



USER MANUAL

Content

CHAPTER 1 COMMANDS FOR NETWORK PORT CONFIGURATION	7
1.1 Commands for Ethernet Port Configuration	7
1.1.1 bandwidth	7
1.1.2 clear counters interface	7
1.1.3 description	8
1.1.4 flow control	8
1.1.5 interface ethernet	9
1.1.6 loopback	9
1.1.7 media-type	9
1.1.8 negotiation	10
1.1.9 port-rate-statistics interval	10
1.1.10 port-scan-mode	10
1.1.11 port-status query interval	11
1.1.12 rate-violation	11
1.1.13 rate-violation control	12
1.1.14 remote-statistics interval	12
1.1.15 show interface	12
1.1.16 shutdown	16
1.1.17 speed-duplex	16
1.1.18 storm-control	17
1.1.19 virtual-cable-test	18
CHAPTER 2 COMMANDS FOR PORT ISOLATION FUNCTION	20
2.1 isolate-port group	20
2.2 isolate-port group switchport interface	20
2.3 isolate-port apply	21
2.4 show isolate-port group	21
CHAPTER 3 COMMANDS FOR PORT LOOPBACK DETECTION FUNCTION	23
3.1 debug loopback-detection	23
3.2 loopback-detection control	23
3.3 loopback-detection control-recovery timeout	24
3.4 loopback-detection interval-time	24
3.5 loopback-detection specified-vlan	25
3.6 show loopback-detection	25

CHAPTER 4 COMMANDS FOR ULDP	26
4.1 debug uldp	26
4.2 debug uldp error	26
4.3 debug uldp event	26
4.4 debug uldp fsm interface ethernet	27
4.5 debug uldp interface ethernet	27
4.6 debug uldp packet	27
4.7 uldp aggressive-mode	28
4.8 uldp enable	28
4.9 uldp disable	29
4.10 uldp hello-interval	29
4.11 uldp manual-shutdown	29
4.12 uldp recovery-time	30
4.13 uldp reset	30
4.14 show uldp	30
CHAPTER 5 COMMANDS FOR LLDP FUNCTION	32
5.1 clear lldp remote-table	32
5.2 debug lldp	32
5.3 debug lldp packets	32
5.4 lldp enable	33
5.5 lldp enable (Port)	33
5.6 lldp mode	33
5.7 lldp msgTxHold	34
5.8 lldp neighbors max-num	34
5.9 lldp notification interval	34
5.10 lldp tooManyNeighbors	35
5.11 lldp transmit delay	35
5.12 lldp transmit optional tlv	35
5.13 lldp trap	36
5.14 lldp tx-interval	36
5.15 show debugging lldp	37
5.16 show lldp	37
5.17 show lldp interface ethernet	38

5.18 show lldp neighbors interface ethernet	38
5.19 show lldp traffic	39
CHAPTER 6 COMMANDS FOR PORT CHANNEL	40
6.1 debug port-channel	40
6.2 interface port-channel	40
6.3 lacp port-priority	41
6.4 lacp system-priority	41
6.5 lacp timeout	41
6.6 load-balance	42
6.7 port-group	42
6.8 port-group mode	42
6.9 show port-group	43
CHAPTER 7 COMMANDS FOR MTU	45
7.1 mtu	45
CHAPTER 8 COMMANDS FOR EFM OAM	46
8.1 clear ethernet-oam	46
8.2 debug ethernet-oam error	46
8.3 debug ethernet-oam fsm	46
8.4 debug ethernet-oam packet	47
8.5 debug ethernet-oam timer	47
8.6 ethernet-oam	47
8.7 ethernet-oam errored-frame threshold high	48
8.8 ethernet-oam errored-frame threshold low	48
8.9 ethernet-oam errored-frame window	49
8.10 ethernet-oam errored-frame-period threshold high	49
8.11 ethernet-oam errored-frame-period threshold low	49
8.12 ethernet-oam errored-frame-period window	50
8.13 ethernet-oam errored-frame-seconds threshold high	50
8.14 ethernet-oam errored-frame-seconds threshold low	51
8.15 ethernet-oam errored-frame-seconds window	51
8.16 ethernet-oam errored-symbol-period threshold high	52
8.17 ethernet-oam errored-symbol-period threshold low	52
8.18 ethernet-oam errored-symbol-period window	53

8.19 ethernet-oam link-monitor	53
8.20 ethernet-oam mode	54
8.21 ethernet-oam period	54
8.22 ethernet-oam remote-failure	54
8.23 ethernet-oam remote-loopback	55
8.24 ethernet-oam remote-loopback supported	55
8.25 ethernet-oam timeout	56
8.26 show ethernet-oam	56
8.27 show ethernet-oam events	61
8.28 show ethernet-oam link-events configuration	64
8.29 show ethernet-oam loopback status	65
CHAPTER 9 COMMANDS FOR BPDU-TUNNEL	67
9.1 bpdu-tunnel dmac	67
9.2 bpdu-tunnel stp	67
9.3 bpdu-tunnel gvrp	67
9.4 bpdu-tunnel uldp	68
9.5 bpdu-tunnel lacp	68
9.6 bpdu-tunnel dot1x	68
CHAPTER 10 COMMANDS FOR LLDP-MED	70
10.1 civic location	70
10.2 {description-language province-state city county street locationNum location floor room postal otherInfo}	70
10.3 ecs location	71
10.4 lldp med fast count	71
10.5 lldp med trap	72
10.6 lldp transmit med tlv all	72
10.7 lldp transmit med tlv capability	72
10.8 lldp transmit med tlv extendPoe	73
10.9 lldp transmit med tlv inventory	73
10.10 lldp transmit med tlv networkPolicy	74
10.11 network policy	74
10.12 show lldp	75
10.13 show lldp [interface ethernet <IFNAME>]	76

10.14 show lldp neighbors	77
CHAPTER 11 COMMANDS FOR PORT SECURITY	78
11.1 clear port-security	78
11.2 show port-security	78
11.3 switchport port-security	78
11.4 switchport port-security aging	79
11.5 switchport port-security mac-address	79
11.6 switchport port-security mac-address sticky	80
11.7 switchport port-security maximum	80
11.8 switchport port-security violation	81
CHAPTER 12 COMMANDS FOR DDM	82
12.1 clear transceiver threshold-violation	82
12.2 debug transceiver	82
12.3 show transceiver	82
12.4 show transceiver threshold-violation	83
12.5 transceiver-monitoring	83
12.6 transceiver-monitoring interval	84
12.7 transceiver threshold	84

Chapter 1 COMMANDS FOR NETWORK PORT CONFIGURATION

1.1 Commands for Ethernet Port Configuration

1.1.1 bandwidth

- **Command:** `bandwidth control <bandwidth> {transmit | receive | both}`
- **no bandwidth control**
- **Function:** Enable the bandwidth limit function on the port; the no command disables this function.
- **Parameter:** `<bandwidth>` is the bandwidth limit, which is shown in kbps ranging between 1-1000000K; both refers to the bandwidth limit when the port receives and sends data, receive refers to the bandwidth limit will only performed when the switch receives data from out side, while **transmit** refers to the function will be perform on sending only.
- **Command Mode:** Port Mode.
- **Default:** Bandwidth limit disabled by default.
- **Usage Guide:** When the bandwidth limit is enabled with a size set, the max bandwidth of the port is determined by this size other than by 10/100/1000M. If [**both | receive | transmit**] keyword is not specified, the default is **both**.
- **Note:** The bandwidth limit can not exceed the physic maximum speed on the port. For example, an 10/100M Ethernet port can not be set to a bandwidth limit at 101000K (or higher), but applicable on a 10/100/1000 port working at a speed of 100M. If the actual bandwidth is not a integral multiple of chip bandwidth granularity, it will be modified automatically. For example, a chip bandwidth granularity is 64K, but the input bandwidth is 50, the bandwidth will be modified as 64K.
- **Example:** Set the bandwidth limit of 1/0/1-8 port is 40000K.
- `Switch(config)#interface ethernet 1/0/1-8`
- `Switch(Config-If-Port-Range)#bandwidth control 40000 both`

1.1.2 clear counters interface

- **Command:** `clear counters [interface {ethernet <interface-list> | vlan <vlan-id> | port-channel <port-channel-number> | <interface-name>}]`
- **Function:** Clears the statistics of the specified port.
- **Parameters:** `<interface-list>` stands for the Ethernet port number; `<vlan-id>` stands for the VLAN interface number; `<port-channel-number>` for trunk interface number; `<interface-name>` for interface name, such as port-channel 1.
- **Command mode:** Admin Mode.
- **Default:** Port statistics are not cleared by default.
- **Usage Guide:** If no port is specified, then statistics of all ports will be cleared.

- **Example:** Clearing the statistics for Ethernet port 1/0/1.
- Switch#clear counters interface ethernet 1/0/1

1.1.3 description

- **Command:** `description <string>`
- **no description**
- **Function:** Set name for specified port; the no command cancels this configuration.
- **Parameter:** `<string>` is a character string, which should not exceed 200 characters.
- **Command Mode:** Port Mode.
- **Default:** No port name by default.
- **Usage Guide:** This command is for helping the user manage switches, such as the user assign names according to the port application, e.g. financial as the name of 1/0/1-2 ports which is used by financial department, engineering as the name of 1/0/9 ports which belongs to the engineering department, while the name of 1/0/12 ports is assigned with Server, which is because they connected to the server. In this way the port distribution state will be brought to the table.
- **Example:** Specify the description of 1/0/1-2 port as financial.
- Switch(config)#interface ethernet 1/0/1-2
- Switch(Config-If-Port-Range)#description financial

1.1.4 flow control

- **Command:** `flow control`
- **no flow control**
- **Function:** Enables the flow control function for the port: the “no flow control” command disables the flow control function for the port.
- **Command mode:** Port Mode.
- **Default:** Port flow control is disabled by default.
- **Usage Guide:** After the flow control function is enabled, the port will notify the sending device to slow down the sending speed to prevent packet loss when traffic received exceeds the capacity of port cache. Ports support IEEE802.3X flow control; the ports work in half-duplex mode, supporting back-pressure flow control. If flow control results in serious HOL, the switch will automatically start HOL control (discarding some packets in the COS queue that may result in HOL) to prevent drastic degradation of network performance.
- **Note:** Port flow control function is not recommended unless the users need a slow speed, low performance network with low packet loss. Flow control will not work between different cards in the switch. When enable the port flow control function, speed and duplex mode of both ends should be the same.
- **Example:** Enabling the flow control function in ports 1/0/1-8.
- Switch(config)#interface ethernet 1/0/1-8
- Switch(Config-If-Port-Range)#flow control

1.1.5 interface ethernet

- **Command:** `interface ethernet <interface-list>`
- **Function:** Enters Ethernet Port Mode from Global Mode.
- **Parameters:** `<interface-list>` stands for port number.
- **Command mode:** Global Mode
- **Usage Guide:** Run the `exit` command to exit the Ethernet Port Mode to Global Mode.
- **Example:** Entering the Ethernet Port Mode for ports 1/0/1, 1/0/4-5, 1/0/8.
 - `Switch(config)#interface ethernet 1/0/1;1/0/4-5;1/0/8`
 - `Switch(Config-If-Port-Range)#`

1.1.6 loopback

- **Command:** `loopback`
 - `no loopback`
- **Function:** Enables the loopback test function in an Ethernet port; the `no` command disables the loopback test on an Ethernet port.
- **Command mode:** Port Mode.
- **Default:** Loopback test is disabled in Ethernet port by default.
- **Usage Guide:** Loopback test can be used to verify the Ethernet ports are working normally. After loopback has been enabled, the port will assume a connection established to itself, and all traffic sent from the port will be received at the very same port.
- **Example:** Enabling loopback test in Ethernet ports 1/0/1-8.
 - `Switch(config)#interface ethernet 1/0/1-8`
 - `Switch(Config-If-Port-Range)#loopback`

1.1.7 media-type

- **Command:** `media-type {copper | fiber}`
- **Function:** Sets to combo port mode (combo ports only).
- **Parameters:** `copper` forces use of copper cable port; `fiber` forces use of fiber cable port.
- **Command mode:** Port Mode.
- **Default:** The default setting for combo mode of combo ports is the forced fiber port.
- **Usage Guide:** The combo mode of combo ports and the port connection condition determines the active port of the combo ports. A combo port consists of one fiber port and a copper cable port. It should be noted that the `speed-duplex` command applies to the copper cable port while the `negotiation` command applies to the fiber cable port, they should not conflict. For combo ports, only one, a fiber cable port or a copper cable port, can be active at a time, and only this port can send and receive data normally.
- **Note:**
 - Combo port is a conception involving the physical layer and the LLC sublayer of the datalink layer. The status of a combo port will not affect any operation in the MAC

sublayer of the datalink layer and upper layers. If the bandwidth limit for a combo port is 1Mbps, then this 1Mbps applies to the active port of this combo port, regardless of the port type being copper or fiber.

