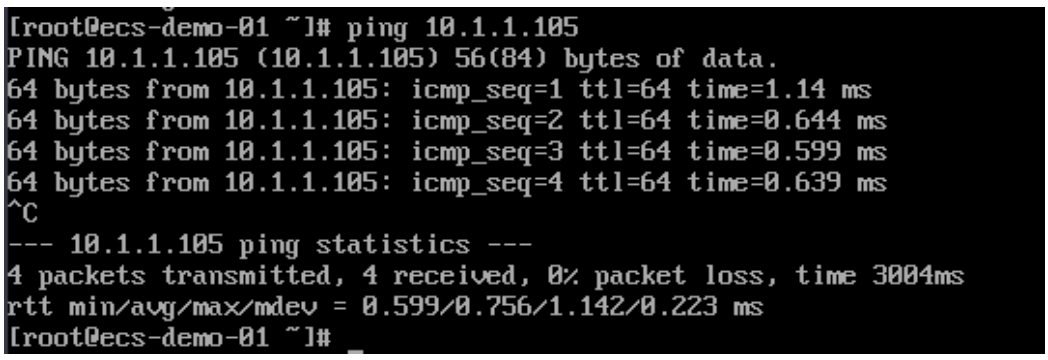
Step 2 Run the following command on the ECS:

ping *IP address of the ECS*

If you log in to ecs-demo-01 to verify the connectivity between vpc-demo-01 and vpc-demo-02, run the following command:

ping 10.1.1.105

If information similar to the following is displayed, the two VPCs can communicate with each other.



Step 3 Repeat **Step 1** to **Step 2** to verify the connectivity between other VPCs.

----End

3 Permissions Management

3.1 Creating a User and Granting Permissions

This section describes how to use IAM to implement fine-grained permissions control for your Enterprise Router resources. With IAM, you can:

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

If your account does not require individual IAM users, skip this topic.

Figure 3-1 shows the procedure for granting permissions.

Prerequisites

You have learned about Enterprise Router permissions that can be added to the user group. For details about the system permissions supported by enterprise routers, see **Permissions**.

Process Flow

Figure 3-1 Process for granting Enterprise Router permissions

1. Create a user group and grant permissions.

   Create a user group on the IAM console, locate the created user group, click **Authorize** in the **Operation** column, and assign the **ER ReadOnlyAccess** permission to the user group.

2. Create a user and add the user to the user group.

   Create a user on the IAM console and add it to the user group created in **1** by choosing **Authorize** in the **Operation** column.

3. Log in to the management console as the created user, switch to the authorized region, and verify that the user has only the **ER ReadOnlyAccess** permission.

   a. Click **Service List** and choose **Enterprise Router**. Then click **Create Enterprise Router** in the upper right corner. If the enterprise router fails to be created, the **ER ReadOnlyAccess** permission has taken effect.

   b. Choose any other service in the **Service List**. If a message appears indicating insufficient permissions to access the service, the **ER ReadOnlyAccess** permission has already taken effect.

3.2 Enterprise Router Custom Policies

Custom policies can be created to supplement system-defined policies of Enterprise Router.

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

- Visual editor: Select cloud services, actions, resources, and request conditions. This does not require knowledge of policy syntax.

- JSON: Edit JSON policies from scratch or based on an existing policy.

For details about how to create custom policies, see Creating a Custom Policy. The following section contains examples of common Enterprise Router custom policies.

Example Custom Policies

- Example 1: Allowing users to create and delete enterprise routers

```
{
    "Version": "1.1",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "er:instances:create",
                "er:instances:delete"
            ]
        }
    ]
}
```

- Example 2: Denying enterprise router deletion

  A policy with only Deny permissions must be used in conjunction with other policies to take effect. If the policies assigned to a user contain both Allow and Deny actions, the Deny actions take precedence over the Allow actions.

  The following method can be used if you need to assign the **ER FullAccess** permission to a user but also forbid the user from deleting enterprise routers. Create a custom policy for denying enterprise router deletion, and assign both policies to the group the user belongs to. Then the user can perform all operations on Enterprise Router except deleting enterprise routers. The following is an example of a deny policy:

```
{
    "Version": "1.1",
    "Statement": [
        {
            "Effect": "Deny",
            "Action": [
                "er:instances:delete"
            ]
        }
    ]
}
```


4 Enterprise Routers

4.1 Creating an Enterprise Router

Scenarios

Create an enterprise router.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Click **Create Enterprise Router** in the upper right corner.

The **Create Enterprise Router** page is displayed.

Step 5 Configure the parameters based on **Table 4-1**.

Table 4-1 Parameters for creating an enterprise router

Parameter	Setting	Example Value
Region	Mandatory Select the region nearest to you to ensure the lowest latency possible.	-

Parameter	Setting	Example Value
AZ	Mandatory An AZ is a physical location where resources use independent power supplies and networks. AZs are physically isolated but interconnected through an internal network. Each region contains multiple AZs. If one AZ is unavailable, the other AZs in the same region continue to provide services. We recommend you to select two AZs. The enterprise router will be deployed in both AZs that work in active-active mode, ensuring reliability and disaster recovery. Traffic in an AZ is preferentially transmitted to the enterprise router in the same AZ to reduce latency.	AZ1 AZ2
Name	Mandatory Enter a name for the enterprise router. The name: ● Must contain 1 to 64 characters. ● Can contain letters, digits, underscores (_), hyphens (-), and periods (.).	er-test-01
ASN	Mandatory An autonomous system is an IP network that is managed by an entity and has the same route policy. On a BGP network, each autonomous system is assigned a unique ASN to differentiate them. Specify a dedicated ASN in the range of 64512-65534 or 4200000000-4294967294. Networks in the same region can be considered as an AS. When Direct Connect and Enterprise Router are used to set up a hybrid cloud network, it is recommended that you set the ASN of the enterprise router different from the BGP ASN of the Direct Connect virtual gateway. If there are multiple Direct Connect connections associated with the enterprise router and the connections do not work in load balancing or active/standby mode, set different BGP ASNs for the virtual gateways of these connections.	64800

Parameter	Setting	Example Value
Default Route Table Association	Optional Enabled by default Enabling **Default Route Table Association** can simplify network configurations. After this function is enabled: 1. An enterprise router automatically comes with a route table named **defaultRouteTable**. By default, this route table is the default association route table. After the enterprise router is created, you can create a custom route table and set it as the default association route table to replace the original one if needed. For details, see **Modifying an Enterprise Router**. 2. If you create an attachment to this enterprise router, the attachment will be automatically associated with the default association route table.	Enable
Default Route Table Propagation	Optional Enabled by default Enabling **Default Route Table Propagation** can simplify network configurations. After this function is enabled: 1. An enterprise router automatically comes with a route table named **defaultRouteTable**. By default, this route table is the default propagation route table. If both **Default Route Table Association** and **Default Route Table Propagation** are enabled, **defaultRouteTable** is not only the default association route table but also the default propagation route table. After the enterprise router is created, you can create a custom route table and set it as the default propagation route table to replace the original one if needed. For details, see **Modifying an Enterprise Router**. 2. If you create an attachment to this enterprise router, the attachment will be automatically propagated to the default propagation route table.	Enable

Parameter	Setting	Example Value
Auto Accept Shared Attachments	Optional As the owner, you can share your enterprise router with other users. These other users can create attachments for your enterprise router. • If you do not select this option, you must manually accept attachments to this enterprise router from the accounts that this enterprise router is shared with. • If you select this option, the attachments from the accounts that this enterprise router is shared with will be automatically accepted. For details, see **Sharing Overview**.	Disable
Description	Optional Describe the enterprise router for easy identification.	-

Step 6 Click **Create Now**.

Step 7 Confirm the enterprise router configurations and click **Submit**.

The enterprise router list is displayed.

Step 8 Check the enterprise router status.

If the status changes from **Creating** to **Normal**, the enterprise router is successfully created.

----End

Follow-Up Operations

- After an enterprise router is created, attach network instances to the enterprise router and configure routes. For details, see **Getting Started**.
- If **Default Route Table Association** and **Default Route Table Propagation** are not enabled for an enterprise router, you need to:
  a. Create a custom route table for the enterprise router. For details, see **Creating a Route Table**.
  b. Create associations for the attachments of the enterprise router. For details, see **Creating an Association for an Attachment in a Route Table**.
  c. Use either of the following methods to add routes for the attachment to the route table:
     - Create a propagation in the route table. For details, see **Creating a Propagation for an Attachment in the Route Table**.
       After the propagation is created, routes of the attachments to the enterprise router will be automatically propagated to the route table of the enterprise router.

- Add static routes to the route table. For details, see **Creating a Static Route**.

4.2 Modifying an Enterprise Router

Scenarios

This section describes how to modify settings of an enterprise router. You can:

- Modify the name of an enterprise router.
- Enable or disable **Default Route Table Association**.
- Enable or disable **Default Route Table Propagation**.

Procedure

Step 1 Log in to the management console.

Step 2 Click in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 In the upper right corner of the target enterprise router, choose **More** > **Modify Settings**.

The **Modify Settings** page is displayed.

Step 6 Modify the enterprise router based on **Table 4-2**.

Table 4-2 Parameter description

Parameter	Setting	Example Value
Name	Mandatory If you want to change the name of the enterprise router, enter a new name. The name: • Must contain 1 to 64 characters. • Can contain letters, digits, underscores (_), hyphens (-), and periods (.).	er-test-01

Parameter	Setting	Example Value
Default Route Table Association	Optional Enabling **Default Route Table Association** can simplify network configurations. After this function is enabled: 1. Select a route table for **Default Association Route Table**. 2. If you create an attachment to this enterprise router, the attachment will be automatically associated with the default association route table.	Enable
Association Route Table	Optional If you enable **Default Route Table Association**, select a route table for **Association Route Table**. ● You can select a custom route table. ● If you do not select a route table, a route table named **defaultRouteTable** will be automatically created as the default association route table. If there is already a route table named **defaultRouteTable**, no route table will be created.	er-rtb-b931
Default Route Table Propagation	Optional Enabling **Default Route Table Propagation** can simplify network configurations. After this function is enabled: 1. Select a route table for **Association Route Table**. 2. If you create an attachment to this enterprise router, the attachment will be automatically propagated to the default propagation route table.	Enable
Propagation Route Table	Optional If you enable **Default Route Table Propagation**, select a route table for **Propagation Route Table**. ● You can select a custom route table. ● If you do not select a route table, a route table named **defaultRouteTable** will be automatically created as the default propagation route table. If there is already a route table named **defaultRouteTable**, no route table will be created.	er-rtb-b931

Parameter	Setting	Example Value
Auto Accept Shared Attachments	Optional As the owner, you can share your enterprise router with other users. These other users can create attachments for your enterprise router. • If you do not select this option, you must manually accept attachments to this enterprise router from the accounts that this enterprise router is shared with. • If you select this option, the attachments from the accounts that this enterprise router is shared with will be automatically accepted. For details, see **Sharing Overview**.	Enable

Step 7 Click **OK**.

