Enterprise Router

User Guide

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Contents

1 Permissions Management

1.1 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 1-1 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**.

For the permissions of other services, see **System Permissions**.

Process Flow

Figure 1-1 Process for granting Enterprise Router permissions
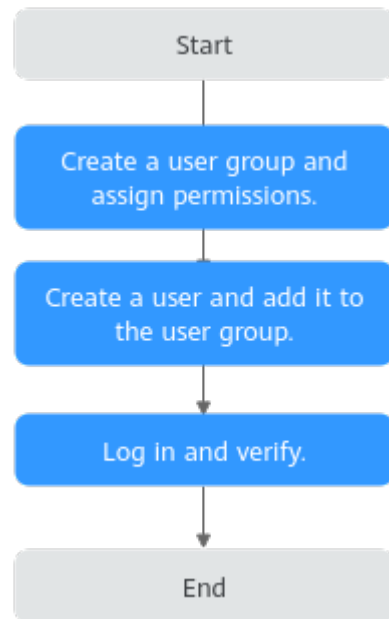
1. **Create a user group and assign permissions**.

   Create a user group on the IAM console, and assign the **ER ReadOnlyAccess** permission to the group.

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

   Create a user on the IAM console and add the user to the group created in **1**.

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.

1.2 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"
            ]
        }
    ]
}
```

2 Enterprise Routers

2.1 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 2-1**.

Table 2-1 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
Enterprise Project	Mandatory Select an enterprise project that the enterprise router will be added to. An enterprise project facilitates project-level management and grouping of cloud resources and users. The default project is **default**.	default
Tag	Optional Add tags to help you quickly find your enterprise router. For details, see **Overview**.	**Tag key**: test **Tag value**: 01
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**.

2.2 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 2-2**.

Table 2-2 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
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

Parameter	Setting	Example Value
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
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

2.3 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**.
- Tags. For details, see **Viewing a Tag**.

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

2.4 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.

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

3 Attachments

3.1 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 3-1 Attachments
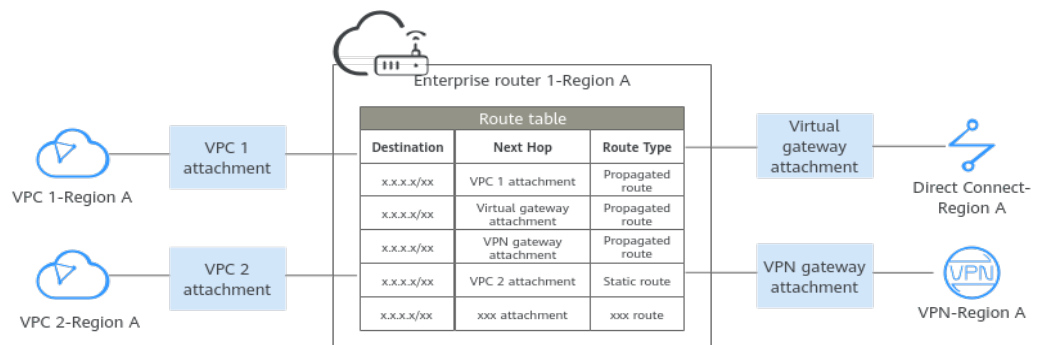
Table 3-1 Attachments

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**	**Viewing an 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**	**Viewing an Attachment**	**Deleting a VPN Gateway Attachment**

Table 3-2 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**
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**

3.2 VPC Attachments

3.2.1 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 3-3**.

Table 3-3 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

Parameter	Setting	Example Value

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

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**. 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.	-
Tag	Optional Add tags to help you quickly find your attachment. For details, see **Overview**.	**Tag key**: test **Tag value**: 01

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**.

3.2.2 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

3.3 Virtual Gateway Attachments

3.3.1 Creating a Virtual Gateway Attachment

You can create a Direct Connect virtual gateway attachment for an enterprise router.

After this attachment is created, you can use Direct Connect and Enterprise Router to set up a hybrid cloud network.

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*.

3.3.2 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

3.4 VPN Gateway Attachments

3.4.1 Creating a VPN Gateway Attachment

You can create a VPN gateway attachment for an enterprise router.

After this attachment is created, you can use VPN and Enterprise Router to set up a hybrid cloud network.

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*.

3.4.2 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

3.5 Global DC Gateway Attachments

3.5.1 Creating a Global DC Gateway Attachment

You can create a Direct Connect global DC gateway attachment for an enterprise router.

After this attachment is created, you can use Direct Connect and Enterprise Router to set up a hybrid cloud network.

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

3.5.2 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**.

----End

3.6 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 3-4 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

3.7 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, creation time, and tags.
- If you click the attached resource, you will go to the details page of the attached resource.

----End

4 Route Tables

4.1 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 4-1 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.

4.2 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 4-2**.

Table 4-2 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.	-
Tag	Optional Add tags to help you quickly find your route table. For details, see **Overview**.	**Tag key**: test **Tag value**: 01

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

4.3 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 4-3 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

4.4 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

4.5 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

5 Associations

5.1 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 5-1 Associations
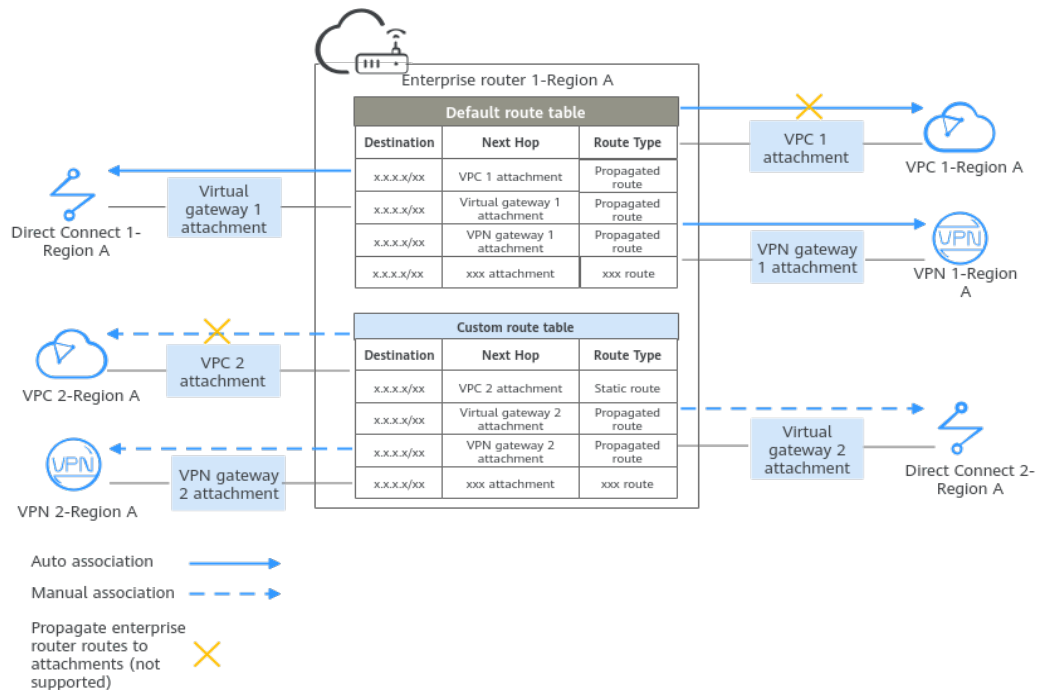
Table 5-1 Associations

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 5-1** 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		

5.2 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 5-2**.

Table 5-2 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

5.3 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

5.4 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

6 Propagations

6.1 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 6-1 Propagated routes and static routes
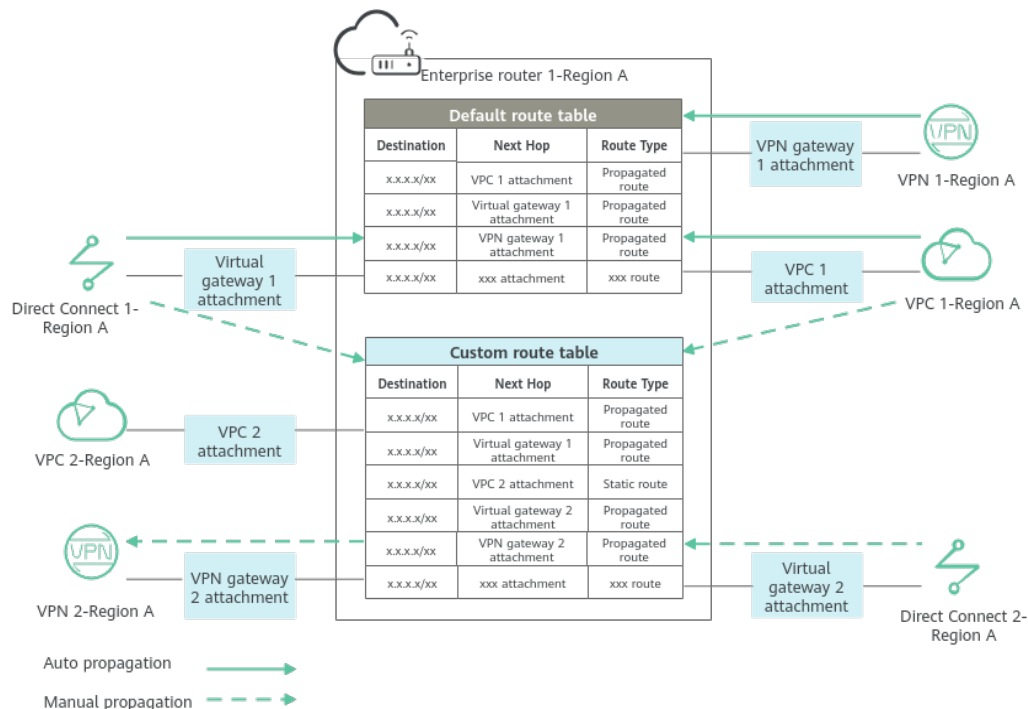
Table 6-1 Propagations

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 6-1** 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		

6.2 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 6-2**.

Table 6-2 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

6.3 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

6.4 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

7 Routes

7.1 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 7-1 Propagated routes and static routes
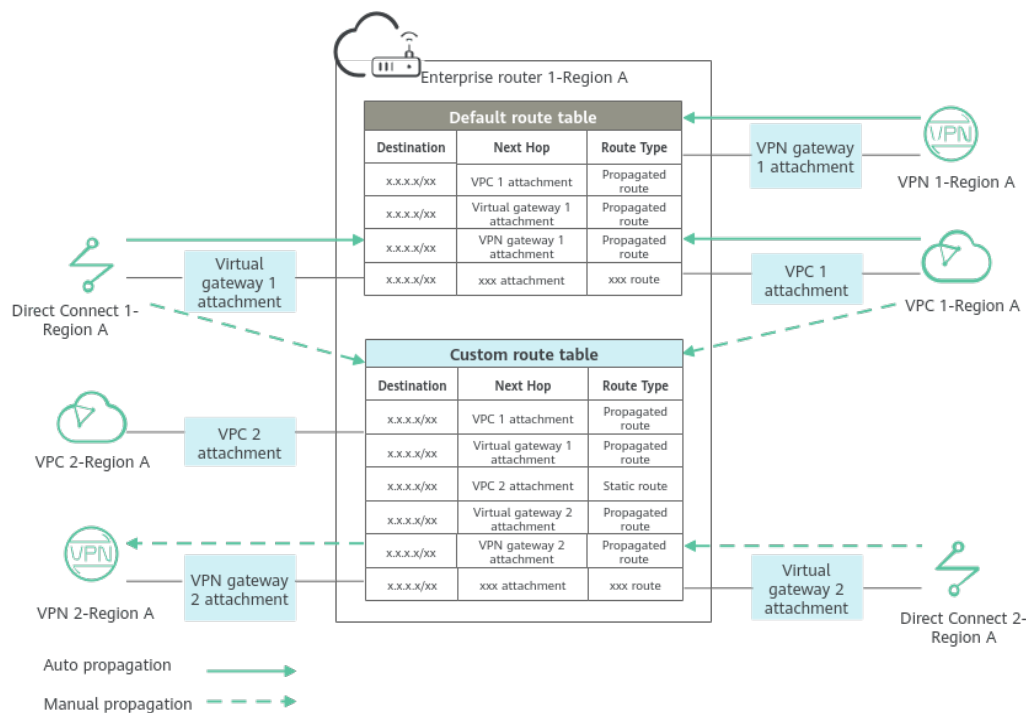
Table 7-1 Route types

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 7-1** 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.
