**Inter-VLAN Communication**

Student Version



Huawei Technologies Co., Ltd.

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| Huawei Technologies Co., Ltd. | |
| Address: | Huawei Industrial Base  Bantian, Longgang  Shenzhen 518129  People's Republic of China |
| Website: | <https://e.huawei.com/> |

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# Inter-VLAN Communication

## Background

VLANs are separated at Layer 2 to minimize broadcast domains. To enable the communication between VLANs,Huawei provides a variety of technologies. The following two technologies are commonly used:

Dot1q termination sub-interface: Such sub-interfaces are Layer 3 logical interfaces. Similar to a VLANIF interface, after a dot1q termination sub-interface and its IP address are configured, the device adds the corresponding MAC address entry and sets the Layer 3 forwarding flag to implement Layer 3 communication between VLANs. A Dot1q termination sub-interface applies to scenarios where a Layer 3 Ethernet port connects to multiple VLANs.

VLANIF interface: VLANIF interfaces are Layer 3 logical interfaces. After a VLANIF interface and its IP address are configured, the device adds the MAC address and VID of the VLANIF interface to the MAC address table and sets the Layer 3 forwarding flag of the MAC address entry. When the destination MAC address of a packet matches the entry, the packet is forwarded at Layer 3 to implement Layer 3 communication between VLANs.

In this lab activity, you will use two methods to implement inter-VLAN communication.

## Objectives

Upon completion of this task, you will be able to:

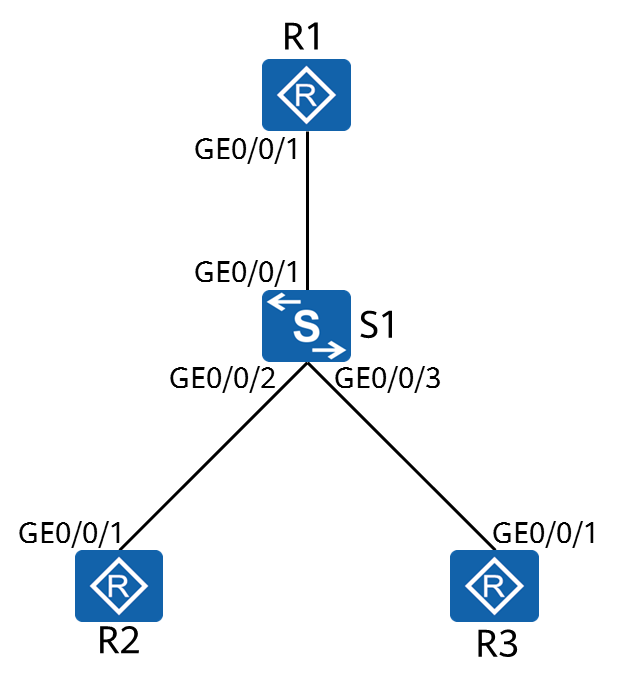
Learn how to use Dot1q termination sub-interfaces to implement inter-VLAN communication

Learn how to use VLANIF interfaces to implement inter-VLAN communication

Understand the forwarding process of inter-VLAN communication

## Topology

Lab Topology



R2 and R3 belong to different VLANs and they need to communicate with each other through VLANIF interfaces and Dot1q termination sub-interfaces.

1. Simulate terminal users on R2 and R3 and assign IP addresses 192.168.2.1/24 and 192.168.3.1/24 to the interfaces.
2. The gateway addresses of R2 and R3 are 192.168.2.254 and 192.168.3.254 respectively.
3. On S1, assign GigabitEthernet0/0/2 and GigabitEthernet0/0/3 to VLAN 2 and VLAN 3, respectively.

## Implementation

### Roadmap

1. Configure Dot1q termination sub-interfaces to implement inter-VLAN communication.
2. Configure VLANIF interfaces to implement inter-VLAN communication.

### Procedure

Complete basic device configuration.

# Name R1, R2, R3, and S1.

The details are not provided here.

