Contents

Configuring multicast routing and forwarding

About multicast routing and forwarding

Each multicast routing protocol has its own routing table. Multicast routing information in routing entries generated by the multicast routing protocols and statically configured multicast routing entries are summarized in a set of (S, G) and (*, G) entries. All the (S, G) and (*, G) entries form a general multicast routing table. The optimal multicast routing entries in the general multicast routing table are added to the multicast forwarding table to guide multicast data forwarding.

RPF check mechanism

A multicast routing protocol uses reverse path forwarding (RPF) check to ensure the multicast data delivery along the correct path and to avoid data loops.

RPF check process

A multicast device performs the RPF check on a multicast packet as follows:

1. Chooses an optimal route back to the packet source separately from the unicast, MBGP, and static multicast routing tables.

   The term "packet source" means different things in different situations:

   - For a packet that travels along the SPT, the packet source is the multicast source.
   - For a packet that travels along the RPT, the packet source is the RP.
   - For a bootstrap message originated from the BSR, the packet source is the BSR.

   For more information about the concepts of SPT, RPT, source-side RPT, RP, and BSR, see "PIM overview."

2. Selects one of the three optimal routes as the RPF route as follows:

   - If the device uses the longest prefix match principle, the route with the highest subnet mask becomes the RPF route. If the routes have the same mask, the route with the highest route preference becomes the RPF route. If the routes have the same route preference, the unicast route becomes the RPF route. If equal cost routes exist, the equal cost route with the highest next hop IP address becomes the RPF route.

     For more information about the route preference, see *Layer 3—IP Routing Configuration Guide*.

   - If the device does not use the longest prefix match principle, the route with the highest route preference becomes the RPF route. If the routes have the same preference, the unicast route becomes the RPF route. If equal cost routes exist, the equal cost route with the highest next hop IP address becomes the RPF route.

   The RPF route contains the RPF interface and RPF neighbor information.

   - If the RPF route is a unicast route or MBGP route, the outgoing interface is the RPF interface and the next hop is the RPF neighbor.
   - If the RPF route is a static multicast route, the RPF interface and RPF neighbor are specified in the route.

3. Determines whether the packet arrived at the RPF interface.

   - If the packet arrived at the RPF interface, the RPF check succeeds and the packet is forwarded.

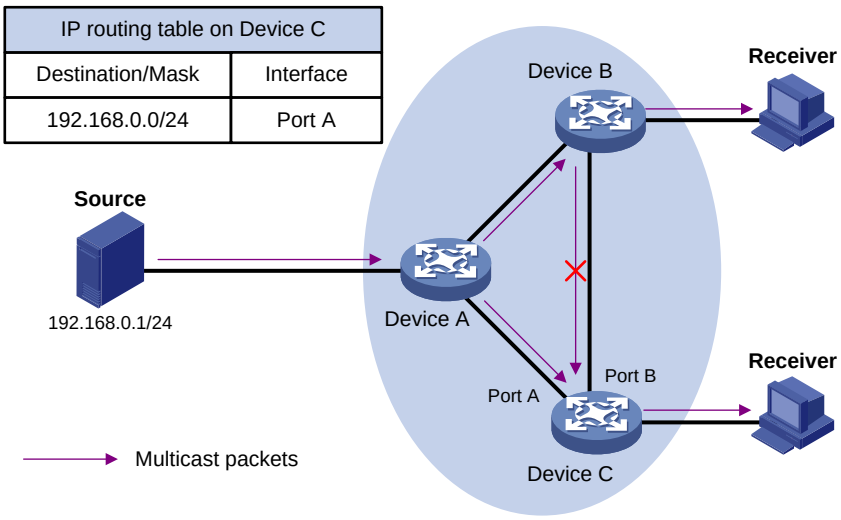
- If the packet arrived at the non-RPF interface, the RPF check fails and the packet is discarded.

RPF check implementation in multicast

Implementing an RPF check on each received multicast packet brings a big burden to the device. The use of a multicast forwarding table is the solution to this issue. When the device creates a multicast forwarding entry for an (S, G) packet, it sets the RPF interface of the packet as the incoming interface of the (S, G) entry. After the device receives another (S, G) packet, it looks up the multicast forwarding table for a matching (S, G) entry.