The enterprise router list is displayed.

Step 8 Check the enterprise router settings.

The settings take effect immediately.

----End

4.3 Viewing an Enterprise Router

Scenarios

This section describes how to view basic information about an enterprise router, including the AZs, default route table association and propagation, and creation time.

You can also view other information about the enterprise router, including:

- Attachments, such as their name, type, and attached resources. For details, see **Viewing an Attachment**.
- Route tables, such as the default route table and custom route tables. For details, see **Viewing Route Tables**.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

In addition to the information shown in the enterprise router list, you can go to **Step 5** to view more details.

Step 5 Click the name of the target enterprise router to go to the **Basic Information** page.

View detailed information about the enterprise router.

----End

4.4 Deleting an Enterprise Router

Scenarios

Delete an enterprise router that is no longer needed.

Notes and Constraints

- An enterprise router that has attachments cannot be deleted. Delete the attachments first. For details, see **Attachment Overview**.
- An enterprise router that has route tables can be deleted directly.
- An enterprise router that is shared with other accounts can be deleted directly.
- Deleting an enterprise router will also delete all of its flow logs.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 In the upper right corner of the target enterprise router, choose **More** > **Delete**.

A confirmation dialog box is displayed.

Step 6 Click **OK**.

A deleted enterprise router cannot be recovered.

----End

5 Attachments

5.1 Attachment Overview

You can create an attachment to attach a network instance to an enterprise router. The attachment type varies by the type of network instance.

Figure 5-1 Attachments

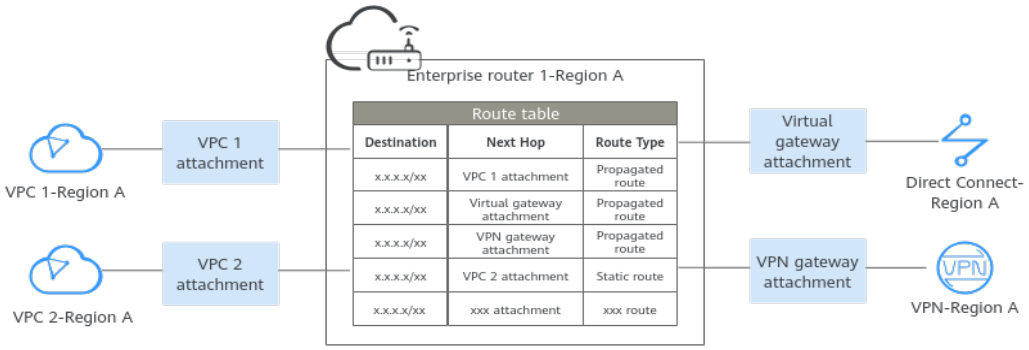


Table 5-1 Attachments

Attachment Type	Network Instance	Create Attachment	View Attachment	Delete Attachment
VPC attachment	VPC	Creating a VPC Attachment	Viewing an Attachment	Deleting a VPC Attachment
Virtual gateway attachment	Virtual gateway of Direct Connect	Creating a Virtual Gateway Attachment		Deleting a Virtual Gateway Attachment

Attachment Type	Network Instance	Create Attachment	View Attachment	Delete Attachment
VPN gateway attachment	VPN gateway	Creating a VPN Gateway Attachment		Deleting a VPN Gateway Attachment
Global DC gateway attachment	Global DC gateway in Direct Connect	Creating a Global DC Gateway Attachment		Deleting a Global DC Gateway Attachment

5.2 VPC Attachments

5.2.1 Creating a VPC Attachment

Scenarios

This section describes how to attach a VPC to an enterprise router so that the VPCs attached to the enterprise router can communicate with each other.

Notes and Constraints

- If you use the propagated routes of a VPC attachment, the route table of the enterprise router automatically learns the VPC CIDR block as the destination of routes. The CIDR block cannot be changed. To ensure that routes in the route table do not conflict, the CIDR blocks of all VPCs attached to the enterprise router cannot overlap. Otherwise, communication fails.
- If your existing VPCs have overlapping CIDR blocks, do not use propagated routes. Instead, manually add static routes to the route table of the enterprise router. The destination of the routes can be VPC subnet CIDR blocks or smaller ones.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Attachments** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Attachment**.
- Click the enterprise router name and click **Attachments**.

Step 6 On the **Attachments** tab, click **Create Attachment**.

The **Create Attachment** page is displayed.

Step 7 Configure the parameters based on **Table 5-2**.

Table 5-2 Parameters for adding a VPC attachment

Parameter	Setting	Example Value
Name	Mandatory Enter an attachment name. The name: • Must contain 1 to 64 characters. • Can contain letters, digits, underscores (_), hyphens (-), and periods (.).	er-attach-01
Attachment Type	Mandatory Select **VPC**, indicating that a VPC is to be attached to the enterprise router. The methods for creating attachments vary depending on the attachment type. For details, see **Attachment Overview**.	VPC
Attached Resource	Mandatory 1. Select the VPC to be attached to the enterprise router. You can enter a VPC name to quickly find the target VPC. 2. Select a subnet in the selected VPC. You can enter a subnet name to quickly find the target subnet. – You can select any subnet in the VPC. All subnets in the same VPC can communicate with each other by default and the enterprise router can connect to the entire VPC. – You are advised to select a subnet that is dedicated for connecting to the enterprise router. To ensure that the subnet has enough IP addresses for the system and the enterprise router, make the subnet mask /28 or smaller.	• VPC: vpc-A • Subnet: subnet-A01

Parameter	Setting	Example Value
Auto Add Routes	Optional • Enable this option if you want to automatically add routes (with this enterprise router as the next hop and 10.0.0.0/8, 172.16.0.0/12, and 192.168.0.0/16 as the destinations) to all route tables of the selected VPC. • Do not enable this option if an existing route in the VPC route tables has a destination set to 10.0.0.0/8, 172.16.0.0/12, or 192.168.0.0/16 because the routes will fail to be added. After the attachment is created, manually add routes to the VPC route tables. For details, see **Step 5: (Optional) Add Routes to VPC Route Tables**. **NOTE** This parameter is only displayed when a VPC attachment is created. It cannot be enabled after the VPC attachment is created.	Enable
Description	Optional Describe the attachment for easy identification.	-

Step 8 Click **Create Now**.

The attachment list is displayed.

Step 9 Check the attachment status.

If the status changes from **Creating** to **Normal**, the attachment is successfully created.

----End

Follow-up Procedure

If **Default Route Table Association** and **Default Route Table Propagation** are not enabled for an enterprise router, you need to:

1. Create a custom route table for the enterprise router. For details, see **Creating a Route Table**.
2. Create associations for the attachments of the enterprise router. For details, see **Creating an Association for an Attachment in a Route Table**.
3. Use either of the following methods to add routes for the attachment to the route table:
   - Create a propagation in the route table. For details, see **Creating a Propagation for an Attachment in the Route Table**.

After the propagation is created, routes of the attachments to the enterprise router will be automatically propagated to the route table of the enterprise router.

- Add static routes to the route table. For details, see **Creating a Static Route**.

5.2.2 Deleting a VPC Attachment

Scenarios

This section describes how to delete a VPC attachment from an enterprise router.

Notes and Constraints

- Deleting a VPC attachment will also delete its associations, propagations, and propagated routes in the route table.
- If a VPC attachment is deleted, the next hop of its related static routes will be **Blackhole**. If the destination of a packet matches the blackhole route, the packet will be discarded.
- If flow logging is enabled for a VPC attachment, flow logging will be disabled, but collected flow logs will not be deleted.

Procedure

Step 1 Log in to the management console.

Step 2 Click in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Attachments** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Attachment**.
- Click the enterprise router name and click **Attachments**.

Step 6 In the attachment list, locate the target VPC attachment, and click **Delete** in the **Operation** column.

A confirmation dialog box is displayed.

Step 7 Confirm the information and click **OK**.

A deleted attachment cannot be recovered.

----End

5.3 Virtual Gateway Attachments

5.3.1 Creating a Virtual Gateway Attachment

Scenarios

Attach a Direct Connect virtual gateway to an enterprise router to set up a hybrid cloud network using Direct Connect and Enterprise Router.

Procedure

Create a virtual gateway attachment to an enterprise router. To create a virtual gateway, refer to "Establishing Network Connectivity" in the *Direct Connect User Guide*.

5.3.2 Deleting a Virtual Gateway Attachment

Scenarios

This section describes how to delete a virtual gateway attachment from an enterprise router.

Notes and Constraints

- Deleting a VPC attachment will also delete its associations, propagations, and propagated routes in the route table.
- If flow logging is enabled for a VPC attachment, flow logging will be disabled, but collected flow logs will not be deleted.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Attachments** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Attachment**.
- Click the enterprise router name and click **Attachments**.

NOTICE

A virtual gateway attachment cannot be directly deleted on the **Attachments** tab.

A virtual gateway attachment will be automatically deleted after you perform the following operations to delete the virtual gateway and its virtual interfaces.

Step 6 Locate the target virtual gateway attachment and click the attached resource.

Example: vgw-demo

The virtual gateway attachment details page is displayed.

Step 7 On the details page, click the virtual gateway.

The virtual gateway list is displayed.

Step 8 Check whether the virtual gateway has virtual interfaces.

- If the virtual gateway has virtual interfaces, delete the virtual interfaces first.

  For details, see section "Deleting a Virtual Interface" in the **Direct Connect User Guide**.
- If the virtual gateway has no virtual interfaces, go to **Step 9**.

Step 9 Locate the target virtual gateway and click **Delete** in the **Operation** column.

A confirmation dialog box is displayed.

Step 10 Click **OK**.

A deleted virtual gateway cannot be recovered.

----End

5.4 VPN Gateway Attachments

5.4.1 Creating a VPN Gateway Attachment

Scenarios

Attach a VPN gateway to an enterprise router to set up a hybrid cloud network using VPN and Enterprise Router.

Procedure

Create a VPN gateway attachment to an enterprise router. To create a VPN gateway, refer to "Creating a VPN Gateway" in the *Virtual Private Network User Guide*.

