Configuring the private VLAN

VLAN technology provides a method for isolating traffic from customers. At the access layer of a network, customer traffic must be isolated for security or accounting purposes. If VLANs are assigned on a per-user basis, a large number of VLANs will be required.

The private VLAN feature saves VLAN resources. It uses a two-tier VLAN structure as follows:

- **Primary VLAN**—Used for connecting the upstream device. A primary VLAN can be associated with multiple secondary VLANs. The upstream device identifies only the primary VLAN.

- **Secondary VLANs**—Used for connecting users. Secondary VLANs are isolated at Layer 2. To implement Layer 3 communication between secondary VLANs associated with the primary VLAN, enable local proxy ARP or ND on the upstream device (for example, L3 Device A in Figure 56).

As shown in Figure 56, the private VLAN feature is enabled on L2 Device B. VLAN 10 is the primary VLAN. VLANs 2, 5, and 8 are secondary VLANs that are associated with VLAN 10. L3 Device A is only aware of VLAN 10.

**Figure 56 Private VLAN example**

If the private VLAN feature is configured on a Layer 3 device, use one of the following methods on the Layer 3 device to enable Layer 3 communication. Layer 3 communication might be required between secondary VLANs that are associated with the same primary VLAN, or between secondary VLANs and other networks.

- **Method 1:**
  a. Create VLAN interfaces for the secondary VLANs.
  b. Assign IP addresses to the secondary VLAN interfaces.

- **Method 2:**
  a. Enable Layer 3 communication between the secondary VLANs that are associated with the primary VLAN.
  b. Create the VLAN interface for the primary VLAN and assign an IP address to it. (Do not create secondary VLAN interfaces if you use this method.)
  c. Enable local proxy ARP or ND on the primary VLAN interface.

**Configuration task list**

To configure the private VLAN feature, perform the following tasks:

1. Configure the primary VLAN.
2. Configure the secondary VLANs.
3.  Associate the secondary VLANs with the primary VLAN.

4.  Configure the uplink and downlink ports:
   - Configure the uplink port (for example, the port connecting L2 Device B to L3 Device A in Figure 56):
     - When the port allows only one primary VLAN, configure the port as a promiscuous port of the primary VLAN. The promiscuous port can be automatically assigned to the primary VLAN and its associated secondary VLANs.
     - When the port allows multiple primary VLANs, configure the port as a trunk promiscuous port of the primary VLANs. The trunk promiscuous port can be automatically assigned to the primary VLANs and their associated secondary VLANs.
   - Configure a downlink port (for example, the port connecting L2 Device B to a host in Figure 56) as a host port. The host port can be automatically assigned to the secondary VLAN and its associated primary VLAN.
   - If a downlink port allows multiple secondary VLANs, configure the port as a trunk secondary port. The trunk secondary port can be automatically assigned to the secondary VLANs and their associated primary VLANs.

For more information about promiscuous, trunk promiscuous, host, and trunk secondary ports, see Layer 2—LAN Switching Command Reference.

5.  Configure Layer 3 communication between the specified secondary VLANs that are associated with the primary VLAN.

Configuration restrictions and guidelines

When you configure the private VLAN feature, follow these restrictions and guidelines:

- Make sure the following requirements are met:
  - For a promiscuous port:
    - The primary VLAN is the PVID of the port.
    - The port is an untagged member of the primary VLAN and secondary VLANs.
  - For a host port:
    - The PVID of the port is a secondary VLAN.
    - The port is an untagged member of the primary VLAN and the secondary VLAN.
  - A trunk promiscuous or trunk secondary port must be a tagged member of the primary VLANs and the secondary VLANs.
- VLAN 1 (system default VLAN) does not support the private VLAN configuration.