- If a combo port connects to another combo port, it is recommended for both parties to use the forced copper or the forced fiber mode.
- Run `show interface` under Admin Mode to check for the active port of a combo port. The following result indicates if the active port for a combo port is the fiber (or copper) cable port: Hardware is Gigabit-combo, active is fiber (or copper)
- **Example:** Setting ports 1/0/21-24 to the forced fiber mode.
- `Switch(config)#interface ethernet 1/0/21-24`
- `Switch(Config-Port-Range)#media-type fiber`

1.1.8 negotiation

- **Command:** `negotiation {on | off}`
- **Function:** Enables/Disables the auto-negotiation function of a 1000Base-FX port.
- **Parameters:** on: enables the auto-negotiation; off: disable the auto-negotiation.
- **Command mode:** Port configuration Mode.
- **Default:** Auto-negotiation is enabled by default.
- **Usage Guide:** This command applies to 1000Base-FX interface only. The **negotiation** command is not available for 1000Base-TX or 100Base-TX interface. For combo port, this command applies to the 1000Base-FX port only but has no effect on the 1000Base-TX port. To change the negotiation mode, speed and duplex mode of 1000Base-TX port, use **speed-duplex** command instead.
- **Example:** Port 1 of Switch1 is connected to port 1 of Switch2, the following will disable the negotiation for both ports.
- `Switch1(config)#interface ethernet1/0/1`
- `Switch1(Config-If-Ethernet1/0/1)#negotiation off`
- `Switch2(config)#interface ethernet1/0/1`
- `Switch2(Config-If-Ethernet1/0/1)#negotiation off`

1.1.9 port-rate-statistics interval

- **Command:** `port-rate-statistics interval <interval-value>`
- **Function:** Set the interval of port-rate-statistics, ranging from 5 to 600.
- **Parameter:** interval-value: The interval of port-rate-statistics, unit is second, ranging from 5 to 600 with the configuration step of 5.
- **Default:** Only port-rate-statistics of 5 seconds and 5 minutes are displayed.
- **Command Mode:** Global Mode
- **Usage Guide:** None.
- **Example:** Count the interval of port-rate-statistics as 20 seconds.
- `Switch(config)#port-rate-statistics interval 20`

1.1.10 port-scan-mode

- **Command:** `port-scan-mode {interrupt | poll}`
 - `no port-scan-mode`
- **Function:** Configure the scan mode of the port as “interrupt” or “poll”, the `no` command restores the default scan mode.
- **Parameter:** `interrupt`: the interrupt mode; `poll`: the poll mode.
- **Command Mode:** Global Mode.
- **Default:** Poll mode.
- **Usage Guide:** There are two modes that can respond up/down event of the port. The interrupt mode means that interrupt hardware to announce the up/down change, the poll mode means that software poll can obtain the port event, the first mode is rapid. If using poll mode, the convergence time of MRPP is several hundred milliseconds, if using interrupt mode, the convergence time is less than 50 milliseconds.
- **Notice:** The scan mode of the port usually configured as poll mode, the interrupt mode is only used to the environment of the good performance, but the security of the poll mode is better.
- **Example:** Configure the scan mode of the port as interrupt mode.
- `Switch(config)#port-scan-mode interrupt`

1.1.11 port-status query interval

- This command is not supported by the switch.

1.1.12 rate-violation

- **Command:** `rate-violation <200-2000000> [recovery <0-86400>]`
- `no rate-violation`
- **Function:** Set the max packet reception rate of a port. If the rate of the received packet violates the packet reception rate, shut down this port and configure the recovery time, the default is 300s. The `no` command will disable the rate-violation function of a port.
- The rate-violation means the port received all packets rate (the number of the received packets per second), do not distinguish the packet type.
- **Parameters:** `<200-2000000>` the max packet reception rate of a port, the unit is packets/s.
- `<0-86400>`: The interval of recovery after shutdown, the unit is s.
- `recovery`: After a period of time the port can recover shutdown to up again. `<0-86400>` is the timeout of recovery. For example, if the shutdown of a port happens after the packet reception rate exceeding the limit, the port will be up again when the user-defined timeout expires. The default timeout is 300s, while 0 means the recovery will never happen.
- **Command Mode:** Interface Mode
- **Default:** There is no control operation for rate-violation.
- **Usage Guide:** This command is mainly used to detect the abnormal port flow. For example, when there are a large number of broadcast messages caused by a loopback,

which affect the processing of other tasks, the port will be shut down to ensure the normal processing of the switch.

- **Example:** Set the rate-violation of port 1/0/8-10 (GB ports) of the switch as 10000pps and the port recovery time as 1200 seconds.
- Switch(config)#interface ethernet 1/0/8-10
- Switch(Config-Port-Range)#rate-violation 10000 recovery 1200

1.1.13 rate-violation control

- This command is not supported by the switch.

1.1.14 remote-statistics interval

- This command is not supported by the switch.

1.1.15 show interface

- **Command:** show interface [ethernet <interface-number> | port-channel <port-channel-number> | loopback <loopback-id> | vlan <vlan-id> | tunnel <tunnel-id> | <interface-name>] [detail]
- **show interface ethernet status**
- **show interface ethernet counter {packet | rate}**
- **Function:** Show information of layer 3 or layer 2 port on the switch
- **Parameter:** <vlan-id> is the VLAN interface number, the value range from 1 to 4094. <tunnel-number> is the tunnel number, the value range from 1 to 50. <loopback-id> is the loop back number, the value range from 1 to 1024. <interface-number> is the port number of the Ethernet, **status** show important information of all the layer 2 ports. **counter {packet | rate}** show package number or rate statistics of all layer 2 ports. <port-channel-number> is the number of the aggregation interface, <interface-name> is the name of the interface such as port-channel1. [detail] show the detail of the port.
- **Command Mode:** Admin and Configuration Mode.
- **Default:** Information not displayed by default
- **Usage Guide:** While for vlan interfaces, the port MAC address, IP address and the statistic state of the data packet will be shown; for tunnel port, this command will show tunnel interface state and the statistic state of control layer receives/sends tunnel data packet, about the statistic data of physics interface receiving/sending data packet, please refer to show interface ethernet command; for loopback port, this command will show the interface statistic state of IP address and receiving/sending data packet; As for Ethernet port, this command will show port speed rate, duplex mode, flow control switch state, broadcast storm suppression of the port and the statistic state of the data packets; for aggregated port, port speed rate, duplex mode, flow control switch state, broadcast storm suppression of the port and the statistic state of the data packets will be displayed. The information of all ports on the switch will be shown if no port is specified.

- Using [detail] to show the detail information for ethernet port and port-channel port, the information is related with the type of switch, board card.
- For ethernet port, using status to show important information of all the layer 2 ports by list format. each port is a row, the showing information include port number, Link, Protocol status, Speed, Duplex, Vlan, port type and port name; counter packets show package number statistics of all ethernet ports, include layer 2 unicast, broadcast, multicast, error of input and output redirection package number; counter rate show the rate statistics of all ethernet ports, input and output package number, byte number in 5 minutes and 5 seconds.
- **Example:** Show the information of VLAN 1
- Switch#show interface vlan 1
- Vlan1 is up, line protocol is up, dev index is 2005
- Device flag 0x1003(UP BROADCAST MULTICAST)
- IPv4 address is:
- 192.168.10.1 255.255.255.0 (Primary)
- Hardware is EtherSVI, address is 00-00-00-00-00-01
- MTU is 1500 bytes , BW is 0 Kbit
- Encapsulation ARPA, loopback not set
- 5 minute input rate 0 bytes/sec, 0 packets/sec
- 5 minute output rate 0 bytes/sec, 0 packets/sec
- The last 5 second input rate 0 bytes/sec, 0 packets/sec
- The last 5 second output rate 0 bytes/sec, 0 packets/sec
- Input packets statistics:
- Input queue 0/600, 0 drops
- 0 packets input, 0 bytes, 0 no buffer
- 0 input errors, 0 CRC, 0 frame alignment, 0 overrun
- 0 ignored, 0 abort, 0 length error
- Output packets statistics:
- 0 packets output, 0 bytes, 0 underruns
- 0 output errors, 0 collisions, 0 late collisions
- Show the information of loopback 1:
- Switch#show interface loopback 1
- Loopback1 is up, line protocol is up, dev index is 2006
- Device flag 0x100b(UP BROADCAST LOOP MULTICAST)
- IPv4 address is:
- 1.1.1.1 255.255.255.255 (Primary)
- MTU is 1500 bytes , BW is 0 Kbit
- 5 minute input rate 0 bytes/sec, 0 packets/sec
- 5 minute output rate 0 bytes/sec, 0 packets/sec
- The last 5 second input rate 0 bytes/sec, 0 packets/sec
- The last 5 second output rate 0 bytes/sec, 0 packets/sec
- Input packets statistics:

- Input queue 0/600, 0 drops
- 0 packets input, 0 bytes, 0 no buffer
- 0 input errors, 0 CRC, 0 frame alignment, 0 overrun
- 0 ignored, 0 abort, 0 length error
- Output packets statistics:
- 0 packets output, 0 bytes, 0 underruns
- 0 output errors, 0 collisions, 0 late collisions
- Show the information of tunnel 1
- Switch#show interface tunnel 1
- Tunnel1 is up, line protocol is up, dev index is 2007
- Device flag 0x91(UP P2P NOARP)
- IPv4 address is:
- (NULL)
- 5 minute input rate 0 bytes/sec, 0 packets/sec
- 5 minute output rate 0 bytes/sec, 0 packets/sec
- The last 5 second input rate 0 bytes/sec, 0 packets/sec
- The last 5 second output rate 0 bytes/sec, 0 packets/sec
- Input packets statistics:
- Input queue 0/600, 0 drops
- 0 packets input, 0 bytes, 0 no buffer
- 0 input errors, 0 CRC, 0 frame alignment, 0 overrun
- 0 ignored, 0 abort, 0 length error
- Output packets statistics:
- 0 packets output, 0 bytes, 0 underruns
- 0 output errors, 0 collisions, 0 late collisions
- Show the information of port 1/0/1.
- Switch#show interface e1/0/1
- Ethernet1/0/1 is up, line protocol is down
- Ethernet1/0/1 is layer 2 port, alias name is (null), index is 1
- Hardware is Gigabit-TX, address is 00-03-0f-02-fc-01
- PVID is 1
- MTU 1500 bytes, BW 10000 Kbit
- Encapsulation ARPA, Loopback not set
- Auto-duplex: Negotiation half-duplex, Auto-speed: Negotiation 10M bits
- FlowControl is off, MDI type is auto
- 5 minute input rate 0 bytes/sec, 0 packets/sec
- 5 minute output rate 0 bytes/sec, 0 packets/sec
- The last 5 second input rate 0 bytes/sec, 0 packets/sec
- The last 5 second output rate 0 bytes/sec, 0 packets/sec
- Input packets statistics:
- 0 input packets, 0 bytes, 0 no buffer
- 0 unicast packets, 0 multicast packets, 0 broadcast packets

- 0 input errors, 0 CRC, 0 frame alignment, 0 overrun, 0 ignored
- 0 abort, 0 length error, 0 pause frame
- Output packets statistics:
- 0 output packets, 0 bytes, 0 underruns
- 0 unicast packets, 0 multicast packets, 0 broadcast packets
- 0 output errors, 0 collisions, 0 late collisions, 0 pause frame

- Show the important information of all layer 2 ports:
- Switch#show interface ethernet status
- Codes: A-Down - administratively down, a - auto, f - force, G - Gigabit

Interface	Link/Protocol	Speed	Duplex	Vlan	Type	Alias Name
1/0/1	UP/UP	f-100M	f-full	1		G-TX
1/0/2	UP/UP	a-100M	a-full		trunk	G-TX
1/0/3	UP/DOWN	auto	auto	1		G-TX
1/0/4	A-Down/DOWN	auto	auto	1		G-TX
...						

- Show the package number statistics information of all layer 2 ports:
- Switch#Show interface ethernet counter packet
- Interface Unicast(pkts) BroadCast(pkts) MultiCast(pkts) Err(pkts)
- 1/0/1 IN 12,345,678 12,345,678,9 12,345,678,9 4,567
- OUT 23,456,789 34,567,890 5,678 0
- 1/0/2 IN 0 0 0 0
- OUT 0 0 0 0
- 1/0/3 IN 0 0 0 0
- OUT 0 0 0 0
- 1/0/4 IN 0 0 0 0
- OUT 0 0 0 0
- ...

- Show the rate statistics information of all layer 2 ports:
- Switch#Show interface ethernet counter rate
- Interface IN(pkts/s) IN(bytes/s) OUT(pkts/s) OUT(bytes/s)
- 1/0/1 5m 13,473 12,345,678 12,345 1,234,567
- 5s 135 65,800 245 92,600

- 1/0/2 5m 0 0 0
- 5s 0 0 0
- 1/0/3 5m 0 0 0
- 5s 0 0 0
- 1/0/4 5m 0 0 0
- 5s 0 0 0
- ...