5.4.2 Deleting a VPN Gateway Attachment

Scenarios

This section describes how to delete a VPN gateway attachment from an enterprise router.

Notes and Constraints

- Deleting a VPC attachment will also delete its associations, propagations, and propagated routes in the route table.
- If flow logging is enabled for a VPC attachment, flow logging will be disabled, but collected flow logs will not be deleted.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Attachments** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Attachment**.
- Click the enterprise router name and click **Attachments**.

NOTICE

A VPN gateway attachment cannot be directly deleted on the **Attachments** tab.

A VPN gateway attachment will be automatically deleted after you perform the following operations to delete its VPN connections, unbind the EIP from the VPN gateway, and delete the VPN gateway.

Step 6 Locate the target VPN gateway attachment and click the attached resource.

Example: vpngw-demo

The VPN gateway attachment details page is displayed.

Step 7 On the attachment details page, click  in the upper left corner.

The VPN gateway list is displayed.

Step 8 In the VPN gateway list, locate the target VPN gateway, click **More** in the **Operation** column, and click **Delete**.

A confirmation dialog box is displayed.

Step 9 Confirm the information and click **OK**.

A deleted VPN gateway cannot be recovered.

----End

5.5 Global DC Gateway Attachments

5.5.1 Creating a Global DC Gateway Attachment

Scenarios

Attach a Direct Connect global DC gateway to an enterprise router to set up a hybrid cloud network using Direct Connect and Enterprise Router.

Procedure

You need to create a global DC gateway attachment on the Direct Connect console. For details, see "Creating a Global DC Gateway" in the *Direct Connect User Guide*.

5.5.2 Deleting a Global DC Gateway Attachment

Scenarios

You can delete a global DC gateway attachment that is no longer needed at any time.

Constraints

- Deleting a VPC attachment will also delete its associations, propagations, and propagated routes in the route table.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Attachments** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Attachment**.
- Click the enterprise router name and click **Attachments**.

In the attachment list, locate the global DC gateway attachment.

NOTICE

A global DC gateway attachment cannot be directly deleted on the **Attachments** tab.

Go to the Direct Connect console, delete the global DC gateway. The global DC gateway attachment will be deleted. For details, see "Deleting a Global DC Gateway" in the *Direct Connect User Guide*.

----End

5.6 Changing the Name of an Attachment

Scenarios

This section describes how to modify the name of an attachment.

Procedure

Step 1 Log in to the management console.

Step 2 Click in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Attachments** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Attachment**.
- Click the enterprise router name and click **Attachments**.

Step 6 In the attachment list, click next to the attachment name.

The **Edit** dialog box is displayed.

Step 7 Enter a new name.

Table 5-3 Parameter description

Parameter	Setting	Example Value
Name	Mandatory Enter an attachment name. The name: • Must contain 1 to 64 characters. • Can contain letters, digits, underscores (_), hyphens (-), and periods (.).	er-attach-01

Step 8 Click **OK**.

The attachment list is displayed.

----End

5.7 Viewing an Attachment

Scenarios

This section describes how to view details about the attachments of an enterprise router, including the attachment name, attachment type, and attached resources.

The methods for viewing details about different types of attachments are the same. This section uses a VPC attachment as an example.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Attachments** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Attachment**.
- Click the enterprise router name and click **Attachments**.

Step 6 On the **Attachments** tab, you can view:

- In the attachment list, you can view information such as the name, status, type, and attached resource.
- If you click the attachment name, you can view more information about the attachment on the displayed page, such as the attachment ID and creation time.
- If you click the attached resource, you will go to the details page of the attached resource.

----End

6 Route Tables

6.1 Route Table Overview

Route tables are used by enterprise routers to forward packets. Each route table contains associations, propagations, and routes. Route tables are classified into custom route tables and default route tables.

Table 6-1 Route tables

Route Table	Description
Custom route table	• A custom route table is an additional route table you optionally create for an enterprise router. • An enterprise router can have multiple custom route tables. You can associate attachments with different route tables to enable communication or isolation between network instances.

Route Table	Description
Default route table	A default route table is automatically created when an enterprise router is created. There are two types of default route tables: default association route table and default propagation route table. You can specify a route table both as the default association route table and the default propagation route table. You can also specify one route table as the default association route and another route table as the default propagation route table. • If **Default Route Table Association** is enabled and the default association route table is specified, attachments will be associated with the default association route table. If no default association route table is specified, a route table named **defaultRouteTable** will be created and used as the default association route table. • If **Default Route Table Propagation** is enabled and the default propagation route table is specified, attachments will be propagated to the default propagation route table. If no default propagation route table is specified, a route table named **defaultRouteTable** will be created and used as the default propagation route table. • If both **Default Route Table Association** and **Default Route Table Propagation** are enabled but the default association route table and the default propagation route table are not specified, the route table named **defaultRouteTable** will be used as both the default association route table and the default propagation route table. • If there is already a route table named **defaultRouteTable**, no additional **defaultRouteTable** will be created. • You can replace the default route table with a custom route table if needed.

6.2 Creating a Route Table

Scenarios

This section describes how to create a custom route table for an enterprise router.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Route Tables** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Route Table**.
- Click the enterprise router name and click **Route Tables**.

Step 6 On the **Route Tables** tab, click **Create Route Table**.

The **Create Route Table** dialog box is displayed.

Step 7 Configure the parameters based on **Table 6-2**.

Table 6-2 Parameters for creating a route table for an enterprise router

Parameter	Setting	Example Value
Name	Mandatory Enter a name for the route table. The name: • Must contain 1 to 64 characters. • Can contain letters, digits, underscores (_), hyphens (-), and periods (.).	er-rtb-01
Description	Optional Describe the route table for easy identification.	-

Step 8 Click **OK**.

The route table list is displayed.

Step 9 View the route table status.

If the status changes from **Creating** to **Normal**, the route table is successfully created.

----End

6.3 Modifying a Route Table

Scenarios

This section describes how to modify the name and description of a route table.

Notes and Constraints

Only the name and description of route tables named **defaultRouteTable** and custom route tables can be changed.

Procedure

Step 1 Log in to the management console.

Step 2 Click in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Route Tables** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Route Table**.
- Click the enterprise router name and click **Route Tables**.

Step 6 In the route table list, click next to the name of the target route table.

The **Modify Route Table** dialog box is displayed.

Step 7 Enter a new name.

Table 6-3 Parameter description

Parameter	Setting	Example Value
Name	Mandatory Enter a new name for the route table. The name: • Must contain 1 to 64 characters. • Can contain letters, digits, underscores (_), hyphens (-), and periods (.).	er-rtb-01
Description	Optional Modify the description of the route table.	-

Step 8 Click **OK**.

The route table list is displayed.

----End

6.4 Viewing Route Tables

Scenarios

This section describes how to view route tables of an enterprise router.

Procedure

Step 1 Log in to the management console.

Step 2 Click in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Route Tables** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Route Table**.
- Click the enterprise router name and click **Route Tables**.

Step 6 In the route table list, click different tabs to view the route table information.

On the **Basic Information** tab, you can view the status of the route table and whether **Default Route Table Association** and **Default Route Table Propagation** are enabled.

----End

6.5 Deleting a Route Table

Scenarios

Delete an enterprise router route table that is no longer needed.

Notes and Constraints

- If a route table is used as the default association route table and/or default propagation route table, the route table cannot be deleted.
  - If **Default Route Association** is set to **Yes** on the basic information page of the route table, the route table is used as the default association route table.
  - Also, if **Default Route Propagation** is set to **Yes** on the basic information of the route table, the route table is used as the default propagation route table.

  To delete such a route table, change **Default Route Association** and **Default Route Propagation** settings. For details, see **Modifying an Enterprise Router**.
- A route table cannot be deleted if it contains an association or a propagation. You need to delete the association and propagation before deleting this route table.
  - For details about how to delete an association, see **Deleting an Association from a Route Table**.
  - For details about how to delete a propagation, see **Deleting a Propagation from a Route Table**.
- A route table can be deleted if it contains only static routes. Ensure that the routes are no longer required before deleting their route table.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Route Tables** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Route Table**.
- Click the enterprise router name and click **Route Tables**.

Step 6 In the route table list, click  next to the name of the target route table.

A confirmation dialog box is displayed.

Step 7 Click **Yes**.

A deleted route table cannot be recovered.

----End

7 Associations

7.1 Association Overview

Each attachment can be associated with one route table for:

- Packet forwarding: Packets from the attachment are forwarded through the routes specified in the associated route table.
- Route propagation: The routes in the associated route tables are automatically propagated to the route table of the attachment.

Figure 7-1 Associations

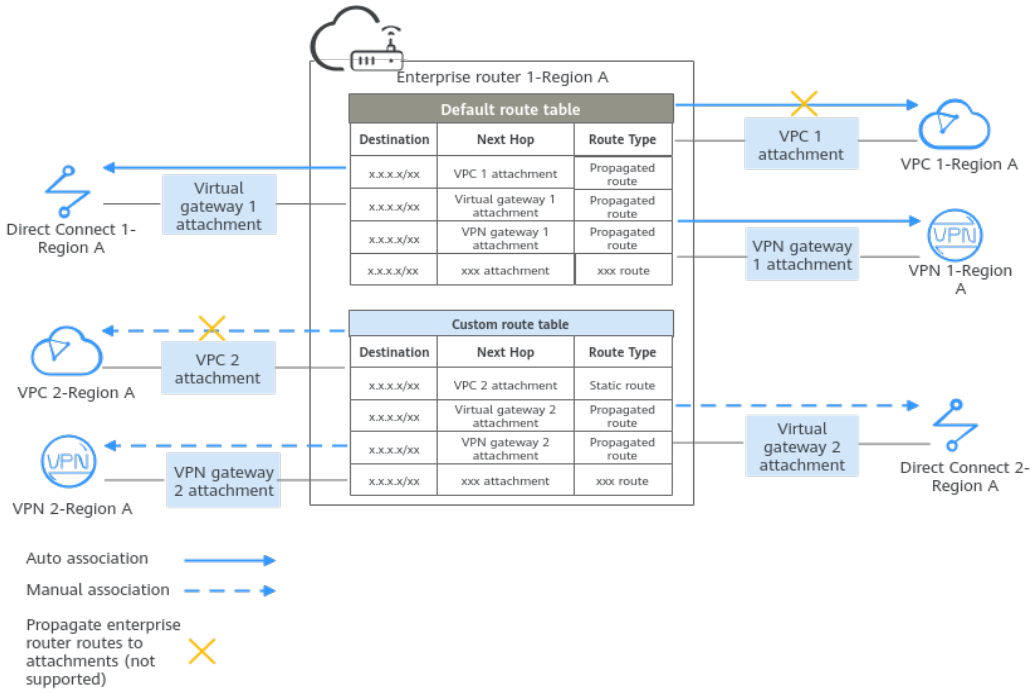


Table 7-1 Associations

Attachment Type	Route Learning	Way to Create Association	Description
VPC	Not supported	• Auto creation: If **Default Route Table Association** is enabled and the default association route table is specified, attachments are automatically associated with the default association route table. – If you want to enable this function when you create an enterprise router, refer to **Creating an Enterprise Router**. – If you want to enable this function after an enterprise router is created, refer to **Modifying an Enterprise Router**. • Manual creation: You can select a route table and create an association in it to associate an attachment with the route table. For details, see **Creating an Association for an Attachment in a Route Table**.	Each attachment can only be associated with one route table. Associations between attachments in **Figure 7-1** are described as follows: • Auto creation: The system automatically associates attachments, such as virtual gateway 1, VPC 1, and VPN gateway 1, with the default route table of the enterprise router. • Manual creation: You need to manually create associations in the custom route table of the enterprise router for attachments, such as VPC 2, VPN gateway 2, and virtual gateway 2.
Virtual gateway	Supported		
VPN gateway	Supported		
Global DC gateway	Supported		