Configuration procedure

To configure the private VLAN feature:

<table>
<thead>
<tr>
<th>Step</th>
<th>Command</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>system-view</td>
<td>N/A</td>
</tr>
<tr>
<td>2.</td>
<td>vlan vlan-id</td>
<td>N/A</td>
</tr>
<tr>
<td>3.</td>
<td>private-vlan primary</td>
<td>By default, a VLAN is not a primary VLAN.</td>
</tr>
<tr>
<td>4.</td>
<td>quit</td>
<td>N/A</td>
</tr>
<tr>
<td>5.</td>
<td>vlan { vlan-id1 [ to vlan-id2 ]</td>
<td>all }</td>
</tr>
<tr>
<td>Step</td>
<td>Command</td>
<td>Remarks</td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>6.</td>
<td>quit</td>
<td>N/A</td>
</tr>
<tr>
<td>7.</td>
<td>vlan vlan-id</td>
<td>N/A</td>
</tr>
<tr>
<td>8.</td>
<td>private-vlan secondary vlan-id-list</td>
<td>By default, a primary VLAN is not associated with any secondary VLANs.</td>
</tr>
<tr>
<td>9.</td>
<td>quit</td>
<td>N/A</td>
</tr>
<tr>
<td>10.</td>
<td>interface interface-type interface-number</td>
<td>N/A</td>
</tr>
<tr>
<td>11.</td>
<td><strong>Configure the uplink port</strong> as a promiscuous or trunk promiscuous port of the specified VLANs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Configure the uplink port as a promiscuous port of the specified VLAN:</strong> port private-vlan vlan-id promiscuous</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Configure the uplink port as a trunk promiscuous port of the specified VLANs:</strong> port private-vlan vlan-id-list trunk promiscuous</td>
<td></td>
</tr>
<tr>
<td></td>
<td>By default, a port is not a promiscuous or trunk promiscuous port of any VLANs.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>quit</td>
<td>N/A</td>
</tr>
<tr>
<td>13.</td>
<td>interface interface-type interface-number</td>
<td>N/A</td>
</tr>
<tr>
<td>14.</td>
<td><strong>Assign the downlink port to secondary VLANs.</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Set the link type of the port: port link-type { access</td>
<td>hybrid</td>
</tr>
<tr>
<td></td>
<td>b. Assign the access port to the specified VLAN: port access vlan vlan-id</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. Assign the trunk port to the specified VLANs: port trunk permit vlan { vlan-id-list</td>
<td>all }</td>
</tr>
<tr>
<td></td>
<td>d. Assign the hybrid port to the specified VLANs: port hybrid vlan vlan-id-list { tagged</td>
<td>untagged }</td>
</tr>
<tr>
<td></td>
<td>Select substep b, c, or d depending on the port link type.</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td><strong>Configure the downlink port</strong> as a host or trunk secondary port.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Configure the downlink port as a host port:</strong> port private-vlan host</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Configure the downlink port as a trunk secondary port of the specified VLANs:</strong> port private-vlan vlan-id-list trunk secondary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>By default, a port is not a host or trunk secondary port.</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>quit</td>
<td>N/A</td>
</tr>
<tr>
<td>17.</td>
<td>vlan vlan-id</td>
<td>N/A</td>
</tr>
<tr>
<td>18.</td>
<td>(Optional.) Enable Layer 2 communication for ports in the same secondary VLAN.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>undo private-vlan isolated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>private-vlan community</td>
<td></td>
</tr>
<tr>
<td></td>
<td>By default, ports in the same secondary VLAN can communicate with each other at Layer 2.</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>quit</td>
<td>N/A</td>
</tr>
</tbody>
</table>
20. (Optional.) Configure Layer 3 communication between the specified secondary VLANs.