1.1.16 shutdown

- **Command:** shutdown
- **no shutdown**
- **Function:** Shuts down the specified Ethernet port; the no command opens the port.
- **Command mode:** Port Mode.
- **Default:** Ethernet port is open by default.
- **Usage Guide:** When Ethernet port is shut down, no data frames are sent in the port, and the port status displayed when the user types the “**show interface**” command is “down”.
- **Example:** Opening ports 1/0/1-8.
- Switch(config)#interface ethernet1/0/1-8
- Switch(Config-If-Port-Range)#no shutdown

1.1.17 speed-duplex

- **Command:** speed-duplex {auto [10 [100 [1000]] [auto | full | half |]] | force10-half | force10-full | force100-half | force100-full | force100-fx [module-type {auto-detected | no-phy-integrated | phy-integrated}] | {{force1g-half | force1g-full} [nonegotiate [master | slave]]} | force10g-full}
 - **no speed-duplex**
- **Function:** Sets the speed and duplex mode for 1000Base-TX, 100Base-TX or 100Base-FX ports; the no command restores the default speed and duplex mode setting, i.e., auto speed negotiation and duplex.
- **Parameters:** **auto** is the auto speed and duplex negotiation, **10** is 10Mbps speed, **100** is 100Mbps speed, **1000** is 1000Mbps speed, **auto** is duplex negotiation, **full** is full-duplex, **half** is half-duplex; **force10-half** is the forced 10Mbps at half-duplex mode; **force10-full** is the forced 10Mbps at full-duplex mode; **force100-half** is the forced 100Mbps at half-duplex mode; **force100-full** is the forced 100Mbps at full-duplex mode; **force100-fx** is the forced 100Mbps at full-duplex mode; **module-type** is the type of 100Base-FX

module; **auto-detected**: automatic detection; **no-phy-integrated**: there is no phy-integratd 100Base-FX module; **phy-integrated**: phy-integratd 100Base-FX module; **force1g-half** is the forced 1000Mbps speed at half-duplex mode; **force1g-full** is the forced 1000Mbps speed at full-duplex mode; **nonegotiate** disables auto-negotiation forcibly for 1000Mb port; **master** forces the 1000Mb port to be **master** mode; **slave** forces the 1000Mb port to be **slave** mode. **force10g-full** is the forced 10000Mbps speed at full-duplex mode.

- **Command mode:** Port Mode.
- **Default:** Auto-negotiation for speed and duplex mode is set by default.
- **Usage Guide:** This command is configures the port speed and duplex mode. When configuring port speed and duplex mode, the speed and duplex mode must be the same as the setting of the remote end, i.e., if the remote device is set to auto-negotiation, then auto-negotiation should be set at the local port. If the remote end is in forced mode, the same should be set in the local end.
- 1000Gb ports are by default **master** when configuring **nonegotiate** mode. If one end is set to **master** mode, the other end must be set to **slave** mode.
- **force1g-half** is not supported yet.
- **Example:** Port 1 of Switch1 is connected to port 1 of Switch2, the following will set both ports in forced 100Mbps at half-duplex mode.
- Switch1(config)#interface ethernet1/0/1
- Switch1(Config-If-Ethernet1/0/1)#speed-duplex force100-half
- Switch2(config)#interface ethernet1/0/1
- Switch2(Config-If-Ethernet1/0/1)#speed-duplex force100-half

1.1.18 storm-control

- **Command:** `storm-control {unicast | broadcast | multicast} <packets>`
- **no storm-control {unicast | broadcast | multicast}**
- **Function:** Sets the traffic limit for broadcasts, multicasts and unknown destination unicasts on all ports in the switch; the no command disables this traffic throttle function on all ports in the switch, i.e., enables broadcasts, multicasts and unknown destination unicasts to pass through the switch at line speed.
- **Parameters:** use unicast to limit unicast traffic for unknown destination; multicast to limit multicast traffic; broadcast to limit broadcast traffic. <packets> is the limit of packet number, ranging from 1 to 1488905. For non-10GB ports, the unit of <packets> is PPS, that is, the value of <packets> is the number of packets allowed to pass per second; for 10GB ports, the unit is KPPS, that is, the value of <packets> multiplies 1000 makes the number of packets allowed, so the value should be less than 14880.
- **Command mode:** Port Mode.
- **Default:** No limit is set by default. So, broadcasts, multicasts and unknown destination unicasts are allowed to pass at line speed.
- **Usage Guide:** All ports in the switch belong to a same broadcast domain if no VLAN has been set. The switch will send the above mentioned three traffics to all ports in the

broadcast domain, which may result in broadcast storm and so may greatly degrade the switch performance. Enabling Broadcast Storm Control can better protect the switch from broadcast storm. Note the difference of this command in 10Gb ports and other ports. If the allowed traffic is set to 3, this means allow 3,120 packets per second and discard the rest for 10Gb ports. However, the same setting for non-10Gb ports means to allow 3 broadcast packets per second and discard the rest.

- **Example:** Setting ports 1/0/8-10 (1000Mbps) allow 3 broadcast packets per second.
- Switch(config)#interface ethernet 1/0/8-10
- Switch(Config-Port-Range)#storm-control broadcast 3

1.1.19 virtual-cable-test

- **Command:** `virtual-cable-test interface (ethernet |)IFNAME`
- **Function:** Test the link of the twisted pair cable connected to the Ethernet port. The response may include: well, short, open, fail. If the test information is not well, the location of the error will be displayed (how many meters it is away from the port).
- **Parameter:** `<interface-list>`: Port ID
- **Command Mode:** Admin Mode.
- **Default Settings:** No link test.
- **Usage Guide:** The RJ-45 port connected with the twisted pair under test should be in accordance with the wiring sequence rules of IEEE802.3, or the wire pairs in the test result may not be the actual ones. On a 100M port, only two pairs are used: (1, 2) and (3, 6), whose results are the only effective ones. If a 1000M port is connected to a 100M port, the results of (4, 5) and (7, 8) will be of no meaning. The result may have deviations according to the type of the twisted pair, the temperature, working voltage and other conditions. When the temperature is 20 degree Celsius, and the voltage is stable without interference, and the length of the twisted pair is not longer than 100 meters, a deviation of +/-2 meters is allowed. When the port is at Link UP status, a deviation of +/-10 meters is allowed. Notice: the test procedure will block all data flow on the line for 5-10 seconds, and then restore the original status.
- **Notice:** combo port supports VCT function detection only at copper cable port mode, 100M port does not diagnose the link length at Link UP status.
- 568A wiring sequence: (1 green white, 2 green), (3 orange white, 6 orange), (4 blue, 5 blue white), (7 brown white, 8 brown).
- 568B wiring sequence: (1 orange white, 2 orange), (3 green white, 6 green), (4 blue, 5 blue white), (7 brown white, 8 brown).
- **Example:** Test the link status of the twisted pair connected to the 1000M port 1/0/25.
- Switch#virtual-cable-test interface ethernet 1/0/25
- Interface Ethernet1/0/25:
- -----
- Cable pairs Cable status Error length (meters)
- -----
- (1, 2) open 5

- (3, 6) open 5
- (4, 5) open 5
- (7, 8) short 5

Chapter 2 COMMANDS FOR PORT ISOLATION FUNCTION

2.1 isolate-port group

- **Command:** `isolate-port group <WORD>`
 - `no isolate-port group <WORD>`
- **Function:** Set a port isolation group, which is the scope of isolating ports; the no operation of this command will delete a port isolation group and remove all ports out of it.
- **Parameters:** `<WORD>` is the name identification of the group, no longer than 32 characters.
- **Command Mode:** Global Mode.
- **Default:** None.
- **Usage Guide:** Users can create different port isolation groups based on their requirements. For example, if a user wants to isolate all downlink ports in a vlan of a switch, he can implement that by creating a port isolation group and adding all downlink ports of the vlan into it. No more than 16 port isolation groups can a switch have. When the users need to change or redo the configuration of the port isolation group, he can delete the existing group with the no operation of this command.
- **Example:** Create a port isolation group and name it as “test”.
 - Switch>enable
 - Switch#config
 - Switch(config)#isolate-port group test

2.2 isolate-port group switchport interface

- **Command:** `isolate-port group <WORD> switchport interface [ethernet | port-channel] <IFNAME>`
 - `no isolate-port group <WORD> switchport interface [ethernet | port-channel] <IFNAME>`
- **Function:** Add one port or a group of ports into a port isolation group to isolate, which will become isolated from the other ports in the group. The no operation of this command will remove one port or a group of ports out of a port isolation group, which will be able to communicate with ports in that group normally. If the ports removed from the group still belong to another port isolation group, they will remain isolated from the ports in that group. If an Ethernet port is a member of a convergence group, it should not be added into a port isolation group, and vice versa, a member of a port isolation group should not be added into an aggregation group. But one port can be a member of one or more port isolation groups.
- **Parameters:** `<WORD>` is the name identification of the group, no longer than 32 characters. If there is no such group with the specified name, create one; **ethernet** means that the ports to be isolated is Ethernet ones, followed by a list of Ethernet ports, supporting symbols like “;” and “-”. For example: “ethernet 1/0/1;3;4-7;8”; port-

channel means that the ports to be isolated is aggregation ports; *<IFNAME>* is the name of the interface, such as e1/0/1. If users use interface name, the parameter of ethernet will not be required.

- **Command Mode:** Global Mode.
- **Default:** None.
- **Usage Guide:** Users can add Ethernet ports into or remove them from a port isolation group according to their requirements. When an Ethernet port is a member of more than one port isolate group, it will be isolated from every port of all groups it belongs to.
- **Example:** Add Ethernet ports 1/0/1-2 and 1/0/5 into a port isolation group named as "test".
- Switch(config)#isolate-port group test switchport interface ethernet 1/0/1-2; 1/0/5

2.3 isolate-port apply

- **Command:** isolate-port apply [*<I2|I3|all>*]
- **Function:** This command will apply the port isolation configuration to isolate layer-2 flows, layer-3 flows or all flows.
- **Parameters:** *<I2|I3|all>* the flow to be isolated, I2 means isolating layer-2 flows, I3 means isolating layer-3 flows, all means isolating all flows.
- **Command Mode:** Global Mode.
- **Default:** Isolate all flows.
- **Usage Guide:** User can apply the port isolation configuration to isolate layer-2 flows, layer-3 flows or all flows according to their requirements.
- **Example:** Only apply port isolation to layer-2 flows on the switch.
- Switch(config)#isolate-port apply I2

2.4 show isolate-port group

- **Command:** show isolate-port group [*<WORD>*]
- **Function:** Display the configuration of port isolation, including all configured port isolation groups and Ethernet ports in each group.
- **Parameters:** *<WORD>* the name identification of the group, no longer than 32 characters; no parameter means to display the configuration of all port isolation groups.
- **Command Mode:** Admin Mode and Global Mode.
- **Default:** Display the configuration of all port isolation groups.
- **Usage Guide:** Users can view the configuration of port isolation with this command.
- **Example:** Display the port isolation configuration of the port isolation group named as "test".
- Switch(config)#show isolate-port group test
- Isolate-port group test

- The isolate-port Ethernet1/0/5
 - The isolate-port Ethernet1/0/2

Chapter 3 COMMANDS FOR PORT LOOPBACK DETECTION FUNCTION

3.1 debug loopback-detection

- **Command:** `debug loopback-detection`
- **Function:** After enabling the loopback detection debug on a port, BEBUG information will be generated when sending, receiving messages and changing states.
- **Parameters:** None.
- **Command Mode:** Admin Mode.
- **Default:** Disabled by default.
- **Usage Guide:** Display the message sending, receiving and state changes with this command.
- **Example:**
 - `Switch#debug loopback-detection`
 - `%Jan 01 03:29:18 2006 Send loopback detection probe packet:dev Ethernet1/0/10, vlan id 1`
 - `%Jan 01 03:29:18 2006 Send loopback detection probe packet:dev Ethernet1/0/10, vlan id 2`

3.2 loopback-detection control

- **Command:** `loopback-detection control {shutdown | block | learning}`
- **no loopback-detection control**
- **Function:** Enable the function of loopback detection control on a port, the no operation of this command will disable the function.
- **Parameters:** **shutdown** set the control method as shutdown, which means to close down the port if a port loopback is found.
 - **block** set the control method as block, which means to block a port by allowing bpdu and loopback detection messages only if a port loopback is found.
 - **learning** disable the control method of learning MAC addresses on the port, not forwarding traffic and delete the MAC address of the port.
- **Default:** Disable the function of loopback detection control.
- **Command Mode:** Port Mode.
- **Usage Guide:** If there is any loopback, the port will not recovery the state of be controlled after enabling control operation on the port. If the overtime is configured, the ports will recovery normal state when the overtime is time-out. If the control method is block, the corresponding relationship between instance and vlan id should be set manually by users, it should be noticed when be used.
- **Example:** Enable the function of loopback detection control under port1/0/2 mode.

