Loopback Detection Configuration

Model: S5900-24S4T2Q
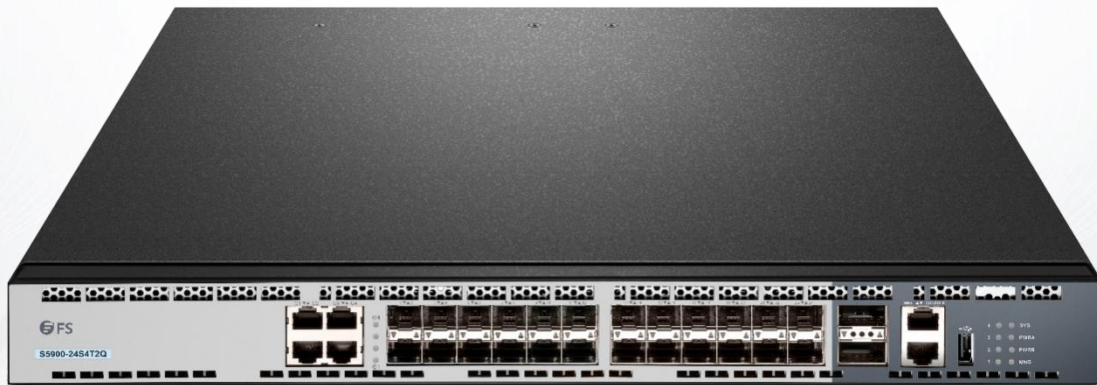
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1.1 Introduction of Loopback Detection

The loopback in a network may trigger the repeated transmission of broadcast, multicast or unicast packets, wasting network resources and even leaving network breakdown. To avoid the above-mentioned troubles, it is necessary to provide a detection mechanism to promptly notify users of detecting network connection and configuration at the occurrence of loopback and to take troubled ports under control. Loopback detection can check whether loopback happens on a port of a to-be-tested device by transmitting a detection packet from this port and checking whether this packet can be received still on this port. When the device finds that loopback exists on its port, it can transmit alarm promptly to the network management system for administrators to detect network problems in time; thus, long time of network disconnection can be prevented. Moreover, loopback detection is capable of having ports under control. You can opt for port block, port MAC-learning forbidding or error-disable according to actual requirements to make corresponding ports under control and lessen the loopback's network influence to the minimum level.

Switches support loopback detection in the following aspects:

- Supporting to set loopback detection on the port

- Supporting to set the destination MAC address for loopback detection packets

- Supporting to conduct loopback detection to at most 10 specified ports

- Supporting to set the transmission interval of loopback detection packets and the recovery time of controlled port

- Supporting to control port, including port block, port MAC-learn forbidding, and error-disable

- Supporting to set whether loopback exists on a port by default

1.1.1 Format of Loopback Detection Packet

Field	Length/Byte	Value
DMAC	6	0x0180C2B0000A (default value, configurable)
SMAC	6	MAC address of the switch
TPID	2	0x8100, VLAN tag type
TCI	2	Specific value of the VLAN tag, priority, VLAN ID
TYPE	2	Protocol type, which ranges from 0 to 9001
CODE	2	Protocol sub-type, which represents loopback detection and is 0x0001
VERSION	2	0x0000 (currently reserved)
Length	2	0x0008, length of the header of loopback detection packet
RESERVE	2	Reserved field
SYSMAC	6	MAC address of the switch
SEQUENCE	4	Sequence ID of packet, which is generated randomly by the system before the packet is transmitted

DiID	4	Port ID, which is the ID of the global port of 85 Series
End	2	0x0000, end character

1.2 Loopback Detection Configuration Tasks

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1.3 Setting Loopback Detection

1.3.1 Configuring Loopback Detection Globally

Enabling or disabling loopback detection globally means enabling or disabling loopback detection on all physical ports. Global configuration is just like a switch. Only when this switch is opened can enabled loopback detection on a port take effect.

Command	Purpose
[no] loopback-detection	Sets loopback detection globally.

1.3.2 Configuring Port Loop Check

If you want to enable or disable loopback detection on a specified port, you should first enable loopback detection globally.

Command	Purpose
[no] loopback-detection enable	Configures port loopback detection.

1.3.3 Configuring a Port to Conduct Loopback Detection in Specified VLAN

If you set loopback detection in a specified VLAN, a port shall transmit multiple detection packets with specified VLAN tag regularly and the port can transmit up to 10 detection packets with specified VLAN tag.

One point to be noted is that the port must exist in the specified VLAN, or the configuration takes no effect. If loopback detection happens in VLAN2 to VLAN8, ports are configured to be in trunk mode, and trunk vlan-allowed is vlans 5-8, the packets with tags 2-4 transmitted by the switch cannot pass through this port and the configuration hence takes no effect.

Command	Purpose
[no] loopback-detection vlan-control vlanlist	Configures a port to conduct loopback detection in specified VLAN.

1.3.4 Configuring the Loopback Detection Interval of Port (Packet transmission interval, controlled port recovery time)

Command	Purpose
[no] loopback-detection hello-time time	Configures the transmission interval of port loopback detection packets.

Because a network is always changeable, loopback detection is a continuous process. The port will transmit loopback detection packets in a regular time. This regular time is called as the transmission interval of loopback detection packets. The default transmission interval of the system is 3 seconds.