- If the destinations of different routes overlap, the longest prefix match routing is used. The route that has the longest subnet mask and is the most specific of the matching table entries is preferentially used to determine the next hop.

  For example, if the destination of traffic is 192.168.1.12/32, the destination of one route is 192.168.0.0/16 with a VPN attachment as the next hop, and the destination of another route B is 192.168.1.0/24 with a VPC attachment as its next hop, the traffic preferentially matches the route with the VPC attachment as the next hop.

7.2 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 7-2**.

Table 7-2 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.	-
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. **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

7.3 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 7-3**.

Table 7-3 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. **VPC**: A VPC is attached to the enterprise router. For more information, see **Attachment Overview**.	VPC

Parameter	Setting	Example Value
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

7.4 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

7.5 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 [C] to refresh the route list. The route does not exist in the list.

----End

8 Routing Control

8.1 Route Policies

8.1.1 Route Policy Overview

Introduction

Route policies filter routes. You can configure route policy values to change the paths through which network traffic passes.

A route policy can be applied to the following types of attachments:

- Virtual gateway attachments
- VPN gateway attachments
- Global DC gateway attachments

An enterprise router can use a route policy to:

- Advertise only the routes that match the conditions specified in the route policy.
- Accept only wanted and valid routes. This reduces route table size and improves network security.
- Filter routes. To enrich routing information, a routing protocol may import routes discovered by other routing protocols. Only the routes that match the conditions of the route policy can be imported and the attributes of the routes can be changed as required.
- Change the policy values of routes as needed.

Advantages

- The size of route tables can be controlled to conserve system resources.
- The route advertisement and acceptance can be controlled to improve network security.
- Route policy values can be modified to control traffic and improve network performance.

Functions

A route policy can contain one or more route policy nodes. A node consists of match conditions and policy values and can be considered as a route filter.

- Routes that match conditions are allowed or denied. For details, see **Table 8-1**.

- Policy values of routes that match conditions can be changed. For details, see **Table 8-2**.

Table 8-1 Route match conditions

Match Condition	Description
Route types	- Static: Manually configured routes Custom routes and propagated routes of VPC attachments in enterprise router route tables are static routes. - BGP: Routes learned through BGP Direct Connect virtual gateways communicate with enterprise routers using BGP so the routes of virtual gateway attachments propagated to enterprise router route tables are BGP routes. Also, the routes of VPN gateway attachments and global DC gateway attachments propagated to enterprise router route tables are BGP routes.
IP prefix lists	An IP prefix list contains prefix rules for route filtering. You can define IP prefixes and netmasks in prefix rules to match the destination addresses or next hops of routes. An IP prefix list is used to filter routes that are advertised and received by dynamic routing protocols. For more information, see **IP Prefix List Overview**.
AS_Path lists	An AS_Path list is a collection of filters that are used to filter BGP routes based on AS_Path attributes contained in BGP routes. AS_Path attributes record the number of each AS that BGP routes pass through from the source to the destination in distance-vector order. AS_Path attributes are private attributes of BGP and AS_Path filters take effect only on BGP routes. For more information, see **AS_Path List Overview**.

Table 8-2 Route policy values

Policy Value	Description
PrefVal	• A larger PrefVal value indicates a higher route priority. • You can change the PrefVal value of a route by changing the PrefVal value in the route policy. The default PrefVal values of routes for different types of enterprise router attachments are as follows: – Virtual gateway attachments: 100 – VPN gateway attachments: 80 – Global DC gateway attachments: 100
AS_Path	• AS_Path attributes record the number of each AS that BGP routes pass through from the source to the destination in distance-vector order. • You can add, replace, or delete AS_Path policy values. – Add a policy value to the left of AS_Path. – Replace the original policy value of AS_Path. – Delete the specified policy value of AS_Path.

Match Rules

A route policy can contain one or more nodes. A node consists of match conditions and policy values. **Figure 8-1** describes the match process. When a route policy is used to filter routes, a node with a smaller number is matched first.

• If a route matches all filtering conditions of a node:
    – If **Action** of the node is **Allow**, the route is allowed.
      You can add, replace, or delete policy values.
    – If **Action** of the node is **Deny**, the route is denied.
• If a route does not match any node in the route policy, the route is denied.

Figure 8-1 Match process
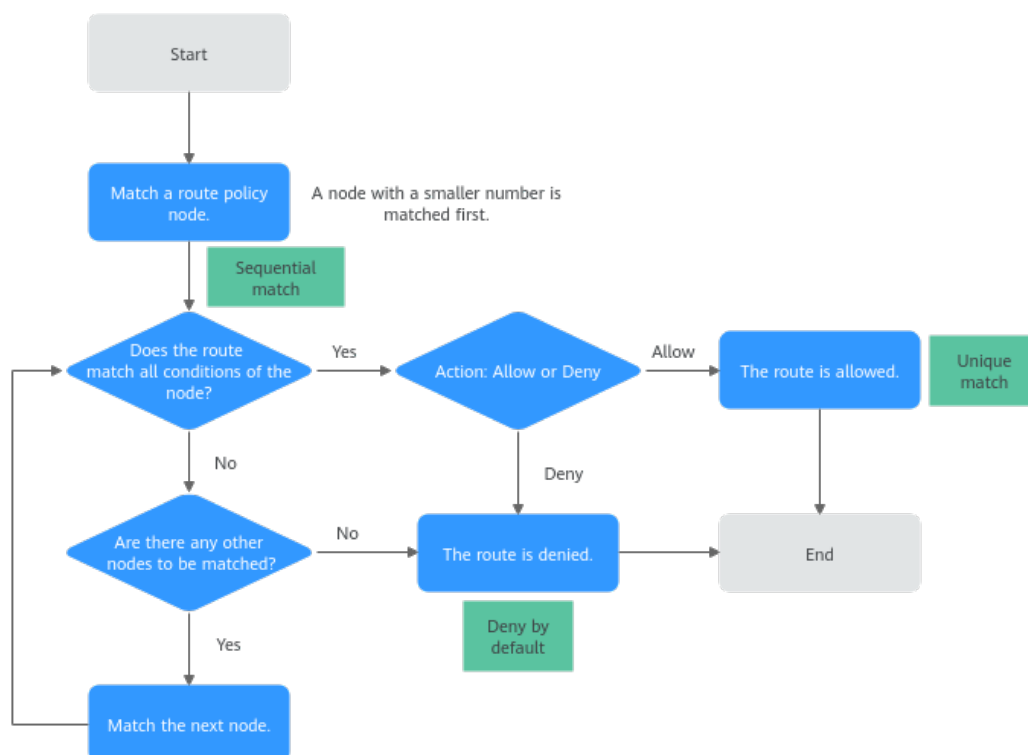
A route policy filters routes by sequential match, unique match, or deny by default.

- Sequential match: Nodes will be matched by sequence, and a node with a smaller number is matched first. Nodes in a route policy may be sorted in different orders if their numbers are changed, and the filtering results may be different.

- Unique match: If a route matches a node, it no longer tries to match other nodes.

- Deny by default: By default, routes that do not match any node in a route policy are denied. If a route policy has one or more deny nodes, you need to create a node to allow all other routes.

Notes and Constraints

- By default, an account can have up to five route policies.

- By default, a route policy can have up to 100 nodes.

- Changing a route policy will also change the associated routes. To reduce the impact on network performance, a route policy can only be changed once within 40 seconds.

8.1.2 Creating a Route Policy

Scenarios

This section describes how to create a route policy.

Notes and Constraints

- Each node in a route policy must have a unique number.
- Each match condition of a node must be unique. For example, a node cannot have two IP prefix lists selected as the match condition at the same time.

Procedure

Step 1 Go to the **Route Policies** page.

Step 2 Click **Create Route Policy** in the upper right corner.

The **Create Route Policy** page is displayed.

Step 3 Configure the parameters based on **Table 8-3**.

Table 8-3 Parameters for creating a route policy

Parameter	Description	Example Value
Name	Mandatory Enter the name of the route policy. The name: • Can contain 1 to 64 characters. • Can contain letters, digits, underscores (_), hyphens (-), and periods (.).	routePolicy-ab
Description	Optional Enter the description of the route policy in the text box as required.	-
Node Number	Mandatory A route policy consists of one or more nodes. When a route policy is used to filter routes, a node with a smaller number is matched first. Enter a value from 0 to 65535.	20
Action	Mandatory Set it to **Allow** or **Deny**. • If **Action** of a node is set to **Allow** and a route matches all the filtering conditions of the node, the route is allowed. • If **Action** of a node is set to **Deny** and a route matches all the filtering conditions of the node, the route is denied. **NOTICE** By default, routes that do not match any node in a route policy are denied. If a route policy has one or more deny nodes, you need to create a node to allow all other routes.	Allow

Parameter	Description	Example Value

Match Condition	Mandatory
	
	Select match conditions. You can select a route type, prefix list, or AS_Path list.
	
	● Route type
	
	  – Static: Manually configured routes Custom routes and propagated routes of VPC attachments in enterprise router route tables are static routes.
	
	  – BGP: Routes learned through BGP Direct Connect virtual gateways communicate with enterprise routers using BGP so the routes of virtual gateway attachments propagated to enterprise router route tables are BGP routes.
	
	  Also, the routes of VPN gateway attachments and global DC gateway attachments propagated to enterprise router route tables are BGP routes.
	
	● An IP prefix list contains prefix rules for route filtering. You can define IP prefixes and netmasks in prefix rules to match the destination addresses or next hops of routes. For more information, see **IP Prefix List Overview**.
	
	● An AS_Path list is a collection of filters that are used to filter BGP routes based on AS_Path attributes contained in BGP routes. AS_Path attributes record the number of each AS that BGP routes pass through from the source to the destination in distance-vector order. For more information, see **AS_Path List Overview**.
		● Route type: BGP
		
		● IP prefix list: prefixFilter-ab
		
		● AS_Path list: asPathFilter-ab

Parameter	Description	Example Value

Policy Value	Optional
	
	You can configure policy values for a route as required if you set **Action** to **Allow**. Each node can have up to two policy values. You can click **Add Policy Value** to add policy values.
	
	● PrefVal:
	A larger PrefVal value indicates a higher route priority.
	
	You can change the PrefVal value of a route by changing the PrefVal value in the route policy.
	
	A PrefVal value must be an integer.
	
	The default PrefVal values of routes for different types of enterprise router attachments are as follows:
	
	  – Virtual gateway attachments: 100
	
	  – VPN gateway attachments: 80
	
	  – Global DC gateway attachments: 100
	
	● AS_Path attributes record the number of each AS that BGP routes pass through from the source to the destination in distance-vector order.
	You can add, replace, or delete AS_Path policy values.
	
	  – Add a policy value to the left of AS_Path.
	
	  – Replace the original policy value of AS_Path.
	
	  – Delete the specified policy value of AS_Path.
	
	AS_Path policy values must meet the following requirements:
	
	  – Each value is an integer in the format of x or x.y. (x: 1 to 65535; y: 0 to 65535).
	
	  – A maximum of 10 values can be entered at a time.
	
	  – Each value must be unique.
		● PrefVal: 20
		● AS_Path: 2000 10.2 3.7 500

Step 4 Click **Add Node** to add more nodes if needed.

Step 5 Click **Create Now**.

The route policy list is displayed.

Step 6 View the route policy status.

If the status is **Normal**, the route policy has been created.