- If no match is found, the device first determines the RPF route back to the packet source and the RPF interface. Then, it creates a forwarding entry with the RPF interface as the incoming interface and makes the following judgments:
  - If the receiving interface is the RPF interface, the RPF check succeeds and the device forwards the packet out of all the outgoing interfaces.
  - If the receiving interface is not the RPF interface, the RPF check fails and the device discards the packet.
- If a match is found and the matching forwarding entry contains the receiving interface, the device forwards the packet out of all the outgoing interfaces.
- If a match is found but the matching forwarding entry does not contain the receiving interface, the device determines the RPF route back to the packet source. Then, the device performs one of the following actions:
  - If the RPF interface is the incoming interface, it means that the forwarding entry is correct but the packet traveled along a wrong path. The packet fails the RPF check, and the device discards the packet.
  - If the RPF interface is not the incoming interface, it means that the forwarding entry has expired. The device replaces the incoming interface with the RPF interface and matches the receiving interface against the RPF interface. If the receiving interface is the RPF interface, the device forwards the packet out of all outgoing interfaces. Otherwise, it discards the packet.

Figure 1 RPF check process



As shown in Figure 1, assume that unicast routes are available on the network, MBGP is not configured, and no static multicast routes have been configured on Device C. Multicast packets travel along the SPT from the multicast source to the receivers. The multicast forwarding table on Device C contains the (S, G) entry, with Port A as the incoming interface.

- If a multicast packet arrives at Device C on Port A, the receiving interface is the incoming interface of the (S, G) entry. Device C forwards the packet out of all outgoing interfaces.

- If a multicast packet arrives at Device C on Port B, the receiving interface is not the incoming interface of the (S, G) entry. Device C searches its unicast routing table and finds that the outgoing interface to the source (the RPF interface) is Port A. In this case, the (S, G) entry is correct, but the packet traveled along a wrong path. The packet fails the RPF check and Device C discards the packet.

Usages of static multicast routes

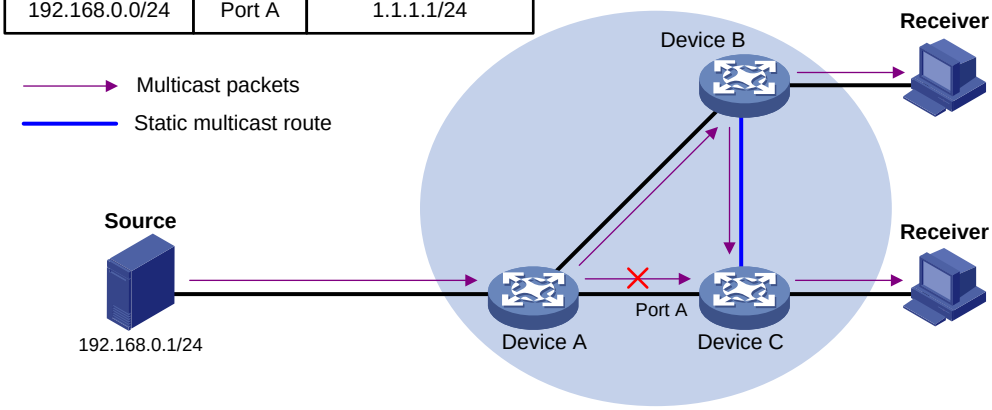
A static multicast route can change an RPF route or create an RPF route.

Changing an RPF route

Typically, the topology structure of a multicast network is the same as that of a unicast network, and multicast traffic follows the same transmission path as unicast traffic does. You can configure a static multicast route for a multicast source to change the RPF route. As a result, the device creates a transmission path for multicast traffic that is different from the transmission path for unicast traffic.

Figure 2 Changing an RPF route

Static multicast routing table on Device C		
Source/Mask	Interface	RPF neighbor/Mask
192.168.0.0/24	Port A	1.1.1.1/24



As shown in Figure 2, when no static multicast route is configured, Device C's RPF neighbor on the path back to the source is Device A. The multicast data from the source travels through Device A to Device C. You can configure a static multicast route on Device C and specify Device B as Device C's RPF neighbor on the path back to the source. The multicast data from the source travels along the path: Device A to Device B and then to Device C.