- Switch(config)#interface ethernet 1/0/2
- Switch(Config-If-Ethernet1/0/2)#loopback-detection control shutdown
- Switch(Config-If-Ethernet1/0/2)#no loopback-detection control

3.3 loopback-detection control-recovery timeout

- **Command:** `loopback-detection control-recovery timeout <0-3600>`
- **Function:** This command is used to recovery to uncontrolled state after a special time when a loopback being detected by the port entry be controlled state.
- **Parameters:** <0-3600> second is recovery time for be controlled state, 0 is not recovery state.
- **Default:** The recovery is not automatic by default.
- **Command Mode:** Global Configuration Mode.
- **Usage Guide:** When a port detects a loopback and works in control mode, the ports always work in control mode and not recover. The port will not sent packet to detection in shutdown mode, however, the port will sent loopback-detection packet to detection whether have loopback in block or learning mode. If the recovery time is configured, the ports will recovery normal state when the overtime is time-out. The recovery time is a useful time for shutdown control mode, because the port can keep on detection loopback in the other modes, so suggest not to use this command.
- **Examples:** Enable automatic recovery of the loopback-detection control mode after 30s.
- Switch(config)#loopback-detection control-recovery timeout 30

3.4 loopback-detection interval-time

- **Command:** `loopback-detection interval-time <loopback> <no-loopback>`
- **no loopback-detection interval-time**
- **Function:** Set the loopback detection interval. The no operate closes the loopback detection interval function.
- **Parameters:** **<loopback >** the detection interval if any loopback is found, ranging from 5 to 300, in seconds.
 - **<no-loopback >** the detection interval if no loopback is found, ranging from 1 to 30, in seconds.
- **Default:** The default value is 5s with loopbacks existing and 3s otherwise.
- **Command Mode:** Global Mode.
- **Usage Guide:** When there is no loopback detection, the detection interval can be relatively shorter, for too short a time would be a disaster for the whole network if there is any loopback. So, a relatively longer interval is recommended when loopbacks exist.
- **Example:** Set the loopback diction interval as 35, 15.
- Switch(config)#loopback-detection interval-time 35 15

3.5 loopback-detection specified-vlan

- **Command:** `loopback-detection specified-vlan <vlan-list>`
- **no loopback-detection specified-vlan** [`<vlan-list>`]
- **Function:** Enable the function of loopback detection on the port and specify the VLAN to be checked; the no operation of this command will disable the function of detecting loopbacks through this port or the specified VLAN.
- **Parameters:** `<vlan-list>` the list of VLANs allowed passing through the port. Given the situation of a trunk port, the specified VLANs can be checked. So this command is used to set the vlan list to be checked.
- **Default:** Disable the function of detecting the loopbacks through the port.
- **Command Mode:** Port Mode.
- **Usage Guide:** If a port can be a TRUNK port of multiple Vlan, the detection of loopbacks can be implemented on the basis of port+Vlan, which means the objects of the detection can be the specified Vlan on a port. If the port is an ACCESS port, only one Vlan on the port is allowed to be checked despite the fact that multiple Vlan can be configured. This function is not supported under Port-channel.
- **Example:** Enable the function of loopback detection under port 1/0/2 mode.
 - Switch(config)#interface ethernet 1/0/2
 - Switch(Config-If-Ethernet1/0/2)#switchport mode trunk
 - Switch(Config-If-Ethernet1/0/2)#switchport trunk allowed vlan all
 - Switch(Config-If-Ethernet1/0/2)#loopback-detection specified-vlan 1;3;5-20
 - Switch(Config-If-Ethernet1/0/2)#no loopback-detection specified-vlan 1;3;5-20

3.6 show loopback-detection

- **Command:** `show loopback-detection [interface <interface-list>]`
- **Function:** Display the state of loopback detection on all ports if no parameter is provided, or the state and result of the specified ports according to the parameters.
- **Parameters:** `<interface-list>` the list of ports to be displayed, for example: ethernet 1/0/1.
- **Command Mode:** Admin and Configuration Mode.
- **Usage Guide:** Display the state and result of loopback detection on ports with this command.
- **Example:** Display the state of loopback detection on port 4.
 - Switch(config)#show loopback-detection interface Ethernet 1/0/4
 - loopback detection config and state information in the switch!
 - PortName Loopback Detection Control Mode Is Controlled
 - Ethernet1/0/4 Enable Shutdown No

Chapter 4 COMMANDS FOR ULDP

4.1 debug uldp

- **Command:** `debug uldp (hello | probe | echo | unidir | all) [receive | send] interface [ethernet] IFNAME`
 - `no debug uldp (hello | probe | echo | unidir | all) [receive | send] interface [ethernet] IFNAME`
- **Function:** Enable the debugging for receiving and sending the specified packets or all ULDP packets on port. After enable the debugging, show the information of the received and sent packets in terminal. The no command disables the debugging.
- **Parameters:** hello: packet's type is hello, it's announcement packet, including common announcement packet, RSY and Flush packet
- probe: packet's type is probe, it's detection packet
- echo: packet's type is echo, it means response of detection packet
 - unidir: packet's type is unidir, it's announcement packet that discover the single link
 - all: All ULDP packets
- **Command mode:** Admin mode
- **Default:** Disable.
- **Usage Guide:** With this command, user can check probe packets received by port 1/0/2.
- `Switch#debug uldp probe receive interface ethernet 1/0/2`

4.2 debug uldp error

- **Command:** `debug uldp error`
- `no debug uldp error`
- **Function:** Enable the error message debug function, the no form command disable the function.
- **Parameter:** None.
- **Command Mode:** Admin Mode.
- **Default:** Disabled.
- **Usage Guide:** Use this command to display the error message.
- **Example:** Display the error message.
- `Switch#debug uldp error`

4.3 debug uldp event

- **Command:** `debug uldp event`
- `no debug uldp event`

- **Function:** Enable the message debug function to display the event; the no form command disables this function.
- **Parameter:** None.
- **Command Mode:** Admin Mode.
- **Default:** Disabled.
- **Usage Guide:** Use this command to display all kinds of event information.
- **Example:** Display event information.
- Switch#debug uldp event

4.4 debug uldp fsm interface ethernet

- **Command:** debug uldp fsm interface ethernet <IFname>
- **no debug uldp fsm interface ethernet <IFname>**
- **Function:** To enable debugging information for ULDP for the specified interface. The no form of this command will disable the debugging information.
- **Parameters:** <IFname> is the interface name.
- **Command Mode:** Admin Configuration Mode.
- **Default:** Disabled by default.
- **Usage Guide:** This command can be used to display the information about state transitions of the specified interfaces.
- **Example:** Print the information about state transitions of interface ethernet 1/0/1.
- Switch#debug uldp fsm interface ethernet 1/0/1

4.5 debug uldp interface ethernet

- **Command:** debug uldp {hello|probe|echo|unidir|all} [receive|send] interface ethernet <IFname>
 - **no debug uldp {hello|probe|echo|unidir|all} [receive|send] interface ethernet <IFname>**
- **Function:** Enable the debug function of display the packet details. After that, display some kinds of the packet details of terminal interface.
- **Parameter:** <IFname>: Name of the interface.
- **Command Mode:** Admin Mode.
- **Default:** Disabled.
- **Usage Guide:** Use this command to display the Hello packet details receiving on the interface Ethernet 1/0/1.
- Switch#debug uldp hello receive interface Ethernet 1/0/1

4.6 debug uldp packet

- **Command:** debug uldp packet [receive|send]
- **no debug uldp packet [receive|send]**

- **Function:** Enable receives and sends packet debug function, after that. Display the type and interface of the packet which receiving and sending on the client. The no form command disables this function.
- **Parameter:** None.
- **Command Mode:** Admin Mode.
- **Default:** Disabled.
- **Usage Guide:** Use this command to display the packet that receiving on each interface.
- Switch#debug uldp packet receive

4.7 uldp aggressive-mode

- **Command:** uldp aggressive-mode
- **no uldp aggressive-mode**
- **Function:** To configure ULDP to work in aggressive mode. The no form of this command will restore the normal mode.
- **Parameters:** None.
- **Command Mode:** Global Configuration Mode and Port Configuration Mode.
- **Default:** Normal mode.
- **Usage Guide:** The ULDP working mode can be configured only if it is enabled globally. When ULDP aggressive mode is enabled globally, all the existing fiber ports will work in aggressive mode. For the copper ports and fiber ports which are available after the configuration is available, aggressive mode should be enabled in port configuration mode.
- **Example:** To enable ULDP aggressive mode globally.
- Switch(config)#uldp aggressive-mode

4.8 uldp enable

- **Command:** uldp enable
- **Function:** ULDP will be enabled after issuing this command. In global configuration mode, this command will enable ULDP for the global. In port configuration mode, this command will enable ULDP for the port.
- **Parameters:** None.
- **Command Mode:** Global Configuration Mode and Port Configuration Mode.
- **Default:** By default ULDP is not configured.
- **Usage Guide:** ULDP can be configured for the ports only if ULDP is enabled globally. If ULDP is enabled globally, it will be effect for all the existing fiber ports. For copper ports and fiber ports which are available after ULDP is enabled, this command should be issued in the port configuration mode to make ULDP be effect.
- **Example:** Enable ULDP in global configuration mode.
- Switch(config)#uldp enable

4.9 uldp disable

- **Command:** `uldp disable`
- **Function:** To disable ULDP configuration through this command.
- **Parameters:** None.
- **Command Mode:** Global Configuration Mode and Port Configuration Mode.
- **Default:** By default ULDP is not configured.
- **Usage Guide:** When ULDP is disabled globally, then ULDP in all the ports will be disabled.
- **Example:** To disable the ULDP configuration in global configuration mode.
- `Switch(config)#uldp disable`

4.10 uldp hello-interval

- **Command:** `uldp hello-interval <integer>`
- **no uldp hello-interval**
- **Function:** To configure the interval for ULDP to send hello messages. The no form of this command will restore the default interval for the hello messages.
- **Parameters:** *<integer>*: The interval for the Hello messages, with its value limited between 5 and 100 seconds, 10 seconds by default.
- **Command Mode:** Global Configuration Mode.
- **Default:** 10 seconds by default.
- **Usage Guide:** Interval for hello messages can be configured only if ULDP is enabled globally, its value limited between 5 and 100 seconds.
- **Example:** To configure the interval of Hello messages to be 12 seconds.
- `Switch(config)#uldp hello-interval 12`

4.11 uldp manual-shutdown

- **Command:** `uldp manual-shutdown`
- **no uldp manual-shutdown**
- **Function:** To configure ULDP to work in manual shutdown mode. The no command will restore the automatic mode.
- **Parameters:** None.
- **Command Mode:** Global Configuration Mode.
- **Default:** Auto mode.
- **Usage Guide:** This command can be issued only if ULDP has been enabled globally.
- **Example:** To enable manual shutdown globally.
- `Switch(config)#uldp manual-shutdown`

4.12 uldp recovery-time

- **Command:** `uldp recovery-time<integer>`
- **no uldp recovery-time**
- **Function:** To configure the interval for ULDP recovery timer. The no form of this command will restore the default configuration.
- **Parameters:** *<integer>*: the time out value for the ULDP recovery timer. Its value is limited between 30 and 86400 seconds.
- **Command Mode:** Global Configuration Mode.
- **Default:** 0 is set by default which means the recovery is disabled.
- **Usage Guide:** If an interface is shutdown by ULDP, and the recovery timer times out, the interface will be reset automatically. If the recovery timer is set to 0, the interface will not be reset.
- **Example:** To set the recovery timer to be 600 seconds.
- `Switch(config)#uldp recovery-time 600`

4.13 uldp reset

- **Command:** `uldp reset`
- **Function:** To reset the port when ULDP is shutdown.
- **Parameters:** None.
- **Command Mode:** Globally Configuration Mode and Port Configuration Mode.
- **Default:** None.
- **Usage Guide:** This command can only be effect only if the specified interface is disabled by ULDP.
- **Example:** To reset all the port which are disabled by ULDP.
- `Switch(config)#uldp reset`

4.14 show uldp

- **Command:** `show uldp [interface ethernet<interface-name>]`
- **Function:** To show the global ULDP configuration and status information of interface. If *<interface-name>* is specified, ULDP configuration and status about the specified interface as well as its neighbors' will be displayed.
- **Parameters:** *<interface-name>* is the interface name.
- **Command Mode:** Admin and Configuration Mode.
- **Default:** None.
- **Usage Guide:** If no parameters are appended, the global ULDP information will be displayed. If the interface name is specified, information about the interface and its neighbors will be displayed along with the global information.
- **Example:** To display the global ULDP information.
-