----End

Follow-Up Operations

A route policy takes effect only after you associate it with an enterprise router. For details, see **Associating a Route Policy with an Enterprise Router**.

8.1.3 Associating a Route Policy with an Enterprise Router

Scenarios

You can associate a route policy with an enterprise router to control the routes of the enterprise router for traffic sending and receiving. For details, see **Table 8-4**.

Table 8-4 Enterprise router routing control by a route policy

Traffic Direction	Description
Routes to send traffic by an enterprise router: From ER-A to Direct Connect virtual gateway or VPN gateway	Control routes used by an enterprise router to send traffic to a Direct Connect virtual gateway or VPN gateway. These routes, including both static and BGP routes, are in the enterprise router route table. On the **Associations** tab of the enterprise router, associate a route policy with the association of an attachment. For details, see **Associating a Route Policy with the Association of an Attachment**.
Routes to receive traffic by an enterprise router: From Direct Connect virtual gateway or VPN gateway to ER-A	Control routes used by an enterprise router to receive traffic from a Direct Connect virtual gateway or VPN gateway. These routes are BGP routes. On the **Propagations** tab of the enterprise router, associate a route policy with the propagation of an attachment. For details, see **Associating a Route Policy with the Propagation of an Attachment**.

Notes and Constraints

- Route policies change the paths through which traffic passes. Evaluate the impact on your services before associating a route policy with an enterprise router.

Associating a Route Policy with the Association of an Attachment

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 page 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 target route table and then the **Associations** tab.

The association list is displayed.

Step 7 Locate the row that contains the target association and click **Modify** in the **Operation** column.

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

Step 8 Select the created route policy and click **OK**.

If there is no desired route policy, create one by referring to **Creating a Route Policy**.

Return to the association list. You can see that the route policy has been associated with the corresponding association.

----End

Associating a Route Policy with the Propagation of an Attachment

Step 1 Search for the target enterprise router by name.

Step 2 Go to the **Route Tables** tab page 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 3 Click the target route table and then the **Propagations** tab.

The propagation list is displayed.

Step 4 Locate the row that contains the target propagation and click **Modify** in the **Operation** column.

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

Step 5 Select the created route policy and click **OK**.

If there is no desired route policy, create one by referring to **Creating a Route Policy**.

Return to the propagation list. You can see that the route policy has been associated with the corresponding propagation.

----End

8.1.4 Changing the Route Policy Associated with an Enterprise Router

Scenarios

This section describes how to change the route policy for an enterprise router.

- **Changing the Route Policy for an Association**
- **Changing the Route Policy for a Propagation**

Notes and Constraints

Route policies change the paths through which traffic passes. Evaluate the impact on your services before changing the route policy associated with an enterprise router.

Changing the Route Policy for an Association

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 page 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 target route table and then the **Associations** tab.

The association list is displayed.

Step 7 Locate the row that contains the target association and click **Modify** in the **Operation** column.

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

Step 8 Select the route policy and click **OK**.

If there is no desired route policy, create one by referring to **Creating a Route Policy**.

Return to the association list. You can see that the route policy has been associated with the corresponding association.

----End

Changing the Route Policy for a Propagation

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 page 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 target route table and then the **Propagations** tab.

The propagation list is displayed.

Step 7 Locate the row that contains the target propagation and click **Modify** in the **Operation** column.

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

Step 8 Select the route policy and click **OK**.

If there is no desired route policy, create one by referring to **Creating a Route Policy**.

Return to the propagation list. You can see that the route policy has been associated with the corresponding propagation.

----End

8.1.5 Disassociating a Route Policy from an Enterprise Router

Scenarios

This section describes how to disassociate a route policy from an enterprise router.

- **Disassociating a Route Policy from an Attachment**
- **Disassociating a Route Policy from a Propagation**

Notes and Constraints

Route policies change the paths through which traffic passes. Evaluate the impact on your services before disassociating a route policy from an enterprise router.

Disassociating a Route Policy from an Attachment

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 page 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 target route table and then the **Associations** tab.

The association list is displayed.

Step 7   Locate the row that contains the target association and click **Modify** in the **Operation** column.

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

Step 8   Move the cursor to the associated route policy and click ✕ .

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

Return to the association list. You can see that the route policy has been disassociated from the corresponding association.

----End

Disassociating a Route Policy from a Propagation

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 page 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 target route table and then the **Propagations** tab.

The propagation list is displayed.

Step 7   Locate the row that contains the target propagation and click **Modify** in the **Operation** column.

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

Step 8   Move the cursor to the associated route policy and click ✕ .

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

Return to the propagation list. You can see that the route policy has been disassociated from the corresponding propagation.

----End

8.1.6 Modifying a Route Policy

Scenarios

You can modify the name and description of a created route policy.

Procedure

Step 1 Go to the **Route Policies** page.

Step 2 In the route policy list, modify the target route policy.

Modifying the name: Move the cursor to the route policy name and click ✎. In the dialog box that is displayed, enter the name and click **OK** to save the modification.

Modifying the description: Move the cursor to the description and click ✎. In the dialog box that is displayed, enter the description and click **OK** to save the modification.

----End

8.1.7 Viewing a Route Policy

Scenarios

This section describes how to view route policies, including their name, status, description, and creation time.

Procedure

Step 1 Go to the **Route Policies** page.

Step 2 Click the name of the target route policy.

The page that shows the details about the route policy is displayed.

----End

8.1.8 Deleting a Route Policy

Scenarios

This section describes how to delete route policies.

Notes and Constraints

If you want to delete a route policy associated with an attachment, disassociate the route policy first by referring to **Disassociating a Route Policy from an Enterprise Router**.

Procedure

Step 1 Go to the **Route Policies** page.

Step 2 Locate the row that contains the route policy you want to delete and click **Delete** in the **Operation** column.

A confirmation dialog box is displayed.

Step 3 Confirm the information and click **OK**.

Deleted route policies cannot be recovered.

----End

8.1.9 Adding a Policy Node to a Route Policy

Scenarios

A route policy can contain one or more route policy nodes, each of which consists of match conditions and policy values and can be considered as a route filter. You can add a node to a route policy if needed.

Notes and Constraints

- Route policies change the path through which network traffic passes. If a route policy has already been associated with an enterprise router, evaluate the impact on services before adding a node to the policy.
- Each node in a route policy must have a unique number.

Prerequisites

A route policy is available. You can create one by referring to **create a route policy**.

Procedure

Step 1 Go to the **Route Policies** page.

Step 2 Click the name of the target route policy.

The node list is displayed.

Step 3 Click **Add Node** in the upper left corner of the page.

The page for adding a policy node is displayed.

Step 4 Configure the parameters based on **Table 8-5**.

Table 8-5 Parameters for adding a node

Parameter	Description	Example Value
Node Number	Mandatory A route policy consists of one or more nodes. When a route policy is used to filter routes, a node with a smaller number is matched first. Enter a value from 0 to 65535.	20

Parameter	Description	Example Value
Action	Mandatory Set it to **Allow** or **Deny**. ● If **Action** of a node is set to **Allow** and a route matches all the filtering conditions of the node, the route is allowed. ● If **Action** of a node is set to **Deny** and a route matches all the filtering conditions of the node, the route is denied. **NOTICE** By default, routes that do not match any node in a route policy are denied. If a route policy has one or more deny nodes, you need to create a node to allow all other routes.	Allow
Match Condition	Mandatory Select match conditions. You can select a route type, prefix list, or AS_Path list. ● Route type – Static: Manually configured routes Custom routes and propagated routes of VPC attachments in enterprise router route tables are static routes. – BGP: Routes learned through BGP Direct Connect virtual gateways communicate with enterprise routers using BGP so the routes of virtual gateway attachments propagated to enterprise router route tables are BGP routes. Also, the routes of VPN gateway attachments and global DC gateway attachments propagated to enterprise router route tables are BGP routes. ● An IP prefix list contains prefix rules for route filtering. You can define IP prefixes and netmasks in prefix rules to match the destination addresses or next hops of routes. For more information, see **IP Prefix List Overview**. ● An AS_Path list is a collection of filters that are used to filter BGP routes based on AS_Path attributes contained in BGP routes. AS_Path attributes record the number of each AS that BGP routes pass through from the source to the destination in distance-vector order. For more information, see **AS_Path List Overview**.	● Route type: BGP ● IP prefix list: prefixFilter-ab ● AS_Path list: asPathFilter-ab

Parameter	Description	Example Value

Policy Value	Optional
	
	You can configure policy values for a route as required if you set **Action** to **Allow**. Each node can have up to two policy values. You can click **Add Policy Value** to add policy values.
	
	● PrefVal:
	A larger PrefVal value indicates a higher route priority.
	
	You can change the PrefVal value of a route by changing the PrefVal value in the route policy.
	
	A PrefVal value must be an integer.
	
	The default PrefVal values of routes for different types of enterprise router attachments are as follows:
	  – Virtual gateway attachments: 100
	  – VPN gateway attachments: 80
	  – Global DC gateway attachments: 100
	● AS_Path attributes record the number of each AS that BGP routes pass through from the source to the destination in distance-vector order.
	You can add, replace, or delete AS_Path policy values.
	  – Add a policy value to the left of AS_Path.
	  – Replace the original policy value of AS_Path.
	  – Delete the specified policy value of AS_Path.
	AS_Path policy values must meet the following requirements:
	  – Each value is an integer in the format of x or x.y. (x: 1 to 65535; y: 0 to 65535).
	  – A maximum of 10 values can be entered at a time.
	  – Each value must be unique.
		● PrefVal: 20
		● AS_Path: 2000 10.2 3.7 500

Step 5 Click **Add Node** to add more nodes if needed.

Step 6 Click **OK**.

The node list is displayed. You can view the added nodes.

----End

8.1.10 Modifying a Policy Node in a Route Policy

Scenarios

This section describes how to modify a node in a route policy.

Notes and Constraints

- Route policies change the path through which network traffic passes. If a route policy has already been associated with an enterprise router, evaluate the impact on services before modifying its nodes.

- Changing a route policy will also change the associated routes. To reduce the impact on network performance, a route policy can only be changed once within 40 seconds.

Procedure

Step 1 Go to the **Route Policies** page.

Step 2 Click the name of the target route policy.

The node list is displayed.

Step 3 Locate the row that contains the node you want to modify and click **Modify** in the **Operation** column.

The page for modifying a node is displayed.

Step 4 Configure the parameters based on **Table 8-6**.

Table 8-6 Parameters for modifying a node

Parameter	Description	Example Value
Node Number	Cannot be modified.	-
Action	Cannot be modified.	-

Parameter	Description	Example Value
Match Condition	Mandatory Select match conditions. You can select a route type, prefix list, or AS_Path list. ● Route type 　– Static: Manually configured routes Custom routes and propagated routes of VPC attachments in enterprise router route tables are static routes. 　– BGP: Routes learned through BGP Direct Connect virtual gateways communicate with enterprise routers using BGP so the routes of virtual gateway attachments propagated to enterprise router route tables are BGP routes. 　Also, the routes of VPN gateway attachments and global DC gateway attachments propagated to enterprise router route tables are BGP routes. ● An IP prefix list contains prefix rules for route filtering. You can define IP prefixes and netmasks in prefix rules to match the destination addresses or next hops of routes. For more information, see **IP Prefix List Overview**. ● An AS_Path list is a collection of filters that are used to filter BGP routes based on AS_Path attributes contained in BGP routes. AS_Path attributes record the number of each AS that BGP routes pass through from the source to the destination in distance-vector order. For more information, see **AS_Path List Overview**.	● Route type: BGP ● IP prefix list: prefixFilter-ab ● AS_Path list: asPathFilter-ab

Parameter	Description	Example Value
Policy Value	Optional You can configure policy values for a route as required if you set **Action** to **Allow**. Each node can have up to two policy values. You can click **Add Policy Value** to add policy values. ● PrefVal: A larger PrefVal value indicates a higher route priority. You can change the PrefVal value of a route by changing the PrefVal value in the route policy. A PrefVal value must be an integer. The default PrefVal values of routes for different types of enterprise router attachments are as follows: – Virtual gateway attachments: 100 – VPN gateway attachments: 80 – Global DC gateway attachments: 100 ● AS_Path attributes record the number of each AS that BGP routes pass through from the source to the destination in distance-vector order. You can add, replace, or delete AS_Path policy values. – Add a policy value to the left of AS_Path. – Replace the original policy value of AS_Path. – Delete the specified policy value of AS_Path. AS_Path policy values must meet the following requirements: – Each value is an integer in the format of x or x.y. (x: 1 to 65535; y: 0 to 65535). – A maximum of 10 values can be entered at a time. – Each value must be unique.	● PrefVal: 20 ● AS_Path: 2000 10.2 3.7 500

Step 5 Click **OK**.