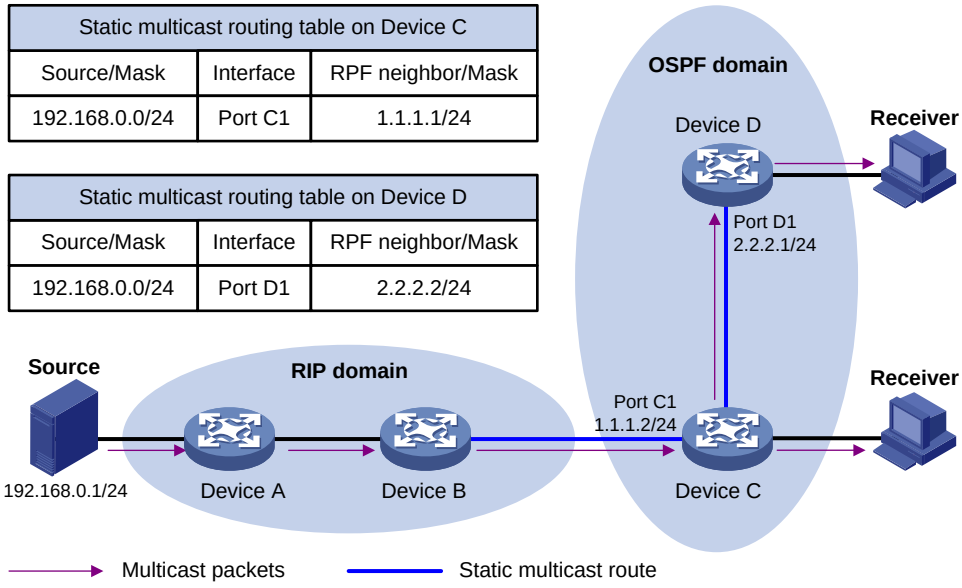
Creating an RPF route

When a unicast route is blocked, multicast forwarding might be stopped due to lack of an RPF route. You can configure a static multicast route to create an RPF route. In this way, a multicast routing entry is created to guide multicast forwarding.

Figure 3 Creating an RPF route

Static multicast routing table on Device C		
Source/Mask	Interface	RPF neighbor/Mask
192.168.0.0/24	Port C1	1.1.1.1/24

Static multicast routing table on Device D		
Source/Mask	Interface	RPF neighbor/Mask
192.168.0.0/24	Port D1	2.2.2.2/24



As shown in Figure 3, the RIP domain and the OSPF domain are unicast isolated from each other. For the receiver hosts in the OSPF domain to receive multicast packets from the multicast source in the RIP domain, you must configure Device C and Device D as follows:

- On Device C, configure a static multicast route for the multicast source and specify Device B as the RPF neighbor.
- On Device D, configure a static multicast route for the multicast source and specify Device C as the RPF neighbor.

Mtrace

Mtrace is a traceroute facility used to trace the path along which multicast group data travels from a source to a destination.

Device roles

Mtrace includes the following roles:

- **Last-hop router (LHR)**—An LHR is a router that has a multicast-enabled interface on the same subnet as the destination and can forward specific multicast data to the subnet.
- **First-hop router (FHR)**—An FHR is a router that is directly connected to the multicast source.
- **Client**—A client is a router that initiates an mtrace.

Process

The mtrace process is as follows:

1. The client sends an mtrace Query message (with a **hops** field indicating the maximum number of hops to trace) to the destination.
2. The LHR turns the received Query message to an mtrace Request message by adding local forwarding information and sends the Request message to the upstream neighbor.
3. Each router along the traced path adds its local forwarding information to the received Request message and sends the Request message to its upstream neighbor.
4. The FHR adds its local forwarding information to the received Request message. Then, it turns the Request message to an mtrace Reply message and sends the Reply message to the client.
5. The client interprets forwarding information in the Reply message and displays the information.

If the client does not receive a Reply message within the waiting time, the client initiates a hop-by-hop trace to determine which device on the path encountered an error. It sends a Query message with the **hops** field set to 1 and waits for a Reply message. If it does not receive a Reply message within the waiting time, the client determines that this hop encountered an error. If the client receives a Reply message within the waiting time, it sends a Query message with the **hops** field value increased by 1 and waits for a Reply message. This process continues until the client does not receive a Reply message within the waiting time any more.

Restrictions and guidelines: Multicast routing and forwarding configuration

The device can route and forward multicast data only through the primary IP addresses of interfaces, rather than their secondary addresses or unnumbered IP addresses. For more information about primary and secondary IP addresses, and IP unnumbered, see *Layer 3—IP Services Configuration Guide.*

During ISSU on a multichassis IRF, if the incoming interface of Layer 3 multicast traffic contains non-local member ports, Layer 3 multicast traffic interruption might occur when the device is rebooting.