<table>
<thead>
<tr>
<th>Step</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a</strong></td>
</tr>
<tr>
<td><strong>b</strong></td>
</tr>
<tr>
<td><strong>c</strong></td>
</tr>
<tr>
<td><strong>d</strong></td>
</tr>
<tr>
<td><strong>e</strong></td>
</tr>
<tr>
<td><strong>f</strong></td>
</tr>
</tbody>
</table>

Remarks:
- Use substeps a, b, c, and e for devices that run IPv4 protocols.
- Use substeps a, b, d, and f for devices that run IPv6 protocols.
- By default:
  - Secondary VLANs cannot communicate with each other at Layer 3.
  - No IP address is configured for a VLAN interface.
  - Local proxy ARP and ND are disabled.

For more information about local proxy ARP and ND, see `Layer 3—IP Services Configuration Guide`. For more information about the `local-proxy-arp enable` and `local-proxy-nd enable` commands, see `Layer 3—IP Services Command Reference`.

Displaying and maintaining the private VLAN

Execute `display` commands in any view.

<table>
<thead>
<tr>
<th>Task</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display information about primary VLANs and the secondary VLANs associated with each primary VLAN.</td>
<td><code>display private-vlan [ primary-vlan-id ]</code></td>
</tr>
</tbody>
</table>

Private VLAN configuration examples

Promiscuous port configuration example

Network requirements

As shown in Figure 57, configure the private VLAN feature to meet the following requirements:

- On Device B, VLAN 5 is a primary VLAN that is associated with secondary VLANs 2 and 3. Ten-GigabitEthernet 1/0/5 is in VLAN 5. Ten-GigabitEthernet 1/0/2 is in VLAN 2. Ten-GigabitEthernet 1/0/3 is in VLAN 3.
- On Device C, VLAN 6 is a primary VLAN that is associated with secondary VLANs 3 and 4. Ten-GigabitEthernet 1/0/5 is in VLAN 6. Ten-GigabitEthernet 1/0/3 is in VLAN 3. Ten-GigabitEthernet 1/0/4 is in VLAN 4.
- Device A is aware of only VLAN 5 on Device B and VLAN 6 on Device C.
Figure 57 Network diagram

Configuration procedure

This example describes the configurations on Device B and Device C.

1. Configure Device B:
   # Configure VLAN 5 as a primary VLAN.
   <DeviceB> system-view
   [DeviceB] vlan 5
   [DeviceB-vlan5] private-vlan primary
   [DeviceB-vlan5] quit

   # Create VLANs 2 and 3.
   [DeviceB] vlan 2 to 3

   # Associate secondary VLANs 2 and 3 with primary VLAN 5.
   [DeviceB] vlan 5
   [DeviceB-vlan5] private-vlan secondary 2 to 3
   [DeviceB-vlan5] quit

   # Configure the uplink port (Ten-GigabitEthernet 1/0/5) as a promiscuous port of VLAN 5.
   [DeviceB] interface ten-gigabitethernet 1/0/5
   [DeviceB-Ten-GigabitEthernet1/0/5] port private-vlan 5 promiscuous
   [DeviceB-Ten-GigabitEthernet1/0/5] quit

   # Assign downlink port Ten-GigabitEthernet 1/0/2 to VLAN 2, and configure the port as a host port.
   [DeviceB] interface ten-gigabitethernet 1/0/2
   [DeviceB-Ten-GigabitEthernet1/0/2] port access vlan 2
   [DeviceB-Ten-GigabitEthernet1/0/2] port private-vlan host
   [DeviceB-Ten-GigabitEthernet1/0/2] quit

   # Assign downlink port Ten-GigabitEthernet 1/0/3 to VLAN 3, and configure the port as a host port.
   [DeviceB] interface ten-gigabitethernet 1/0/3
   [DeviceB-Ten-GigabitEthernet1/0/3] port access vlan 3
   [DeviceB-Ten-GigabitEthernet1/0/3] port private-vlan host
Verifying the configuration

