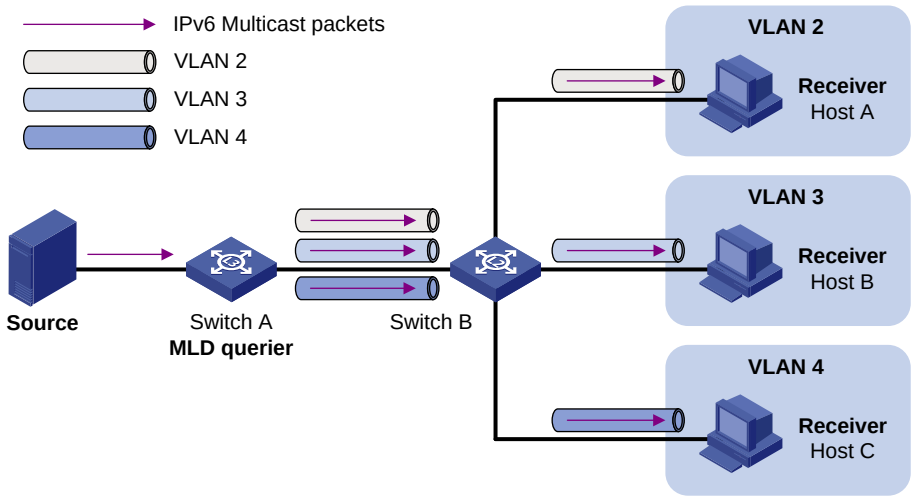
# Contents

# Configuring IPv6 multicast VLANs

## IPv6 multicast VLAN feature

As shown in Figure 1, Host A, Host B, and Host C are in different VLANs and the same IPv6 multicast group. When Switch A (Layer 3 device) receives IPv6 multicast data for that group, it forwards three copies of the data to Switch B (Layer 2 device). This occupies a large amount of bandwidth and increases the burden on the Layer 3 device.

**Figure 1 Multicast transmission without the IPv6 multicast VLAN feature**




After an IPv6 multicast VLAN is configured on Switch B, Switch A sends one copy of the IPv6 multicast data to the IPv6 multicast VLAN on Switch B. This saves network bandwidth and lessens the burden on the Layer 3 device.

## IPv6 multicast VLAN methods

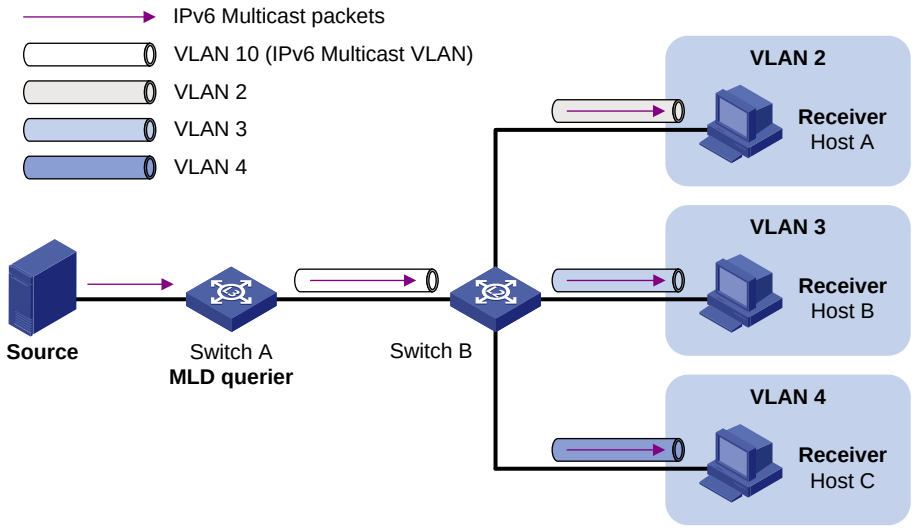
IPv6 multicast VLANs support sub-VLAN-based IPv6 multicast VLANs and port-based IPv6 multicast VLANs.

