Lab 1-2 VLAN Configuration

Learning Objectives

As a result of this lab section, you should achieve the following tasks:

- Assign port interfaces to become access and trunk ports.
- Create VLANs.
- Configure VLAN tagging over ports using the hybrid port link type.
- Configure the default VLAN for an interface using the Port VLAN ID.

Topology

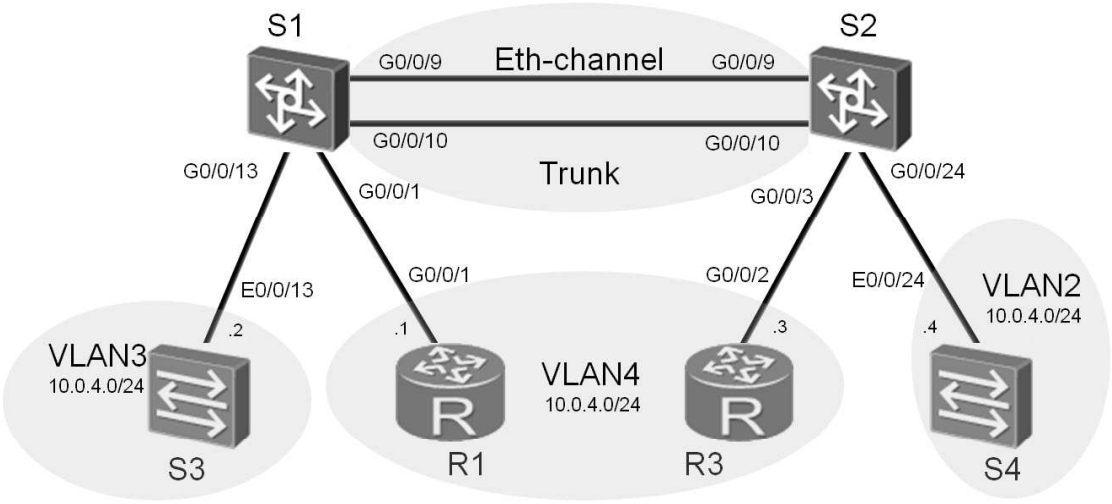

Figure 1.2 VLAN topology

Scenario

The enterprise network currently operates in a single broadcast domain resulting in a large amount of traffic being flooded to all network nodes.

It is required that the administrator attempt to control the flow of traffic at the link layer by implementing VLAN solutions. The VLAN solutions are to be applied to switches S1 and S2.

Tasks

Step 1 Preparing the environment.

If you are starting this section with a non-configured device, begin here and then move to step 2. For those continuing from previous labs, begin at step 2.

Establish an Eth-trunk link between S1 and S2.

```
<Quidway>system-view
[Quidway]sysname S1
[S1]interface Eth-trunk 1
[S1-Eth-Trunk1]mode lacp-static
[S1-Eth-Trunk1]quit
[S1]interface GigabitEthernet0/0/9
[S1-Gigabitethernet0/0/9]eth-trunk 1
[S1-Gigabitethernet0/0/9]interface GigabitEthernet0/0/10
[S1-Gigabitethernet0/0/10]eth-trunk 1
```

On S2, add interfaces to an Eth-Trunk using the Eth-Trunk view.

```
<Quidway>system-view
[Quidway]sysname S2
[S2]interface eth-trunk 1
[S2-Eth-Trunk1]mode lacp-static
[S2-Eth-Trunk1]trunkport GigabitEthernet 0/0/9
[S2-Eth-Trunk1]trunkport GigabitEthernet 0/0/10
```

Step 2 Disable unused interfaces and establish a VLAN trunk.

Unused interfaces must be disabled to ensure test result accuracy. In this lab, interfaces Ethernet 0/0/1 and Ethernet 0/0/23 on S3 and Ethernet0/0/14 on S4 need to be shut down.

```
<Quidway>system-view
Enter system view, return user view with Ctrl+Z.
[Quidway]sysname S3
```

```
[S3]interface Ethernet 0/0/1
[S3-Ethernet0/0/1]shutdown
[S3-Ethernet0/0/1]quit
[S3]interface Ethernet 0/0/23
[S3-Ethernet0/0/23]shutdown

<Quidway>system-view
Enter system view, return user view with Ctrl+Z.
[Quidway]sysname S4
[S4]interface Ethernet 0/0/14
[S4-Ethernet0/0/14]shutdown
```