7.2 Creating an Association for an Attachment in a Route Table

Scenarios

This section describes how to create an association in a route table of an enterprise router to associate a specified attachment with the route table.

Notes and Constraints

Each attachment can only be associated with one route table. Packets from the attachment will be forwarded based on the route table.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Route Tables** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Route Table**.
- Click the enterprise router name and click **Route Tables**.

Step 6 Click the route table where you want to create an association. On the **Associations** tab, click **Create Association**.

The **Create Association** dialog box is displayed.

Step 7 Configure the parameters based on **Table 7-2**.

Table 7-2 Parameters for creating an association

Parameter	Setting	Example Value
Attachment Type	Mandatory Select an attachment type. • **VPC**: A VPC is attached to the enterprise router. • **Virtual gateway**: A Direct Connect virtual gateway is attached to the enterprise router. • **VPN gateway**: A VPN gateway is attached to the enterprise router. • **Global DC gateway**: A Direct Connect global DC gateway is attached to the enterprise router. For more information, see **Attachment Overview**.	VPC
Attachment	Mandatory In the drop-down list, select the attachment to be associated with the route table.	er-attach-02

Step 8 Click **OK**.

The association list is displayed. You can view your association.

----End

7.3 Viewing Associations in a Route Table

Scenarios

This section describes how to view associations in the route table of an enterprise router. You can also view all the attachments associated with this route table.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Route Tables** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Route Table**.
- Click the enterprise router name and click **Route Tables**.

Step 6 Click the route table where you want to view its associations. On the **Associations** tab, view the associations.

All attachments associated with the route table are displayed in the list. You can view their settings such as the ID, status, and name of each attachment.

----End

7.4 Deleting an Association from a Route Table

Scenarios

This section describes how to delete an association from the route table of an enterprise router.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Route Tables** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Route Table**.
- Click the enterprise router name and click **Route Tables**.

Step 6 Click the route table that you want to delete an association from. On the **Associations** tab, locate the association you want to delete and click **Delete** in the **Operation** column.

A confirmation dialog box is displayed.

Step 7 Click **Yes**.

A deleted association cannot be recovered.

----End

8 Propagations

8.1 Propagation Overview

You can create a propagation for each attachment to propagate routes to one or more route tables on an enterprise router.

If you do not want to create a propagation, you can manually add static routes for attachments to the route tables.

Figure 8-1 Propagated routes and static routes

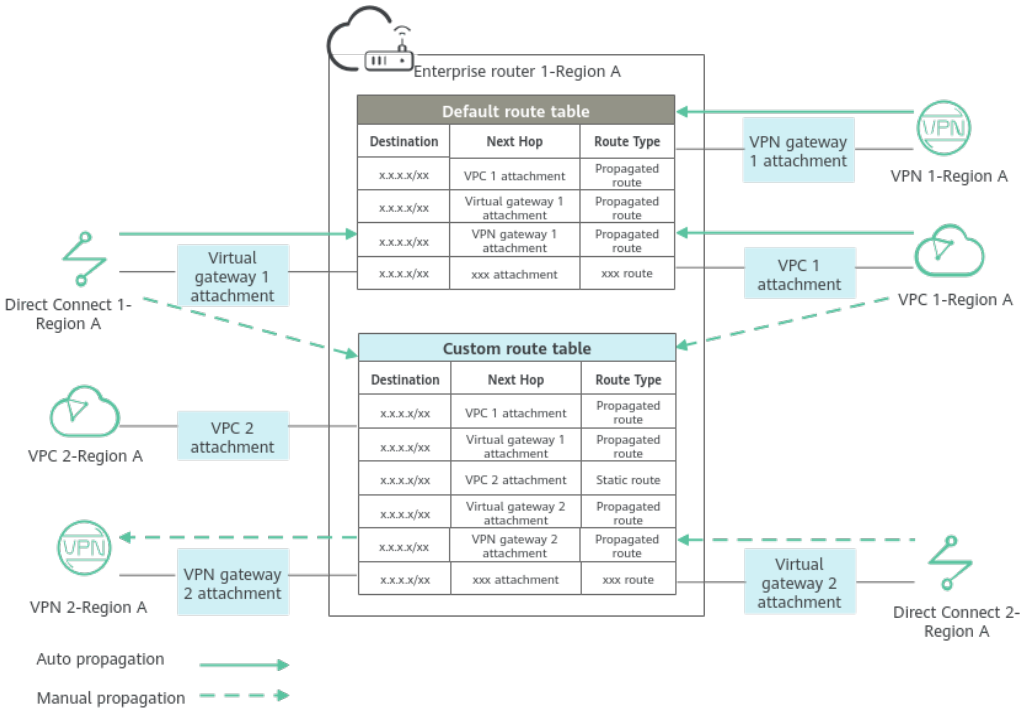


Table 8-1 Propagations

Attachment Type	Propagated Info	Way to Create Propagation	Description
VPC	VPC CIDR blocks	• Auto creation: If **Default Route Table Propagation** is enabled and the default propagation route table is specified, attachments automatically propagate routes to the default propagation route table. – If you want to enable this function when you create an enterprise router, refer to **Creating an Enterprise Router**. – If you want to enable this function after an enterprise router is created, refer to **Modifying an Enterprise Router**. • Manual creation: You can select a route table and create a propagation for an attachment in the route table. For details, see **Creating a Propagation for an Attachment in the Route Table**.	An attachment can be propagated to different route tables. You can create propagations for attachments in **Figure 8-1** as follows: • Auto creation: Propagations are automatically created for the attachments, such as virtual gateway 1, VPN gateway 1, and VPC 1 attachments, in the default propagation route table of the enterprise router. • Manual creation: You need to manually create propagations in the custom route table of the enterprise router for attachments, such as virtual gateway 1, VPC 1, VPN gateway 2, and virtual gateway 2 attachments. • No propagation: If you do not want to use propagated routes, you need to manually add static routes to the custom route table of the enterprise router for attachments, such as VPC 2 attachment.
Virtual gateway	All routes		
VPN gateway	All routes		
Global DC gateway	All routes		

8.2 Creating a Propagation for an Attachment in the Route Table

Scenarios

This section describes how to create a propagation in the route table of an enterprise router.

Notes

You can create propagations for the same attachment in different route tables.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Route Tables** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Route Table**.
- Click the enterprise router name and click **Route Tables**.

Step 6 Click the route table where you want to create a propagation. On the **Propagations** tab, click **Create Propagation**.

The **Create Propagation** dialog box is displayed.

Step 7 Configure the parameters based on **Table 8-2**.

Table 8-2 Parameters for creating a propagation

Parameter	Setting	Example Value
Attachment Type	Mandatory Select an attachment type. • **VPC**: A VPC is attached to the enterprise router. • **Virtual gateway**: A Direct Connect virtual gateway is attached to the enterprise router. • **VPN gateway**: A VPN gateway is attached to the enterprise router. • **Global DC gateway**: A Direct Connect global DC gateway is attached to the enterprise router. For more information, see **Attachment Overview**.	VPC
Attachment	Mandatory In the drop-down list, select the attachment who will propagate routes to the route table.	er-attach-02

Step 8 Click **OK**.

The propagation list is displayed. You can view your propagation.

----End

8.3 Viewing a Propagation in a Route Table

Scenarios

This section describes how to view a propagation in the route table of an enterprise router.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Route Tables** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Route Table**.

- Click the enterprise router name and click **Route Tables**.

Step 6 Click the route table where you want to view a propagation. On the **Propagations** tab, view your propagation.

All propagations associated with the route table are displayed in the list. You can view their settings such as the ID, status, and name of each propagation.

----End

8.4 Deleting a Propagation from a Route Table

Scenarios

This section describes how to delete a propagation from the route table of an enterprise router.

Notes and Constraints

Propagated routes are learned through propagation. Deleting a propagation will also delete the propagated routes.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Route Tables** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Route Table**.
- Click the enterprise router name and click **Route Tables**.

Step 6 Click the route table where you want to delete a propagation. On the **Propagations** tab, locate the propagation you want to delete and click **Delete** in the **Operation** column.

A confirmation dialog box is displayed.

Step 7 Click **Yes**.

A deleted propagation cannot be recovered.

----End

9 Routes

9.1 Route Overview

What Is a Route?

Routes are used to forward packets. A route contains information such as the destination, next hop, and route type.

You can create a propagation for attachments to automatically propagate routes to route tables or manually add static routes to route tables.