Multicast routing and forwarding tasks at a glance

To configure multicast routing and forwarding, perform the following tasks:

1. Enabling IP multicast routing
2. (Optional.) Configuring static multicast routes
3. (Optional.) Specifying the longest prefix match principle
4. (Optional.) Configuring multicast load splitting
5. (Optional.) Configuring a multicast forwarding boundary
6. (Optional.) Enabling multicast forwarding between sub-VLANs of a super VLAN
7. (Optional.) Using mtrace to trace a multicast path
8. (Optional.) Setting the maximum number of cached unknown multicast packets

Prerequisites for multicast routing and forwarding

Before you configure multicast routing and forwarding, configure a unicast routing protocol so that all devices in the domain can interoperate at the network layer.

Enabling IP multicast routing

About IP multicast routing

Enable IP multicast routing before you configure any Layer 3 multicast functionality on the public network or VPN instance.

Procedure

1. Enter system view.

   system-view
2. Enable IP multicast routing and enter MRIB view.

   multicast routing [**vpn-instance** *vpn-instance-name*]

By default, IP multicast routing is disabled.

Configuring static multicast routes

About static multicast routes

To configure a static multicast route for a multicast source, you can specify an RPF interface or an RPF neighbor for the multicast traffic from that source.

Restrictions and guidelines

Static multicast routes take effect only on the multicast devices on which they are configured, and will not be advertised throughout the network or redistributed to other devices.

Procedure

1. Enter system view.

   system-view

2. Configure a static multicast route.

   ip rpf-route-static [**vpn-instance** *vpn-instance-name*] *source-address* { *mask-length* | *mask* } { *rpf-nbr-address* | *interface-type interface-number* } [**preference** *preference*]

3. (Optional.) Delete all static multicast routes.

   delete ip rpf-route-static [**vpn-instance** *vpn-instance-name*]

   You can use the **undo ip rpf-route-static** command to delete a specific static multicast route or use the **delete ip rpf-route-static** command to delete all static multicast routes.

Specifying the longest prefix match principle

About the longest prefix match principle

You can enable the device to use the longest prefix match principle for RPF route selection. For more information about RPF route selection, see "RPF check process."

Procedure

1. Enter system view.

   system-view

2. Enter MRIB view.

   multicast routing [**vpn-instance** *vpn-instance-name*]

3. Specify the longest prefix match principle.

   longest-match

   By default, the route preference principle is used.

Configuring multicast load splitting

About multicast load splitting

You can enable the device to split multiple data flows on a per-source basis or on a per-source-and-group basis. This optimizes the traffic delivery.

Restrictions and guidelines

This feature does not take effect on BIDIR-PIM.

Procedure

1. Enter system view.
   system-view
2. Enter MRIB view.
   multicast routing [**vpn-instance** *vpn-instance-name*]
3. Configure multicast load splitting.
   load-splitting { **source** | **source-group** }
   By default, multicast load splitting is disabled.

Configuring a multicast forwarding boundary

About a multicast forwarding boundaries

You can configure an interface as a multicast forwarding boundary for a multicast group range. The interface cannot receive or forward multicast packets for the group range.

Restrictions and guidelines

You do not need to enable IP multicast before this configuration.

Procedure

1. Enter system view.
   system-view
2. Enter interface view.
   interface *interface-type interface-number*
3. Configure the interface as a multicast forwarding boundary for a multicast group range.
   multicast boundary *group-address* { *mask-length* | *mask* }
   By default, an interface is not a multicast forwarding boundary.

Enabling multicast forwarding between sub-VLANs of a super VLAN

About multicast forwarding between sub-VLANs of a super VLAN

A super VLAN is associated with multiple sub-VLANs. Sub-VLANs are isolated with each other at Layer 2. For information about the super VLAN and sub-VLANs, see *Layer 2—LAN Switching Configuration Guide*.

Procedure

1. Enter system view.
   system-view
2. Enter VLAN interface view.
   interface vlan-interface *interface-number*
3. Enable multicast forwarding between sub-VLANs that are associated with a super VLAN.
   multicast forwarding supervlan community
   By default, multicast data cannot be forwarded between sub-VLANs that are associated with a super VLAN.
4. Return to system view.
   quit

5. Return to user view.
6. **quit**
7. Clear all multicast forwarding entries with the super VLAN interface as the incoming interface.
   reset multicast [**vpn-instance** *vpn-instance-name*] **forwarding-table incoming-interface** { *interface-type interface-number* }
   The **multicast forwarding supervlan community** command takes effect only after you perform this step.