The node list is displayed. You can view the modified node.

----End

8.1.11 Exporting Policy Nodes in a Route Policy

Scenarios

You can export information of policy nodes in a route policy to an XLSX file. There are two options:

- Export all policy nodes in the route policy.
- Export only the selected policy nodes in the route policy.

Procedure

Step 1 Go to the **Route Policies** page.

Step 2 Click the name of the target route policy.

The node list is displayed.

Step 3 Above the policy node list, click **Export** and select the required operation.

- **Export all data to an XLSX file**: Export all policy nodes in the route policy.
- **Export selected data to an XLSX file**: Select the policy nodes to be exported and click **Export selected data to an XLSX file** to export the selected policy nodes.

----End

8.1.12 Viewing a Policy Node in a Route Policy

Scenarios

This section describes how to view a node in a route policy, including their number, action, match conditions, and policy values.

Procedure

Step 1 Go to the **Route Policies** page.

Step 2 Click the name of the target route policy.

The node list is displayed and you can view details about the node.

----End

8.1.13 Deleting a Policy Node from a Route Policy

Scenarios

This section describes how to delete a node from a route policy.

Notes and Constraints

- Route policies change the path through which network traffic passes. If a route policy has already been associated with an enterprise router, evaluate the impact on services before deleting its nodes.

- Each route policy must contain at least one node. If you want to delete the last node from a route policy, you can add a node and then delete the last node.

Procedure

Step 1 Go to the **Route Policies** page.

Step 2 Click the name of the target route policy.

The node list is displayed.

Step 3 In the node list, perform the following operations to delete a node:

- To delete a single node, locate the node you want to delete and click **Delete** in the **Operation** column.

  A confirmation dialog box is displayed.

- To delete multiple nodes, select the nodes and click **Delete** in the upper left corner of the list.

  A confirmation dialog box is displayed.

Step 4 Confirm the information and click **OK**.

Deleted nodes cannot be recovered.

----End

8.2 IP Prefix Lists

8.2.1 IP Prefix List Overview

Introduction

An IP prefix list contains prefix rules for route filtering. You can define IP prefixes and netmasks in prefix rules to match the destination addresses or next hops of routes. An IP prefix list is used to filter routes that are advertised and received by dynamic routing protocols. An IP prefix list is matched against routes using either of the following:

- Netmask length: A netmask length, together with an IP address, identifies an IP prefix. Each IP prefix in an IP prefix list is used to filter routes with the same IP prefix.

  For example, the netmask length of 10.1.0.0/16 is 16, and the valid prefix is 10.1.0.0.

- Netmask length range: A netmask length range can be defined in an IP prefix list to match routes with the same IP prefix or different netmask lengths within the specified range.

◯ **NOTE**

Currently, IP prefix lists only support IPv4 addresses.

IP Prefix Match Rules

An IP prefix list can contain multiple IP prefix rules. In **Figure 8-2**, routes to be filtered are matched against an IP prefix list by IP prefix rules in ascending order.

- If a route matches a prefix rule with **Action** set to **Allow**, the route is allowed. If the prefix rule has **Action** set to **Deny**, the route is denied.

- If a route does not match any prefix rule in the IP prefix list, the route is denied.

Figure 8-2 Match process
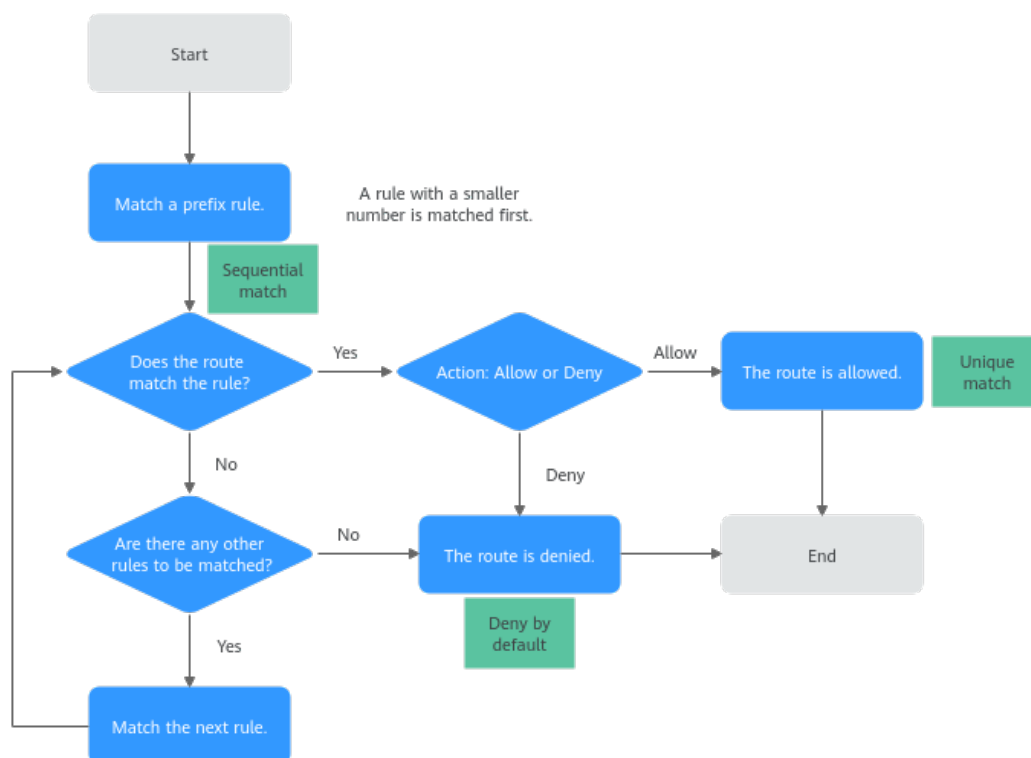
An IP prefix list filters routes by sequential match, unique match, or deny by default.

- Sequential match: A prefix rule with a smaller number is matched first. Prefix rules in an IP prefix list can be sorted by sequence number in different orders, leading to different filtering results.

- Unique match: If a route matches a prefix rule, it no longer tries to match other prefix rules.

- Deny by default: By default, routes that do not match any prefix rule in an IP prefix list are denied. If an IP prefix list has one or more deny rules, you need to create a rule to allow all other routes.

IP Prefix Netmask Match Rules

An IP prefix rule consists of an IP prefix, min. netmask length, and max. netmask length, as detailed in **Table 8-7**.

Table 8-7 Parameters for creating a prefix rule

Parameter	Description
IP prefix	An IP prefix consists of an IP address and a netmask in the format of *IP address/Netmask*, for example, 10.1.0.0/16. An IP prefix specifies the first bits of an IP address range that a route destination must match.
• Min. netmask length • Max. netmask length	If a route matches a prefix rule, the netmask length of the route destination is within a specified length range. In a prefix rule: • The min. netmask length cannot be smaller than the netmask length of the IP prefix. For example, if the netmask length of the IP prefix is 16, the min. netmask length must be greater than or equal to 16 (for example, 18). • The max. netmask length cannot be smaller than the min. netmask length. For example, if the min. netmask length is 18, the max. netmask length must be from 18 to 32 (for example, 20). A prefix rule uses min. and max. netmask lengths to filter routes based on the following: • If min. and max. netmask lengths are not specified, a route can only be filtered when its netmask length is the same as that of the IP prefix. • If only the min. netmask length is specified, a route can only be filtered when its netmask length is within [min. netmask length, 32]. • If only the max. netmask length is specified, a route can only be filtered when its netmask length is within [IP prefix netmask length, max. netmask length]. • If both min. and max. netmask lengths are specified, a route can only be filtered when its netmask length is within [min. netmask length, max. netmask length].

Table 8-8 lists example prefix rules and describes the requirements that routes to be filtered must meet.

Table 8-8 IP prefix rules

Prefix Rule	Route Can Be Filtered	Allowed IP Address Range	Denied IP Address Range

Example 1
• Action: Allow
• IP Prefix: 10.0.0.0/16
• Min. Netmask Length: Not specified
• Max. Netmask Length: Not specified
	A route can only be filtered when it meets both of the following conditions:
	• The first 16 bits are matched.
	• Netmask length: 16
		Both the two conditions are met: 10.0.0.0/16	• Only the first 16 bits are matched:
			  – 10.0.0.0/8
			  – 10.0.1.0/24
			  – 10.0.253.25/32
			• Only the netmask length is matched: 10.1.0.0/16

Example 2
• Action: Allow
• IP Prefix: 10.0.0.0/16
• Min. Netmask Length: 18
• Max. Netmask Length: Not specified
	A route can only be filtered when it meets both of the following conditions:
	• The first 16 bits are matched.
	• Netmask length: [18, 32]
		Both the two conditions are met:
		• 10.0.1.0/24
		• 10.0.253.25/32
			• Only the first 16 bits are matched:
			  – 10.0.0.0/8
			  – 10.0.0.0/16
			• Only the netmask length is matched: 10.1.0.0/20

Example 3
• Action: Allow
• IP Prefix: 10.0.0.0/16
• Min. Netmask Length: Not specified
• Max. Netmask Length: 24
	A route can only be filtered when it meets both of the following conditions:
	• The first 16 bits are matched.
	• Netmask length: [16, 24]
		Both the two conditions are met:
		• 10.0.0.0/16
		• 10.0.0.0/20
		• 10.0.1.0/24
			• Only the first 16 bits are matched:
			  – 10.0.0.0/8
			  – 10.0.253.25/32
			• Only the netmask length is matched: 10.1.0.0/20

Prefix Rule	Route Can Be Filtered	Allowed IP Address Range	Denied IP Address Range
Example 4 • Action: Allow • IP Prefix: 10.0.0.0/16 • Min. Netmask Length: 18 • Max. Netmask Length: 24	A route can only be filtered when it meets both of the following conditions: • The first 16 bits are matched. • Netmask length: [18, 24]	Both the two conditions are met: • 10.0.0.0/20 • 10.0.1.0/24	• Only the first 16 bits are matched: 　– 10.0.0.0/8 　– 10.0.0.0/16 　– 10.0.253.25/32 • Only the netmask length is matched: 10.1.0.0/20

When the first four octets in an IP prefix are set to 0.0.0.0:

- If the IP prefix netmask length is specified, all routes with the netmask length are allowed or denied.
- If both min. and max. netmask lengths are specified, all routes with netmask lengths in the range are allowed or rejected.

Table 8-9 describes the route matching rules if 0.0.0.0 used.

Table 8-9 Route matching rules if 0.0.0.0 used

Min. and Max. Netmask Lengths	IP Prefix	Matching Rule
• Min. Netmask Length: Not specified • Max. Netmask Length: Not specified	IP Prefix: 0.0.0.0/0	Matches only the default route (destination: 0.0.0.0/0). Example: Only default route (destination: 0.0.0.0/0) is allowed or denied.
	IP Prefix: 0.0.0.0/X (X is not 0)	Matches all routes with the netmask length of X. Example: If X is 8, all routes with the netmask length of 8 are allowed or denied.