- Switch(config)#show uldp

Chapter 5 COMMANDS FOR LLDP FUNCTION

5.1 clear lldp remote-table

- **Command:** clear lldp remote-table
- **Function:** Clear the Remote-table on the port.
- **Parameters:** None.
- **Default:** Do not clear the entries.
- **Command Mode:** Port Configuration Mode.
- **Usage Guide:** Clear the Remote table entries on this port.
- **Example:** Clear the Remote table entries on this port.
- Switch(Config-If-Ethernet 1/0/1)# clear lldp remote-table

5.2 debug lldp

- **Command:** debug lldp
- **no debug lldp**
- **Function:** Enable the debug information of LLDP function, the no operation of this command will disable the debug information of LLDP function.
- **Parameters:** None.
- **Default:** Disable the debug information of LLDP function.
- **Command Mode:** Admin Mode.
- **Usage Guide:** When the debug switch is enabled, users can check the receiving and sending of packets and other information.
- **Example:** Enable the debug switch of LLDP function on the switch.
- Switch#debug lldp

5.3 debug lldp packets

- **Command:** debug lldp packets interface ethernet <IFNAME>
- **no debug lldp packets interface ethernet <IFNAME>**
- **Function:** Display the message-receiving and message-sending information of LLDP on the port; the no operation of this command will disable the debug information switch.
- **Parameters:** None.
- **Default:** Disable the debug information on the port.
- **Command Mode:** Admin Mode.
- **Usage Guide:** When the debug switch is enabled, users can check the receiving and sending of packets and other information on the port.
- **Example:** Enable the debug switch of LLDP function on the switch.
- Switch#debug lldp packets interface ethernet 1/0/1
- %Jan 01 00:02:40 2006 LLDP-PDU-TX PORT= ethernet 1/0/1

5.4 lldp enable

- **Command:** lldp enable
- **lldp disable**
- **Function:** Globally enable LLDP function; **disable** command globally disables LLDP function.
- **Parameters:** None.
- **Default:** Disable LLDP function.
- **Command Mode:** Global Mode.
- **Usage Guide:** If LLDP function is globally enabled, it will be enabled on every port.
- **Example:** Enable LLDP function on the switch.
- Switch(config)#lldp enable

5.5 lldp enable (Port)

- **Command:** lldp enable
- **lldp disable**
- **Function:** Enable the LLDP function module of ports in port configuration mode; **disable** command will disable the LLDP function module of port.
- **Parameters:** None.
- **Default:** the LLDP function module of ports is enabled by default in port configuration mode.
- **Command Mode:** Port Configuration Mode.
- **Usage Guide:** When LLDP is globally enabled, it will be enabled on every port, the switch on a port is used to disable this function when it is unnecessary on the port.
- **Example:** Disable LLDP function of port on the port ethernet 1/0/5 of the switch.
- Switch(config)#in ethernet 1/0/5
- Switch(Config-If-Ethernet1/0/5)#lldp disable

5.6 lldp mode

- **Command:** lldp mode *<send | receive | both | disable>*
- **Function:** Configure the operating state of LLDP function of the port.
- **Parameters:** send: Configure the LLDP function as only being able to send messages.
 - receive: Configure the LLDP function as only being able to receive messages.
 - both: Configure the LLDP function as being able to both send and receive messages.
 - disable: Configure the LLDP function as not being able to send or receive messages.
- **Default:** The operating state of the port is “both”.
- **Command Mode:** Port Configuration Mode.

- **Usage Guide:** Choose the operating state of the lldp Agent on the port.
- **Example:** Configure the state of port ethernet 1/0/5 of the switch as “receive”.
- Switch(config)#in ethernet 1/0/5
- Switch(Config-If-Ethernet1/0/5)#lldp mode receive

5.7 lldp msgTxHold

- **Command:** lldp msgTxHold <value>
- **no lldp msgTxHold**
- **Function:** Set the multiplier value of the aging time carried by update messages sent by the all ports with LLDP function enabled, the value ranges from 2 to 10.
- **Parameters:** <value> is the aging time multiplier, ranging from 2 to 10.
- **Default:** the value of the multiplier is 4 by default.
- **Command Mode:** Global Mode.
- **Usage Guide:** After configuring the multiplier, the aging time is defined as the product of the multiplier and the interval of sending messages, and its maximum value is 65535 seconds.
- **Example:** Set the value of the aging time multiplier as 6.
- Switch(config)#lldp msgTxHold 6

5.8 lldp neighbors max-num

- **Command:** lldp neighbors max-num <value>
- **no lldp neighbors max-num**
- **Function:** Set the maximum number of entries can be stored in Remote MIB.
- **Parameters:** <value> is the configured number of entries, ranging from 5 to 500.
- **Default:** The maximum number of entries can be stored in Remote MIB is 100.
- **Command Mode:** Port Configuration Mode.
- **Usage Guide:** The maximum number of entries can be stored in Remote MIB.
- **Example:** Set the Remote as 200 on port ethernet 1/0/5 of the switch.
- Switch(config)#in ethernet 1/0/5
- Switch(Config-If-Ethernet1/0/5)# lldp neighbors max-num 200

5.9 lldp notification interval

- **Command:** lldp notification interval <seconds>
- **no lldp notification interval**
- **Function:** When the time interval ends, the system is set to check whether the Remote Table has been changed. If it has, the system will send Trap to the SNMP management end.
- **Parameters:** <seconds> is the time interval, ranging from 5 to 3600 seconds.
- **Default:** The time interval is 5 seconds.

- **Command Mode:** Global Mode.
- **Usage Guide:** After configuring the notification time interval, a “trap” message will be sent at the end of this time interval whenever the Remote Table changes.
- **Example:** Set the time interval of sending Trap messages as 20 seconds.
- Switch(config)#lldp notification interval 20

5.10 lldp tooManyNeighbors

- **Command:** lldp tooManyNeighbors {discard | delete}
- **Function:** Set which operation will be done when the Remote Table is full.
- **Parameters:** discard: discard the current message.
 - delete: Delete the message with the least TTL in the Remoter Table.
- **Default:** Discard.
- **Command Mode:** Port Configuration Mode.
- **Usage Guide:** When the Remote MIB is full, Discard means to discard the received message; Delete means to the message with the least TTL in the Remoter Table.
- **Example:** Set port ethernet 1/0/5 of the switch as delete.
- Switch(config)#in ethernet 1/0/5
- Switch(Config-If-Ethernet1/0/5)#lldp tooManyNeighbors delete

5.11 lldp transmit delay

- **Command:** lldp transmit delay <seconds>
- **no lldp transmit delay**
- **Function:** Since local information might change frequently because of the variability of the network environment, there could be many update messages sent in a short time. So a delay is required to guarantee an accurate statistics of local information.
- When transmit delay is the default value and tx-interval is configured via some commands, transmit delay will become one fourth of the latter, instead of the default 2.
- **Parameters:** <seconds>is the time interval, ranging from 1 to 8192 seconds.
- **Default:** The interval is 2 seconds by default.
- **Command Mode:** Global Mode.
- **Usage Guide:** When the messages are being sent continuously, a sending delay is set to prevent the Remote information from being updated repeatedly due to sending messages simultaneously.
- **Example:** Set the delay of sending messages as 3 seconds.
- Switch(config)#lldp transmit delay 3

5.12 lldp transmit optional tlv

- **Command:** lldp transmit optional tlv [portDesc] [sysName] [sysDesc] [sysCap]

- **no lldp transmit optional tlv**
- **Function:** Configure the type of optional TLV of the port.
- **Parameters:** **portDesc:** the description of the port; **sysName:** the system name; **sysDesc:** The description of the system; **sysCap:** the capability of the system.
- **Default:** The messages carry no optional TLV by default.
- **Command Mode:** Port Configuration Mode.
- **Usage Guide:** When configuring the optional TLV, each TLV can only appear once in a message, **portDesc** optional TLV represents the name of local port; **sysName** optional TLV represents the name of local system; **sysDesc** optional TLV represents the description of local system; **sysCap** optional TLV represents the capability of local system.
- **Example:** Configure that port ethernet 1/0/5 of the switch carries portDesc and sysCap TLV.
- Switch(config)#in ethernet 1/0/5
- Switch(Config-If-Ethernet1/0/5)#lldp transmit optional tlv portDesc sysCap

5.13 lldp trap

- **Command:** **lldp trap <enable | disable>**
- **Function:** **enable:** configure to enable the Trap function on the specified port; **disable:** configure to disable the Trap function on the specified port.
- **Parameters:** None.
- **Default:** The Trap function is disabled on the specified port by default.
- **Command Mode:** Port Configuration Mode.
- **Usage Guide:** The function of sending Trap messages is enabled on the port.
- **Example:** Enable the Trap function on port ethernet 1/0/5 of the switch.
- Switch(config)#in ethernet1/0/5
- Switch(Config-If-Ethernet1/0/5)#lldp trap enable

5.14 lldp tx-interval

- **Command:** **lldp tx-interval <integer>**
- **no lldp tx-interval**
- **Function:** Set the interval of sending update messages on all the ports with LLDP function enabled, the value of which ranges from 5 to 32768 seconds and is 30 seconds by default.
- **Parameters:** **<integer>** is the interval of sending updating messages, ranging from 5 to 32768 seconds.
- **Default:** 30 seconds.
- **Command Settings:** Global Mode.
- **Usage Guide:** After configuring the interval of sending messages, LLDP messages can only be received after a period as long as configured. The interval should be less than or

equal with half of aging time, for a too long interval will cause the state of being aged and reconstruction happen too often; while a too short interval will increase the flow of the network and decrease the bandwidth of the port. The value of the aging time of messages is the product of the multiplier and the interval of sending messages. The maximum aging time is 65535 seconds.

- When tx-interval is the default value and transmit delay is configured via some commands, tx-interval will become four times of the latter, instead of the default 40.
- **Example:** Set the interval of sending messages as 40 seconds.
- Switch(config)#lldp tx-interval 40

5.15 show debugging lldp

- **Command:** show debugging lldp
- **Function:** Display all ports with lldp debug enabled.
- **Parameters:** None.
- **Default:** None.
- **Command Mode:** Admin and Configuration Mode.
- **Usage Guide:** With show debugging lldp, all ports with lldp debug enabled will be displayed.
- **Example:** Display all ports with lldp debug enabled.
- Switch(config)#show debugging lldp
- =====BEGINNING OF LLDP DEBUG SETTINGS=====
- debug lldp
- debug lldp packets interface Ethernet1/0/1
- debug lldp packets interface Ethernet1/0/2
- debug lldp packets interface Ethernet1/0/3
- debug lldp packets interface Ethernet1/0/4
- debug lldp packets interface Ethernet1/0/5
- =====END OF DEBUG SETTINGS=====

5.16 show lldp

- **Command:** show lldp
- **Function:** Display the configuration information of global LLDP, such as the list of all the ports with LLDP enabled, the interval of sending update messages, the configuration of aging time, the interval needed by the sending module to wait for re-initialization, the interval of sending TRAP, the limitation of the number of the entries in the Remote Table.
- **Parameters:** None.
- **Default:** Do not display the configuration information of global LLDP.
- **Command Mode:** Admin Mode, Global Mode.

- **Usage Guide:** Users can check all the configuration information of global LLDP by using “show lldp”.
- **Example:** Check the configuration information of global LLDP after it is enabled on the switch.
- Switch(config)#show lldp
- -----LLDP GLOBAL INFORMATIONS-----
- LLDP enabled port : Ethernet 1/0/1
- LLDP interval :30
- LLDP txTTL :120
- LLDP txShutdownWhile :2
- LLDP NotificationInterval :5
- LLDP txDelay :20
- -----END-----

5.17 show lldp interface ethernet

- **Command:** show lldp interface ethernet <IFNAME>
- **Function:** Display the configuration information of LLDP on the port, such as: the working state of LLDP Agent.
- **Parameters:** <IFNAME>: Interface name.
- **Default:** Do not display the configuration information of LLDP on the port.
- **Command Mode:** Admin Mode, Global Mode.
- **Usage Guide:** Users can check the configuration information of LLDP on the port by using “show lldp interface ethernet XXX”.
- **Example:** Check the configuration information of LLDP on the port after LLDP is enabled on the switch.
- Switch(config)#show lldp interface ethernet 1/0/1
- Port name : ethernet 1/0/1
- LLDP Agent Adminstatus: Both
- LLDP Operation TLV: portDecs sysName sysDesc sysCap
- LLDP Trap Status: disable
- LLDP maxRemote: 100
- LLDP Overflow handle: discard
- LLDP interface remote status : Full

5.18 show lldp neighbors interface ethernet

- **Command:** show lldp neighbors interface ethernet < IFNAME >
- **Function:** Display the LLDP neighbor information of the port.
- **Parameters:** None.
- **Default:** Do not display the LLDP neighbor information of the port.
- **Command Mode:** Admin Mode, Global Mode.