The link type of a switch port interface is hybrid by default. Configure the port link-type for Eth-Trunk 1 to become a trunk port. Additionally, allow all VLANS to be permitted over the trunk port.

```
[S1]interface Eth-Trunk 1
[S1-Eth-Trunk1]port link-type trunk
[S1-Eth-Trunk1]port trunk allow-pass vlan all

[S2]interface Eth-Trunk 1
[S2-Eth-Trunk1]port link-type trunk
[S2-Eth-Trunk1]port trunk allow-pass vlan all
```

Step 3 **Configure VLANs.**

Use S3, R1, R3, and S4 as non-VLAN aware hosts. There are two methods to create VLANs, and two methods to bind interfaces to the created VLANs, S1 and S2 are used to demonstrate the two methods. All interfaces associated with hosts should be configured as access ports.

On S1, associate interface Gigabit Ethernet 0/0/13 with VLAN 3, and interface Gigabit Ethernet 0/0/1 with VLAN 4.

On S2, associate interface Gigabit Ethernet 0/0/2 with VLAN4, and Gigabit Ethernet 0/0/24 with VLAN 2.

```
[S1]interface GigabitEthernet0/0/13
[S1-GigabitEthernet0/0/13]port link-type access
[S1-GigabitEthernet0/0/13]quit
[S1]interface GigabitEthernet0/0/1
[S1-GigabitEthernet0/0/1]port link-type access
[S1-GigabitEthernet0/0/1]quit
[S1]vlan 2
[S1-vlan2]vlan 3
[S1-vlan3]port GigabitEthernet0/0/13
```

```
[S1-vlan3]vlan 4
[S1-vlan4]port GigabitEthernet0/0/1
[S2]vlan batch 2 to 4
[S2]interface GigabitEthernet 0/0/3
[S2-GigabitEthernet0/0/3]port link-type access
[S2-GigabitEthernet0/0/3]port default vlan 4
[S2-GigabitEthernet0/0/3]quit
[S2]interface GigabitEthernet 0/0/24
[S2-GigabitEthernet0/0/24]port link-type access
[S2-GigabitEthernet0/0/24]port default vlan 2
```

Verify that the VLAN configuration has been correctly applied to S1 and S2.

```
<S1>display vlan
The total number of vlans is : 4
--------------------------------------------------------------------------------
U: Up;        D: Down;        TG: Tagged;        UT: Untagged;
MP: Vlan-mapping;             ST: Vlan-stacking;
#: ProtocolTransparent-vlan;    *: Management-vlan;
--------------------------------------------------------------------------------

VID  Type        Ports
--------------------------------------------------------------------------------
1    common      UT:GE0/0/2(U)  GE0/0/3(U)      GE0/0/4(U)      GE0/0/5(U)
                 GE0/0/6(D)     GE0/0/7(D)      GE0/0/8(D)      GE0/0/11(D)
                 GE0/0/12(D)    GE0/0/14(D)     GE0/0/15(D)     GE0/0/16(D)
                 GE0/0/17(D)    GE0/0/18(D)     GE0/0/19(D)     GE0/0/20(D)
                 GE0/0/21(U)    GE0/0/22(U)     GE0/0/23(U)     GE0/0/24(D)
                 Eth-Trunk1(U)
2    common  TG:Eth-Trunk1(U)
3    common  UT:GE0/0/13(U)
             TG:Eth-Trunk1(U)
4    common  UT:GE0/0/1(U)
             TG:Eth-Trunk1(U)
…output omitted…

<S2>display vlan
The total number of vlans is : 4
--------------------------------------------------------------------------------
U: Up;        D: Down;        TG: Tagged;        UT: Untagged;
MP: Vlan-mapping;             ST: Vlan-stacking;
#: ProtocolTransparent-vlan;    *: Management-vlan;
--------------------------------------------------------------------------------
```

```
VID  Type        Ports
--------------------------------------------------------------------------------
1    common      UT:GE0/0/1(U)  GE0/0/2(U)      GE0/0/4(U)      GE0/0/5(U)
                 GE0/0/6(D)     GE0/0/7(D)      GE0/0/8(D)      GE0/0/11(U)
                 GE0/0/12(U)    GE0/0/13(U)     GE0/0/14(D)     GE0/0/15(D)
                 GE0/0/16(D)    GE0/0/17(D)     GE0/0/18(D)     GE0/0/19(D)
                 GE0/0/20(D)    GE0/0/21(D)     GE0/0/22(D)     GE0/0/23(D)
                 Eth-Trunk1(U)
2    common  UT:GE0/0/24(U)
             TG:Eth-Trunk1(U)
3    common  TG:Eth-Trunk1(U)
4    common  UT:GE0/0/3(U)
             TG:Eth-Trunk1(U)
…output omitted…
```

The highlighted entries confirm the binding of the interfaces to each created VLAN. All VLANs are permitted over the trunk (TG) port Eth-Trunk 1.