• Min. Netmask Length: Specified • Max. Netmask Length: Not specified	IP Prefix: 0.0.0.0/0	Matches all the routes with netmask lengths within [min. netmask length, 32]. Example: If the min. netmask length is 20, all the routes with the netmask lengths from 20 to 32 are allowed or denied.

Min. and Max. Netmask Lengths	IP Prefix	Matching Rule
	IP Prefix: 0.0.0.0/X (X is not 0)	Matches all the routes with netmask lengths within [min. netmask length, 32]. Example: If X is 8 and the min. netmask length is 20, all the routes with the netmask lengths from 20 to 32 are allowed or denied.
● Min. Netmask Length: Not specified ● Max. Netmask Length: Specified	IP Prefix: 0.0.0.0/0	Matches all the routes with netmask lengths within [0, max. netmask length]. Example: If the max. netmask length is 28, all the routes with the netmask lengths from 0 to 28 are allowed or denied.
	IP Prefix: 0.0.0.0/X (X is not 0)	Matches all the routes with netmask lengths within [X, max. netmask length]. Example: If X is 8 and the max. netmask length is 28, all the routes with the netmask lengths from 8 to 28 are allowed or denied.
● Min. Netmask Length: Specified ● Max. Netmask Length: Specified	IP Prefix: 0.0.0.0/0	Matches all the routes with netmask lengths within [min. netmask length, max. netmask length]. Example: If min. and max. netmask lengths are 20 and 28, all the routes with the netmask lengths from 20 to 28 are allowed or denied.
	IP Prefix: 0.0.0.0/X (X is not 0)	Matches all the routes with netmask lengths within [min. netmask length, max. netmask length]. Example: If X, min. and max. netmask lengths are 8, 20, and 28, all the routes with the netmask lengths from 20 to 28 are allowed or denied.

Notes and Constraints

- By default, an account can have up to five IP prefix lists.
- By default, each IP prefix list can have up to 100 prefix rules.
- Changing an IP prefix list will also change the associated routes and traffic routing. To reduce the impact on network performance, a prefix list can only be changed once within 40 seconds.

8.2.2 Creating an IP Prefix List

Scenarios

This section describes how to create an IP prefix list.

Notes and Constraints

- An IP prefix list must have at least one prefix rule.
- Each prefix rule in an IP prefix list must have its unique sequence number and IP prefix.

Procedure

Step 1 Go to the **Prefix Lists** page.

Step 2 Click **Create Prefix List** in the upper right corner of the page.

The **Create Prefix List** dialog box is displayed.

Step 3 Configure the parameters based on **Table 8-10**.

Table 8-10 Parameters for creating an IP prefix list

Parameter	Description	Example Value
Name	Mandatory Enter a name for the IP prefix list. The name: - Can contain 1 to 64 characters. - Can contain letters, digits, underscores (_), hyphens (-), and periods (.).	prefixFilter-ab
Description	Optional Enter the description of the IP prefix list in the text box.	-

Parameter	Description	Example Value
Configuration	Mandatory Choose **Quick** or **Advanced**. ● **Quick** Enter the IP prefix in the CIDR format. An IP prefix specifies the first bits of an IP address range that a route destination must match. The following are parameters that you do not need to configure: – **Sequence Number**: Automatically generated. The sequence number increases by a multiple of 10, with that of the first rule set to 10. The subsequent numbers are 20, 30, and so on. – **Action**: **Allow** by default – **Min. Netmask Length** and **Max. Netmask Length** ● **Advanced** – **Sequence Number**: An IP prefix list consists of one or more prefix rules that are applied to filter routes based on their sequence numbers, in ascending order. A sequence number can be from 0 to 65535. You are advised to set the sequence number of the first rule to 20. – **Action**: Select **Allow** or **Deny**. If a route matches a prefix rule with **Action** set to **Allow**, the route is allowed. If the prefix rule has **Action** set to **Deny**, the route is denied. – **IP Prefix**: Enter the IP prefix in the CIDR format. This parameter specifies the first bits of an IP address range that a route destination must match. – **Min. Netmask Length**: It cannot be smaller than the netmask length of the IP prefix. For example, if the netmask length of the IP prefix is 16, the min. netmask length must be greater than or equal to 16 (for example, 18). – **Max. Netmask Length**: It cannot be smaller than the min. netmask length. For example, if the min. netmask length is 18, the max. netmask length must be from 18 to 32 (for example, 20).	● **Sequence Number**: 10 ● **Action**: Allow ● **IP Prefix**: 10.0.0.0/16 ● **Min. Netmask Length**: 20 ● **Max. Netmask Length**: 28

Step 4 Click **OK**.

You can view the created IP prefix list.

----End

Follow-Up Operations

Creating a Route Policy: An IP prefix list takes effect through a route policy.

8.2.3 Modifying the Name of an IP Prefix List

Scenarios

You can change the name of a created IP prefix list.

Procedure

Step 1 Go to the **Prefix Lists** page.

Step 2 Move the cursor to the IP prefix list name and click ✎. In the dialog box that is displayed, enter the name and click **OK** to save the modification.

----End

8.2.4 Viewing an IP Prefix List

Scenarios

This section describes how to view IP prefix lists, including their names, status, address family, description, and creation time.

Procedure

Step 1 Go to the **Prefix Lists** page.

Step 2 Click the name of the target IP prefix list.

The page that shows the details about the IP prefix list is displayed.

----End

8.2.5 Deleting an IP Prefix List

Scenarios

This section describes how to delete an IP prefix list.

Notes and Constraints

If the route policy that an IP prefix list to be deleted belongs to has been associated with an enterprise router, remove the IP prefix list from the route policy by referring to **Modifying a Policy Node in a Route Policy**.

Procedure

Step 1 Go to the **Prefix Lists** page.

Step 2 Locate the row that contains the target IP prefix list and click **Delete** in the **Operation** column.

A confirmation dialog box is displayed.

Step 3 Confirm the information and click **OK**.

Deleted IP prefix lists cannot be recovered.

----End

8.2.6 Adding a Prefix Rule to an IP Address Prefix List

Scenarios

This section describes how to add prefix rules to an IP prefix list. Each IP prefix list can have multiple prefix rules.

Notes and Constraints

- IP prefix rules change the path through which network traffic passes. If the route policy of a prefix rule has already been associated with an enterprise router, evaluate the impact on services before adding a prefix rule to the policy.
- Each prefix rule in an IP prefix list must have its unique sequence number and IP prefix.

Prerequisites

An IP prefix list is available. You can create one by referring to **Creating an IP Prefix List**.

Procedure

Step 1 Go to the **Prefix Lists** page.

Step 2 Click the name of the target IP prefix list.

The prefix rule list is displayed.

Step 3 Click **Add Prefix Rule** in the upper left corner of the list.

The **Add Prefix Rule** dialog box is displayed.

Step 4 Configure the parameters based on **Table 8-11**.

Table 8-11 Parameters for adding a prefix rule

Parameter	Description	Example Value
Configuration	Mandatory Choose **Quick** or **Advanced**. ● **Quick** Enter the IP prefix in the CIDR format. An IP prefix specifies the first bits of an IP address range that a route destination must match. The following are parameters that you do not need to configure: – **Sequence Number**: Automatically generated. The sequence number increases by a multiple of 10, with that of the first rule set to 10. The subsequent numbers are 20, 30, and so on. – **Action**: **Allow** by default – **Min. Netmask Length** and **Max. Netmask Length** ● **Advanced** – **Sequence Number**: An IP prefix list consists of one or more prefix rules that are applied to filter routes based on their sequence numbers, in ascending order. A sequence number can be from 0 to 65535. You are advised to set the sequence number of the first rule to 20. – **Action**: Select **Allow** or **Deny**. If a route matches a prefix rule with **Action** set to **Allow**, the route is allowed. If the prefix rule has **Action** set to **Deny**, the route is denied. – **IP Prefix**: Enter the IP prefix in the CIDR format. This parameter specifies the first bits of an IP address range that a route destination must match. – **Min. Netmask Length**: It cannot be smaller than the netmask length of the IP prefix. For example, if the netmask length of the IP prefix is 16, the min. netmask length must be greater than or equal to 16 (for example, 18). – **Max. Netmask Length**: It cannot be smaller than the min. netmask length. For example, if the min. netmask length	● **Sequence Number**: 10 ● **Action**: Allow ● **IP Prefix**: 10.0.0.0/16 ● **Min. Netmask Length**: 20 ● **Max. Netmask Length**: 28

Parameter	Description	Example Value
	is 18, the max. netmask length must be from 18 to 32 (for example, 20).	

Step 5   Click **OK**.

You can view the added prefix rule.

----End

8.2.7 Modifying an IP Prefix Rule in an IP Prefix List

Scenarios

This section describes how to modify a prefix rule.

Notes and Constraints

IP prefix rules change the path through which network traffic passes. If the route policy of a prefix rule has already been associated with an enterprise router, evaluate the impact on services before modifying the prefix rule.

Procedure

Step 1   Go to the **Prefix Lists** page.

Step 2   Click the name of the target IP prefix list.

The prefix rule list is displayed.

Step 3   Locate the row that contains the target prefix rule and click **Modify** in the **Operation** column.

The **Modify Prefix Rule** dialog box is displayed.

Step 4   Configure the parameters based on **Table 8-12**.

Table 8-12 Parameters for modifying a prefix rule

Parameter	Description	Example Value
Serial Number	Cannot be modified.	-
Action	Cannot be modified.	-
IP Prefix	Cannot be modified.	-
Min. Netmask Length	The min. netmask length cannot be smaller than the netmask length of the IP prefix. For example, if the netmask length of the IP prefix is 16, the min. netmask length must be greater than or equal to 16 (for example, 18).	20

Parameter	Description	Example Value
Max. Netmask Length	The max. netmask length cannot be smaller than the min. netmask length. For example, if the min. netmask length is 18, the max. netmask length must be from 18 to 32 (for example, 20).	28

Step 5 Click **OK**.

You can view the modified prefix rule.

----End

8.2.8 Exporting Prefix Rules in an IP Prefix List

Scenarios

You can export the IP prefix rules in an IP prefix list to an XLSX file. There are two options:

- Export all prefix rules in the IP prefix list.
- Export the selected prefix rules in the IP prefix list.

Procedure

Step 1 Go to the **Prefix Lists** page.

Step 2 Click the name of the target IP prefix list.

The prefix rule list is displayed.

Step 3 Above the prefix rule list, click **Export** and select the required operation.

- **Export all data to an XLSX file**: Export all prefix rules in the IP prefix list.
- **Export selected data to an XLSX list**: Select the prefix rules to be exported and click **Export selected data to an XLSX list** to export the selected prefix rules.

----End

8.2.9 Viewing a Prefix Rule in an IP Prefix List

Scenarios

This section describes how to view a prefix rule, including the sequence number, action, IP prefix, min. netmask length, and max. netmask length.

Procedure

Step 1 Go to the **Prefix Lists** page.

Step 2 Click the name of the target IP prefix list.

You can view details about each prefix rule.

----End

8.2.10 Deleting a Prefix Rule from an IP Prefix List

Scenarios

This section describes how to delete a prefix rule.

Notes and Constraints

- IP prefix rules change the path through which network traffic passes. If the route policy of a prefix rule has already been associated with an enterprise router, evaluate the impact on services before deleting the prefix rule.
- Each IP prefix list must contain at least one prefix rule. If you want to delete the last prefix rule from an IP prefix list, you can add a prefix rule and then delete the old rule.

Procedure

Step 1 Go to the **Prefix Lists** page.

Step 2 Click the name of the target IP prefix list.

The prefix rule list is displayed.

Step 3 Locate the row that contains the target prefix rule and click **Delete** in the **Operation** column.

A confirmation dialog box is displayed.

Step 4 Confirm the information and click **OK**.

Deleted prefix rules cannot be recovered.