- **Usage Guide:** Users can check the LLDP neighbor information of the port by using “show lldp neighbors interface ethernet XXX”.
- **Example:** Check the LLDP neighbor information of the port after LLDP is enabled on the port.
- Switch(config)#show lldp neighbors interface ethernet 1/0/1

5.19 show lldp traffic

- **Command:** show lldp traffic
- **Function:** Display the statistics of LLDP data packets.
- **Parameters:** None.
- **Default:** Do not display the statistics of LLDP data packets.
- **Command Mode:** Admin Mode, Global Mode.
- **Usage Guide:** Users can check the statistics of LLDP data packets by using “show lldp traffic”.
- **Example:** Check the statistics of LLDP data packets after LLDP is enabled on the switch.
- Switch(config)#show lldp traffic
- | PortName | Ageouts | FramesDiscarded | FramesInErrors | FramesIn | FramesOut | TLVsDiscarded | TLVsUnrecognized | ----- | ----- | ----- |
|---------------|---------|-----------------|----------------|----------|-----------|---------------|------------------|-------|-------|-------|
| Ethernet1/0/1 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | | | |

Chapter 6 COMMANDS FOR PORT CHANNEL

6.1 debug port-channel

- **Command:** `debug port-channel <port-group-number> {all | event | fsm | packet | timer}`
 - `no debug port-channel [<port-group-number>]`
- **Function:** Open the debug switch of port-channel.
- **Parameters:** `<port-group-number>` is the group number of port channel, ranging from 1~128
 - **all:** all debug information
 - **event:** debug event information
 - **fsm:** debug the state machine
 - **packet:** debug LACP packet information
 - **timer:** debug the timer information
- **Command mode:** Admin mode.
- **Default:** Disable the debugging of port-channel.
- **Usage Guide:** Open the debug switch to check the debug information of port-channel.
- **Example:**
 - (1)debug the state machine for port-group 1.
 - Switch#debug port-channel 1 fsm
 - (2) debug LACP packet information for port-group 2.
 - Switch#debug port-channel 2 packet
 - (3) debug all for port-group 1.
 - Switch#debug port-channel 1 all

6.2 interface port-channel

- **Command:** `interface port-channel <port-channel-number>`
- **Function:** Enters the port channel configuration mode
- **Command mode:** Global Mode
- **Usage Guide:** On entering aggregated port mode, configuration to GVRP or spanning tree modules will apply to aggregated ports; if the aggregated port does not exist (i.e., ports have not been aggregated), an error message will be displayed and configuration will be saved and will be restored until the ports are aggregated. Note such restoration will be performed only once, if an aggregated group is ungrouped and aggregated again, the initial user configuration will not be restored. If it is configuration for modules, such as shutdown configuration, then the configuration to current port will apply to all member ports in the corresponding port group.
- **Example:** Entering configuration mode for port-channel 1.
 - Switch(config)#interface port-channel 1
 - Switch(Config-If-Port-Channel1)#

6.3 lacp port-priority

- **Command:** `lacp port-priority <port-priority>`
 - `no lacp port-priority`
- **Function:** Set the port priority of LACP protocol.
- **Parameters:** `<port-priority>`: the port priority of LACP protocol, the range from 0 to 65535.
- **Command mode:** Port Mode.
- **Default:** The default priority is 32768 by system.
- **Usage Guide:** Use this command to modify the port priority of LACP protocol, the no command restores the default value.
- **Example:** Set the port priority of LACP protocol.
- `Switch(Config-If-Ethernet1/0/1)# lacp port-priority 30000`

6.4 lacp system-priority

- **Command:** `lacp system-priority <system-priority>`
 - `no lacp system-priority`
- **Function:** Set the system priority of LACP protocol.
- **Parameters:** `<system-priority>`: The system priority of LACP protocol, ranging from 0 to 65535.
- **Command mode:** Global Mode
- **Default:** The default priority is 32768.
- **Usage Guide:** Use this command to modify the system priority of LACP protocol, the no command restores the default value.
- **Example:** Set the system priority of LACP protocol.
- `Switch(config)#lacp system-priority 30000`

6.5 lacp timeout

- **Command:** `lacp timeout {short | long}`
 - `no lacp timeout`
- **Function:** Set the timeout mode of LACP protocol.
- **Parameters:** The timeout mode includes long and short.
- **Command mode:** Port Mode
- **Default:** Long.
- **Usage Guide:** Set the timeout mode of LACP protocol.
- **Example:** Set the timeout mode as short in LACP protocol.
- `Switch(Config-If-Ethernet1/0/1)#lacp timeout short`

6.6 load-balance

- **Command:** `load-balance {dst-src-mac | dst-src-ip | dst-src-mac-ip}`
- **Function:** Set load-balance mode for switch, it takes effect for port-group and ECMP at the same time.
- **Parameter:** `dst-src-mac` performs load-balance according to the source and destination MAC
- `dst-src-ip` performs load-balance according to the destination and source IP
 - `dst-src-mac-ip` performs load-balance according to the destination and source MAC, the destination and source IP
- **Command mode:** Global mode.
- **Default:** Perform load-balance according to the source and destination MAC.
- **Usage Guide:** Use port-channel or ECMP to implement load-balance, user can configure the load-balance mode according to the requirements. If the specific load-balance mode of the command line is different with the current load-balance mode, then modify the load-balance as the specific load-balance of command line; otherwise return a message to notice that the current mode is already configured.
- **Example:** Set load-balance mode.
- `Switch(config)#load-balance src-mac-ip`

6.7 port-group

- **Command:** `port-group <port-group-number>`
 - `no port-group <port-group-number>`
- **Function:** Creates a port group. The no command deletes that group.
- **Parameters:** `<port-group-number>` is the group number of a port channel from 1~128.
- **Default:** There is no port-group.
- **Command mode:** Global Mode
- **Example:** Creating a port group.
- `Switch(config)# port-group 1`
- Delete a port group.
- `Switch(config)#no port-group 1`

6.8 port-group mode

- **Command:** `port-group <port-group-number> mode {active | passive | on}`
 - `no port-group`
- **Function:** Add a physical port to port channel, the no operation removes specified port from the port channel.
- **Parameters:** `<port-group-number>` is the group number of port channel, from 1~128; **active** enables LACP on the port and sets it in Active mode; **passive** enables LACP on the

port and sets it in Passive mode; **on** forces the port to join a port channel without enabling LACP.

- **Command mode:** Port Mode.
- **Default:** Switch ports do not belong to a port channel by default; LACP not enabled by default.
- **Usage Guide:** If the specified port group does not exist, then print a error message. All ports in a port group must be added in the same mode, i.e., all ports use the mode used by the first port added. Adding a port in “on” mode is a “forced” action, which means the local end switch port aggregation does not rely on the information of the other end, port aggregation will succeed as long as all ports have consistent VLAN information. Adding a port in “active” or “passive” mode enables LACP. Ports of at least one end must be added in “active” mode, if ports of both ends are added in “passive” mode, the ports will never aggregate.
- **Example:** Under the Port Mode of Ethernet1/0/1, add current port to “port-group 1” in “active” mode.
- Switch(Config-If-Ethernet1/0/1)#port-group 1 mode active

6.9 show port-group

- **Command:** `show port-group [<port-group-number>] {brief | detail |}`
- **Function:** Display the specified group number or the configuration information of all port-channel which have been configured.
- **Parameters:** `<port-group-number>` is the group number of port channel to be displayed, from 1~128; **brief** displays summary information; **detail** displays detailed information.
- **Command mode:** All Configuration Mode.
- **Usage Guide:** If the user does not input port-group-number, that means the information of all the existent port-group are showed; if the port channel corresponds to port-group-number parameter and is not exist, then print a error message, otherwise display the current port-channel information of the specified group number.
- **Example:** 1. Display summary information for port-group 1.
- Switch#show port-group brief
- ID: port group number; Mode: port group mode such as on active or passive;
- Ports: different types of port number of a port group,
- the first is selected ports number, the second is standby ports number, and
- the third is unselected ports number.

- ID Mode Partner ID Ports Load-balance
- -----
- 1 active 0x8000,00-12-cf-4d-e1-a1 8,1,1 dst-src-mac
- 10 passive 0x8000,00-12-cf-4d-e1-b2 8,2,0 dst-src-ip
- 20 on 8,0,0 dst-src-mac-ip

- 2. Display the detailed information of port-group 1.
- Switch#show port-group 1 detail
- Flags: A -- LACP_Activity, B -- LACP_timeout, C -- Aggregation,
- D -- Synchronization, E -- Collecting, F -- Distributing,
- G -- Defaulted, H -- Expired

- Port-group number: 1, Mode: active, Load-balance: dst-src-mac
- Port-group detail information:

- System ID: 0x8000,00-03-0f-0c-16-6d

- Local:

- Port Status Priority Oper-Key Flag

- -----
- Ethernet1/0/1 Selected 32768 1 {ACDEF}
- Ethernet1/0/2 Selected 32768 1 {ACDEF}
- Ethernet1/0/3 Selected 32768 1 {ACDEF}
- Ethernet1/0/4 Selected 32768 1 {ACDEF}
- Ethernet1/0/5 Selected 32768 1 {ACDEF}
- Ethernet1/0/6 Selected 32768 1 {ACDEF}
- Ethernet1/0/7 Selected 32768 1 {ACDEF}
- Ethernet1/0/8 Selected 32768 1 {ACDEF}
- Ethernet1/0/20 Unselected 32768 1 {ACG}
- Ethernet1/0/23 Standby 32768 1 {AC}

- Remote:

- Actor Partner Priority Oper-Key SystemID Flag

- -----
- Ethernet1/0/1 1 32768 1 0x8000,00-03-0f-01-02-04 {CDEF}
- Ethernet1/0/2 2 32768 1 0x8000,00-03-0f-01-02-04 {CDEF}
- Ethernet1/0/3 3 32768 1 0x8000,00-03-0f-01-02-04 {CDEF}
- Ethernet1/0/4 4 32768 1 0x8000,00-03-0f-01-02-04 {CDEF}
- Ethernet1/0/5 5 32768 1 0x8000,00-03-0f-01-02-04 {CDEF}
- Ethernet1/0/6 6 32768 1 0x8000,00-03-0f-01-02-04 {CDEF}
- Ethernet1/0/7 7 32768 1 0x8000,00-03-0f-01-02-04 {CDEF}
- Ethernet1/0/8 8 32768 1 0x8000,00-03-0f-01-02-04 {CDEF}
- Ethernet1/0/23 23 32768 1 0x8000,00-03-0f-01-02-04 {C}

- Switch#

Chapter 7 COMMANDS FOR MTU

7.1 mtu

- **Command:** `mtu [<mtu-value>]`
 - `no mtu`
- **Function:** Enable the mtu receiving function. The no command restores to the normal frame range of 64--1518.
- **Parameter:** mtu-value: the MTU value of frames that can be received, in byte, ranging from <1500-9000>. The corresponding frame size is <1518/1522-9018/9022>. Without setting is parameter, the allowed max frame size is 9018/9022.
- **Default:** MTU function not enabled by default.
- **Command Mode:** Global Mode
- **Usage Guide:** Set switch of both ends mtu necessarily, or mtu frame will be dropped at the switch has not be set.
- **Example:** Enable the mtu function of the switch.
- `Switch(config)#mtu`

Chapter 8 COMMANDS FOR EFM OAM

8.1 clear ethernet-oam

- **Command:** clear ethernet-oam [interface {ethernet |} <IFNAME>]
- **Function:** Clear the statistic information of packets and link event on specific or all ports for OAM.
- **Parameters:** <IFNAME>, the name of the port needs to clear OAM statistic information
- **Command Mode:** Admin mode
- **Default:** N/A.
- **Usage Guide:** N/A.
- **Example:** Clear the statistic information of OAM packets and link event on all ports.
- Switch(config)#clear ethernet-oam

8.2 debug ethernet-oam error

- **Command:** debug ethernet-oam error [interface {ethernet |} <IFNAME>]
 - no debug ethernet-oam error [interface {ethernet |} <IFNAME>]
- **Function:** Enable the debugging of OAM error information, no command disables it.
- **Parameters:** <IFNAME>: name of the port that the debugging will be enabled or disabled.
- **Command Mode:** Admin mode
- **Default:** Disable.
- **Usage Guide:** N/A.
- **Example:** Enable the debugging of OAM error information for ethernet1/0/1.
- Switch#debug ethernet-oam error interface ethernet1/0/1

8.3 debug ethernet-oam fsm

- **Command:** debug ethernet-oam fsm {all | Discovery | Transmit} [interface {ethernet |} <IFNAME>]
 - no debug ethernet-oam fsm {all | Discovery | Transmit} [interface {ethernet |} <IFNAME>]
- **Function:** Enable the debugging of OAM state machine, no command disables it.
- **Parameters:** <IFNAME>: name of the port that the debugging will be enabled or disabled
- **Command Mode:** Admin mode
- **Default:** Disable.
- **Usage Guide:** N/A.
- **Example:** Enable the debugging of Discovery state machine for ethernet1/0/1.
- Switch#debug ethernet-oam fsm Discovery interface ethernet1/0/1.