Step 4 **Configure IP addressing for each VLAN.**

Configure IP addresses on hosts, R1, S3, R3, and S4 as part of the respective VLANs. Physical port interfaces on switches cannot be configured with IP addresses, therefore configure the native management interface Vlanif1 with the IP address for the switch.

```
<Huawei>system-view
[Huawei]sysname R1
[R1]interface GigabitEthernet0/0/1
[R1-GigabitEthernet0/0/1]ip address 10.0.4.1 24

[S3]interface vlanif 1
[S3-vlanif1]ip address 10.0.4.2 24

<Huawei>system-view
[Huawei]sysname R3
[R3]interface GigabitEthernet0/0/2
[R3-GigabitEthernet0/0/2]ip address 10.0.4.3 24

[S4]interface vlanif 1
[S4-vlanif1]ip address 10.0.4.4 24
```

Step 5 Verify the configuration, by checking the connectivity.

Use the **ping** command. R1 and R3 in VLAN 4 should be able to communicate with one another. Devices in other VLANs should be unable to communicate.

```
[R1]ping 10.0.4.3
  PING 10.0.4.3: 56  data bytes, press CTRL_C to break
    Reply from 10.0.4.3: bytes=56 Sequence=1 ttl=255 time=6 ms
    Reply from 10.0.4.3: bytes=56 Sequence=2 ttl=255 time=2 ms
    Reply from 10.0.4.3: bytes=56 Sequence=3 ttl=255 time=2 ms
    Reply from 10.0.4.3: bytes=56 Sequence=4 ttl=255 time=2 ms
    Reply from 10.0.4.3: bytes=56 Sequence=5 ttl=255 time=2 ms

  --- 10.0.4.3 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
round-trip min/avg/max = 2/2/6 ms

[R1]ping 10.0.4.4
  PING 10.0.4.4: 56  data bytes, press CTRL_C to break
    Request time out
    Request time out
    Request time out
    Request time out
    Request time out

  --- 10.0.4.4 ping statistics ---
    5 packet(s) transmitted
    0 packet(s) received
    100.00% packet loss
```

You may wish to also try between R1 and S3, and between R3 and S4.

Step 6 Configure a hybrid interface.

Use the hybrid port link type to allow VLAN tagging to be closely managed at a port interface level. We shall use hybrid ports to allow tagged frames from VLAN 4 to be received by VLAN 2 and vice versa.

Set the port link type of port interface Gigabit Ethernet 0/0/1 of port S1 and the interfaces Gigabit Ethernet 0/0/3 and 0/0/24 of S2 as hybrid ports. Additionally set the hybrid ports to untag all frames associated with VLAN 2 and 4.

```
[S1]interface GigabitEthernet 0/0/1
[S1-GigabitEthernet0/0/1]undo port default vlan
[S1-GigabitEthernet0/0/1]port link-type hybrid
[S1-GigabitEthernet0/0/1]port hybrid untagged vlan 2 4
[S1-GigabitEthernet0/0/1]port hybrid pvid vlan 4

[S2]interface GigabitEthernet 0/0/3
[S2-GigabitEthernet0/0/3]undo port default vlan
[S2-GigabitEthernet0/0/3]port link-type hybrid
[S2-GigabitEthernet0/0/3]port hybrid untagged vlan 2 4
[S2-GigabitEthernet0/0/3]port hybrid pvid vlan 4
[S2-GigabitEthernet0/0/3]quit
[S2]interface GigabitEthernet 0/0/24
[S2-GigabitEthernet0/0/24]undo port default vlan
[S2-GigabitEthernet0/0/24]port link-type hybrid
[S2-GigabitEthernet0/0/24]port hybrid untagged vlan 2 4
[S2-GigabitEthernet0/0/24]port hybrid pvid vlan 2
```

The **port hybrid pvid vlan** command will ensure frames received from the host are tagged with the appropriate VLAN tag. Frames received from VLAN 2 or 4 will be untagged at the interface before being forwarded to the host.