----End

8.3 AS_Path Lists

8.3.1 AS_Path List Overview

Introduction

An AS_Path list is a collection of filters that are used to filter BGP routes based on AS_Path attributes contained in BGP routes. AS_Path attributes record the number of each AS that BGP routes pass through from the source to the destination in distance-vector order.

If two AS_Paths both can enable communications, the AS_Path with a smaller ASN is preferred because it uses a shorter path.

📖 NOTE

> AS_Path attributes are private attributes of BGP and AS_Path filters take effect only on BGP routes.

Match Rules

An AS_Path attribute can be regarded as a string containing spaces and is used to match routes through a regular expression.

In **Figure 8-3**, the ASN of ER-A is 100. If a BGP route from the peer passes through ER-A, the ASN 100 of ER-A is automatically added to the left of AS_Path.

Figure 8-3 ASNs in AS_Paths

A regular expression is a string that describes a characteristic and verifies whether another string conforms to this characteristic. An AS_Path filter defines an AS_Path regular expression to match AS_Path attributes of BGP routes for filtering BGP routes.

An AS_Path list can contain multiple AS_Path filters for route filtering. In **Figure 8-4**, routes to be filtered are matched against an AS_Path list by AS_Path filter in ascending order.

- If a route matches an AS_Path filter with **Action** set to **Allow**, the route is allowed. If the AS_Path filter has **Action** set to **Deny**, the route is denied.

- If a route does not match any AS_Path filter in an AS_Path list, the route is denied.

Figure 8-4 Match process
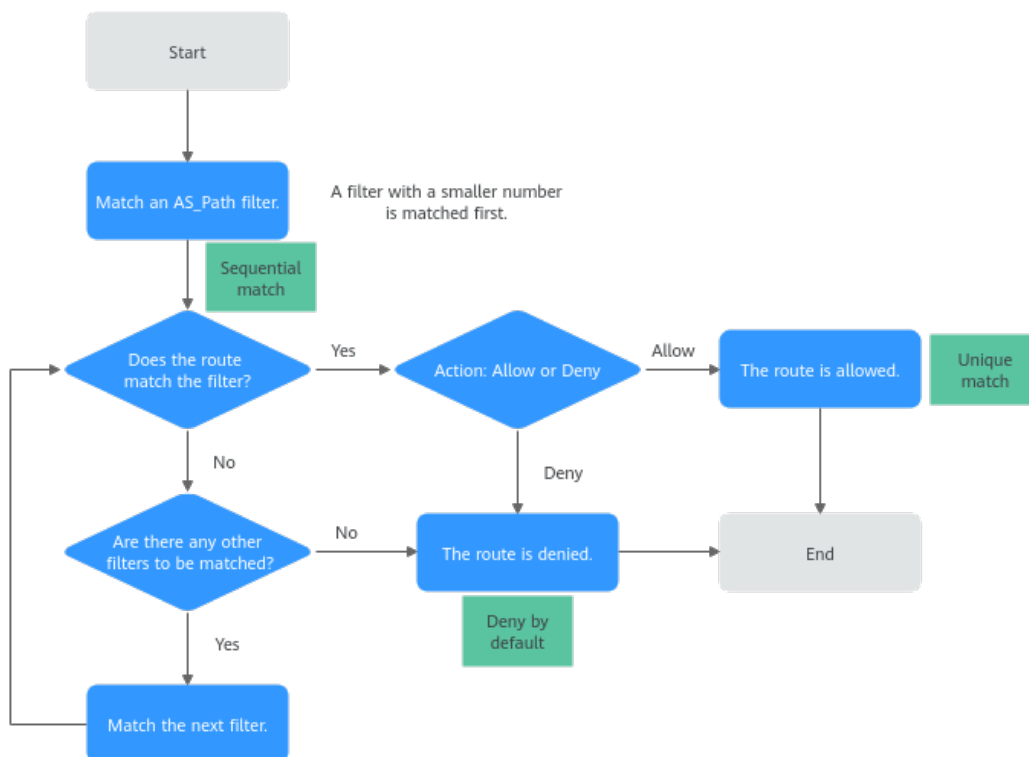
An AS_Path list filters routes by sequential match, unique match, or deny by default.

- Sequential match: An AS_Path filter with a smaller number is matched first. AS_Path filters in an AS_Path list can be sorted by sequence number in different orders, leading to different filtering results.

- Unique match: If a route matches an AS_Path filter, it no longer tries to match other AS_Path filters.

- Deny by default: By default, routes that do not match any AS_Path filter in an AS_Path list are denied. If an AS_Path list has one or more deny filters, you need to create an AS_Path filter to allow all other routes.

AS_Path Regular Expressions

An AS_Path filter is essentially a regular expression. The content of a regular expression is complex. The following describes the AS_Path filter.

An AS_Path filter uses a regular expression to define matching rules. A regular expression consists of the following parts:

- Metacharacter: defines matching rules.

- General character: defines match objects.

Table 8-13 lists the metacharacters supported by BGP AS_Path regular expressions.

Table 8-13 AS_Path metacharacters

Metac haract er	Description	Example
.	Matches AS_Paths with any single character except "\n", including spaces.	.* matches any AS_Path or route. **NOTE** If an AS_Path list has one or more deny filters, you need to create an AS_Path filter to allow all other routes.
*	Matches AS_Paths with 0 or more sequences of the character before the asterisk "*".	See the preceding example.
+	Matches AS_Paths with 1 or more sequences of the character before the plus sign "+".	65+ matches AS_Paths that begin with 6 and include one 5 or consecutive 5. ● AS_Path examples that 65+ matches: 65, 655, 6559, 65259, and 65529 ● AS_Path examples that 65+ does not match: 56, 556, 5669, 55269, and 56259
|	Matches any AS_Path with characters on either side of the vertical bar "|".	100|65002|65003 matches 100, 65002, or 65003. AS_Path examples that 100|65002|65003 matches: ● 100, 655, 6559 ● 65, 655, 65002 ● 65, 65003, 100
^	Matches AS_Paths beginning with the characters that follow the caret "^".	^65 matches AS_Paths beginning with 65. ● AS_Path examples that ^65 matches: 65, 651, 6501, and 65001 ● AS_Path examples that 65+ does not match: 165, 1650, 6650, and 60065
$	Matches AS_Paths ending with the characters before the dollar sign "$".	65$ matches AS_Paths ending with 65. ● AS_Path examples that 65$ matches: 65, 165, 1065, 10065, and 60065 ● AS_Path examples that 65$ does not match: 651, 1650, 6650, 60650, and 65001 **NOTE** ^$ matches null character strings (null AS_Path) and can be used to match the locally originated routes.

Metacharacter	Description	Example
( )	Defines a subexpression. Both the expression and the subexpression must match.	100(200)+ matches AS_Paths that begin with 100 and include one 200 or consecutive 200. AS_Path examples that 100(200)+ matches: ● 100200 ● 100200200 ● 100200200200
[ ]	Matches AS_Paths with any character in the brackets "[ ]".	● [896] matches AS_Paths with 8, 9, or 6. ● [2-4] matches AS_Paths with 2, 3, or 4. ● [0-9] matches AS_Paths with numbers from 0 to 9. **NOTE** The characters in the brackets "[ ]" can only be numbers 0 to 9. To match AS_Paths within the range of 735 to 907, use (73[5-9]|7[4-9][0-9]|8[0-9][0-9]|90[0-7]).
[^]	Matches AS_Paths without any character within the range specified in the brackets "[ ]".	● [^2-4] matches AS_Paths without 2, 3, or 4. ● [^0-9] matches AS_Paths without numbers 0 to 9. ● [^896] matches AS_Paths with any character except 8, 9, and 6.
_	Matches AS_Paths with a sign, such as a comma ",", left brace "{", right brace "}", left parenthesis "(", right parenthesis ")", or space. An underscore "_" can be used at the beginning of a regular expression with the same function as the caret "^" or at the end of a regular expression with the same function as the dollar sign "$".	● ^65001_ matches AS_Paths that begin with 65001 followed by a sign. Specifically, ^65001_ matches AS_Paths with 65001 as the leftmost ASN (the number of the last AS through which a route passes) or matches the routes sent by peers in AS 65001. ● _65001_ matches AS_Paths with 65001 or matches routes that pass through AS 65001. ● _65001$ matches AS_Paths that end with a sign followed by 65001. Specifically, _65001$ matches AS_Paths with 65001 as the rightmost ASN (the number of the first AS through which a route passes) or matches the routes that are originated in AS 65001.

Metacharacter	Description	Example
\	Indicates an escape character.	A backslash "\" is used to disable special functions of signs in regular expressions, such as the left parenthesis "(" and right parenthesis ")" in an AS_Confed_Sequence, the left bracket "[" and right bracket "]" in an AS_Confed_Set, and the left brace "{" and right brace "}" in an AS_Set. ● \(65002_ matches AS_Confed_Sequences that begin with (65002 followed by a sign. Specifically, \(65002_ matches AS_Confed_Sequences with 65002 as the leftmost ASN (the number of the last AS through which a route passes) or matches the routes sent by peers in AS 65002. ● \(.*_65003_.*\) matches AS_Confed_Sequences with 65003 or matches the routes that pass through AS 65003. ● _65004\) matches AS_Confed_Sequences that end with a sign followed by 65004). Specifically, _65004\) matches AS_Confed_Sequences with 65004 as the rightmost ASN (the number of the first AS through which a route passes) or matches the routes that are originated in AS 65004.

Notes and Constraints

- By default, an account can have up to five AS_Path lists.
- By default, each AS_Path list can have up to 100 AS_Path filters.
- Changing an AS_Path list will also change the associated routes and traffic routing. To reduce the impact on network performance, an AS_Path list can only be changed once within 40 seconds.

8.3.2 Creating an AS_Path List

Scenarios

This section describes how to create an AS_Path list.

Notes and Constraints

Each filter in an AS_Path list must have its unique sequence number.

Procedure

Step 1 Go to the **AS_Path Lists** page.

Step 2 Click **Create AS_Path List** in the upper right corner.

The **Create AS_Path List** dialog box is displayed.

Step 3 Configure the parameters based on **Table 8-14**.

Table 8-14 Parameters for creating an AS_Path list

Parameter	Description	Example Value
Name	Mandatory Enter the name of the AS_Path list. The name: ● Can contain 1 to 64 characters. ● Can contain letters, digits, underscores (_), hyphens (-), and periods (.).	asPathFilter-ab
Description	Optional Enter the description of the AS_Path list in the text box as required.	-
AS_Path Filters	Mandatory Configure parameters of the AS_Path filters: ● **Sequence Number**: An AS_Path list consists of one or more AS_Path filters that are applied to filter routes based on their sequence numbers, in ascending order. A sequence number can be from 0 to 65535. ● **Action**: Select **Allow** or **Deny**. If a route matches an AS_Path filter with **Action** set to **Allow**, the route is allowed. If the AS_Path filter has **Action** set to **Deny**, the route is denied. ● **Regular Expression**: A string that describes a characteristic and verifies whether another string conforms to this characteristic. An AS_Path filter defines an AS_Path regular expression to match AS_Path attributes of BGP routes for filtering BGP routes. For details, see **AS_Path Regular Expressions**.	● **Sequence Number**: 10 ● **Action**: Allow ● **Regular Expression**: 65+

Step 4 Click **OK**.

On the **AS_Path Lists** page, you can view the created AS_Path list.

----End

Follow-Up Operations

Creating a Route Policy: An AS_Path list takes effect through a route policy.

8.3.3 Modifying the Name of an AS_Path List

Scenarios

You can modify the name of a created AS_Path list.

Procedure

Step 1 Go to the **AS_Path Lists** page.

Step 2 Move the cursor to the IP prefix list name and click ✎. In the dialog box that is displayed, enter the name and click **OK** to save the modification.

----End

8.3.4 Viewing an AS_Path List

Scenarios

This section describes how to view an AS_Path list, including their name, status, description, and creation time.

Procedure

Step 1 Go to the **AS_Path Lists** page.