Figure 9-1 Propagated routes and static routes

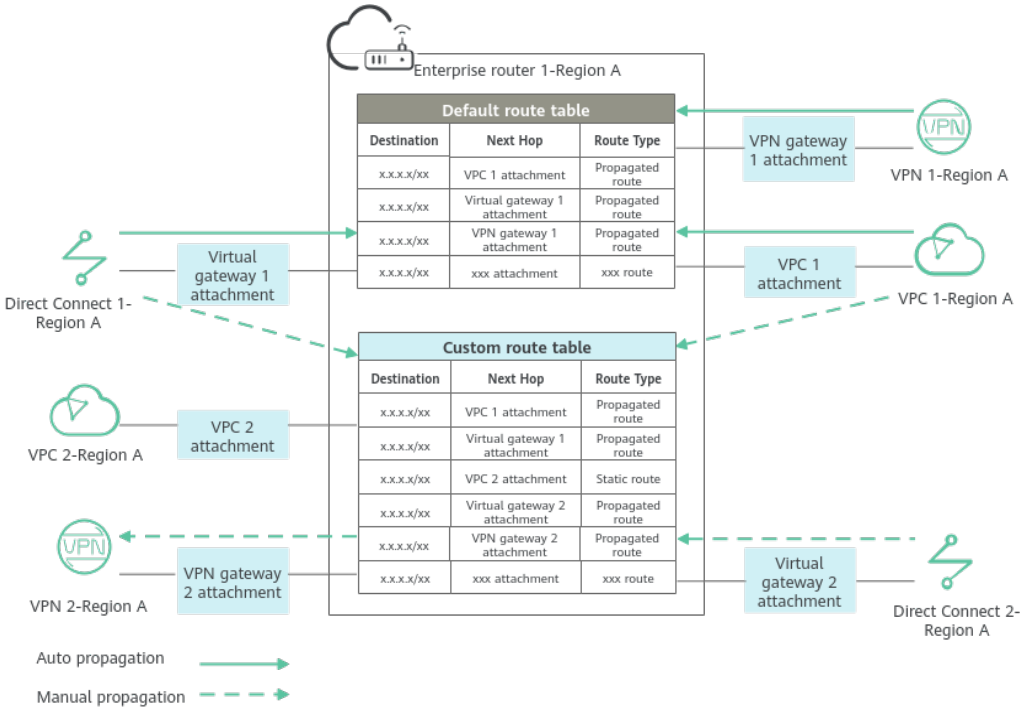


Table 9-1 Route types

Route Type	Description	How to Create	Description
Propagated routes	Propagated routes are routes that attachments propagate to the route tables of the enterprise router. They cannot be modified or deleted.	To create a propagation, see **Creating a Propagation for an Attachment in the Route Table**.	Routes are classified into propagated routes and static routes. The routes shown in **Figure 9-1** are described as follows: • Propagated routes are from: – Propagations automatically created in the default route table of the enterprise router for attachments, such as virtual gateway 1, VPN gateway 1 and VPC 1 attachments. – Propagations manually created in the custom route table of the enterprise router for attachments, such as virtual gateway 1, VPC 1, VPN gateway 2, and virtual gateway 2 attachments. • Static routes are manually added to the custom route table of the enterprise router for attachments, such as VPC 2 attachment.
Static routes	Static routes are manually created and can be modified or deleted.	To create a route, see **Creating a Static Route**.	

Route Priority

If there are multiple routes with the same destination but different targets in a route table, the route priority is as follows:

Static route > Propagated route for VPC attachment > Propagated route for virtual gateway attachment = Propagated route for global DC gateway attachment > Propagated route for VPN gateway attachment

NOTE

- Static routes are manually configured and the destination of each static route must be unique in a route table.
- Propagated routes are automatically learned by the system and may have the same destination in a route table.
- A static route and a propagated route may have the same destination in a route table.

9.2 Creating a Static Route

Scenarios

You can create static routes in a route table of an enterprise router.

Static routes are classified into common routes and blackhole routes. A blackhole route only has a destination and has no next hop. It drops all traffic sent to the specified destination.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Route Tables** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Route Table**.
- Click the enterprise router name and click **Route Tables**.

Step 6 Click the route table where you want to create a static route. On the **Routes** tab, click **Create Route**.

The **Create Route** dialog box is displayed.

Step 7 Configure the parameters based on **Table 9-2**.

Table 9-2 Parameter description

Parameter	Setting	Example Value
Destination	Mandatory Enter the IP address or CIDR block of the attachment. For example, if it is a VPC attachment, enter the CIDR block of the VPC or a subnet of the VPC.	192.168.2.0/24
Blackhole Route	Optional If **Blackhole Route** is enabled, you do not need to configure **Attachment Type** and **Next Hop** for the route. If the destination of a route is the same as, or is contained in, that of this blackhole route, all packets destined for the destination will be dropped.	-

Parameter	Setting	Example Value
Attachment Type	• If **Blackhole Route** is not enabled, you need to configure this parameter. • If **Blackhole Route** is enabled, you do not need to configure this parameter. Select an attachment type. • **VPC**: Create a static route for a VPC attachment. For more information, see **Attachment Overview**.	VPC
Next Hop	• If **Blackhole Route** is not enabled, you need to configure this parameter. • If **Blackhole Route** is enabled, you do not need to configure this parameter. In the drop-down list, select the target attachment.	er-attach-01

Step 8 Click **OK**.

Wait for 2 to 3 seconds, and click  to refresh the route list. The created static route is displayed.

----End

9.3 Modifying a Static Route

Scenarios

This section describes how to modify static routes, including common routes and blackhole routes, in a route table of an enterprise router. For example, you can perform the following operations:

- Change a common route to a blackhole route.
- Change the attachment type and next hop of a common route.

Only static routes can be modified. Propagation routes cannot be modified.

Notes and Constraints

To change the destination of a static route, delete this static route and create another one with your desired destination.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Route Tables** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Route Table**.
- Click the enterprise router name and click **Route Tables**.

Step 6 Click the route table where you want to modify a route. On the **Routes** tab, locate the route and click **Modify** in the **Operation** column.

The **Modify Route** dialog box is displayed.

Step 7 Modify the route based on **Table 9-3**.

Table 9-3 Parameter description

Parameter	Setting	Example Value
Blackhole Route	Optional If **Blackhole Route** is enabled, you do not need to configure **Attachment Type** and **Next Hop** for the route. If the destination of a route is the same as, or is contained in, that of this blackhole route, all packets destined for the destination will be dropped.	-
Attachment Type	• If **Blackhole Route** is not enabled, you need to configure this parameter. • If **Blackhole Route** is enabled, you do not need to configure this parameter. Select an attachment type. • **VPC**: Create a static route for a VPC attachment. For more information, see **Attachment Overview**.	VPC
Next Hop	• If **Blackhole Route** is not enabled, you need to configure this parameter. • If **Blackhole Route** is enabled, you do not need to configure this parameter. In the drop-down list, select the target attachment.	er-attach-01

Step 8 Click **OK**.

View the modified static route in the route list.

----End

9.4 Viewing Routes

Scenarios

View propagated routes and static routes in a route table of an enterprise router.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Route Tables** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Route Table**.
- Click the enterprise router name and click **Route Tables**.

Step 6 Click the route table whose routes you want to view. On the **Routes** tab, view the routes.

Each route includes information such as the destination, next hop, attachment type, and route type.

----End

9.5 Deleting a Static Route

Scenarios

Delete a static route from a route table of an enterprise router.

Only static routes can be deleted. To delete a propagated route, you need to delete its propagation. The route will be deleted together with the propagation. For details, see **Deleting a Propagation from a Route Table**.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Route Tables** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Route Table**.
- Click the enterprise router name and click **Route Tables**.

Step 6 Click the route table where you want to delete a route. On the **Routes** tab, locate the route and click **Delete** in the **Operation** column.

A confirmation dialog box is displayed.

Step 7 Click **Yes**.

A deleted static route cannot be recovered.

Wait for 2 to 3 seconds, and click  to refresh the route list. The route does not exist in the list.

----End

10 Sharing

10.1 Sharing Overview

What Is Sharing?

You can share an enterprise router in your account with other accounts.

- You are the owner of the enterprise router.
- Other accounts are the users of the enterprise router.

After you share your enterprise router with other accounts, these other users can attach their network instances to your enterprise router, so that their network instances can access your enterprise router.

You can share an enterprise router in your account with other accounts so that these other accounts can attach their VPCs to your enterprise router.

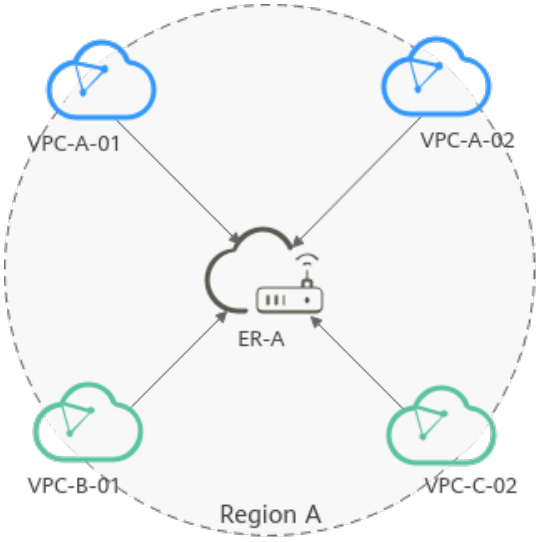
This example uses account A, account B, and account C to describe how you can build a network using one enterprise router. **Table 10-1** describes the resources of each account.

If account A shares enterprise router (ER-A) with account B and account C, the VPCs of accounts B and C can be attached to ER-A. **Figure 10-1** shows the networking.

Table 10-1 Accounts and their resources

Account	Enterprise Router	VPC
A	ER-A	VPC-A-01 VPC-A-02
B	ER-B	VPC-B-01
C	ER-C	VPC-C-01

Figure 10-1 Attaching VPCs in different accounts to the same enterprise router



Allowed Operations by the Owner and Other Users

The owner can perform all operations but these other users can perform only some of the operations. **Table 10-2** lists the operations that other users can perform.

Table 10-2 Allowed operations by other users

Role	Allowed Operation	Description
Other users (user accounts)	**Viewing an Enterprise Router**	Other users can view: The name of the shared enterprise router followed by **Shared with me**.
	Adding attachments to an enterprise router **Creating a VPC Attachment**	Other users: • Can only create VPC attachments. • Can create attachments to the shared enterprise router only after the owner account accepts the attachment requests. If **Auto Accept Shared Attachments** is enabled, a request from a user for creating an attachment will be automatically accepted. For details about the process for creating an attachment for an enterprise router in another account, see **Sharing an Enterprise Router with Other Users**.
	Viewing an Attachment	Other users:

Role	Allowed Operation	Description
	Changing the Name of an Attachment	Other users can change the names of their attachments created for the shared enterprise router.
	Deleting a VPC Attachment	Other users can delete their attachments created for the shared enterprise router without the approval of the owner account.

NOTE

Other users cannot view **Route Tables**, **Sharing**, and **Flow Logs** of the enterprise router.