8.4 debug ethernet-oam packet

- **Command:** `debug ethernet-oam packet [detail] {all | send | receive} [interface {ethernet | } <IFNAME>]`
 - `no debug ethernet-oam packet [detail] {all | send | receive} interface {ethernet | } <IFNAME>`
- **Function:** Enable the debugging of packets received or sent by OAM, no command disables the debugging.
- **Parameters:** <IFNAME>: name of the port that the debugging will be enabled or disabled
- **Command Mode:** Admin mode
- **Default:** Disable.
- **Usage Guide:** N/A.
- **Example:** Enable the debugging of packets received or sent for ethernet1/0/1.
- `Switch#debug ethernet-oam packet detail all interface ethernet1/0/1`

8.5 debug ethernet-oam timer

- **Command:** `debug ethernet-oam timer {all | pdu_timer | local_lost_link_timer} [interface {ethernet | } <IFNAME>]`
 - `no debug ethernet-oam timer {all | pdu_timer | local_lost_link_timer} [interface {ethernet | } <IFNAME>]`
- **Function:** Enable the debugging of refreshing information for specific or all timers, no this command disables the debugging.
- **Parameters:** <IFNAME>: name of the port that the debugging will be enabled or disabled
- **Command Mode:** Admin mode
- **Default:** Disable.
- **Usage Guide:** N/A.
- **Example:** Enable the debugging of refreshing information for all timers of ethernet1/0/1.
- `Switch#debug ethernet-oam timer all interface ethernet1/0/1`

8.6 ethernet-oam

- **Command:** `ethernet-oam`
 - `no ethernet-oam`
- **Function:** Enable ethernet-oam of ports, no command disables ethernet-oam of ports.
- **Parameters:** None.
- **Command Mode:** Port mode
- **Default:** Disable.
- **Usage Guide:** N/A.

- **Example:** Enable ethernet-oam of Ethernet 1/0/4.
- Switch(config)#interface ethernet 1/0/4
- Switch(Config-If-Ethernet1/0/4)#ethernet-oam

8.7 ethernet-oam errored-frame threshold high

- **Command:** ethernet-oam errored-frame threshold high {<high-frames> | none}
 - no ethernet-oam errored-frame threshold high
- **Function:** Configure the high threshold of errored frame event, no command restores the default value.
- **Parameters:** <high-frames>, the high detection threshold of errored frame event, ranging from 2 to 4294967295.
 - none, cancel the high threshold configuration.
- **Command Mode:** Port mode
- **Default:** none.
- **Usage Guide:** During the specific detection period, serious link event is induced if the number of errored frame is larger than or equal to the high threshold and the device notifies the peer by sending Information OAMPDU of which the value of Link Fault flag in Flags field is 1. Note that the high threshold can not be less than the low threshold.
- **Example:** Configure the high threshold of errored frame event on Ethernet 1/0/4 to be 3000.
- Switch(Config-If-Ethernet1/0/4)#ethernet-oam errored-frame threshold high 3000

8.8 ethernet-oam errored-frame threshold low

- **Command:** ethernet-oam errored-frame threshold low <low-frames>
 - no ethernet-oam errored-frame threshold low
- **Function:** Configure the low threshold of errored frame event, no command restores the default value.
- **Parameters:** <low-frames>, the low detection threshold of errored frame event, ranging from 1 to 4294967295.
- **Command Mode:** Port mode
- **Default:** 1.
- **Usage Guide:** During the specific detection period, errored frame event is induced if the number of errored frame is larger than or equal to the low threshold and the device notifies the peer by sending event notification OAMPDU. Note that the low threshold can not be larger than the high threshold.
- **Example:** Configure the low threshold of errored frame event on Ethernet 1/0/4 to 100.
- Switch(Config-If-Ethernet1/0/4)#ethernet-oam errored-frame threshold low 100

8.9 ethernet-oam errored-frame window

- **Command:** `ethernet-oam errored-frame window <seconds>`
 - `no ethernet-oam errored-frame window`
- **Function:** Configure the detection period of errored frame event, no command restores the default value.
- **Parameters:** `<seconds>` is the time for counting the specified frame number, its range from 5 to 300, unit is 200ms.
- **Command Mode:** Port mode
- **Default:** 5.
- **Usage Guide:** Detect the errored frame number of the port after the time of specific detection period. If the number of errored frame is larger than or equal to the threshold, bring the corresponding event and notify the peer through OAMPDU.
- **Example:** Configure the detection period of errored frame event on port1/0/4 to be 20s.
- `Switch(Config-If-Ethernet1/0/4)#ethernet-oam errored-frame window 100`

8.10 ethernet-oam errored-frame-period threshold high

- **Command:** `ethernet-oam errored-frame-period threshold high {<high-frames> | none}`
 - `no ethernet-oam errored-frame-period threshold high`
- **Function:** Configure the high threshold of errored frame period event, no command restores the default value.
- **Parameters:** `<high-frames>`, the high detection threshold of errored frame period event, ranging from 2 to 4294967295.
 - `none`, cancel the high threshold configuration.
- **Command Mode:** Port mode
- **Default:** none.
- **Usage Guide:** During the specific detection period, serious link event is induced if the number of errored frame is larger than or equal to the high threshold and the device notifies the peer by sending Information OAMPDU of which the value of Link Fault flag in Flags field is 1. Note that the high threshold can not be less than the low threshold.
- **Example:** Configure the high threshold of errored frame period event on port 1/0/4 to be 3000.
- `Switch(Config-If-Ethernet1/0/4)#ethernet-oam errored-frame-period threshold high 3000`

8.11 ethernet-oam errored-frame-period threshold low

- **Command:** `ethernet-oam errored-frame-period threshold low <low-frames>`
 - `no ethernet-oam errored-frame-period threshold low`

- **Function:** Configure the low threshold of errored frame period event, no command restores the default value.
- **Parameters:** *<low-frames>*, the low detection threshold of errored frame period event, ranging from 1 to 4294967295 frames.
- **Command Mode:** Port mode
- **Default:** 1.
- **Usage Guide:** During the specific detection period, errored frame period event is induced if the number of errored frame is larger than or equal to the low threshold and the device notifies the peer by event notification OAMPDU. Note that the low threshold should not be larger than the high threshold.
- **Example:** Configure the low threshold of errored frame period event on port 1/0/4 to be 100.
- Switch(Config-If-Ethernet1/0/4)#ethernet-oam errored-frame-period threshold low 100

8.12 ethernet-oam errored-frame-period window

- **Command:** ethernet-oam errored-frame-period window *<seconds>*
 - no ethernet-oam errored-frame-period window
- **Function:** Configure the detection period of errored frame period event, no command restores the default value.
- **Parameters:** *<seconds>* is the time for counting the specified frame number, its range from 1 to 300, unit is 200ms.
- **Command Mode:** Port mode
- **Default:** 5.
- **Usage Guide:** Detect errored frame of the port after the time of specific detection period. If the number of errored frame is larger than or equal to the threshold, corresponding event is induced and the device notifies the peer through OAMPDU. When sending the packets, the maximum number of frames is filled as the value of window in errored frame period event. The conversion rule is maximum number of frames= $\text{interface bandwidth} \times \text{detection period of errored frame period event(s)} \div (64 \times 8)$, of which the detection period is the number of seconds in window of the configuration.
- **Example:** Configure the detection period of errored frame period event on port 1/0/4 to be 10s.
- Switch(Config-If-Ethernet1/0/4)#ethernet-oam errored-frame-period window 50

8.13 ethernet-oam errored-frame-seconds threshold high

- **Command:** ethernet-oam errored-frame-seconds threshold high {*<high-seconds>* | none}
 - no ethernet-oam errored-frame-seconds threshold high

- **Function:** Configure the high threshold of errored frame seconds event, no command restores the default value.
- **Parameters:** *<high-seconds>*, the high detection threshold of errored frame seconds event, ranging from 2 to 65535 seconds.
 - **none**, cancel the high threshold configuration.
- **Command Mode:** Port mode
- **Default:** none.
- **Usage Guide:** During the specific detection period, serious link event is induced if the number of errored frame seconds is larger than or equal to the high threshold and the device notifies the peer by sending Information OAMPDU of which the value of Link Fault flag in Flags field is 1. Note that the high threshold should not be less than the low threshold. The definition of errored frame seconds is the second in which errored frame is received.
- **Example:** Configure the high threshold of errored frame seconds event on port 1/0/4 to be 3000.
- Switch(Config-If-Ethernet1/0/4)#ethernet-oam errored-frame-seconds threshold high 3000

8.14 ethernet-oam errored-frame-seconds threshold low

- **Command:** ethernet-oam errored-frame-seconds threshold low *<low-seconds>*
 - **no ethernet-oam errored-frame-seconds threshold low**
- **Function:** Configure the low threshold of errored frame seconds event, no command restores the default value.
- **Parameters:** *<low-seconds>*, the low detection threshold of errored frame seconds event, ranging from 1 to 65535 seconds.
- **Command Mode:** Port mode
- **Default:** 1.
- **Usage Guide:** During the specific detection period, errored frame seconds event is induced if the number of errored frame seconds is larger than or equal to the low threshold and the device notifies the peer by sending event notification OAMPDU. Note that the low threshold should not be larger than the high threshold. The definition of errored frame seconds is the second in which errored frame is received.
- **Example:** Configure the low threshold of errored frame seconds event on port 1/0/4 to be 100.
- Switch(Config-If-Ethernet1/0/4)#ethernet-oam errored-frame-seconds threshold low 100

8.15 ethernet-oam errored-frame-seconds window

- **Command:** ethernet-oam errored-frame-seconds window *<seconds>*
 - **no ethernet-oam errored-frame-seconds window**

- **Function:** Configure the detection period of errored frame seconds event, no command restores the default value.
- **Parameters:** *<seconds>* is the time for counting the specified frame number, its range from 50 to 450, unit is 200ms.
- **Command Mode:** Port mode
- **Default:** 300.
- **Usage Guide:** Detect errored frame seconds of the port after the time of specific detection period. If the number of errored frame seconds is larger than or equal to the threshold, corresponding event is induced and the device notified the peer through OAMPDU.
- **Example:** Configure the detection period of errored frame seconds event on port 1/0/4 to be 120s.
- Switch(Config-If-Ethernet1/0/4)#ethernet-oam errored-frame-seconds window 600

8.16 ethernet-oam errored-symbol-period threshold high

- **Command:** ethernet-oam errored-symbol-period threshold high {*<high-symbols>* | none}
 - no ethernet-oam errored-symbol-period threshold high
- **Function:** Configure the high threshold of errored symbol event, no command restores the default value.
- **Parameters:** *<high-symbols>*, the high detection threshold of errored symbol event, ranging from 2 to 18446744073709551615 symbols.
 - none, cancel the high threshold configuration.
- **Command Mode:** Port mode
- **Default:** none.
- **Usage Guide:** During the specific detection period, serious link event is induced if the number of errored symbols is larger than or equal to the high threshold and the device notifies the peer by sending Information OAMPDU of which the value of Link Fault flag in Flags field is 1. Note that the high threshold should not be less than the low threshold.
- **Example:** Set the high threshold of errored symbol event on port 1/0/4 to none.
- Switch(Config-If-Ethernet1/0/4)#ethernet-oam errored-symbol-period threshold high none

8.17 ethernet-oam errored-symbol-period threshold low

- **Command:** ethernet-oam errored-symbol-period threshold low *<low-symbols>*
 - no ethernet-oam errored-symbol-period threshold low
- **Function:** Configure the low threshold of errored symbol event, no command restores the default value.