## Sub-VLAN-based IPv6 multicast VLAN

As shown in Figure 2:

- Host A, Host B, and Host C are in VLAN 2 through VLAN 4, respectively.
- On Switch B, VLAN 10 is an IPv6 multicast VLAN. VLAN 2 through VLAN 4 are sub-VLANs of VLAN 10.
- MLD snooping is enabled for the multicast VLAN and its sub-VLANs.

**Figure 2 Sub-VLAN-based multicast VLAN**



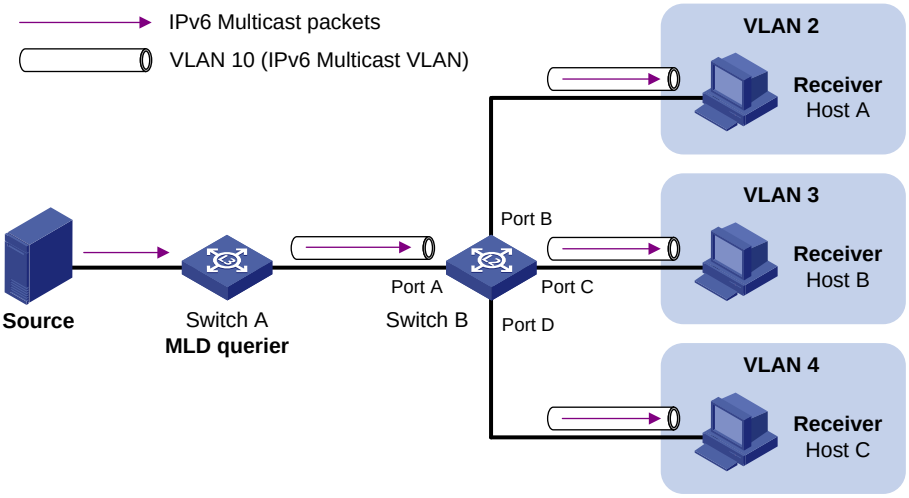

MLD snooping manages router ports in the IPv6 multicast VLAN and member ports in each sub-VLAN. When Switch A receives IPv6 multicast data from the IPv6 multicast source, it sends only one copy of the IPv6 multicast data to the IPv6 multicast VLAN on Switch B. Then, Switch B sends a separate copy to each sub-VLAN of the IPv6 multicast VLAN.

# Port-based IPv6 multicast VLAN

As shown in Figure 3:

- Host A, Host B, and Host C are in VLAN 2 through VLAN 4, respectively. All the user ports (ports with attached hosts) on Switch B are hybrid ports.
- On Switch B, VLAN 10 is an IPv6 multicast VLAN. All the user ports are assigned to VLAN 10.
- MLD snooping is enabled for the IPv6 multicast VLAN and its sub-VLANs.

**Figure 3 Port-based IPv6 multicast VLAN**




MLD snooping manages the router ports and member ports in the IPv6 multicast VLAN. When Switch A receives IPv6 multicast data from the IPv6 multicast source, it sends only one copy of the IPv6 multicast data to the IPv6 multicast VLAN on Switch B. Then, Switch B sends a separate copy to each user port in the IPv6 multicast VLAN.

# Restrictions and guidelines: IPv6 multicast VLAN configuration

The VLAN to be configured as an IPv6 multicast VLAN must exist.

If you have configured both a sub-VLAN-based IPv6 multicast VLAN and a port-based IPv6 multicast VLAN on a device, the port-based IPv6 multicast VLAN configuration takes effect.

Do not configure an IPv6 multicast VLAN on a device that is enabled with IPv6 multicast routing. Otherwise, the system displays errors. Do not enable IPv6 multicast routing on a device that is configured with IPv6 multicast VLANs. Otherwise, IPv6 multicast forwarding exceptions occur.

Do not configure a VLAN as an IPv6 multicast VLAN or an IPv6 sub-VLAN if the VLAN interface is enabled with IPv6 PIM or MLD. Otherwise, the system displays errors. Do not enable IPv6 PIM or MLD on a VLAN interface if the VLAN interface belongs to an IPv6 multicast VLAN or an IPv6 multicast sub-VLAN. Otherwise, IPv6 multicast forwarding exceptions occur.