Using mtrace to trace a multicast path

Using mtrace1 to trace a multicast path

To use mtrace version 1 (mtrace1) to trace a multicast path, execute the following command in any view:

mtrace [**v1**] [**vpn-instance** *vpn-instance-name*] { *source-address* | *group-address* } * [**destination** *address*] [**verbose**]

Using mtrace2 to trace a multicast path

Restrictions and guidelines

For successful mtrace, do not specify a UDP port number used by other modules.

You must specify the same UDP port number on all devices on the traced path.

Procedure

1. Enter system view.
   system-view
2. (Optional.) Specify the UDP port number used by mtrace.
   mtrace-service port *number*
   By default, mtrace uses UDP port number 10240.
3. Use mtrace version 2 (mtrace2) to trace a multicast path.
   mtrace v2 [**vpn-instance** *vpn-instance-name*] { *source-address* | *group-address* } * [**destination** *address* | **port** *number* | **wait-time** *time* | **max-hop** *count*] * [**verbose**]
   Execute this command in any view.
   The UDP port number specified in this command must be the same as that specified in the **mtrace-service port** command.

Setting the maximum number of cached unknown multicast packets

About setting the maximum number of cached unknown multicast packets

The device caches a multicast packet for a period of time if no matching multicast forwarding entry is found for the packet. If a multicast forwarding entry is established for the packet within the time period, the device forwards the packet. This mechanism prevents the device from mistakenly dropping multicast packets when the multicast forwarding entries for these packets are to be established.

You can set the maximum number of unknown multicast packets that can be cached for an (S, G) entry, in total, or both.

Restrictions and guidelines

As a best practice, set the value in the **multicast forwarding-table cache-unknown total** command to be far greater than the value in the **multicast forwarding-table cache-unknown per-entry** command.

Procedure

1. Enter system view.
   system-view
2. Set the maximum number of unknown multicast packets that can be cached for an (S, G) entry.
   multicast forwarding-table cache-unknown per-entry *per-entry-limit*
   By default, the device can cache only one unknown multicast packet for an (S, G) entry.
3. Set the maximum number of unknown multicast packets that can be cached in total.
   multicast forwarding-table cache-unknown total *total-limit*
   By default, the device can cache 1024 unknown multicast packets in total.

Display and maintenance commands for multicast routing and forwarding

CAUTION:
The **reset** commands might cause multicast data transmission failures.

Execute **display** commands in any view and **reset** commands in user view.

Task	Command
Display information about the interfaces maintained by the MRIB.	**display mrib** [**vpn-instance** *vpn-instance-name*] **interface** [*interface-type interface-number*]
Display multicast boundary information.	**display multicast** [**vpn-instance** *vpn-instance-name*] **boundary** [*group-address* [*mask-length* | *mask*]] [**interface** *interface-type interface-number*]
Display multicast fast forwarding entries.	**display multicast** [**vpn-instance** *vpn-instance-name*] **fast-forwarding cache** [*source-address* | *group-address*] * [**slot** *slot-number*]
Display DF information.	**display multicast** [**vpn-instance** *vpn-instance-name*] **forwarding df-info** [*rp-address*] [**verbose**] [**slot** *slot-number*]
Display statistics for multicast forwarding events.	**display multicast** [**vpn-instance** *vpn-instance-name*] **forwarding event** [**slot** *slot-number*]
Display multicast forwarding entries.	**display multicast** [**vpn-instance**