# Verify the private VLAN configurations on the devices, for example, on Device B.

[DeviceB] display private-vlan
Primary VLAN ID: 5
Secondary VLAN ID: 2-3

VLAN ID: 5
VLAN type: Static
Private VLAN type: Primary
Route interface: Not configured
Description: VLAN 0005
Name: VLAN 0005
Tagged ports: None
Untagged ports:
  Ten-GigabitEthernet1/0/2
  Ten-GigabitEthernet1/0/3
  Ten-GigabitEthernet1/0/5
VLAN ID: 2
VLAN type: Static
Private VLAN type: Secondary
Route interface: Not configured
Description: VLAN 0002
Name: VLAN 0002
Tagged ports: None
Untagged ports:
  Ten-GigabitEthernet1/0/2
  Ten-GigabitEthernet1/0/5

VLAN ID: 3
VLAN type: Static
Private VLAN type: Secondary
Route interface: Not configured
Description: VLAN 0003
Name: VLAN 0003
Tagged Ports: None
Untagged Ports:
  Ten-GigabitEthernet1/0/3
  Ten-GigabitEthernet1/0/5

The output shows that:

- The promiscuous port (Ten-GigabitEthernet 1/0/5) is an untagged member of primary VLAN 5 and secondary VLANs 2 and 3.
- Host port Ten-GigabitEthernet 1/0/2 is an untagged member of primary VLAN 5 and secondary VLAN 2.
- Host port Ten-GigabitEthernet 1/0/3 is an untagged member of primary VLAN 5 and secondary VLAN 3.

Trunk promiscuous port configuration example

Network requirements

As shown in Figure 58, configure the private VLAN feature to meet the following requirements:

- VLANs 5 and 10 are primary VLANs on Device B. The uplink port (Ten-GigabitEthernet 1/0/1) on Device B permits the packets from VLANs 5 and 10 to pass through tagged.
- On Device B, downlink port Ten-GigabitEthernet 1/0/2 permits secondary VLAN 2. Downlink port Ten-GigabitEthernet 1/0/3 permits secondary VLAN 3. Secondary VLANs 2 and 3 are associated with primary VLAN 5.
- Device A is aware of only VLANs 5 and 10 on Device B.
Configuration procedure

1. Configure Device B:

   # Configure VLANs 5 and 10 as primary VLANs.
   <DeviceB> system-view
   [DeviceB] vlan 5
   [DeviceB-vlan5] private-vlan primary
   [DeviceB-vlan5] quit
   [DeviceB] vlan 10
   [DeviceB-vlan10] private-vlan primary
   [DeviceB-vlan10] quit

   # Create VLANs 2, 3, 6, and 8.
   [DeviceB] vlan 2 to 3
   [DeviceB] vlan 6
   [DeviceB-vlan6] quit
   [DeviceB] vlan 8
   [DeviceB-vlan8] quit

   # Associate secondary VLANs 2 and 3 with primary VLAN 5.
   [DeviceB-vlan5] private-vlan secondary 2 to 3
   [DeviceB-vlan5] quit

   # Associate secondary VLANs 6 and 8 with primary VLAN 10.
   [DeviceB-vlan10] private-vlan secondary 6 8
   [DeviceB-vlan10] quit

   # Configure the uplink port (Ten-GigabitEthernet 1/0/1) as a trunk promiscuous port of VLANs 5 and 10.
   [DeviceB] interface ten-gigabitethernet 1/0/1
   [DeviceB-Ten-GigabitEthernet1/0/1] port private-vlan 5 10 trunk promiscuous
   [DeviceB-Ten-GigabitEthernet1/0/1] quit
# Assign downlink port Ten-GigabitEthernet 1/0/2 to VLAN 2, and configure the port as a host port.
[DeviceB] interface ten-gigabitethernet 1/0/2
[DeviceB-Ten-GigabitEthernet1/0/2] port access vlan 2
[DeviceB-Ten-GigabitEthernet1/0/2] port private-vlan host
[DeviceB-Ten-GigabitEthernet1/0/2] quit