The IPv6 multicast VLAN feature does not take effect on secondary VLANs. As a best practice, do not configure the IPv6 multicast VLAN feature for secondary VLANs. For more information about secondary VLAN, see *Layer 2—LAN Switching Configuration Guide.*

# Configuring a sub-VLAN-based IPv6 multicast VLAN

### Restrictions and guidelines

The VLANs to be configured as sub-VLANs of an IPv6 multicast VLAN must exist and cannot be IPv6 multicast VLANs or sub-VLANs of any other IPv6 multicast VLANs.

### Prerequisites

Before you configure a sub-VLAN-based IPv6 multicast VLAN, you must complete the following tasks:

- Create VLANs as required.
- Enable MLD snooping for the VLAN to be configured as the IPv6 multicast VLAN, and for the VLANs to be configured as sub-VLANs.

### Procedure

1. Enter system view.

   **system-view**
2. Configure a VLAN as an IPv6 multicast VLAN and enter IPv6 multicast VLAN view.

   **ipv6 multicast-vlan** *vlan-id*

   By default, a VLAN is not an IPv6 multicast VLAN.
3. Assign VLANs to the IPv6 multicast VLAN as sub-VLANs.

   **subvlan** *vlan-list*

   By default, an IPv6 multicast VLAN does not have any sub-VLANs.

# Configuring a port-based IPv6 multicast VLAN

### Restrictions and guidelines

You can assign user ports to an IPv6 multicast VLAN in IPv6 multicast VLAN view or assign a user port to an IPv6 multicast VLAN in interface view.

A user port can belong to only one IPv6 multicast VLAN.

### Prerequisites

Before you configure a port-based IPv6 multicast VLAN, you must complete the following tasks:

- Create VLANs as required.
- Enable MLD snooping for the VLAN to be configured as the IPv6 multicast VLAN.
- Enable MLD snooping for all the VLANs that contain the multicast receivers.
- Configure the attributes of user ports. Make sure the ports can forward packets from the VLAN to be configured as the IPv6 multicast VLAN and send the packets with the VLAN tag removed. For more information about configuring port attributes, see VLAN configuration in *Layer 2—LAN Switching Configuration Guide*.

### Assigning user ports to an IPv6 multicast VLAN in IPv6 multicast VLAN view

1. Enter system view.
   **system-view**
2. Configure an IPv6 VLAN as an IPv6 multicast VLAN and enter IPv6 multicast VLAN view.
   **ipv6 multicast-vlan** *vlan-id*
   By default, a VLAN is not an IPv6 multicast VLAN.
3. Assign ports to the IPv6 multicast VLAN as user ports.
   **port** *interface-list*

### Assigning user ports to an IPv6 multicast VLAN in interface view

1. Enter system view.
   **system-view**
2. Configure an IPv6 VLAN as an IPv6 multicast VLAN and enter IPv6 multicast VLAN view.
   **ipv6 multicast-vlan** *vlan-id*
   By default, a VLAN is not an IPv6 multicast VLAN.
3. Return to system view.
   **quit**
4. Enter Layer 2 interface view.
   - Enter Layer 2 Ethernet interface view.
     **interface** *interface-type interface-number*
   - Enter Layer 2 aggregate interface view.
     **interface bridge-aggregation** *interface-number*
5. Assign the port to the IPv6 multicast VLAN as a user port.
   **ipv6 port multicast-vlan** *vlan-id*
   By default, a port does not belong to any IPv6 multicast VLAN.

# Setting the maximum number of IPv6 multicast VLAN forwarding entries

### About setting the maximum number of IPv6 multicast VLAN forwarding entries

You can set the maximum number of IPv6 multicast VLAN forwarding entries on the device. When the upper limit is reached, the device does not create IPv6 multicast VLAN forwarding entries until some entries age out or are manually removed.

### Procedure

1. Enter system view.
   **system-view**
2. Set the maximum number of IPv6 multicast VLAN forwarding entries.
   **ipv6 multicast-vlan entry-limit** *limit*
   By default, the maximum number of IPv6 multicast VLAN forwarding entries is 500.