Sharing an Enterprise Router with Other Users

As the owner, you can share your enterprise router with other users. These other users can create attachments for your enterprise router.

- If **Auto Accept Shared Attachments** is not enabled on your enterprise router, you must accept the attachment creation requests from other users.

Figure 10-2 Accepting or rejecting attachment creation requests

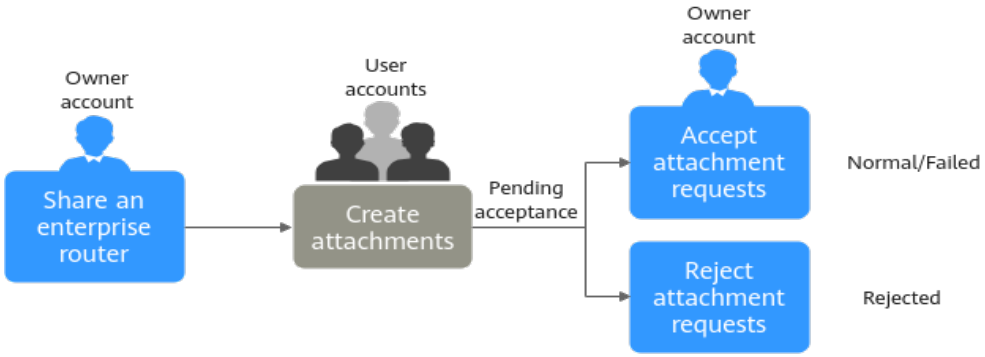


Table 10-3 Process description

No.	Step	Role	Description
1	Creating a Sharing	Owner	The owner creates a sharing to share an enterprise router with another user. This user can easily identify the shared enterprise router because its name is followed by **Shared with me**.

No.	Step	Role	Description
2	Creating a VPC Attachment	User	The user creates an attachment to the shared enterprise router. The attachment will be in the **Pending acceptance** state because **Auto Accept Shared Attachments** is disabled on the enterprise router.
3	• Accepting an Attachment Request • Rejecting an Attachment Request	Owner	• The owner accepts the attachment request. The attachment status changes from **Pending acceptance** to **Creating**. – When the attachment status changes to **Normal**, the attachment is successfully created. – When the attachment status changes to **Failed**, the attachment fails to be created. Contact technical support. After an attachment is created, you can perform **Follow-up Procedure**. • The owner can also reject the attachment request. If the owner rejects the request, the attachment status changes from **Pending acceptance** to **Rejected**, and the attachment fails to be created. If this happens, contact the owner.

- If **Auto Accept Shared Attachments** is enabled on an enterprise router, the other users' requests to create attachments to this enterprise router will be automatically accepted without the approval from the owner.

Figure 10-3 Attachment requests automatically accepted

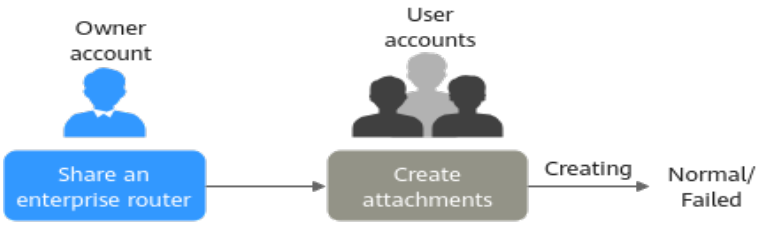


Table 10-4 Process description

No.	Step	Role	Description
1	Creating a Sharing	Owner	The owner creates a sharing to share an enterprise router with another user. This user can easily identify the shared enterprise router because its name is followed by **Shared with me**.
2	Creating a VPC Attachment	User account	**Auto Accept Shared Attachments** is enabled on the enterprise router. The user creates an attachment to the shared enterprise router. The attachment will be in the **Creating** state. • When the attachment status changes to **Normal**, the attachment is successfully created. • When the attachment status changes to **Failed**, the attachment fails to be created. Contact technical support.

10.2 Creating a Sharing

Scenarios

This section describes how to share your enterprise router with another user. After the enterprise router is shared, this user can view your enterprise router with its name followed by **Shared with me**.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Sharing** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Sharing**.
- Click the enterprise router name and click **Sharing**.

Step 6 On the **Sharing** tab, click **Share Enterprise Router**.

The **Share Enterprise Router** dialog box is displayed.

Configure the parameters based on **Table 10-5**.

Table 10-5 Parameters for creating a sharing

Parameter	Setting	Example Value
Sharing Name	Mandatory Enter a name for the sharing. The name: • Must contain 1 to 64 characters. • Can contain letters, digits, underscores (_), hyphens (-), and periods (.).	ershare-ab
Resource User Account ID	Mandatory The ID of the account that you want to share the enterprise router with.	2364e06b8XXXXXXdfeb

Step 7 Click **OK**.

The sharing list is displayed. You can view your sharing.

----End

10.3 Changing the Name of a Sharing

Scenarios

This section describes how you can change the name of a sharing.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Sharing** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Sharing**.
- Click the enterprise router name and click **Sharing**.

Step 6 In the sharing list, click  next to the sharing.

The **Edit Sharing Name** dialog box is displayed.

Step 7 Enter a new name.

Table 10-6 Parameter for changing the name of a sharing

Parameter	Setting	Example Value
Name	Mandatory Enter a name for the sharing. The name: • Must contain 1 to 64 characters. • Can contain letters, digits, underscores (_), hyphens (-), and periods (.).	ershare-cd

Step 8 Click **OK**.

The sharing list is displayed.

----End

10.4 Viewing Sharing Details

Scenarios

After you share an enterprise router with other users, you can view information about the sharing and the other users, for example, the time when the sharing was created and the other users' account ID.

Procedure

Step 1 Log in to the management console.

Step 2 Click in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Sharing** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Sharing**.
- Click the enterprise router name and click **Sharing**.

Step 6 On the **Sharing** tab, you can view:

Sharing name, resource owner account ID, resource user account ID, and creation time.

----End

10.5 Accepting an Attachment Request

Scenarios

This section describes how to accept a request from another user for creating an attachment to your enterprise router.

NOTE

- If **Auto Accept Shared Attachments** is disabled on your enterprise router, you can choose to accept the attachment request or not.
- If **Auto Accept Shared Attachments** is enabled on your enterprise router, the attachment will be automatically accepted without your approval.

Procedure

Step 1 Log in to the management console.

Step 2 Click in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Attachments** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Attachment**.
- Click the enterprise router name and click **Attachments**.

Step 6 In the attachment list, locate the attachment you want to accept and click **Accept** in the **Operation** column.

The owner accepts the attachment request. The attachment status changes from **Pending acceptance** to **Creating**.

- When the attachment status changes to **Normal**, the attachment is successfully created.
- When the attachment status changes to **Failed**, the attachment fails to be created. Contact technical support.

After an attachment is created, you can perform **Follow-up Procedure**.

----End

10.6 Rejecting an Attachment Request

Scenarios

This section describes how to reject a request from another user for creating an attachment to your enterprise router.

NOTE

- If **Auto Accept Shared Attachments** is disabled on your enterprise router, you can choose to accept the attachment request or not.
- If **Auto Accept Shared Attachments** is enabled on your enterprise router, the attachment will be automatically accepted without your approval.

Procedure

Step 1 Log in to the management console.

Step 2 Click in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Attachments** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Attachment**.
- Click the enterprise router name and click **Attachments**.

Step 6 In the attachment list, locate the attachment you want to reject and click **Reject** in the **Operation** column.

The owner can also reject the attachment request. If the owner rejects the request, the attachment status changes from **Pending acceptance** to **Rejected**, and the attachment fails to be created. If this happens, contact the owner.

----End

10.7 Deleting a Sharing

Scenarios

This section describes how to delete a sharing. After a sharing is deleted, your enterprise router cannot be used by other users anymore.

Notes and Constraints

Deleting a sharing will not delete the attachments created by other users.

Procedure

Step 1 Log in to the management console.

Step 2 Click in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Go to the **Sharing** tab using either of the following methods:

- In the upper right corner of the enterprise router, click **Manage Sharing**.
- Click the enterprise router name and click **Sharing**.

Step 6 Locate the sharing you want to delete and click **Delete** in the **Operation** column.

A confirmation dialog box is displayed.

Step 7 Click **Yes**.

A deleted sharing cannot be recovered.

----End

11 Flow Logs

11.1 Flow Log Overview

What Is a Flow Log?

Log Tank Service (LTS) can record flow logs for enterprise routers. A flow log records traffic of attachments on enterprise routers in real time. These logs allow you to monitor the network traffic of attachments and analyze network attacks, improving the O&M efficiency.

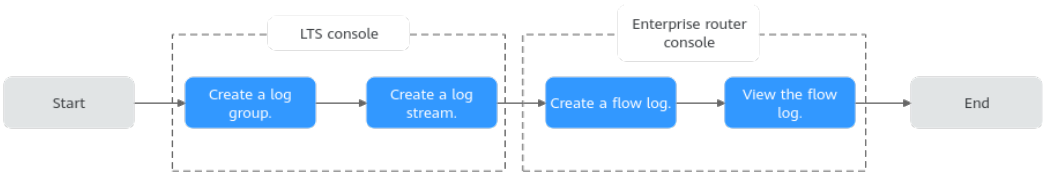
Flow logs can capture traffic of the following types of attachments:

- VPC
- Virtual gateway
- VPN gateway
- Global DC gateway

Creation Process

Before creating a flow log for an enterprise router, you need to create a log group and a log stream on the LTS console.

Figure 11-1 Process of creating a flow log



Notes and Constraints

- By default, you can create a maximum of 20 flow logs.
- For TCP and UDP fragments, flow logs can record only the first fragment. Other fragments cannot be recorded because of incomplete packet header.

- Flow logs can only record traffic generated for network communications and do not capture traffic generated by the network. For example, BGP traffic used by an enterprise router to learn routes of attachments is not recorded.

11.2 Creating a Flow Log

Scenarios

This section describes how to create a flow log to record information about the traffic of enterprise router attachments.

Notes and Constraints

Only one flow log can be created for an attachment in the same log group and log stream.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Click the enterprise router name and click **Flow Logs**.

The flow log list is displayed.

Step 6 On the **Flow Logs** tab, click **Create Flow Log**.

The **Create Flow Log** dialog box is displayed.

Step 7 Configure the parameters based on **Table 11-1**.