# Assign downlink port Ten-GigabitEthernet 1/0/3 to VLAN 3, and configure the port as a host port.
[DeviceB] interface ten-gigabitethernet 1/0/3
[DeviceB-Ten-GigabitEthernet1/0/3] port access vlan 3
[DeviceB-Ten-GigabitEthernet1/0/3] port private-vlan host
[DeviceB-Ten-GigabitEthernet1/0/3] quit

# Assign downlink port Ten-GigabitEthernet 1/0/4 to VLAN 6, and configure the port as a host port.
[DeviceB] interface ten-gigabitethernet 1/0/4
[DeviceB-Ten-GigabitEthernet1/0/4] port access vlan 6
[DeviceB-Ten-GigabitEthernet1/0/4] port private-vlan host
[DeviceB-Ten-GigabitEthernet1/0/4] quit

# Assign downlink port Ten-GigabitEthernet 1/0/5 to VLAN 8, and configure the port as a host port.
[DeviceB] interface ten-gigabitethernet 1/0/5
[DeviceB-Ten-GigabitEthernet1/0/5] port access vlan 8
[DeviceB-Ten-GigabitEthernet1/0/5] port private-vlan host
[DeviceB-Ten-GigabitEthernet1/0/5] quit

2. Configure Device A:
   # Create VLANs 5 and 10.
   [DeviceA] vlan 5
   [DeviceA-vlan5] quit
   [DeviceA] vlan 10
   [DeviceA-vlan10] quit

   # Configure Ten-GigabitEthernet 1/0/1 as a hybrid port, and assign it to VLANs 5 and 10 as a tagged VLAN member.
   [DeviceA] interface ten-gigabitethernet 1/0/1
   [DeviceA-Ten-GigabitEthernet1/0/1] port link-type hybrid
   [DeviceA-Ten-GigabitEthernet1/0/1] port hybrid vlan 5 10 tagged
   [DeviceA-Ten-GigabitEthernet1/0/1] quit

Verifying the configuration

# Verify the primary VLAN configurations on Device B. The following output uses primary VLAN 5 as an example.
[DeviceB] display private-vlan 5
  Primary VLAN ID: 5
  Secondary VLAN ID: 2-3

VLAN ID: 5
VLAN type: Static
Private VLAN type: Primary
Route interface: Not configured
Description: VLAN 0005
Name: VLAN 0005
Tagged ports:
  Ten-GigabitEthernet1/0/1
Untagged ports:
  Ten-GigabitEthernet1/0/2
  Ten-GigabitEthernet1/0/3

VLAN ID: 2
VLAN type: Static
Private VLAN type: Secondary
Route interface: Not configured
Description: VLAN 0002
Name: VLAN 0002
Tagged ports:
  Ten-GigabitEthernet1/0/1
Untagged ports:
  Ten-GigabitEthernet1/0/2

VLAN ID: 3
VLAN type: Static
Private VLAN type: Secondary
Route interface: Not configured
Description: VLAN 0003
Name: VLAN 0003
Tagged ports:
  Ten-GigabitEthernet1/0/1
Untagged ports:
  Ten-GigabitEthernet1/0/3

The output shows that:
- The trunk promiscuous port (Ten-GigabitEthernet 1/0/1) is a tagged member of primary VLAN 5 and secondary VLANs 2 and 3.
- Host port Ten-GigabitEthernet 1/0/2 is an untagged member of primary VLAN 5 and secondary VLAN 2.
- Host port Ten-GigabitEthernet 1/0/3 is an untagged member of primary VLAN 5 and secondary VLAN 3.