# Display and maintenance commands for IPv6 multicast VLANs

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

| Task | Command |
|---|---|
| Display information about IPv6 multicast VLANs. | **display ipv6 multicast-vlan** [ *vlan-id* ] |
| Display IPv6 multicast VLAN forwarding entries. | **display ipv6 multicast-vlan forwarding-table** [ *ipv6-source-address* [ *prefix-length* ] \| *ipv6-group-address* [ *prefix-length* ] \| **slot** *slot-number* \| **subvlan** *vlan-id* \| **vlan** *vlan-id* ] * |
| Display information about information about IPv6 multicast group entries in IPv6 multicast VLANs. | **display ipv6 multicast-vlan group** [ *ipv6-source-address* \| *ipv6-group-address* \| **slot** *slot-number* \| **verbose** \| **vlan** *vlan-id* ] * |
| Clear IPv6 multicast group entries in IPv6 multicast VLANs. | **reset ipv6 multicast-vlan group** [ *ipv6-group-address* [ *prefix-length* ] \| *ipv6-source-address* [ *prefix-length* ] \| **vlan** *vlan-id* ] * |

# IPv6 multicast VLAN configuration examples

## Example: Configuring sub-VLAN-based IPv6 multicast VLAN

### Network configuration

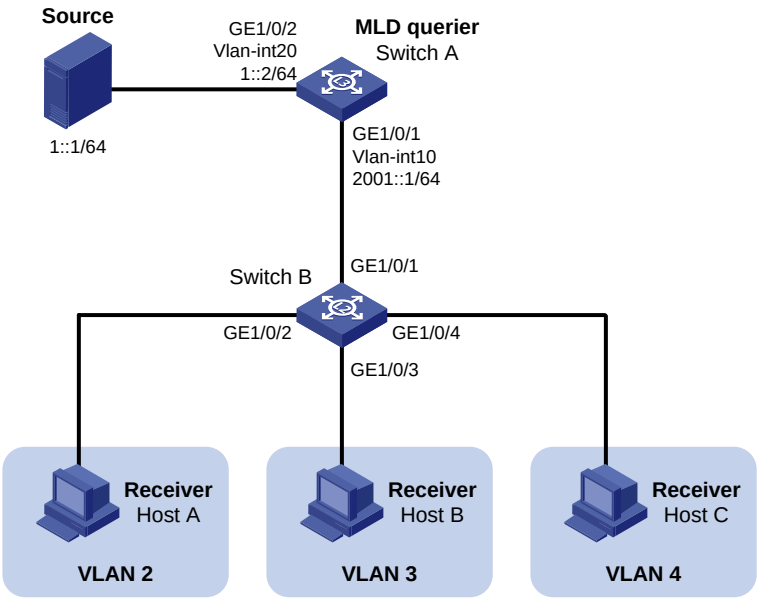
As shown in Figure 4:

- Layer 3 device Switch A runs MLD and acts as the MLD querier. Layer 2 device Switch B runs MLDv1 snooping.
- The IPv6 multicast source sends IPv6 multicast data to IPv6 multicast group FF1E::101. Receivers Host A, Host B, and Host C belong to VLAN 2, VLAN 3, and VLAN 4, respectively.

Configure a sub-VLAN-based IPv6 multicast VLAN on Switch B to meet the following requirements:

- Switch A sends the IPv6 multicast data to Switch B through the IPv6 multicast VLAN.
- Switch B forwards the IPv6 multicast data to the receivers in different user VLANs.

**Figure 4 Network diagram**




## Procedure

**1.** Configure Switch A:

# Enable IPv6 multicast routing.

```
<SwitchA> system-view
[SwitchA] ipv6 multicast routing
[SwitchA-mrib6] quit
```

# Create VLAN 20, and assign GigabitEthernet 1/0/2 to the VLAN.

```
[SwitchA] vlan 20
[SwitchA-vlan20] port gigabitethernet 1/0/2
[SwitchA-vlan20] quit
```

# Assign an IPv6 address to VLAN-interface 20, and enable IPv6 PIM-DM on the interface.

```
[SwitchA] interface vlan-interface 20
[SwitchA-Vlan-interface20] ipv6 address 1::2 64
[SwitchA-Vlan-interface20] ipv6 pim dm
[SwitchA-Vlan-interface20] quit
```

