Loopback Detection Configuration
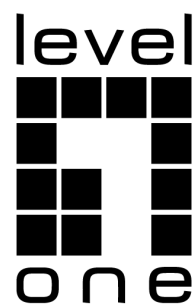
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Chapter 1 Loopback Detection Configuration

1.1 Introduction to Loopback Detection

Loopback in the network may cause the equipment repeatedly forward the broadcast, multicast and unknown unicast, resulting in the waste of network resources or the network breakdown. In order to timely inform the user the conditions of the network connection and configuration, a detection mechanism is necessary. So there is the Loopback Detection. It can detect if there is a loopback in the port of the equipment, i.e. forward packets from the port regularly and detect whether the packets are sent back from the forwarding port. If there is a loopback in the port, Loopback Detection will forward the warning information timely to the network management system. Thus, the equipment can avoid long-time off-line. Besides, the equipment supports three modes of port controls: block, no MAC learning, and shutdown (error-disable).

The switch supports:

- the loopback detection of the port;

- the destination MAC address of the loopback detection packet; the loopback detection packet forwarded by each port can be configured;

- the loopback detection for certain VLANs (at most 4094) ;

- the loopback-detection hello-time and loopback-detection recovery-time;

- three modes of port controls: block, no MAC learning, and shutdown (error-disable);

- loopback detection existence configuration.

1.1.1 Format of Loopback Detection Packet

Field	Length/Byte	Value
DMAC	6	0x0180C2B0000A (Default, can be configured)
SMAC	6	MAC address of switch system
TPID	2	0x8100,VLAN tag type
TCI	2	The concrete value of VLAN tag, priority, VLAN ID
TYPE	2	Type: Protocol type, value 0x9001

CODE	2	The subtype of the protocol, represents loopback detection, value 0x0001
VERSION	2	0x0000, reserve at present
Length	2	0x0008, the length of the loopback detection packet head
RESERVE	2	Reserve the field
SYSMAC	6	MAC address of switch system
SEQUENCE	4	Serial number of the packet, it will be automatically generated before forwarding the packet
DiID	4	Port number, the 85 product is global port number
End	2	0x0000 end mark

1.2 Loopback Detection Configuration Task List

- Configure the global loopback detection
- Configure the loopback detection of the port
- Configure the loopback detection for certain VLANs
- Configure the loopback-detection time
- Configure the loopback-detection control
- Configure Loopback Detection Destination MAC
- Configure loopback detection existence
- Configure the loopback-detection frames threshold
- Configure the loopback-detection frames monitor
- Show loopback detection global configuration information
- Show loopback detection port information

1.3 Loopback Detection Configuration

1.3.1 Configure the global loopback detection

Enable or disable the global loopback detection. The global commands are invalid for all physical ports. The loopback detection will take effect only when enabling the global loopback detection. The port configuration is invalid if the loopback detection disables.

Command	Purpose
[no] loopback-detection	Configure the global loopback detection.

1.3.2 Configure the loopback detection of the port

This command can be used to enable or disable loopback detection on a specified port. However, this settings takes effect only after loopback detection is enabled globally.

Command	Purpose
[no] loopback-detection enable	Configuring Port Loop Check

1.3.3 Configure the loopback detection for certain VLANs

After loopback detection is configured on a specified VLAN, the port transmits multiple detection packets of specified VLAN tag regularly and the number of these detection packets transmitted by this port can be up to 4094.

Note that: The port must be in the configured VLAN and the VLAN must be created, or the configuration is invalid. Specifically, if the port configures the loopback detection to the runk mode in VLAN2-VLAN8 and trunk vlan-allowed is VLAN 5-8, packets with 2-4tag from switch cannot be forwarded through the port and the configuration is invalid. Meanwhile, configure trunk vlan-untagged to 2-8, so that the forwarded packets with vlan tag. The relevant VLAN must be created, or the tag with VLAN id will be invalid.

Command	Purpose
[no] loopback-detection vlan-control *vlanlist*	Configure the loopback detection for certain VLANs

1.3.4 Configure Loopback Detection Time

Command	Purpose
[no] loopback-detection hello-time *time*	Configure the loopback-detection hello-time

As the network is in change, the loopback detection is a lasting process. The port forwards loopback detection packets regularly. The time interval, i.e. loopback-detection hello-time is 1 second in default.

Command	Purpose
[no] loopback-detection recovery-time *time*	Configure loopback-detection recovery-time

Configure the recovery time after the loopback is disappeared. The loopback is regarded to be disappeared if the port doesn't receive the forwarded loopback detection packet in 10s. It is recommended that the recovery time is at least 3 times of the packet forwarding time and the recovery time is more than 10s than the hello-time.

Command	Purpose

| [no] **loopback-detection delay-time** *time* | Configures the Period for Sending Loop Detection Packets on a Port |

Set the time for delaying the execution of controlled actions when a loop occurs. The system default time is 0 seconds.