### Trunk promiscuous and trunk secondary port configuration example

#### Network requirements

As shown in Figure 59, configure the private VLAN feature to meet the following requirements:
- VLANs 10 and 20 are primary VLANs on Device A. The uplink port (Ten-GigabitEthernet 1/0/5) on Device A permits the packets from VLANs 10 and 20 to pass through tagged.
- VLANs 11, 12, 21, and 22 are secondary VLANs on Device A.
  - Downlink port Ten-GigabitEthernet 1/0/2 permits the packets from secondary VLANs 11 and 21 to pass through tagged.
  - Downlink port Ten-GigabitEthernet 1/0/1 permits secondary VLAN 22.
- Downlink port Ten-GigabitEthernet 1/0/3 permits secondary VLAN 12.
- Secondary VLANs 11 and 12 are associated with primary VLAN 10.
- Secondary VLANs 21 and 22 are associated with primary VLAN 20.

**Figure 59 Network diagram**

---

**Configuration procedure**

1. **Configure Device A:**
   - # Configure VLANs 10 and 20 as primary VLANs.
     ```
     <DeviceA> system-view
     [DeviceA] vlan 10
     [DeviceA-vlan10] private-vlan primary
     [DeviceA-vlan10] quit
     [DeviceA] vlan 20
     [DeviceA-vlan20] private-vlan primary
     [DeviceA-vlan20] quit
     # Create VLANs 11, 12, 21, and 22.
     [DeviceA] vlan 11 to 12
     [DeviceA] vlan 21 to 22
     # Associate secondary VLANs 11 and 12 with primary VLAN 10.
     [DeviceA-vlan10] private-vlan secondary 11 12
     [DeviceA-vlan10] quit
     # Associate secondary VLANs 21 and 22 with primary VLAN 20.
     [DeviceA-vlan20] private-vlan secondary 21 22
     ```
---
Configure the uplink port (Ten-GigabitEthernet 1/0/5) as a trunk promiscuous port of VLANs 10 and 20.

```
[DeviceA-vlan20] quit
```

```
# Configure the uplink port (Ten-GigabitEthernet 1/0/5) as a trunk promiscuous port of VLANs 10 and 20.
[DeviceA] interface ten-gigabitethernet 1/0/5
[DeviceA-Ten-GigabitEthernet1/0/5] port private-vlan 10 20 trunk promiscuous
[DeviceA-Ten-GigabitEthernet1/0/5] quit
```

Assign downlink port Ten-GigabitEthernet 1/0/1 to VLAN 22 and configure the port as a host port.

```
[DeviceA] interface ten-gigabitethernet 1/0/1
[DeviceA-Ten-GigabitEthernet1/0/1] port access vlan 22
[DeviceA-Ten-GigabitEthernet1/0/1] port private-vlan host
[DeviceA-Ten-GigabitEthernet1/0/1] quit
```

Assign downlink port Ten-GigabitEthernet 1/0/3 to VLAN 12 and configure the port as a host port.

```
[DeviceA] interface ten-gigabitethernet 1/0/3
[DeviceA-Ten-GigabitEthernet1/0/3] port access vlan 12
[DeviceA-Ten-GigabitEthernet1/0/3] port private-vlan host
[DeviceA-Ten-GigabitEthernet1/0/3] quit
```

Configure downlink port Ten-GigabitEthernet 1/0/2 as a trunk secondary port of VLANs 11 and 21.

```
[DeviceA] interface ten-gigabitethernet 1/0/2
[DeviceA-Ten-GigabitEthernet1/0/2] port private-vlan 11 21 trunk secondary
[DeviceA-Ten-GigabitEthernet1/0/2] quit
```

2. Configure Device B:

```
# Create VLANs 11 and 21.
<DeviceB> system-view
[DeviceB] vlan 11
[DeviceB-vlan11] quit
[DeviceB] vlan 21
[DeviceB-vlan21] quit
```

Configure Ten-GigabitEthernet 1/0/2 as a hybrid port, and assign it to VLANs 11 and 21 as a tagged VLAN member.

```
[DeviceB] interface ten-gigabitethernet 1/0/2
[DeviceB-Ten-GigabitEthernet1/0/2] port link-type hybrid
[DeviceB-Ten-GigabitEthernet1/0/2] port hybrid vlan 11 21 tagged
[DeviceB-Ten-GigabitEthernet1/0/2] quit
```