# Create VLAN 10.

```
[SwitchA] vlan 10
[SwitchA-vlan10] quit
```

# Configure GigabitEthernet 1/0/1 as a hybrid port, and assign the port to VLAN 10 as a tagged VLAN member.

```
[SwitchA] interface gigabitethernet 1/0/1
[SwitchA-GigabitEthernet1/0/1] port link-type hybrid
[SwitchA-GigabitEthernet1/0/1] port hybrid vlan 10 tagged
[SwitchA-GigabitEthernet1/0/1] quit
```

# Assign an IPv6 address to VLAN-interface 10, and enable MLD on the interface.

```
[SwitchA] interface vlan-interface 10
[SwitchA-Vlan-interface10] ipv6 address 2001::1 64
[SwitchA-Vlan-interface10] mld enable
[SwitchA-Vlan-interface10] quit
```

**2.** Configure Switch B:

# Enable the MLD snooping feature.

```
<SwitchB> system-view
[SwitchB] mld-snooping
[SwitchB-mld-snooping] quit
```

# Create VLAN 2, assign GigabitEthernet 1/0/2 to the VLAN, and enable MLD snooping for the VLAN.

```
[SwitchB] vlan 2
[SwitchB-vlan2] port gigabitethernet 1/0/2
[SwitchB-vlan2] mld-snooping enable
[SwitchB-vlan2] quit
```

# Create VLAN 3, assign GigabitEthernet 1/0/3 to the VLAN, and enable MLD snooping for the VLAN.

```
[SwitchB] vlan 3
[SwitchB-vlan3] port gigabitethernet 1/0/3
[SwitchB-vlan3] mld-snooping enable
[SwitchB-vlan3] quit
```

# Create VLAN 4, assign GigabitEthernet 1/0/4 to the VLAN, and enable MLD snooping for the VLAN.

```
[SwitchB] vlan 4
[SwitchB-vlan4] port gigabitethernet 1/0/4
[SwitchB-vlan4] mld-snooping enable
[SwitchB-vlan4] quit
```

# Create VLAN 10, and enable MLD snooping for the VLAN.

```
[SwitchB] vlan 10
[SwitchB-vlan10] mld-snooping enable
[SwitchB-vlan10] quit
```

# Configure GigabitEthernet 1/0/1 as a hybrid port, and assign the port to VLAN 10 as a tagged VLAN member.

```
[SwitchB] interface gigabitethernet 1/0/1
[SwitchB-GigabitEthernet1/0/1] port link-type hybrid
[SwitchB-GigabitEthernet1/0/1] port hybrid vlan 10 tagged
[SwitchB-GigabitEthernet1/0/1] quit
```

# Configure VLAN 10 as an IPv6 multicast VLAN, and assign VLAN 2 through VLAN 4 as sub-VLANs to multicast VLAN 10.

```
[SwitchB] ipv6 multicast-vlan 10
[SwitchB-ipv6-mvlan-10] subvlan 2 to 4
[SwitchB-ipv6-mvlan-10] quit
```

## Verifying the configuration

# Display information about all IPv6 multicast VLANs on Switch B.

```
[SwitchB] display ipv6 multicast-vlan
Total 1 IPv6 multicast VLANs.

IPv6 multicast VLAN 10:
  Sub-VLAN list(3 in total):
     2-4
  Port list(0 in total):
```

# Display information about IPv6 multicast groups in IPv6 multicast VLANs on Switch B.

```
[SwitchB] display ipv6 multicast-vlan group
Total 1 entries.

IPv6 multicast VLAN 10: Total 1 entries.
  (::, FF1E::101)
    Sub-VLANs (3 in total):
      VLAN 2
      VLAN 3
      VLAN 4
```

The output shows that IPv6 multicast group FF1E::101 belongs to IPv6 multicast VLAN 10. IPv6 multicast VLAN 10 contains sub-VLANs VLAN 2 through VLAN 4. Switch B will replicate the IPv6 multicast data of VLAN 10 to VLAN 2 through VLAN 4.