Step 2 Click the name of the target AS_Path list.

The page that shows the details about the AS_Path list is displayed.

----End

8.3.5 Deleting an AS_Path List

Scenarios

This section describes how to delete an AS_Path list.

Notes and Constraints

If the route policy that an AS_Path list to be deleted belongs to has been associated with an enterprise router, change the route policy to not use this AS_Path list by referring to **Modifying a Policy Node in a Route Policy**.

Procedure

Step 1 Go to the **AS_Path Lists** page.

Step 2 Locate the row that contains the AS_Path list you want to delete and click **Delete** in the **Operation** column.

A confirmation dialog box is displayed.

Step 3 Confirm the information and click **OK**.

Deleted AS_Path lists cannot be recovered.

----End

8.3.6 Adding an AS_Path Filter to an AS_Path List

Scenarios

This section describes how to add an AS_Path filter to an AS_Path list. Each AS_Path list can have multiple AS_Path filters.

Notes and Constraints

- AS_Path filters change the path through which network traffic passes. If a route policy has already been associated with an enterprise router, evaluate the impact on services before adding an AS_Path filter to an AS_Path list.
- Each filter in an AS_Path list must have its unique sequence number.

Prerequisites

An AS_Path list is available. You can create one by referring to **Creating an AS_Path List**.

Procedure

Step 1 Go to the **AS_Path Lists** page.

Step 2 Click the name of the target AS_Path list.

The AS_Path filters are displayed.

Step 3 Click **Add AS_Path Filter** in the upper left corner of the filter list.

The **Add AS_Path Filter** dialog box is displayed.

Step 4 Configure the parameters based on **Table 8-15**.

Table 8-15 Parameters for adding an AS_Path filter

Parameter	Description	Example Value
Sequence Number	Mandatory An AS_Path list consists of one or more AS_Path filters that are applied to filter routes based on their sequence numbers, in ascending order. A sequence number can be from 0 to 65535.	10
Action	Mandatory Select **Allow** or **Deny**. ● If a route matches an AS_Path filter with **Action** set to **Allow**, the route is allowed. ● If the AS_Path filter has **Action** set to **Deny**, the route is denied.	Allow
Regular Expression	A regular expression is a string that describes a characteristic and verifies whether another string conforms to this characteristic. An AS_Path filter defines an AS_Path regular expression to match AS_Path attributes of BGP routes for filtering BGP routes. For details, see **AS_Path Regular Expressions**.	65+

Step 5 Click **OK**.

In the AS_Path filter list, you can view the created AS_Path filter.

----End

Follow-Up Operations

Deleting an AS_Path Filter from an AS_Path List: An AS_Path filter cannot be modified after being added. You can delete an AS_Path filter that you do not need and add another one.

8.3.7 Exporting AS_Path Filters in an AS_Path List

Scenarios

You can export the AS_Path filters in an AS_Path list to an XLSX file. There are two options:

● Export all AS_Path filters in the AS_Path list.
● Export the selected AS_Path filters in the AS_Path list.

Procedure

Step 1 Go to the **AS_Path Lists** page.

Step 2 Click the name of the target AS_Path list.

The AS_Path filters are displayed.

Step 3 Above the AS_Path filter list, click **Export** and select the required operation.

- **Export all data to an XLSX file**: Export all AS_Path filters in the AS_Path list.
- **Export selected data to an XLSX file**: Select the AS_Path filters to be exported and click **Export selected data to an XLSX file** to export the selected AS_Path filters.

----End

8.3.8 Viewing an AS_Path Filter in an AS_Path List

Scenarios

This section describes how to view an AS_Path filter, including the sequence number, action, and regular expression.

Procedure

Step 1 Go to the **AS_Path Lists** page.

Step 2 Click the name of the target AS_Path list.

You can view details about each AS_Path filter.

----End

8.3.9 Deleting an AS_Path Filter from an AS_Path List

Scenarios

This section describes how to delete an AS_Path filter.

Notes and Constraints

- AS_Path filters change the path through which network traffic passes. If a route policy has already been associated with an enterprise router, evaluate the impact on services before deleting an AS_Path filter from an AS_Path list.
- Each AS_Path list must contain at least one AS_Path filter. If you want to delete the last AS_Path filter from an AS_Path list, you can add an AS_Path filter and then delete the old filter.

Procedure

Step 1 Go to the **AS_Path Lists** page.

Step 2 Click the name of the target AS_Path list.

The AS_Path filters are displayed.

Step 3 Locate the row that contains the target AS_Path filter and click **Delete** in the **Operation** column.

A confirmation dialog box is displayed.

Step 4 Confirm the information and click **OK**.

Deleted AS_Path filters cannot be recovered.

----End

9 Sharing

9.1 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 9-1** 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 9-1** shows the networking.

Table 9-1 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 9-1 Attaching VPCs in different accounts to the same enterprise router
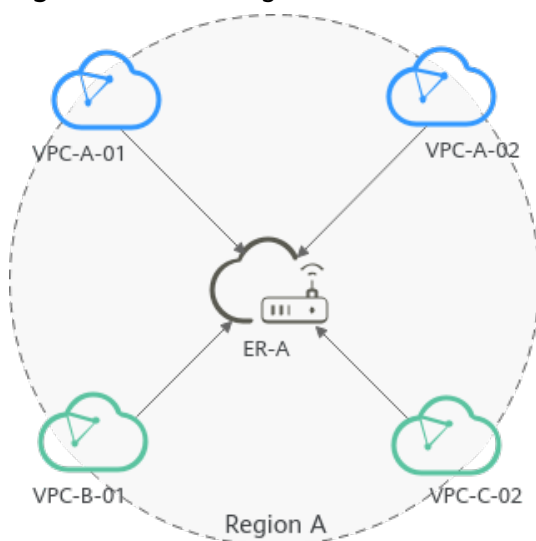
Allowed Operations by the Owner and Other Users

The owner can perform all operations but these other users can perform only some of the operations. **Table 9-2** lists the operations that other users can perform.

Table 9-2 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. ● Cannot add tags to their created attachments to the shared enterprise router. For details about the process for creating an attachment for an enterprise router in another account, see **Sharing an Enterprise Router with Other Users**.

Role	Allowed Operation	Description
	Viewing an Attachment	Other users: Cannot view the tags added of their attachments.
	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 the **Route Tables**, **Sharing**, **Flow Logs**, and **Tags** tabs 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.

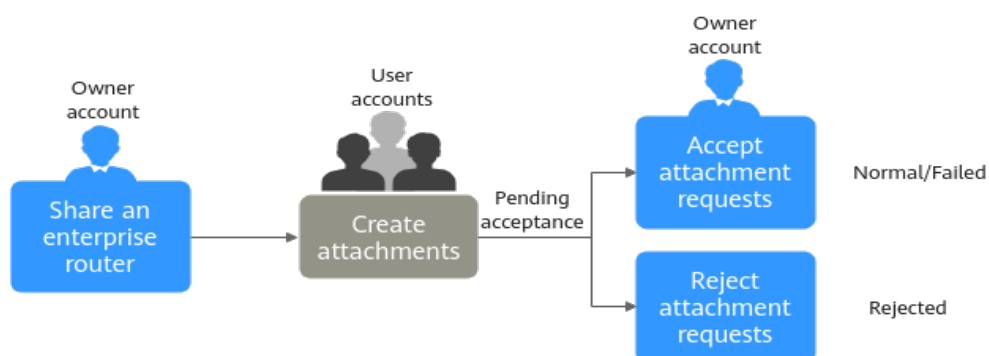**Figure 9-2** Accepting or rejecting attachment creation requests

Table 9-3 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**.
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 customer service.
			 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.
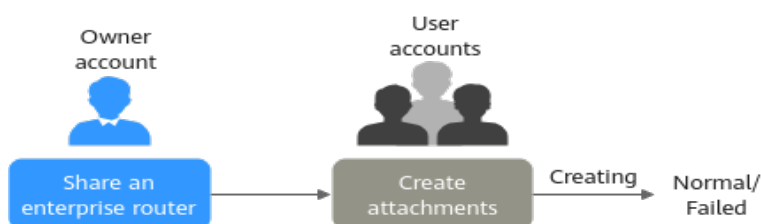
Figure 9-3 Attachment requests automatically accepted

Table 9-4 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 customer service.

9.2 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 9-5**.

Table 9-5 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. **Learn how to obtain an account ID.**	2364e06b8XXX XXXdfeb

Step 7 Click **OK**.

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

----End

9.3 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 9-6 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

9.4 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

9.5 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 customer service.

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

----End

9.6 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

9.7 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

10 Flow Logs

10.1 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.
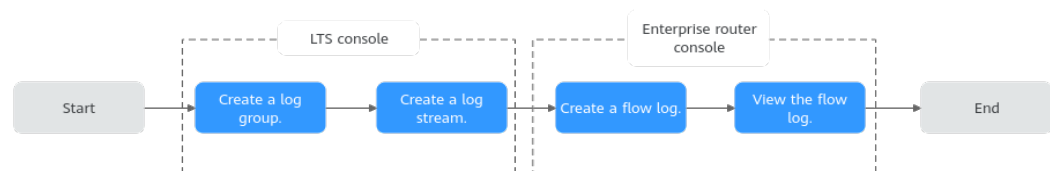
Flow logs can capture traffic of the following types of attachments:

- 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 10-1 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.

10.2 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 10-1**.

Table 10-1 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

10.3 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 10-2 describes the flow log parameters.

Table 10-2 Enterprise router flow log parameters

Parameter	Description	Example
version	Flow log version	1
project_id	Project ID	5f67944957444bd6bb4f e3b367de8f3d
resource_id	ID of the attachment that the traffic is generated for	10a163ee-6efa-4e4d-9 937-ead59f308497
instance_id	Enterprise router ID	a5cbd16c-7d99-4000-8f 14-526ec48298ce

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

10.4 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

10.5 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

10.6 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

11 Monitoring and Audit

11.1 Cloud Eye Monitoring

11.1.1 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 11-1**
- **Table 11-2**

Table 11-1 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 11-2 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**.

11.1.2 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

11.1.3 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

11.2 CTS Auditing

11.2.1 Key Operations Recorded by CTS

An enterprise router is a central router that interconnects all of your VPCs and on-premises networks.

With CTS, you can record operations associated with your enterprise routers for future query, audit, and backtracking.

Table 11-3 Enterprise router operations recorded by CTS

Operation	Resource Type	Trace Name
Creating an Enterprise Router	erInstance	createInstance

Operation	Resource Type	Trace Name
Modifying an Enterprise Router	erInstance	updateInstance
Deleting an Enterprise Router	erInstance	deleteInstance
Adding Attachments to an Enterprise Router	erAttachment	createAttachment
Modifying an Attachment	erAttachment	updateAttachment
Deleting an Attachment	erAttachment	deleteAttachment
Accepting an Attachment Request	erAttachment	acceptAttachment
Rejecting an Attachment Request	erAttachment	rejectAttachment
Creating a Route Table	erRouteTable	createRouteTable
Modifying Route Table Information	erRouteTable	updateRouteTable
Deleting a Route Table	erRouteTable	deleteRouteTable
Creating a Static Route	erStaticRoute	createStaticRoute
Batch Creating Static Routes	erStaticRoute	batchCreateStaticRoute
Deleting a Static Route	erStaticRoute	deleteStaticRoute
Batch Deleting Static Routes	erStaticRoute	batchDeleteStaticRoute
Modifying a Static Route	erStaticRoute	updateStaticRoute
Creating an Association	erAssociation	createAssociation
Deleting an Association	erAssociation	deleteAssociation
Creating a Propagation	erPropagation	createPropagation
Deleting a Propagation	erPropagation	deletePropagation
Deleting a multicast domain	erMulticastDomain	deleteMulticastDomain
Creating a Flow Log	erFlowLog	createFlowLog
Disabling a Flow Log	erFlowLog	updateFlowLog
Enabling a Flow Log	erFlowLog	updateFlowLog
Deleting a Flow Log	erFlowLog	deleteFlowLog

11.2.2 Viewing Traces

Scenarios

After CTS is enabled, CTS starts recording operations on cloud resources. The CTS management console stores the last seven days of operation records.