Task	Command
	vpn-instance-name] **forwarding-table** [*source-address* [**mask** { *mask-length* | *mask* }] | *group-address* [**mask** { *mask-length* | *mask* }] | **incoming-interface** *interface-type interface-number* | **outgoing-interface** { **exclude** | **include** | **match** } *interface-type interface-number* | **slot** *slot-number* | **statistics**] *
Display information about the DF list in the multicast forwarding table.	**display multicast** [**vpn-instance** *vpn-instance-name*] **forwarding-table df-list** [*group-address*] [**verbose**] [**slot** *slot-number*]
Display multicast routing entries.	**display multicast** [**vpn-instance** *vpn-instance-name*] **routing-table** [*source-address* [**mask** { *mask-length* | *mask* }] | *group-address* [**mask** { *mask-length* | *mask* }] | **incoming-interface** *interface-type interface-number* | **outgoing-interface** { **exclude** | **include** | **match** } *interface-type interface-number*] *
Display static multicast routing entries.	**display multicast** [**vpn-instance** *vpn-instance-name*] **routing-table static** [*source-address* { *mask-length* | *mask* }]
Display RPF information for a multicast source.	**display multicast** [**vpn-instance** *vpn-instance-name*] **rpf-info** *source-address* [*group-address*]
Clear multicast fast forwarding entries.	**reset multicast** [**vpn-instance** *vpn-instance-name*] **fast-forwarding cache** { { *source-address* | *group-address* } * | **all** } [**slot** *slot-number*]
Clear statistics for multicast forwarding events.	**reset multicast** [**vpn-instance** *vpn-instance-name*] **forwarding event**
Clear multicast forwarding entries.	**reset multicast** [**vpn-instance** *vpn-instance-name*] **forwarding-table** { { *source-address* [**mask** { *mask-length* | *mask* }] | *group-address* [**mask** { *mask-length* | *mask* }] | **incoming-interface** { *interface-type interface-number* } } * | **all** }
Clear multicast routing entries.	**reset multicast** [**vpn-instance** *vpn-instance-name*] **routing-table** { { *source-address* [**mask** { *mask-length* | *mask* }] | *group-address* [**mask** { *mask-length* | *mask* }] | **incoming-interface** *interface-type interface-number* } * | **all** }

NOTE:

- When you clear a multicast routing entry, the associated multicast forwarding entry is also cleared.
- When you clear a multicast forwarding entry, the associated multicast routing entry is also cleared.

Multicast routing and forwarding configuration examples

Example: Changing an RPF route

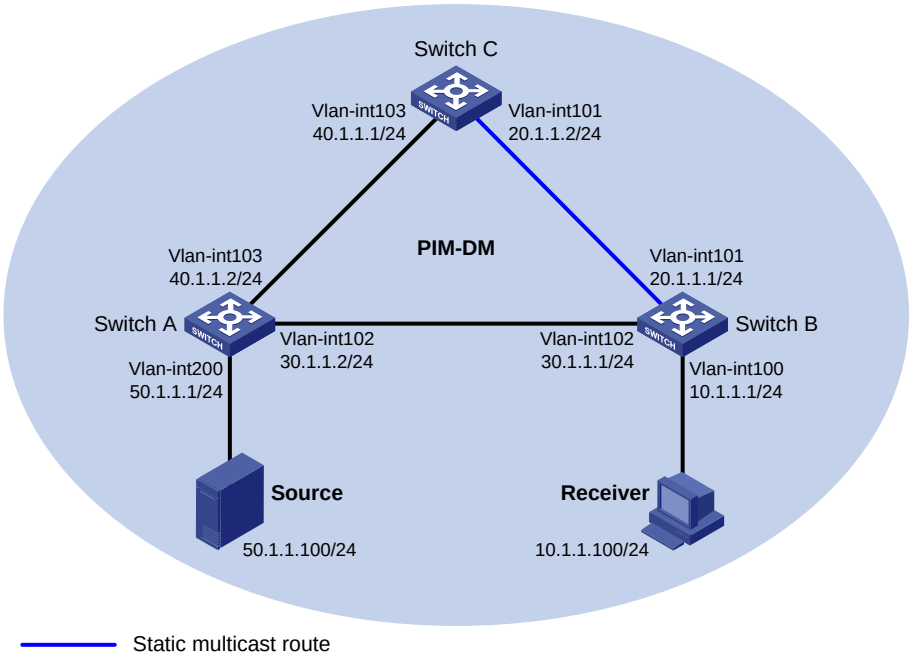
Network configuration

As shown in Figure 4:

- PIM-DM runs on the network.
- All switches on the network support multicast.
- Switch A, Switch B and Switch C run OSPF.
- Typically, the receiver host can receive the multicast data from the source through the path: Switch A to Switch B, which is the same as the unicast route.

Configure the switches so that the multicast data from the source travels to the receiver through the path: Switch A to Switch C to Switch B. This is different from the unicast route.

Figure 4 Network diagram



Procedure

1. Assign an IP address and subnet mask for each interface, as shown in Figure 4. (Details not shown.)
2. Configure OSPF on the switches in the PIM-DM domain. (Details not shown.)