# Example: Configuring port-based IPv6 multicast VLAN

## Network configuration

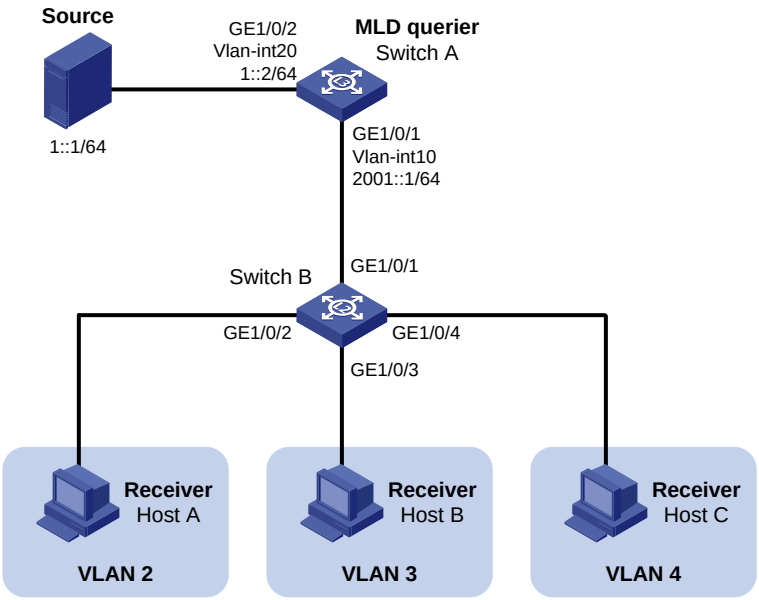
As shown in Figure 5:

- Layer 3 device Switch A runs MLDv1 and acts as the MLD querier. Layer 2 device Switch B runs MLDv1 snooping.
- The IPv6 multicast source sends IPv6 multicast data to IPv6 multicast group FF1E::101. Receivers Host A, Host B, and Host C belong to VLAN 2, VLAN 3, and VLAN 4, respectively.

Configure a port-based IPv6 multicast VLAN on Switch B to meet the following requirements:

- Switch A sends IPv6 multicast data to Switch B through the IPv6 multicast VLAN.
- Switch B forwards the IPv6 multicast data to the receivers in different user VLANs.

**Figure 5 Network diagram**




## Procedure

1. Configure Switch A:

   # Enable IPv6 multicast routing.

   ```
   <SwitchA> system-view
   ```

```
[SwitchA] ipv6 multicast routing
[SwitchA-mrib6] quit
```

# Create VLAN 20, and assign GigabitEthernet 1/0/2 to the VLAN.

```
[SwitchA] vlan 20
[SwitchA-vlan20] port gigabitethernet 1/0/2
[SwitchA-vlan20] quit
```

# Assign an IPv6 address to VLAN-interface 20, and enable IPv6 PIM-DM on the interface.

```
[SwitchA] interface vlan-interface 20
[SwitchA-Vlan-interface20] ipv6 address 1::2 64
[SwitchA-Vlan-interface20] ipv6 pim dm
[SwitchA-Vlan-interface20] quit
```

# Create VLAN 10, and assign GigabitEthernet 1/0/1 to the VLAN.

```
[SwitchA] vlan 10
[SwitchA-vlan10] port gigabitethernet 1/0/1
[SwitchA-vlan10] quit
```

# Assign an IPv6 address to VLAN-interface 10, and enable MLD on the interface.

```
[SwitchA] interface vlan-interface 10
[SwitchA-Vlan-interface10] ipv6 address 2001::1 64
[SwitchA-Vlan-interface10] mld enable
[SwitchA-Vlan-interface10] quit
```

**2.** Configure Switch B:

# Enable the MLD snooping feature.

```
<SwitchB> system-view
[SwitchB] mld-snooping
[SwitchB-mld-snooping] quit
```

# Create VLAN 10, assign GigabitEthernet 1/0/1 to the VLAN, and enable MLD snooping for the VLAN.

```
[SwitchB] vlan 10
[SwitchB-vlan10] port gigabitethernet 1/0/1
[SwitchB-vlan10] mld-snooping enable
[SwitchB-vlan10] quit
```

# Create VLAN 2, and enable MLD snooping for the VLAN.

```
[SwitchB] vlan 2
[SwitchB-vlan2] mld-snooping enable
[SwitchB-vlan2] quit
```