Use the ping command to verify that R3 in VLAN 4 is still reachable.

```
<R1>ping 10.0.4.3
  PING 10.0.4.3: 56  data bytes, press CTRL_C to break
    Reply from 10.0.4.3: bytes=56 Sequence=1 ttl=255 time=1 ms
    Reply from 10.0.4.3: bytes=56 Sequence=2 ttl=255 time=1 ms
    Reply from 10.0.4.3: bytes=56 Sequence=3 ttl=255 time=1 ms
    Reply from 10.0.4.3: bytes=56 Sequence=4 ttl=255 time=10 ms
    Reply from 10.0.4.3: bytes=56 Sequence=5 ttl=255 time=1 ms

  --- 10.0.4.3 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
    round-trip min/avg/max = 1/2/10 ms
```

Use the ping command to test whether S4 in VLAN 2 is now reachable from R1 in VLAN 4.

```
<R1>ping 10.0.4.4
  PING 10.0.4.4: 56  data bytes, press CTRL_C to break
    Reply from 10.0.4.4: bytes=56 Sequence=1 ttl=255 time=41 ms
    Reply from 10.0.4.4: bytes=56 Sequence=2 ttl=254 time=2 ms
    Reply from 10.0.4.4: bytes=56 Sequence=3 ttl=254 time=3 ms
    Reply from 10.0.4.4: bytes=56 Sequence=4 ttl=254 time=2 ms
    Reply from 10.0.4.4: bytes=56 Sequence=5 ttl=254 time=2 ms

  --- 10.0.4.4 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
    round-trip min/avg/max = 2/10/41 ms
```

In using the hybrid port link type, frames originating from VLAN 4 are now able to be received by VLAN 2 and vice versa, whilst still being unable to reach the host address of 10.0.4.2 in VLAN 3.

Final Configuration

```
[R1]display current-configuration
[V200R003C00SPC200]
#
 sysname R1
#
interface GigabitEthernet0/0/1
 ip address 10.0.4.1 255.255.255.0
#
return

[S3]display current-configuration
#
!Software Version V100R006C00SPC800
 sysname S3
#
interface Vlanif1
 ip address 10.0.4.2 255.255.255.0
#
interface Ethernet0/0/1
 shutdown
#
interface Ethernet0/0/23
 shutdown
```

```
#
return

[S1]display current-configuration
#
!Software Version V100R006C00SPC800
 sysname S1
#
 vlan batch 2 to 4
#
 lacp priority 100
#
interface Eth-Trunk1
 port link-type trunk
 port trunk allow-pass vlan 2 to 4094
 mode lacp-static
#
interface GigabitEthernet0/0/1
 port hybrid pvid vlan 4
 port hybrid untagged vlan 2 4
#
interface GigabitEthernet0/0/9
 eth-trunk 1
 lacp priority 100
 undo negotiation auto
 speed 100
#
interface GigabitEthernet0/0/10
 eth-trunk 1
 lacp priority 100
 undo negotiation auto
 speed 100
#
interface GigabitEthernet0/0/13
 port link-type access
 port default vlan 3
#
return

[S2]display current-configuration
#
!Software Version V100R006C00SPC800
 sysname S2
```

```
#
 vlan batch 2 4
#
interface Eth-Trunk1
 port link-type trunk
 port trunk allow-pass vlan 2 to 4094
 mode lacp-static
#
interface GigabitEthernet0/0/3
 port hybrid pvid vlan 4
 port hybrid untagged vlan 2 4
#
interface GigabitEthernet0/0/9
 eth-trunk 1
 undo negotiation auto
 speed 100
#
interface GigabitEthernet0/0/10
 eth-trunk 1
 undo negotiation auto
 speed 100
#
interface GigabitEthernet0/0/24
 port hybrid pvid vlan 2
 port hybrid untagged vlan 2 4
#
interface NULL0
#
user-interface con 0
user-interface vty 0 4
#
return

[R3]display current-configuration
[V200R003C00SPC200]
#
 sysname R3
#
interface GigabitEthernet0/0/2
 ip address 10.0.4.3 255.255.255.0
#
return
```

```
[S4]display current-configuration
#
!Software Version V100R006C00SPC800
 sysname S4
#
interface Vlanif1
 ip address 10.0.4.4 255.255.255.0
#
interface Ethernet0/0/14
 shutdown
#
return
```