Command	Purpose
[no] loopback-detection recovery-time time	Configures the transmission interval of port loopback detection packets.

This command above is used to set the automatic recovery time of a port when loopback disappears. In default settings, if a port has not received the already transmitted loopback detection packet within 10 seconds, it is regarded that loopback vanishes. It is recommended to set the recovery time to be triple of the packet transmission time; if the transmission time is set to be a very small value, you'd better set the recovery time to be at least 10 seconds longer than the transmission time.

1.3.5 Configuring Port Control

Command	Purpose
[no] loopback-detection control {block | learning | shutdown}	Configures port control.

When a port detects that loopback exists in its network, you can set port control to manage this port. The control state of a port can be block, nolearn, shutdown or trap. When any control state is set and loopback exists on a port, the trap alarm message will be transmitted. It is not configured by default.

When loopback detection is enabled globally, a loopback detection packet is transmitted from a port, on which loopback detection is enabled, and received again by this port, the port may get the following four control actions:

Block: When loopback is found, this port is then isolated from other ports. Hence the packets entering this port cannot be forwarded to other ports. The port is then in protocol down state and its MAC address table list ages.

Nolearn: means to forbid the port to learn MAC addresses. When loopback is detected, the port will not conduct MAC address learning anymore and at the same time the MAC address table of this port ages.

shutdown: Means to close the port. When loopback is detected, except that trap message will be transmitted and the port's MAC address table ages, the port will be automatically closed and it cannot forward packets any more until the err-disable-recover time.

Trap: It means that the port only reports alarm. When loopback is detected, the port only reports alarm and ages its MAC address table without any further action.

When the port is in block state, it cannot forward incoming packets and at the same time it transmits loopback detection packets continuously. When loopback disappears, the port will recover automatically. In default settings, if a port has not received the already transmitted loopback detection packet within 10 seconds, it is regarded that loopback vanishes.

In block state, the port protocol is down; in shutdown state, the port's link is down directly.

1.3.6 Configuring the Destination MAC Address of Loopback Detection Packet

Command	Purpose
[no] loopback-detection dest-mac Mac-address	Configures the destination MAC address of loopback detection packet.

The default destination MAC address of loopback detection packet is 01-80-C2-00-00-0a. If you have set other destination MAC, it will be used as the destination MAC address of loopback detection packet.

1.3.7 Configuring Loopback to Exist on a Port by Default

Command	Purpose
[no] loopback-detection existence	Configures loopback to exist on a port by default.

When a port is up and port loopback detection takes effect, the command above is used to set whether loopback exists on this port. When a port is in shutdown state, this port is not suitable to set to have loopback, for the port in shutdown state cannot forward packets. The default settings is that loopback does not exist in a port.

1.3.8 Displaying the Configuration of Global Loopback Detection

Command	Purpose
show loopback-detection	Displays the configuration of global loopback detection.

This command is used to display the information about global loopback detection configuration, including global configuration, whether loopback exists on each port, and some ports' configurations.

1.3.9 Displaying the Configuration of Port Loopback Detection

Command	Purpose
show loopback-detection interface intf	Displays the configuration of port loopback detection.

This command is mainly used to display port loopback detection, including the port timer and the information about transmitted and received packets.
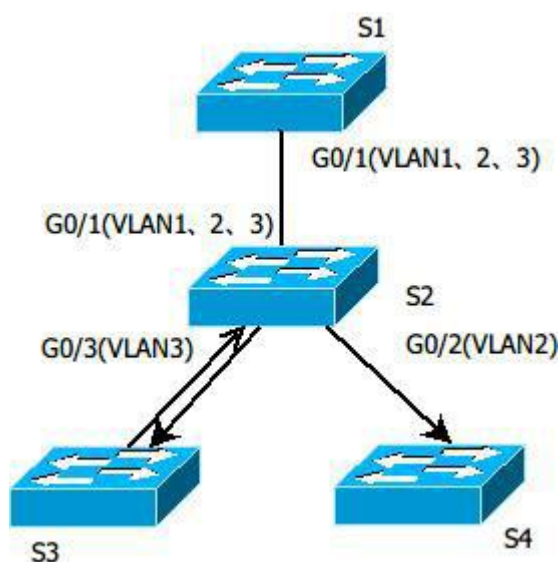
1.4 Configuration Example

Figure 1.1 Loopback detection configuration

As shown in figure 1.1, the port of S1 conducts loopback detection to specified VLANs 1, 2 and 3. The corresponding configurations on all switches are shown below:

Switch S1:
Configuration of interface GigaEthernet0/1: switchport trunk vlan-untagged 1-3 switchport mode trunk
loopback-detection enable loopback-detection control block loopback-detection vlan-control 1-5 Global Configuration
loopback-detection vlan 1-3

Switch S2:
Configuration of interface GigaEthernet0/1: switchport mode trunk
Configuration of interface GigaEthernet0/2: switchport mode trunk
Configuration of interface GigaEthernet0/3: switchport mode trunk
Global Configuration vlan1-3

Switch S3:
Configuration of interface GigaEthernet0/1: switchport pvid 3

If loopback exists in the network that S3 connects and the PVID of the interface, on which loopback exists, is 3, the packets will be transmitted to interface g0/1 of S1 and S1 will block interface g0/1 after finding loopback.