1.3.5 Configure the loopback-detection control

Command	Purpose
[no] **loopback-detection control {block|learning|shutdown|isolate-vlan}**	Configure loopback detection control

If there is a loopback in the network, control the port by command [no] loopback-detection control. The port has three controlled modes: block, no MAC learning, shutdown (error-disable), trap (only report alarms on the interface), isolate-vlan (isolate vlan with loop loop). The trap warning information will be forwarded no matter what control mode is configured. The trap configuration is by default.

After loopback detection is enabled globally, the port on which loopback detection is enabled transmits the loopback detection packets and receives the already transmitted loopback detection packets. Five control actions are conducted on the port:

Block: When detecting the loopback, the port will be isolated from other ports and the data forwarded into the port cannot be forwarded to other ports. When the port is in the state of protocol down, the MAC address table will age simultaneously.

Nolearn: Prohibit port MAC learning. When detecting the loopback, the port will have no MAC learning but the MAC address table ages.

Shutdown: Disable the port. When detecting the loopback, the port forwards trap warning information, ages the MAC address table and automatically disables the port (error-disable). Thus, the port cannot forward the packet until the error-disable-recover time.

Trap: The port only report warning. When detect the loopback, the port only reports warning and ages MAC address. The default controlled configuration of the port is trap.

isolate-vlan: Disable the forwarding of isolated vlan packets. When a loop is detected, the port will isolate the vlan in the loop from the port, and will no longer forward the packets carrying the vlan tag.

When the port is in block, the packet will not be forwarded into it and the port will continue forward the loopback detection packet. When the loopback disappears in detection, the port will automatically recover. By default, if the forwarded loopback detection packet is not received in 10s, the loopback will be regarded as disappeared. In block state

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

1.3.6 Configure Loopback Detection Destination MAC

Command	Purpose
[no] **loopback-detection dest-mac** *Mac-address*	Configure the loopback detection dest-mac address

The default loopback detection destination mac is 01-80-C2-00-00-0a. If the user has configured, the MAC address configured by the user will be taken as the destination mac address.

1.3.7 Configure Loopback Detection Existence

Command	Purpose
[no] loopback-detection existence	Configure loopback detection existence

This command is mainly used to solve the problem that loopback exists on a port or not when this port is up and its loopback detection function takes effect. When the controlled action of this port is set to shutdown, it is improper to regard that loopback exists on this port for a shutdown port has already not forwarded packets. There is no loopback by default.

1.3.8 Configure the loopback-detection frames threshold

Command	Purpose
[no] loopback-detection frames-threshold *frames-threshold*	Configure the upper limit number of loop detection frames received per second

The default loopback-detection frames threshold is 10.

1.3.9 Configure the loopback-detection frames monitor

Command	Purpose
[no] loopback-detection frames-monitor	Configure whether to enable the loopback-detection frames monitor of the port.

1.3.10 Configure whether to enable the prohibiting forwarding of loop packets on the port

Command	Purpose
[no] loopback-detection forbid-packet	Configure whether to enable the prohibiting forwarding of loop packets on the port

1.3.11 Configure port to recover VLAN isolated due to loop

Command	Purpose
loopback-detection vlan-recovery	Configure port to recover VLAN isolated due to loop

1.3.12 Show loopback detection global configuration information

Command	Purpose
show loopback-detection	Show global loopback detection configuration

It is mainly used for showing global loopback detection information, including global configuration, loopback existence and some configuration information.

1.3.13 Show Loopback Detection Interface

Command	Purpose
show loopback-detection interface *intf*	Show loopback detection interface

It is mainly used for showing loopback detection information, including the timer value and the packet information.
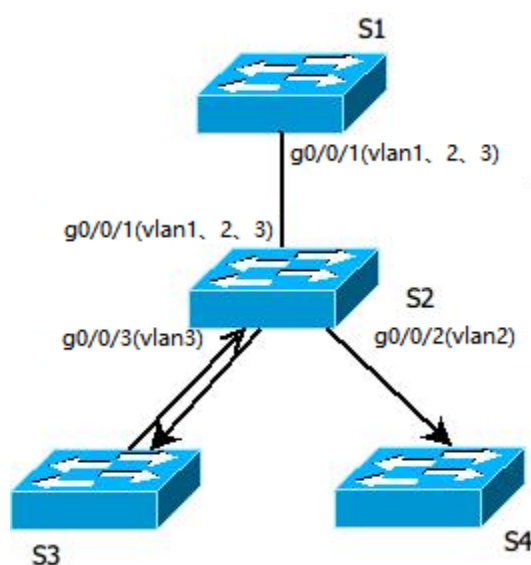
1.4 Configuration Example

Figure 1.1 Loopback Detection Configurations

As shown in Figure 1.1, port switch S1 designates loopback detection of certain VLAN (1,2,3):
Switch S1:
Configure interface g0/0/1:
  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:
Configure interface g0/0/1:
  switchport mode trunk
Configure interface g0/0/2:
  switchport mode trunk
Configure interface g0/0/3:
  switchport mode trunk
Global Configuration:
  vlan1-3

Switch S3:
  Configure interface g0/0/1:
switchport pvid 3

If S3 has loopback and PVID of the port is 3, the packets will forward back to G0/0/1 of S1. S1 will block G0/0/1 if there is loopback.