3. Enable IP multicast routing, and enable IGMP and PIM-DM:

On Switch B, enable IP multicast routing.

```
<SwitchB> system-view
[SwitchB] multicast routing
[SwitchB-mrib] quit
```

Enable IGMP on the receiver-side interface VLAN-interface 100.

```
[SwitchB] interface vlan-interface 100
[SwitchB-Vlan-interface100] igmp enable
[SwitchB-Vlan-interface100] quit
```

Enable PIM-DM on other interfaces.

```
[SwitchB] interface vlan-interface 101
[SwitchB-Vlan-interface101] pim dm
[SwitchB-Vlan-interface101] quit
[SwitchB] interface vlan-interface 102
[SwitchB-Vlan-interface102] pim dm
[SwitchB-Vlan-interface102] quit
```

On Switch A, enable IP multicast routing.

```
<SwitchA> system-view
[SwitchA] multicast routing
[SwitchA-mrib] quit
```

Enable PIM-DM on each interface.

```
[SwitchA] interface vlan-interface 200
[SwitchA-Vlan-interface200] pim dm
[SwitchA-Vlan-interface200] quit
[SwitchA] interface vlan-interface 102
[SwitchA-Vlan-interface102] pim dm
[SwitchA-Vlan-interface102] quit
[SwitchA] interface vlan-interface 103
[SwitchA-Vlan-interface103] pim dm
[SwitchA-Vlan-interface103] quit
```

Enable IP multicast routing and PIM-DM on Switch C in the same way Switch A is configured. (Details not shown.)

4. Display RPF information for the source on Switch B.

```
[SwitchB] display multicast rpf-info 50.1.1.100
 RPF information about source 50.1.1.100:
     RPF interface: Vlan-interface102, RPF neighbor: 30.1.1.2
     Referenced route/mask: 50.1.1.0/24
     Referenced route type: igp
     Route selection rule: preference-preferred
     Load splitting rule: disable
     Source AS: 0
     C-multicast route target: 0x0000000000000000
```

The output shows that the current RPF route on Switch B is contributed by a unicast routing protocol and the RPF neighbor is Switch A.

5. Configure a static multicast route on Switch B and specify Switch C as its RPF neighbor on the route to the source.

```
[SwitchB] ip rpf-route-static 50.1.1.0 24 20.1.1.2
```

Verifying the configuration

Display RPF information for the source on Switch B.

```
[SwitchB] display multicast rpf-info 50.1.1.100
 RPF information about source 50.1.1.100:
     RPF interface: Vlan-interface101, RPF neighbor: 20.1.1.2
     Referenced route/mask: 50.1.1.0/24
     Referenced route type: multicast static
     Route selection rule: preference-preferred
     Load splitting rule: disable
     Source AS: 0
     C-multicast route target: 0x0000000000000000
```

The output shows the following information:

- The RPF route on Switch B is the configured static multicast route.
- The RPF neighbor of Switch B is Switch C.

Example: Creating an RPF route

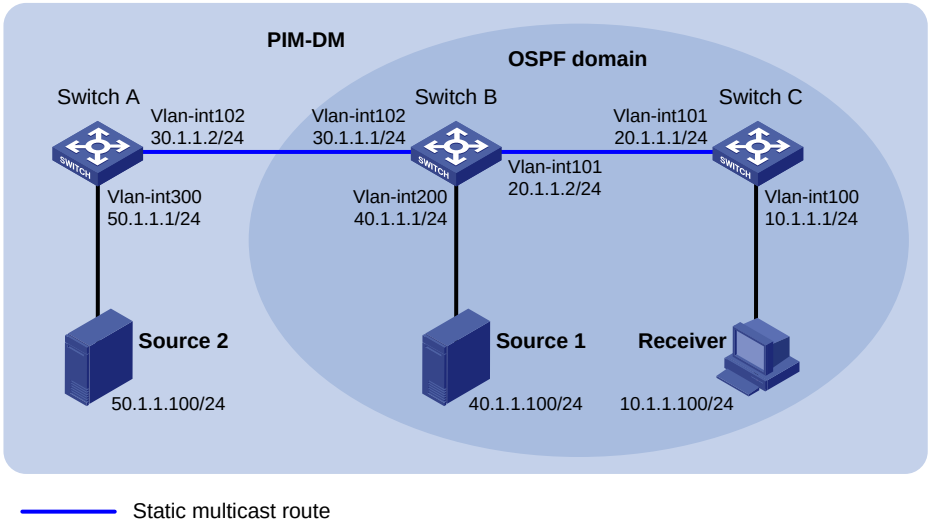
Network configuration

As shown in Figure 5:

- PIM-DM runs on the network.
- All switches on the network support IP multicast.
- Switch B and Switch C run OSPF, and have no unicast routes to Switch A.
- Typically, the receiver host receives the multicast data from Source 1 in the OSPF domain.