Table 11-1 Parameters for creating a flow log

Parameter	Setting	Example Value
Name	Mandatory Enter a name for the flow log. The name: • Must contain 1 to 64 characters. • Can contain letters, digits, underscores (_), hyphens (-), and periods (.).	flowlog-ab

Parameter	Setting	Example Value
Resource Type	Mandatory Select the type of the resource whose traffic information is to be collected. The enterprise router flow log function can capture traffic of the following attachments: • VPC • Virtual gateway: Virtual gateway of Direct Connect • VPN gateway • Global DC gateway: Direct Connect global DC gateway	Virtual gateway
Resource	Mandatory In the resource list, select the resource whose traffic information is to be collected.	vgw-ab
Log Group	Mandatory Select a log group. If there is no log group, click **Create Log Group**.	lts-group-ab
Log Stream	Mandatory Select a log stream. If there is no log stream, click **Create Log Stream**.	lts-topic-ab
Description	Optional Describe the flow log as required.	-

Step 8 Click **OK**.

The flow log list is displayed.

Step 9 View the flow log status.

If the flow status changes from **Creating** to **Enabled**, the flow log is successfully created.

----End

11.3 Viewing Details About a Flow Log

Scenarios

This section describes how to view details about a flow log, including the attachment ID, source/destination address, source/destination port, data packet size, and packet quantity.

Constraints

Flow logs are generated every 10 minutes. After creating a VPC flow log, you need to wait about 10 minutes before you can view the flow log record.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Click the enterprise router name and click **Flow Logs**.

The flow log list is displayed.

Step 6 Locate the target flow log and click **View Log Record** in the **Operation** column.

The LTS console is displayed.

Step 7 View details about the flow log.

Flow log format:

```
<version> <project_id> <resource_id> <instance_id> <srcaddr> <dstaddr> <srcport> <dstport> <protocol> <packets> <bytes> <start> <end> <direct>
```

Example 1:

```
1 0605768ad980d5762f8ac010b919754c 9e00a67c-b21e-435f-9da6-20004b8392e9 a5cbd16c-7d99-4000-8f14-526ec48298ce 1.1.1.1 192.168.1.199 0 0 1 229 22442 1664007127 1664007727 ingress
```

Example 2:

```
1 0605768ad980d5762f8ac010b919754c 9e00a67c-b21e-435f-9da6-20004b8392e9 a5cbd16c-7d99-4000-8f14-526ec48298ce 192.168.1.199 1.1.1.1 8 0 1 229 22442 1664007127 1664007727 egress
```

Table 11-2 describes the flow log parameters.

Table 11-2 Enterprise router flow log parameters

Parameter	Description	Example
version	Flow log version	1
project_id	Project ID	5f67944957444bd6bb4fe3b367de8f3d
resource_id	ID of the attachment that the traffic is generated for	10a163ee-6efa-4e4d-9937-ead59f308497
instance_id	Enterprise router ID	a5cbd16c-7d99-4000-8f14-526ec48298ce

Parameter	Description	Example
srcaddr	Source IP address	192.168.0.154
dstaddr	Destination IP address	192.168.3.25
srcport	Source port	38929
dstport	Destination port	53
protocol	Internet Assigned Numbers Authority (IANA) protocol number of the traffic For more information, see **Internet Protocol Numbers**.	17
packets	Number of data packets during the flow log capture	1
bytes	Size of the data packet during the flow log capture	96
start	The time when the capture started, in Unix seconds	1548752136
end	The time when the capture ended, in Unix seconds	1548752736
direct	Traffic direction • **ingress**: traffic going in to the attachment • **egress**: traffic going out of the attachment	egress

----End

11.4 Disabling a Flow Log

Scenarios

If flow logging is disabled, no flow logs will be collected in the next log collection period. Collected flow logs can still be viewed.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Click the enterprise router name and click **Flow Logs**.

The flow log list is displayed.

Step 6 Locate the target flow log and click **Disable** in the **Operation** column.

A confirmation dialog box is displayed.

Step 7 Confirm the information and click **OK**.

The flow log list is displayed.

Step 8 View the flow log status.

If the flow status changes from **Modifying** to **Disabled**, the flow log is successfully disabled.

----End

11.5 Enabling a Flow Log

Scenarios

If flow logging is enabled, flow logs will be collected from the next log collection period.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Click the enterprise router name and click **Flow Logs**.

The flow log list is displayed.

Step 6 Locate the target flow log and click **Enable** in the **Operation** column.

A confirmation dialog box is displayed.

Step 7 Confirm the information and click **OK**.

The flow log list is displayed.

Step 8 View the flow log status.

If the flow status changes from **Modifying** to **Enabled**, the flow log is successfully enabled.

----End

11.6 Deleting a Flow Log

Scenarios

This section describes how to delete a flow log.

Notes and Constraints

After a flow log is deleted, information captured in the flow log is still available.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List** and choose **Networking** > **Enterprise Router**.

The **Enterprise Router** page is displayed.

Step 4 Search for the target enterprise router by name.

Step 5 Click the enterprise router name and click **Flow Logs**.

The flow log list is displayed.

Step 6 Locate the target flow log and click **Delete** in the **Operation** column.

A confirmation dialog box is displayed.

Step 7 Confirm the information and click **OK**.

The flow log list is displayed.

A deleted flow log cannot be recovered.

----End

12 Monitoring

12.1 Cloud Eye Monitoring

12.1.1 Supported Metrics

Function

This section describes monitoring metrics reported by Enterprise Router to Cloud Eye as well as their namespaces, metrics, and dimensions. You can use the Cloud Eye management console or APIs to obtain the monitoring metrics and alarms generated for Enterprise Router.

Namespace

SYS.ER

Metrics

You can use Cloud Eye to monitor the network status of enterprise routers and their attachments.

- Table 12-1
- Table 12-2

Table 12-1 Monitoring metrics of an enterprise router

ID	Name	Description	Value Range	Monitored Object	Monitoring Interval (Raw Data)
instance_bytes_in	Inbound Traffic	Network traffic going into the enterprise router Unit: byte	≥ 0	Enterprise router	1 minute

ID	Name	Description	Value Range	Monitored Object	Monitoring Interval (Raw Data)
instance_bytes_out	Outbound Traffic	Network traffic going out of the enterprise router Unit: byte	≥ 0	Enterprise router	1 minute
instance_bits_rate_in	Inbound Bandwidth	Network traffic per second going into the enterprise router Unit: bit/s	≥ 0	Enterprise router	1 minute
instance_bits_rate_out	Outbound Bandwidth	Network traffic per second going out of the enterprise router Unit: bit/s	≥ 0	Enterprise router	1 minute
instance_packets_in	Inbound PPS	Packets per second going into the enterprise router Unit: packet/s	≥ 0	Enterprise router	1 minute
instance_packets_out	Outbound PPS	Packets per second going out of the enterprise router Unit: packet/s	≥ 0	Enterprise router	1 minute
instance_packets_drop_blackhole	Packets Dropped by Black Hole Route	Packets dropped by black hole route of the enterprise router Unit: count	≥ 0	Enterprise router	1 minute

ID	Name	Description	Value Range	Monitored Object	Monitoring Interval (Raw Data)
instance_packets_drop_noroute	Packets Dropped Due to No Matching Routes	Packets dropped because the enterprise router has no matching routes Unit: count	≥ 0	Enterprise router	1 minute

Table 12-2 Monitoring metrics of an attachment

ID	Name	Description	Value Range	Monitored Object	Monitoring Interval (Raw Data)
attachment_bytes_in	Inbound Traffic	Network traffic going into the attachment Unit: byte	≥ 0	Attachment	1 minute
attachment_bytes_out	Outbound Traffic	Network traffic going out of the attachment Unit: byte	≥ 0	Attachment	1 minute
attachment_bits_rate_in	Inbound Bandwidth	Network traffic per second going into the attachment Unit: bit/s	≥ 0	Attachment	1 minute
attachment_bits_rate_out	Outbound Bandwidth	Network traffic per second going out of the attachment Unit: bit/s	≥ 0	Attachment	1 minute
attachment_packets_in	Inbound PPS	Packets per second going into the attachment Unit: packet/s	≥ 0	Attachment	1 minute

ID	Name	Description	Value Range	Monitored Object	Monitoring Interval (Raw Data)
attachment_packets_out	Outbound PPS	Packets per second going out of the attachment Unit: packet/s	≥ 0	Attachment	1 minute
attachment_packets_drop_blackhole	Packets Dropped by Black Hole Route	Packets dropped by black hole route of the attachment Unit: count	≥ 0	Attachment	1 minute
attachment_packets_drop_noroute	Packets Dropped Due to No Matching Routes	Packets dropped because the attachment has no matching routes Unit: count	≥ 0	Attachment	1 minute

If a monitored object has multiple dimensions, all dimensions are mandatory when you use APIs to query the metrics.

- Query a single metric:
  ```
  dim.0=er_instance_id,d9f7b61f-e211-4bce-ac5f-2b76f3d0cf1d&dim.1=er_attachment_id,659614a0-e559-46c0-86ca-00c03c3d61b8
  ```
- Query metrics in batches:
  ```
  "dimensions": [
    {
      "name": "er_instance_id",
      "value": "d9f7b61f-e211-4bce-ac5f-2b76f3d0cf1d"
    },
    {
      "name": "er_attachment_id",
      "value": "659614a0-e559-46c0-86ca-00c03c3d61b8"
    }
  ]
  ```

Dimensions

Key	Value
er_instance_id	Enterprise router
er_attachment_id	Attachment

- The monitoring metric measurement dimension of an enterprise router is **er_instance_id**.
- The monitoring metric measurement dimensions of an attachment are **er_instance_id** and **er_attachment_id**.

12.1.2 Viewing Metrics

Scenarios

This section describes how to view monitoring metrics of enterprise routers and their attachments.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List**. Under **Management & Governance**, click **Cloud Eye**.

The **Cloud Eye** console is displayed.

Step 4 In the navigation pane on the left, choose **Cloud Service Monitoring** > **Enterprise Router**.

The enterprise router list is displayed.

Step 5 View the real-time monitoring metrics of enterprise routers and their attachments:

- View metrics of an enterprise router.
  a. In the enterprise router list, locate the enterprise router and click **View Metric** in the **Operation** column.

     The metrics are displayed.
  b. View metrics of the enterprise router.
- View metrics of an attachment.

  a. In the enterprise router list, locate the enterprise router, click to view its attachments, locate the attachment, and click **View Metric** in the **Operation** column.

     The metrics are displayed.
  b. View metrics of the attachment.

----End

12.1.3 Creating Alarm Rules

Scenarios

This section describes how to create alarm rules and notifications for enterprise routers and their attachments.