Assign Ten-GigabitEthernet 1/0/3 to VLAN 11.

```
[DeviceB] interface ten-gigabitethernet 1/0/3
[DeviceB-Ten-GigabitEthernet1/0/3] port access vlan 11
[DeviceB-Ten-GigabitEthernet1/0/3] quit
```

Assign Ten-GigabitEthernet 1/0/4 to VLAN 21.

```
[DeviceB] interface ten-gigabitethernet 1/0/4
[DeviceB-Ten-GigabitEthernet1/0/4] port access vlan 21
[DeviceB-Ten-GigabitEthernet1/0/4] quit
```

3. Configure Device C:

```
# Create VLANs 10 and 20.
<DeviceC> system-view
[DeviceC] vlan 10
```

```
```
Verifying the configuration

# Configure Ten-GigabitEthernet 1/0/5 as a hybrid port, and assign it to VLANs 10 and 20 as a tagged VLAN member.

# Verify the primary VLAN configurations on Device A. The following output uses primary VLAN 10 as an example.

[DeviceC-vlan10] quit
[DeviceC] vlan 20
[DeviceC-vlan20] quit

Verifying the configuration

# Configure Ten-GigabitEthernet 1/0/5 as a hybrid port, and assign it to VLANs 10 and 20 as a tagged VLAN member.

[DeviceC] interface ten-gigabitethernet 1/0/5
[DeviceC-Ten-GigabitEthernet1/0/5] port link-type hybrid
[DeviceC-Ten-GigabitEthernet1/0/5] port hybrid vlan 10 20 tagged
[DeviceC-Ten-GigabitEthernet1/0/5] quit

Verifying the configuration

# Verify the primary VLAN configurations on Device A. The following output uses primary VLAN 10 as an example.

[DeviceA] display private-vlan 10
Primary VLAN ID: 10
Secondary VLAN ID: 11-12

VLAN ID: 10
VLAN type: Static
Private-vlan type: Primary
Route interface: Not configured
Description: VLAN 0010
Name: VLAN 0010
Tagged ports:
  Ten-GigabitEthernet1/0/2
  Ten-GigabitEthernet1/0/5
Untagged ports:
  Ten-GigabitEthernet1/0/3

VLAN ID: 11
VLAN type: Static
Private-vlan type: Secondary
Route interface: Not configured
Description: VLAN 0011
Name: VLAN 0011
Tagged ports:
  Ten-GigabitEthernet1/0/2
  Ten-GigabitEthernet1/0/5
Untagged ports: None

VLAN ID: 12
VLAN type: Static
Private-vlan type: Secondary
Route interface: Not configured
Description: VLAN 0012
Name: VLAN 0012
Tagged ports:
  Ten-GigabitEthernet1/0/5
Untagged ports:
The output shows that:

- The trunk promiscuous port (Ten-GigabitEthernet 1/0/5) is a tagged member of primary VLAN 10 and secondary VLANs 11 and 12.
- The trunk secondary port (Ten-GigabitEthernet 1/0/2) is a tagged member of primary VLAN 10 and secondary VLAN 11.
- The host port (Ten-GigabitEthernet 1/0/3) is an untagged member of primary VLAN 10 and secondary VLAN 12.

Secondary VLAN Layer 3 communication configuration example

Network requirements

As shown in Figure 60, configure the private VLAN feature to meet the following requirements:

- Primary VLAN 10 on Device A is associated with secondary VLANs 2 and 3. The IP address of VLAN-interface 10 is 192.168.1.1/24.
- Ten-GigabitEthernet 1/0/1 belongs to VLAN 10. Ten-GigabitEthernet 1/0/2 and Ten-GigabitEthernet 1/0/3 belong to VLAN 2 and VLAN 3, respectively.
- Secondary VLANs are isolated at Layer 2 but interoperable at Layer 3.

