实验 1-2 VLAN 配置

学习目标

- 掌握VLAN的创建方法
- 掌握Access和Trunk类型接口的配置方法
- 掌握Hybird接口的配置
- 掌握将接口与VLAN关联的配置方法

拓扑图

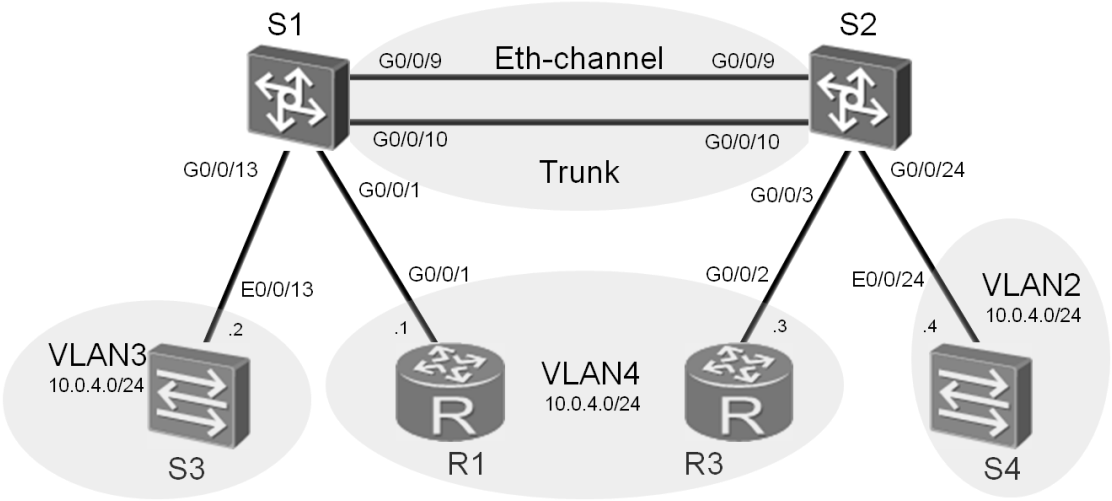

图1.2 VLAN配置实验拓扑图

场景

目前，公司网络内的所有主机都处在同一个广播域，网络中充斥着大量的广播流量。作为网络管理员，您需要将网络划分成多个VLAN来控制广播流量的泛滥。本实验中，您需要在交换机S1和S2上进行VLAN配置。

操作步骤

步骤一. 实验环境准备

如果本任务中您使用的是空配置设备，那么请从步骤1开始配置。如果使用的设备包含上一个实验的配置，请直接从步骤2开始配置。

在S1和S2上创建Eth-Trunk 1并配置该Eth-Trunk为静态LACP模式。然后将G0/0/9和G0/0/10接口加入Eth-Trunk 1。

```
<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


<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
```

步骤二. 关闭不相关接口，并配置 Trunk

为了确保测试结果的准确性，需要关闭S3上的E0/0/1和E0/0/23端口以及S4上的E0/0/14端口。

```
<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
```

交换机端口的类型默认为Hybrid端口。将Eth-Trunk 1的端口类型配置为Trunk，并允许所有VLAN的报文通过该端口。

```
[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
```

步骤三. 创建 VLAN

本实验中将S3、R1、R3和S4设备作为客户端主机。在S1和S2上分别创建VLAN，并使用两种不同方式将端口加入到已创建VLAN中。将所有连接客户端的端口类型配置为Access。

在S1上，将端口G0/0/13和G0/0/1分别加入到VLAN 3和VLAN 4。

在S2上，将端口G0/0/2和G0/0/24分别加入VLAN 4和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
```

确认S1和S2上已成功创建VLAN，且已将相应端口划分到对应的VLAN中。

```
<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…
```

回显信息中灰色阴影标注的部分表明接口已经加入到各个对应VLAN中，并且Eth-Trunk 1端口允许所有VLAN的报文通过。

步骤四. 为客户端配置 IP 地址

分别为主机R1、S3、R3和S4配置IP地址。由于无法直接为交换机的物理接口分配IP地址，因此将S3和S4的本地管理接口VLANIF 1作为用户接口，配置IP地址。

```
<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
```

步骤五. 检测设备连通性，验证 VLAN 配置结果

执行**ping**命令。同属VLAN 4中的R1和R3能够相互通信。其他不同VLAN间的设备无法通信。

```
[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
```

同样，还可以检测R1和S3以及R3和S4之间的连通性。此处不再赘述。

步骤六. 配置 Hybrid 端口

配置端口的类型为Hybrid ,可以实现端口为来自不同VLAN报文打上标签或去除标签的功能。本任务中 ,需要通过配置Hybrid端口来允许VLAN 2和VLAN 4之间可以互相通信。

将S1上的G0/0/1端口和S2上的G0/0/3和G0/0/24端口的类型配置为Hybrid。同时 ,配置这些端口发送数据帧时能够删除VLAN 2和VLAN 4的标签。

```
[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
```

执行**port hybrid pvid vlan**命令，可以配置端口收到数据帧时需要给数据帧添加的VLAN标签。同时**port hybrid untagged vlan**命令可以配置该端口在向主机转发数据帧之前，删除相应的VLAN标签。

执行**ping**命令。测试VLAN 3中的R1与R3是否还能通信。

```
<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
```

执行**ping**命令，测试VLAN 2中的S4能否与VLAN 4中的R1通信。

```
 <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
```

通过配置Hybrid端口，使VLAN 2内的主机能够接收来自VLAN 4的报文，反之亦然。而没有配置Hybrid端口的VLAN 3中地址为10.0.4.2的主机仍无法与其他VLAN主机通信。

配置文件

```
[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
```