Configure the switches so that the receiver host receives multicast data from Source 2, which is outside the OSPF domain.

Figure 5 Network diagram



Procedure

1. Assign an IP address and subnet mask for each interface, as shown in Figure 5. (Details not shown.)
2. Configure OSPF on Switch B and Switch C. (Details not shown.)

3. Enable IP multicast routing, and enable IGMP and PIM-DM:

   # On Switch C, enable IP multicast routing.

```
<SwitchC> system-view
[SwitchC] multicast routing
[SwitchC-mrib] quit
```

   # Enable IGMP on the receiver-side interface VLAN-interface 100.

```
[SwitchC] interface vlan-interface 100
[SwitchC-Vlan-interface100] igmp enable
[SwitchC-Vlan-interface100] quit
```

   # Enable PIM-DM on VLAN-interface 101.

```
[SwitchC] interface vlan-interface 101
[SwitchC-Vlan-interface101] pim dm
[SwitchC-Vlan-interface101] quit
```

   # On Switch A, enable IP multicast routing.

```
<SwitchA> system-view
[SwitchA] multicast routing
[SwitchA-mrib] quit
```

   # Enable PIM-DM on each interface.

```
[SwitchA] interface vlan-interface 300
[SwitchA-Vlan-interface300] pim dm
[SwitchA-Vlan-interface300] quit
[SwitchA] interface vlan-interface 102
[SwitchA-Vlan-interface102] pim dm
[SwitchA-Vlan-interface102] quit
```

   # Enable IP multicast routing and PIM-DM on Switch B in the same way Switch A is configured. (Details not shown.)

4. Display RPF information for Source 2 on Switch B and Switch C.

```
[SwitchB] display multicast rpf-info 50.1.1.100
[SwitchC] display multicast rpf-info 50.1.1.100
```

   No output is displayed because no RPF routes to Source 2 exist on Switch B or Switch C.

5. Configure a static multicast route:

   # Configure a static multicast route on Switch B and specify Switch A as its RPF neighbor on the route to Source 2.

```
[SwitchB] ip rpf-route-static 50.1.1.0 24 30.1.1.2
```

   # Configure a static multicast route on Switch C and specify Switch B as its RPF neighbor on the route to Source 2.

```
[SwitchC] ip rpf-route-static 10.1.1.0 24 20.1.1.2
```

Verifying the configuration

Display RPF information for Source 2 on Switch B.

```
[SwitchB] display multicast rpf-info 50.1.1.100
 RPF information about source 50.1.1.100:
     RPF interface: Vlan-interface102, RPF neighbor: 30.1.1.2
     Referenced route/mask: 50.1.1.0/24
     Referenced route type: multicast static
     Route selection rule: preference-preferred
     Load splitting rule: disable
     Source AS: 0
```

```
     C-multicast route target: 0x0000000000000000
```

Display RPF information for Source 2 on Switch C.

```
[SwitchC] display multicast rpf-info 50.1.1.100
 RPF information about source 50.1.1.100:
     RPF interface: Vlan-interface101, RPF neighbor: 20.1.1.2
     Referenced route/mask: 50.1.1.0/24
     Referenced route type: multicast static
     Route selection rule: preference-preferred
     Load splitting rule: disable
     Source AS: 0
     C-multicast route target: 0x0000000000000000
```

The output shows that the RPF routes to Source 2 exist on Switch B and Switch C. The routes are the configured static routes.

Troubleshooting multicast routing and forwarding

Static multicast route failure

Symptom

No dynamic routing protocol is enabled on the routers, and the physical status and link layer status of interfaces are both up, but the static multicast route fails.

Solution

To resolve the problem:

1. Use the **`display multicast routing-table static`** command to display information about static multicast routes. Verify that the static multicast route has been correctly configured and that the route entry exists in the static multicast routing table.
2. Check the type of interface that connects the static multicast route to the RPF neighbor. If the interface is not a point-to-point interface, be sure to specify the address for the RPF neighbor.
3. If the problem persists, contact H3C Support.