Figure 60 Network diagram

![Network Diagram]

Configuration procedure

# Create VLAN 10 and configure it as a primary VLAN.
<DeviceA> system-view
[DeviceA] vlan 10
[DeviceA-vlan10] private-vlan primary
[DeviceA-vlan10] quit

# Create VLANs 2 and 3.
<DeviceA> system-view
[DeviceA] vlan 2 to 3

# Associate primary VLAN 10 with secondary VLANs 2 and 3.
[DeviceA] vlan 10
[DeviceA-vlan10] private-vlan primary
[DeviceA-vlan10] private-vlan secondary 2 3
[DeviceA-vlan10] quit
# Configure the uplink port (Ten-GigabitEthernet 1/0/1) as a promiscuous port of VLAN 10.
[DeviceA] interface ten-gigabitethernet 1/0/1
[DeviceA-Ten-GigabitEthernet1/0/1] port private-vlan 10 promiscuous
[DeviceA-Ten-GigabitEthernet1/0/1] quit

# Assign downlink port Ten-GigabitEthernet 1/0/2 to VLAN 2, and configure the port as a host port.
[DeviceA] interface ten-gigabitethernet 1/0/2
[DeviceA-Ten-GigabitEthernet1/0/2] port access vlan 2
[DeviceA-Ten-GigabitEthernet1/0/2] port private-vlan host
[DeviceA-Ten-GigabitEthernet1/0/2] quit

# Assign downlink port Ten-GigabitEthernet 1/0/3 to VLAN 3, and configure the port as a host port.
[DeviceA] interface ten-gigabitethernet 1/0/3
[DeviceA-Ten-GigabitEthernet1/0/3] port access vlan 3
[DeviceA-Ten-GigabitEthernet1/0/3] port private-vlan host
[DeviceA-Ten-GigabitEthernet1/0/3] quit

# Enable Layer 3 communication between secondary VLANs 2 and 3 that are associated with primary VLAN 10.
[DeviceA] interface vlan-interface 10
[DeviceA-Vlan-interface10] private-vlan secondary 2 3

# Assign IP address 192.168.1.1/24 to VLAN-interface 10.
[DeviceA-Vlan-interface10] ip address 192.168.1.1 255.255.255.0

# Enable local proxy ARP on VLAN-interface 10.
[DeviceA-Vlan-interface10] local-proxy-arp enable
[DeviceA-Vlan-interface10] quit

Verifying the configuration

# Display the configuration of primary VLAN 10.
[DeviceA] display private-vlan 10
Primary VLAN ID: 10
Secondary VLAN ID: 2-3

VLAN ID: 10
VLAN type: Static
Private VLAN type: Primary
Route interface: Configured
IPv4 address: 192.168.1.1
IPv4 subnet mask: 255.255.255.0
Description: VLAN 0010
Name: VLAN 0010
Tagged ports:  None
Untagged ports:
  Ten-GigabitEthernet1/0/1
  Ten-GigabitEthernet1/0/2
  Ten-GigabitEthernet1/0/3

VLAN ID: 2
VLAN type: Static
Private VLAN type: Secondary
Route interface: Configured
IPv4 address: 192.168.1.1
IPv4 subnet mask: 255.255.255.0
Description: VLAN 0002
Name: VLAN 0002
Tagged ports: None
Untagged ports:
   Ten-GigabitEthernet1/0/1
   Ten-GigabitEthernet1/0/2

VLAN ID: 3
VLAN type: Static
Private VLAN type: Secondary
Route interface: Configured
IPv4 address: 192.168.1.1
IPv4 subnet mask: 255.255.255.0
Description: VLAN 0003
Name: VLAN 0003
Tagged ports: None
Untagged ports:
   Ten-GigabitEthernet1/0/1
   Ten-GigabitEthernet1/0/3

The Route interface field in the output is Configured, indicating that secondary VLANs 2 and 3 are interoperable at Layer 3.