# Configure IP addresses and gateways for R2 and R3.

<R2>

*Configure a default route (equivalent to a gateway) for the device.*

<R3>

# On S1, assign R2 and R3 to different VLANs.

[S1]

Configure Dot1q termination sub-interfaces to implement INter-VLAN communication.

# Configure a trunk port on S1.

[S1]

# Configure a dot1q termination sub-interface on R1.

[R1]

A sub-interface is created and the sub-interface view is displayed. In this example, **2** indicates the sub-interface number. It is recommended that the sub-interface number be the same as the VLAN ID.

[R1-GigabitEthernet0/0/1.2]

The **dot1q termination vid** *vlan-id* command configures the VLAN ID for Dot1q termination on a sub-interface.

In this example, when GigabitEthernet0/0/1 receives data tagged with VLAN 2, it sends the data to sub-interface 2 for VLAN termination and subsequent processing. The data sent from sub-interface 2 is also tagged with VLAN 2.

[R1-GigabitEthernet0/0/1.2]

Sub-interfaces for VLAN tag termination cannot forward broadcast packets and automatically discard them upon receiving. To allow such sub-interfaces to forward broadcast packets, the ARP broadcast function must be enabled using the **arp broadcast enable** command. By default, this function is enabled on some devices.

[R1]

# Test the connectivity between VLANs.

<R2>ping 192.168.3.1

PING 192.168.3.1: 56 data bytes, press CTRL\_C to break

Reply from 192.168.3.1: bytes=56 Sequence=1 ttl=254 time=60 ms

Reply from 192.168.3.1: bytes=56 Sequence=2 ttl=254 time=40 ms

Reply from 192.168.3.1: bytes=56 Sequence=3 ttl=254 time=110 ms

Reply from 192.168.3.1: bytes=56 Sequence=4 ttl=254 time=70 ms

Reply from 192.168.3.1: bytes=56 Sequence=5 ttl=254 time=100 ms

--- 192.168.3.1 ping statistics ---

5 packet(s) transmitted

5 packet(s) received

0.00% packet loss

round-trip min/avg/max = 40/76/110 ms

<R2>tracert 192.168.3.1

traceroute to 192.168.3.1(192.168.3.1), max hops: 30 ,packet length: 40,press CTRL\_C to break

1 192.168.2.254 30 ms 50 ms 50 ms

2 192.168.3.1 70 ms 60 ms 60 ms

VLAN 2 and VLAN 3 can communicate with each other.

Configure VLANIF interfaces to enable inter-VLAN communication.

# Delete the configuration in the previous step.

[S1]

# Create a VLANIF interface on S1.

[S1]interface Vlanif 2

The **interface vlanif** *vlan-id* command creates a VLANIF interface and displays the VLANIF interface view. You must create a VLAN before configuring a VLANIF interface.

[S1]

# Test the connectivity between VLANs.

<R2>ping 192.168.3.1

PING 192.168.3.1: 56 data bytes, press CTRL\_C to break

Reply from 192.168.3.1: bytes=56 Sequence=1 ttl=254 time=100 ms

Reply from 192.168.3.1: bytes=56 Sequence=2 ttl=254 time=50 ms

Reply from 192.168.3.1: bytes=56 Sequence=3 ttl=254 time=50 ms

Reply from 192.168.3.1: bytes=56 Sequence=4 ttl=254 time=60 ms

Reply from 192.168.3.1: bytes=56 Sequence=5 ttl=254 time=70 ms

--- 192.168.3.1 ping statistics ---

5 packet(s) transmitted

5 packet(s) received

0.00% packet loss

round-trip min/avg/max = 50/66/100 ms

<R2>tracert 192.168.3.1

traceroute to 192.168.3.1(192.168.3.1), max hops: 30 ,packet length: 40,press CTRL\_C to break

1 192.168.2.254 40 ms 30 ms 20 ms

2 192.168.3.1 40 ms 30 ms 40 ms

VLAN 2 and VLAN 3 can communicate with each other.

**----End**

* 1. **Verification**

The details are not provided here.