You can create an alarm rule to configure the conditions that trigger an alarm and determine whether to send notifications when there is the alarm.

If you create an alarm rule for a metric, you can timely know metric exceptions and rectify the exceptions.

Procedure

Step 1 Log in to the management console.

Step 2 Click  in the upper left corner and select the desired region and project.

Step 3 Click **Service List**. Under **Management & Governance**, click **Cloud Eye**.

The **Cloud Eye** console is displayed.

Step 4 In the navigation pane on the left, choose **Cloud Service Monitoring** > **Enterprise Router**.

The enterprise router list is displayed.

Step 5 Create alarm rules for enterprise routers and their attachments:

- Enterprise router
  a. In the enterprise router list, locate the enterprise router and click **Create Alarm Rule** in the **Operation** column.

     The **Create Alarm Rule** page is displayed.
  b. On the **Create Alarm Rule** page, set parameters as prompted.
- Attachment
  a. In the enterprise router list, locate the enterprise router, click  to view its attachments, locate the attachment, and click **Create Alarm Rule** in the **Operation** column.

     The **Create Alarm Rule** page is displayed.
  b. On the **Create Alarm Rule** page, set parameters as prompted.

----End

13 Quotas

13.1 Overview

Quotas can limit the number or amount of resources available to users, for example, how many enterprise routers can be created, how many attachments can be created for each enterprise router, and how many routes can be added to each route table.

You can also request for increased quotas if your existing quotas cannot meet your service requirements.

13.2 Viewing Quotas

Scenarios

The following provides operations for you to view the quotas of enterprise routers and related resources in your account.

How Do I View My Quotas?

1. Log in to the management console.
2. In the upper right corner of the page, click .
   The **Quotas** page is displayed.
3. View the used and total quota of each type of resources on the displayed page.
   If a quota cannot meet service requirements, apply for a higher quota.

13.3 Increasing Quotas

Scenarios

The following provides operations for you to increase the quotas of enterprise routers and related resources in your account.

How Do I Apply for a Higher Quota?

The system does not support online quota adjustment. If you need to adjust a quota, contact the operations administrator.

Before contacting the operations administrator, make sure that the following information has been obtained:

- Account name, which can be obtained by performing the following operations:

  Log in to the management console using the cloud account, click the username in the upper right corner, select **My Credentials** from the drop-down list, and obtain the account name on the **My Credentials** page.
- Quota information, which includes service name, quota type, and required quota

14 FAQ

14.1 Why Traffic Can't Be Forwarded from a VPC with a Route Destination of 0.0.0.0/0 to Its Enterprise Router?

Scenarios

Traffic cannot be forwarded from a VPC to the enterprise router that the VPC is attached to if you set the destination of a route to 0.0.0.0/0 in the VPC route table and:

- An ECS in the VPC has an EIP bound.

  NOTE

  Refer to solution 1.

- ELB, NAT Gateway, VPC Endpoint and DCS are deployed in the VPC.

  NOTE

  Refer to solution 1 or solution 2.

  When method 2 is used, if a VPC wants to access public network, the traffic from the VPC is forwarded to the enterprise router and then to the public network. For this reason, if a VPC accesses the public network using an EIP, do not use this method.

Solutions

Select a solution based on your actual service scenario.

- Solution 1: Change the destination (0.0.0.0/0) of the default route to a specific IP address range, for example, 192.168.0.0/16.
- Solution 2: Add eight routes with specific IP address ranges as the destination to replace the default route (with a destination of 0.0.0.0/0).

Table 14-1 Route destinations and next hops

Destination	Next Hop
128.0.0.0/1	Enterprise router
64.0.0.0/2	Enterprise router
32.0.0.0/3	Enterprise router
16.0.0.0/4	Enterprise router
8.0.0.0/5	Enterprise router
4.0.0.0/6	Enterprise router
2.0.0.0/7	Enterprise router
1.0.0.0/8	Enterprise router

14.2 How Do I Route Traffic to 100.64.x.x Through an Enterprise Router?

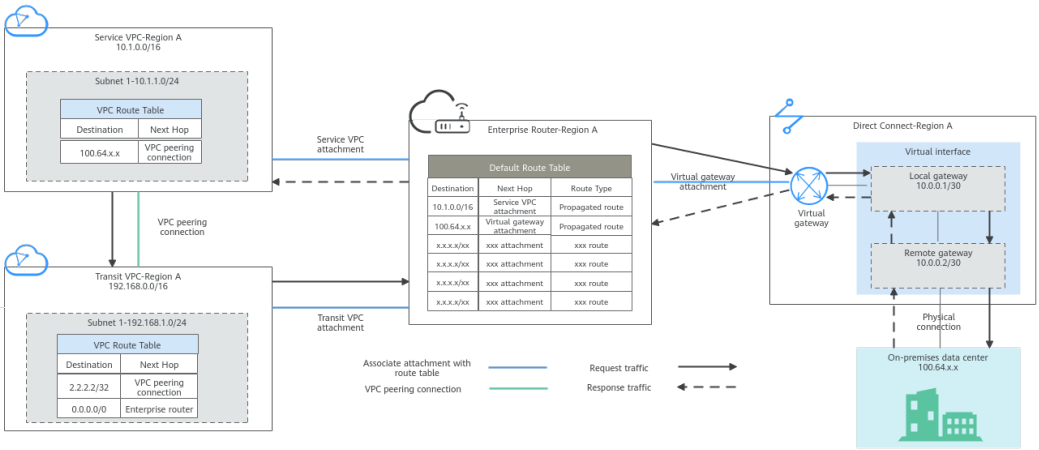
Scenarios

A route with 100.64.x.x as the destination and an enterprise router as the next hop cannot be added to a VPC route table.

Solutions

If you want to route traffic to 100.64.x.x through an enterprise router, you need to create a transit VPC. **Figure 14-1** shows the network diagram.

Figure 14-1 Transit VPC network diagram



The request traffic from the service VPC to the on-premises data center will be forwarded through the transit VPC, but the response traffic will not. For details, see **Table 14-2**.

Table 14-2 Network traffic flows

Path	Description
Request traffic: service VPC → transit VPC → enterprise router → virtual gateway → on-premises data center	1. The service VPC route table has a route with the VPC peering connection as the next hop to forward traffic from the service VPC to the transit VPC. 2. The transit VPC route table has a route with next hop set to the enterprise router to forward traffic from the transit VPC to the enterprise router. 3. The enterprise router route table has a route with next hop set to virtual gateway attachment to forward traffic from the enterprise router to the virtual gateway. 4. The virtual gateway is connected to the virtual interface. Traffic from the virtual gateway is forwarded to the physical connection through the remote gateway of the virtual interface 5. Traffic is sent to the on-premises data center over the connection.
Response traffic: on-premises data center → virtual gateway → enterprise router → service VPC	1. Traffic is forwarded to the virtual interface through the connection. 2. The virtual interface is connected to the virtual gateway. Traffic from the virtual interface is forwarded to the virtual gateway through the local gateway of the virtual interface. 3. Traffic is forwarded from the virtual gateway to enterprise router. 4. The enterprise router route table has a route with next hop set to the service VPC attachment to forward traffic from the enterprise router to the service VPC.

The required resources and routes are as follows:

- **Table 14-3**: Required service VPC, transit VPC, enterprise router, and Direct Connect connection that connects the cloud and the on-premises data center
- **Table 14-4**: Required routes of the service VPC, transit VPC, and enterprise router

Table 14-3 Resource planning

Resource	Quantity	Description
VPC	2	Service VPC that your services are deployed and needs to be attached to the enterprise router • VPC CIDR block: 10.1.0.0/16 • Subnet CIDR block: 10.1.1.0/24

Resource	Quantity	Description
		Transit VPC that is connected to the service VPC over a VPC peering connection and needs to be attached to the enterprise router • VPC CIDR block: 192.168.0.0/16 • Subnet CIDR block: 192.168.1.0/24
Enterprise router	1	Three attachments on the enterprise router: • Service VPC attachment: service VPC • Transit VPC attachment: transit VPC • Virtual gateway attachment: virtual gateway of Direct Connect
Direct Connect	1	• Connection • Virtual gateway that needs to be attached to the enterprise router • Virtual interface – Local gateway: 10.0.0.1/30 – Remote gateway: 10.0.0.2/30 – Remote subnet: subnet of the on-premises data center (100.64.x.x)

Table 14-4 Route planning

Route Table	Destination	Next Hop	Route Type
Service VPC	100.64.x.x	VPC peering connection	Static route (custom)
Transit VPC	2.2.2.2/32 **NOTE** 2.2.2.2/32 is mandatory and must be added.	VPC peering connection	Static route (custom)
	0.0.0.0/0	Enterprise router	Static route (custom)
Enterprise router	10.1.0.0/16	Service VPC attachment	Propagated route
	100.64.x.x	Virtual gateway attachment	Propagated route

Step 1 Create a transit VPC, attach it to the enterprise router, and associate the transit VPC with the default route table of the enterprise router.

- The subnet of the transit VPC cannot overlap with that of the service VPC, or the VPC peering connection to be created in **Step 2** cannot take effect.

- The transit VPC cannot have the following situations. Otherwise, the default route (0.0.0.0/0) to be configured in **Step 3** cannot forward traffic.
  - An ECS in the VPC has an EIP bound.
  - The VPC is being used by ELB (either dedicated or shared load balancers), NAT Gateway, VPC Endpoint, and DCS.

Step 2 Create a VPC peering connection between the service VPC and transit VPC.

NOTICE

You do not need to add routes for the VPC peering connection. For details about the routes to be added, see **Step 3**.

Step 3 Add routes to the VPC route tables.

For details about required routes, see **Table 14-4**.

1. Add the route to the service VPC route table.
2. Add two routes to the transit VPC route table.

----End

14.3 How Do I Enable Two Attachments of an Enterprise Router to Learn Routes from Each Other?

If you want two attachments of an enterprise router to learn routes from each other, the router and each attachment must have a unique ASN. In this way, the enterprise router advertises the learned route information between the attachments.

If you want a virtual gateway and a VPN gateway attached to an enterprise router to learn routes from each other, their ASNs can be as follows:

- Enterprise router: 64512
- Virtual gateway attachment: 64513 (BGP ASN of the virtual gateway)
- VPN gateway attachment: 64515 (BGP ASN of the VPN gateway)

NOTE

VPC attachments do not support route learning.

A Change History

Released On	Description
2024-11-30	This issue is the first official release.