# Create VLAN 3, and enable MLD snooping for the VLAN.

```
[SwitchB] vlan 3
[SwitchB-vlan3] mld-snooping enable
[SwitchB-vlan3] quit
```

# Create VLAN 4, and enable MLD snooping for the VLAN.

```
[SwitchB] vlan 4
[SwitchB-vlan4] mld-snooping enable
[SwitchB-vlan4] quit
```

# Configure GigabitEthernet 1/0/2 as a hybrid port, and configure VLAN 2 as the PVID of the hybrid port.

```
[SwitchB] interface gigabitethernet 1/0/2
[SwitchB-GigabitEthernet1/0/2] port link-type hybrid
[SwitchB-GigabitEthernet1/0/2] port hybrid pvid vlan 2
```

# Assign GigabitEthernet 1/0/2 to VLAN 2 and VLAN 10 as an untagged VLAN member.

```
[SwitchB-GigabitEthernet1/0/2] port hybrid vlan 2 untagged
[SwitchB-GigabitEthernet1/0/2] port hybrid vlan 10 untagged
[SwitchB-GigabitEthernet1/0/2] quit
```

# Configure GigabitEthernet 1/0/3 as a hybrid port, and configure VLAN 3 as the PVID of the hybrid port.

```
[SwitchB] interface gigabitethernet 1/0/3
[SwitchB-GigabitEthernet1/0/3] port link-type hybrid
[SwitchB-GigabitEthernet1/0/3] port hybrid pvid vlan 3
```

# Assign GigabitEthernet 1/0/3 to VLAN 3 and VLAN 10 as an untagged VLAN member.

```
[SwitchB-GigabitEthernet1/0/3] port hybrid vlan 3 untagged
[SwitchB-GigabitEthernet1/0/3] port hybrid vlan 10 untagged
[SwitchB-GigabitEthernet1/0/3] quit
```

# Configure GigabitEthernet 1/0/4 as a hybrid port, and configure VLAN 4 as the PVID of the hybrid port.

```
[SwitchB] interface gigabitethernet 1/0/4
[SwitchB-GigabitEthernet1/0/4] port link-type hybrid
[SwitchB-GigabitEthernet1/0/4] port hybrid pvid vlan 4
```

# Assign GigabitEthernet 1/0/4 to VLAN 4 and VLAN 10 as an untagged VLAN member.

```
[SwitchB-GigabitEthernet1/0/4] port hybrid vlan 4 untagged
[SwitchB-GigabitEthernet1/0/4] port hybrid vlan 10 untagged
[SwitchB-GigabitEthernet1/0/4] quit
```

# Configure VLAN 10 as an IPv6 multicast VLAN.

```
[SwitchB] ipv6 multicast-vlan 10
```

# Assign GigabitEthernet 1/0/2 and GigabitEthernet 1/0/3 to VLAN 10.

```
[SwitchB-ipv6-mvlan-10] port gigabitethernet 1/0/2 to gigabitethernet 1/0/3
[SwitchB-ipv6-mvlan-10] quit
```

# Assign GigabitEthernet 1/0/4 to VLAN 10.

```
[SwitchB] interface gigabitethernet 1/0/4
[SwitchB-GigabitEthernet1/0/4] ipv6 port multicast-vlan 10
[SwitchB-GigabitEthernet1/0/4] quit
```

## Verifying the configuration

# Display information about IPv6 multicast VLANs on Switch B.

```
[SwitchB] display ipv6 multicast-vlan
Total 1 IPv6 multicast VLANs.

IPv6 multicast VLAN 10:
  Sub-VLAN list(0 in total):
  Port list(3 in total):
    GE1/0/2
    GE1/0/3
    GE1/0/4
```

# Display dynamic MLD snooping forwarding entries on Switch B.

```
[SwitchB] display mld-snooping group
Total 1 entries.

VLAN 10: Total 1 entries.
```

```
(::, FF1E::101)
  Host slots (0 in total):
  Host ports (3 in total):
    GE1/0/2         (00:03:23)
    GE1/0/3         (00:04:07)
    GE1/0/4         (00:04:16)
```

The output shows that MLD snooping maintains the user ports in the multicast VLAN (VLAN 10). Switch B will forward the IPv6 multicast data of VLAN 10 through these user ports.