This section describes how to query or export the last seven days of operation records on the management console.

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 Trace Service**.

The **Cloud Trace Service** console is displayed.

Step 4 In the navigation pane on the left, choose **Trace List**.

The **Trace List** page is displayed.

Step 5 Specify filters as needed.

The following filters are available:

- **Trace Type**: Set it to **Management** or **Data**.
- **Trace Source**, **Resource Type**, and **Search By**
  - If you select **Trace name** for **Search By**, select a trace name.
  - If you select **Resource ID** for **Search By**, select or enter a resource ID.
  - If you select **Resource name** for **Search By**, select or enter a resource name.
- **Operator**: Select a specific operator (a user other than an account).
- **Trace Status**: Select **All trace statuses**, **Normal**, **Warning**, or **Incident**.
- Time range: Select any time range in the last seven days.

Step 6 Expand the trace for details.

Step 7 Click **View Trace**. A dialog box is displayed, in which the trace details are displayed.

For more information about CTS, see the *Cloud Trace Service User Guide*.

----End

12 Tags

12.1 Overview

What Is a Tag?

Tags are used to identify cloud resources for purposes of easy categorization and quick search. You can add tags to enterprise routers, attachments, and route tables using either of the methods:

- Add tags when you create an enterprise router, attachment, or route table.
- Add tags on the details page of an existing enterprise router, attachment, or route table. You can also edit or delete tags.

Basic Knowledge About Tags

Tags are used to identify cloud resources. When you have many cloud resources of the same type, you can use tags to classify cloud resources by dimension (for example, use, owner, or environment).

Figure 12-1 shows how tags work. In this example, you assign two tags to each cloud resource. Each tag contains a key and a value that you define. The key of one tag is **Owner**, and the key of another tag is **Usage**. Each tag has a value.

You can quickly search for specific cloud resources based on the tags added to them. For example, you can define a set of tags for cloud resources in an account to track the owner and usage of each cloud resource, making resource management easier.

Figure 12-1 Example tags added for Enterprise Router
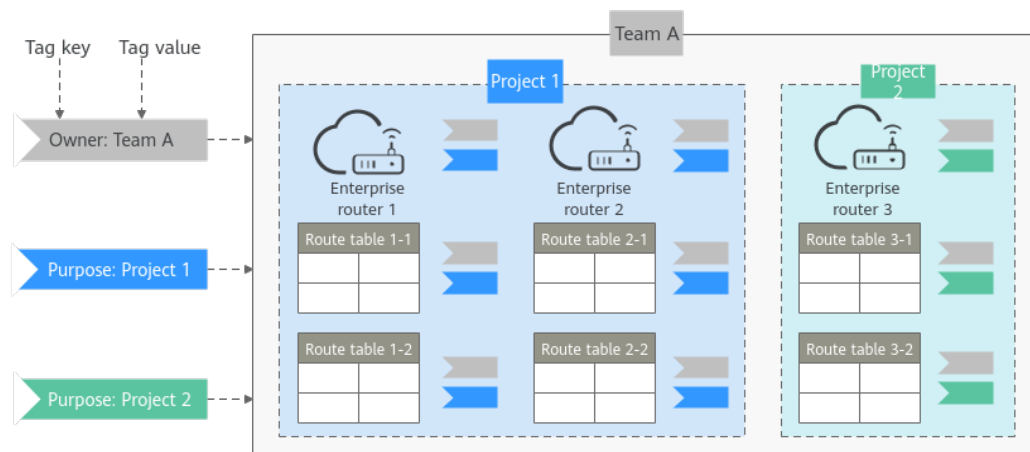
Constraints on Using Tags

- Each tag consists of a tag key and a tag value. The rules for naming a tag key and a tag value are as follows:

  Tag key

  – Cannot be left blank.

  – Can contain a maximum of 36 characters.

  – Can consist of letters, digits, underscores (_), and hyphens (-).

  Tag value

  – Can be left blank.

  – Can contain a maximum of 43 characters.

  – Can consist of letters, digits, underscores (_), periods (.), and hyphens (-).

- Up to 20 tags can be added to a cloud resource.

- For each resource, each tag key must be unique, and each tag key can only have one tag value.

12.2 Adding a Tag

12.2.1 Adding a Tag to an Enterprise Router

Scenarios

Add a tag to an existing 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 Click the enterprise router name and click **Tags**.

The tag list is displayed.

Step 6 Click **Add Tag**.

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

Step 7 Set the tag key and tag value as prompted and click **OK**.

View the added tag in the tag list.

----End

12.2.2 Adding a Tag to an Attachment

Scenarios

Add a tag to an existing 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 Click the enterprise router name and click **Attachments**.

The attachment list is displayed.

Step 6 Locate the attachment that you want to add a tag to and click its name.

The attachment details page is displayed.

Step 7 Click **Add Tag**.

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

Step 8 Set the tag key and tag value as prompted and click **OK**.

View the added tag in the tag list.

----End

12.2.3 Adding a Tag to a Route Table

Scenarios

Add a tag to an existing 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 Click the enterprise router name and click **Route Tables**.

The route table list is displayed.

Step 6 Locate the route table to which you want to add a tag. On the **Tags** tab, click **Add Tag** in the right pane.

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

Step 7 Set the tag key and tag value as prompted and click **OK**.

View the added tag in the tag list.

----End

12.3 Editing a Tag

12.3.1 Editing an Enterprise Router Tag

Scenarios

Edit a tag added to an existing enterprise router.

Notes and Constraints

- Each tag consists of a tag key and a tag value. Only the tag value can be edited.
- To edit the tag key, delete it and add it again. For details, see **Deleting an Enterprise Router Tag** and **Adding a Tag to 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 Click the enterprise router name and click **Tags**.

The tag list is displayed.

Step 6 Locate the tag you want to edit and click **Edit** in the **Operation** column.

The **Edit Tag** dialog box is displayed.

Step 7 Edit the tag value as prompted and click **OK**.

View the edited tag in the tag list.

----End

12.3.2 Editing an Attachment Tag

Scenarios

Modify a tag added to an existing attachment.

Notes and Constraints

- Each tag consists of a tag key and a tag value. Only the tag value can be edited.
- To edit the tag key, delete it and add it again. For details, see **Deleting an Attachment Tag** and **Adding a Tag to 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 Click the enterprise router name and click **Attachments**.

The attachment list is displayed.

Step 6 Locate the attachment whose tag you want to edit and click its name.

The attachment details page is displayed.

Step 7 Locate the tag you want to edit and click **Edit** in the **Operation** column.

The **Edit Tag** dialog box is displayed.

Step 8 Edit the tag value as prompted and click **OK**.

View the edited tag in the tag list.

----End

12.3.3 Editing a Route Table Tag

Scenarios

Edit a tag added to an existing route table.

Notes and Constraints

- Each tag consists of a tag key and a tag value. Only the tag value can be edited.
- To edit the tag key, delete it and add it again. For details, see **Deleting a Route Table Tag** and **Adding a Tag to 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 Click the enterprise router name and click **Route Tables**.

The route table list is displayed.

Step 6 Locate the route table whose tag you want to edit. On the **Tags** tab, locate the tag you want to edit and click **Edit** in the **Operation** column.

The **Edit Tag** dialog box is displayed.

Step 7 Edit the tag value as prompted and click **OK**.

View the edited tag in the tag list.

----End

12.4 Searching for a Cloud Resource by Tag

12.4.1 Searching for an Enterprise Router by Tag

Scenarios

Search for an enterprise router using a tag added to that 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 **Search by Tag**.

Step 5 Enter or select a tag key and a tag value.

- If you need to query a resource with multiple tags, click [+] to add multiple tags. A maximum of 10 tags can be added at a time.

- You can click [×] to delete the added tags one by one or click **Reset** to clear all of them.

Step 6 Click **Search**.

The resource with the tags is displayed in the list.

----End

12.4.2 Searching for an Attachment by Tag

Scenarios

Search for an attachment using a tag added to that 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 Click the enterprise router name and click **Attachments**.

The attachment list is displayed.

Step 6 Click the search box, select **Tag** for **Property**, select the tag to be searched for, and click **OK**.

The resource with the tag is displayed in the list.

----End

12.4.3 Searching for a Route Table by Tag

Scenarios

Search for a route table using a tag added to that 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   Click the enterprise router name and click **Route Tables**.

The route table list is displayed.

Step 6   Click **Search by Tag**.

Step 7   Enter or select a tag key and a tag value.

- If you need to query a resource with multiple tags, click [+] to add multiple tags. A maximum of 10 tags can be added at a time.

- You can click [×] to delete the added tags one by one or click **Reset** to clear all of them.

Step 8   Click **Search**.

The resource with the tags is displayed in the list.

----End

12.5 Viewing a Tag

12.5.1 Viewing an Enterprise Router Tag

Scenarios

View a tag added to 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   Click the enterprise router name and click **Tags**.

The tag list is displayed.

Step 6 Locate the tag and view its details, including the tag key and tag value.

----End

12.5.2 Viewing an Attachment Tag

Scenarios

View a tag added to 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 Click the enterprise router name and click **Attachments**.

The attachment list is displayed.

Step 6 Locate the attachment whose tag you want to view and click its name.

The attachment details page is displayed.

Step 7 Locate the tag and view its details, including the tag key and tag value.

----End

12.5.3 Viewing a Route Table Tag

Scenarios

View a tag added to 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 Click the enterprise router name and click **Route Tables**.

The route table list is displayed.

Step 6 Locate the tag and view its details, including the tag key and tag value.

----End

12.6 Deleting a Tag

12.6.1 Deleting an Enterprise Router Tag

Scenarios

Delete a tag added to 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 Click the enterprise router name and click **Tags**.

The tag list is displayed.

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

A confirmation dialog box is displayed.

Step 7 Click **Yes**.

A deleted tag cannot be recovered.

----End

12.6.2 Deleting an Attachment Tag

Scenarios

Delete a tag added to 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 Click the enterprise router name and click **Attachments**.

The attachment list is displayed.

Step 6 Locate the attachment whose tag you want to delete and click its name.

The attachment details page is displayed.

Step 7 Locate the tag you want to delete and click **Delete** in the **Operation** column.

A confirmation dialog box is displayed.

Step 8 Click **Yes**.

A deleted tag cannot be recovered.

----End

12.6.3 Deleting a Route Table Tag

Scenarios

Delete a tag added to 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 Click the enterprise router name and click **Route Tables**.

The route table list is displayed.

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

A confirmation dialog box is displayed.

Step 7 Click **Yes**.

A deleted tag cannot be recovered.

----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 higher quotas if your existing quotas cannot meet your service requirements.

- **Viewing Quotas**: View used quotas and total quotas.
- **Increasing Quotas**: Request a quota increase.

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. Click [ ] in the upper left corner and select the desired region and project.

3. In the upper right corner of the page, choose **Resources** > **My Quotas**.

   The **Service Quota** page is displayed.

4. 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?

1. Log in to the management console.
2. In the upper right corner of the page, choose **Resources** > **My Quotas**.

   The **Service Quota** page is displayed.
3. Click **Increase Quota** in the upper right corner of the page.
4. On the **Create Service Ticket** page, configure parameters as required.

   In the **Problem Description** area, fill in the content and reason for adjustment.
5. After all necessary parameters are configured, select **I have read and agree to the Ticket Service Protocol and Privacy Statement** and click **Submit**.