- **Parameters:** *<low-symbols>*, the low threshold of errored symbol event, ranging from 1 to 18446744073709551615 symbols.
 - **none**, cancel the high threshold configuration.
- **Command Mode:** Port mode
- **Default:** 1.
- **Usage Guide:** During the specific detection period, errored symbol event is induced if the number of errored symbols is larger than or equal to the low threshold and the device notifies the peer by sending event notification OAMPDU. Note that the low threshold should not be larger than the high threshold.
- **Example:** Set the low threshold of errored symbol event on port 1/0/4 to be 5.
- Switch(Config-If-Ethernet1/0/4)#ethernet-oam errored-symbol-period threshold low 5

8.18 ethernet-oam errored-symbol-period window

- **Command:** ethernet-oam errored-symbol-period window *<seconds>*
 - **no ethernet-oam errored-symbol-period window**
- **Function:** Configure the detection period of errored symbol event, no command restores the default value.
- **Parameters:** *<seconds>* is the time for counting the specified frame number, its range from 5 to 300, unit is 200ms.
- **Command Mode:** Port mode
- **Default:** 5.
- **Usage Guide:** Detect errored symbols of the port after the time of specific detection period. If the number of errored symbols is larger than or equal to the threshold, corresponding event is induced and the device notified the peer through OAMPDU.
- **Example:** Set the detection period of errored symbol event on port 1/0/4 to be 2s.
- Switch(Config-If-Ethernet1/0/4)#ethernet-oam errored-symbol-period window 10

8.19 ethernet-oam link-monitor

- **Command:** ethernet-oam link-monitor
 - **no ethernet-oam link-monitor**
- **Function:** Enable link monitor, no command disables the function.
- **Parameters:** None.
- **Command Mode:** Port mode
- **Default:** Enable.
- **Usage Guide:** Enable OAM to monitor local link errors. Generally link monitor is enabled when enabling OAM function of the port. When OAM link monitor is disabled, although local link error is not monitored, Event information OAMPDU from the peer is still normally received and processed.
- **Example:** Enable the link monitor of port 1/0/4.
- Switch(Config-If-Ethernet1/0/4)#ethernet-oam link-monitor

8.20 ethernet-oam mode

- **Command:** `ethernet-oam mode {active | passive}`
 - **no ethernet-oam mode**
- **Function:** Configure the mode of OAM function, no command restores the default value.
- **Parameters:** **active**, active mode
 - **passive**, passive mode
- **Command Mode:** Port mode
- **Default:** active mode.
- **Usage Guide:** At least one of the two connected OAM entities should be configured to active mode. Once OAM is enabled, the working mode of OAM cannot be changed and you need to disable OAM function if you have to change the working mode.
- **Example:** Set the mode of OAM function on ethernet 1/0/4 to passive mode.
- `Switch(Config-If-Ethernet1/0/4)#ethernet-oam mode passive`

8.21 ethernet-oam period

- **Command:** `ethernet-oam period <seconds>`
 - **no ethernet-oam mode**
- **Function:** Configure the transmission period of Information OAMPDU, no command restores the default value.
- **Parameters:** `<seconds>`, sending period, ranging from 1 to 2 seconds.
- **Command Mode:** Port mode
- **Default:** 1s.
- **Usage Guide:** Use this command to configure the transmission interval of Information OAMPDU which keep OAM connection normally.
- **Example:** Set the transmission interval of Information OAMPDU for ethernet 1/0/4 to be 2s.
- `Switch(Config-If-Ethernet1/0/4)# ethernet-oam period 2`

8.22 ethernet-oam remote-failure

- **Command:** `ethernet-oam remote-failure`
 - **no ethernet-oam remote-failure**
- **Function:** Enable remote failure indication of OAM, no command disables the function.
- **Parameters:** None.
- **Command Mode:** Port mode
- **Default:** Enable.
- **Usage Guide:** With remote failure indication is enabled, if critical-event or link fault event is occurred locally, it will notify the peer by sending Information OAMPDU, log the fault information and send SNMP trap warning. When the remote failure indication

is disabled, although local critical-event or link fault event is not monitored, failure indication information from the peer is still normally received and processed.

- **Example:** Enable remote failure indication of ethernet 1/0/4.
- `Switch(Config-If-Ethernet1/0/4)#ethernet-oam remote-failure`

8.23 ethernet-oam remote-loopback

- **Command:** `ethernet-oam remote-loopback`
 - `no ethernet-oam remote-loopback`
- **Function:** Local OAM entity sends remote loopback request to enable the remote end to enter OAM loopback mode, no command disables remote loopback.
- **Parameters:** None.
- **Command Mode:** Port mode
- **Default:** Disable.
- **Usage Guide:** Only OAM entities working in active mode can launch remote loopback request but the ones in passive mode cannot. When remote OAM entities work in loopback mode, all packets except OAMPDU return to the local port according to the original paths (note that normal communication cannot be performed in OAM loopback mode.) and network administrators can detect link delay, jitter and throughput through remote loopback. Remote loopback can only be achieved after OAM connection is established and the loopback will be automatically cancelled if OAM connection is disconnected during the loopback process. This command is mutually exclusive with **ethernet-oam remote-loopback supported** command.
- **Example:** Enable remote OAM entity of ethernet 1/0/4 to enter remote loopback mode.
- `Switch(Config-If-Ethernet1/0/4)# ethernet-oam remote-loopback`
- Normal forwarding will be suspended during the remote-loopback, are you sure to start remote-loopback? [Y/N]

8.24 ethernet-oam remote-loopback supported

- **Command:** `ethernet-oam remote-loopback supported`
 - `no ethernet-oam remote-loopback supported`
- **Function:** Enable OAM loopback support of the port, no command disables it.
- **Parameters:** None.
- **Command Mode:** Port mode
- **Default:** Disable.
- **Usage Guide:** only ports with remote loopback support enabled can accept OAM loopback request and enter loopback mode. Therefore, make sure the remote end has configured loopback support when enabling it to enter OAM loopback. This command is mutually exclusive with **ethernet-oam remote-loopback** command.
- **Example:** Enable OAM loopback support of ethernet 1/0/4.

- Switch(Config-If-Ethernet1/0/4)#ethernet-oam remote-loopback supported

8.25 ethernet-oam timeout

- **Command:** ethernet-oam timeout <seconds>
 - no ethernet-oam timeout
- **Function:** Configure the timeout of OAM connection, no command restores the default value.
- **Parameters:** <seconds>, the timeout ranging from 5 to 10 seconds.
- **Command Mode:** Port mode
- **Default:** 5s.
- **Usage Guide:** OAM connection will be disconnected if no OAMPDU is received after specified timeout.
- **Example:** Set the timeout of OAM connection for ethernet 1/0/4 to be 6 seconds.
- Switch(Config-If-Ethernet1/0/4)#ethernet-oam timeout 6

8.26 show ethernet-oam

- **Command:** show ethernet-oam [{local | remote} interface {ethernet | } <IFNAME>]
- **Function:** Show Ethernet OAM connection of specified or all ports.
- **Parameters:** Overview information of all Ethernet OAM connections will be shown if no parameters is input
- **local**, show detailed information of local OAM connection
- **remote**, show detailed information of remote OAM connection
- <IFNAME>, the port that OAM connection information will be shown
- **Command Mode:** Admin mode
- **Default:** N/A.
- **Usage Guide:** N/A.
- **Example:** Show overview information of Ethernet OAM connection.
- Switch#show ethernet-oam
- Remote-Capability codes: L - Link Monitor, R - Remote Loopback
 - U - Unidirection, V - Variable Retrieval

Interface	Local-Mode	Local-Capability	Remote-MAC-Addr	Remote-Mode	Remote-Capability
1/0/1	active	L R	0003.0f02.2e5d	active	L R
1/0/2	active	L R	0003.0f19.3a3e	active	L R
1/0/4	active	L R	0003.0f26.480c	passive	L R
1/0/5	active	L R	0003.0f28.020a	active	L R

Field	Description
Interface	port with Ethernet OAM enabled
Local-Mode	Working mode of the local port OAM.
Local-Capability	Functions are supported by local port OAM L - Link Monitor, R - Remote Loopback U - Unidirection, V - Variable Retrieval
Remote-MAC-Addr	MAC address of the peer
Remote-Mode	OAM working mode of the peer
Remote-Capability	Functions are supported by OAM of the peer L - Link Monitor, R - Remote Loopback U - Unidirection, V - Variable Retrieval

- Show detailed information of local OAM entity for ethernet 1/0/2:
- Switch#show ethernet-oam local interface ethernet1/0/2
- Ethernet1/0/2 oam local Information:
- oam_status=enable
- local_mode=active
- period=1s
- timeout=8s
- Loopback Supported=YES
- Unidirectional Support=YES
- Link Events=YES
- Remote Failure=YES
- local_pdu=INFO
- local_mux_action=FWD
- local_par_action=DISCARD
- Max_OAMPDU_Size=1518
- -----
- OAM_local_flags_field:
- Link Fault=0 Dying Gasp=0 Critical Events=0
- -----

- Packet statistic:
- Packets Send Receive
- OAMPDU 553 21
- Information 552 21
- Event Notification 1 0
- Loopback Control 0 0
- -----

Field	Description
oam_status	Status of Ethernet OAM: enable, OAM is enabled; disable, OAM is not enabled.
local_mode	Working mode of Ethernet OAM: active, the port is set as active mode; passive, the port is set as passive mode.
Period	Transmission period of packets
Timeout	Timeout of connection
local_pdu	The way in which the local end processes Ethernet OAMPDU: RX_INFO, the port only receives Information OAMPDU and does not send any Ethernet OAMPDU. LF_INFO, the port only sends Information OAMPDU packets without Information TLV and with their link error flag bits being set. INFO, the port only sends and receives Information OAMPDU packets. ANY, the port sends and receives any OAMPDU packets.
local_mux_action	Working mode of the local transmitter: FWD, the port can send any packets; DISCARD, the port only sends OAMPDU packets and discards others.

local_par_action	Working mode of the local receiver in the following: FWD, receiving any packets is allowed; DISCARD, only OAMPDU packets is received while others are discarded; LB, OAM remote loopback is enabled on the port. In this case, all the packets except OAMPDU packets received are returned to their sources along the ways they come.
Loopback Supported	Whether support remote loopback: YES for support and NO for not.
Unidirectional Support	Whether support unidirectional transmission: YES for support and NO for not.
Link Events	Whether support general link events: YES for support and NO for not.
Remote Failure	Whether support severe link events (remote failure indication): YES for support and NO for not.
Link Fault	Whether occur a Link Fault event: 0 for no and 1 for yes.
Dying Gasp	Whether occur a Dying Gasp event: 0 for no and 1 for yes.
Critical Event	Whether occur a Critical Event: 0 for no and 1 for yes.
Max_OAMPDU_Size	The maximum length of OAMPDU is supported.
OAMPDU	Show the number of the OAMPDU packets sent and received which is the sum of three kinds of packets.
Information	Show the number of the Information OAMPDU packets sent and received
Event Notification	Show the number of the Event Notification OAMPDU packets sent and received
Loopback Control	Show the number of the Loopback Control OAMPDU packets sent and received

- Display detailed information of remote OAM entity for Ethernet 1/0/2
- Switch#show ethernet-oam remote interface ethernet1/0/2
- Ethernet1/0/2 oam remote Information:
- Remote_Mac_Address=0003.0f19.3a3e
- local_mode=active
- -----
- local_pdu=INFO
- local_mux_action=FWD
- local_par_action=DISCARD
- Loopback Supported=YES
- Unidirectional Support=NO
- Link Events=YES
- Remote Failure=YES
- Max_OAMPDU_Size=1518
- -----
- OAM Remote Flags Field:
- Link Fault=0 Dying Gasp=0 Critical Event=0

Field	Description
Remote_Mac_Address	MAC address of remote OAM entity
local_mode	Working mode of Ethernet OAM: active, the port is set as active mode; passive, the port is set as passive mode.
local_pdu	The way in which the local end processes Ethernet OAMPDU: RX_INFO, the port only receives Information OAMPDU and does not send any Ethernet OAMPDU. LF_INFO, the port only sends Information OAMPDU packets without Information TLV and with their link error flag bits being set. INFO, the port only sends and receives Information OAMPDU packets. ANY, the port sends and receives any OAMPDU packets.

local_mux_action	Working mode of the local transmitter: FWD, the port can send any packets; DISCARD, the port only sends OAMPDU packets and discards others.
local_par_action	Working mode of the local receiver in the following: FWD, receiving any packets is allowed; DISCARD, only OAMPDU packets is received while others are discarded; LB, OAM remote loopback is enabled on the port. In this case, all the packets except OAMPDU packets received are returned to their sources along the ways they come.
Loopback Supported	Whether support remote loopback: YES for support and NO for not.
Unidirectional Support	Whether support unidirectional transmission: YES for support and NO for not.
Link Events	Whether support general link events: YES for support and NO for not.
Remote Failure	Whether support severe link events: YES for support and NO for not.
Max_OAMPDU_Size	The maximum length of OAMPDU is supported.
Link Fault	Whether occur a Link Fault event: 0 for no and 1 for yes.
Dying Gasp	Whether occur a Dying Gasp event: 0 for no and 1 for yes.
Critical Event	Whether occur a Critical Event: 0 for no and 1 for yes.

8.27 show ethernet-oam events

- **Command:** `show ethernet-oam events {local | remote} [interface {ethernet } <IFNAME>]`
- **Function:** Shows the statistic information of link events on specified or all ports with OAM enabled, including general link events and severe link events.

- **Parameters:** **local**, show the detailed information of the local events;
 - **remote**, show the detailed information of the remote events;
 - **<IFNAME>**, the port that the statistic information of OAM link events needs to be shown, the statistic information of OAM link events for all ports will be shown if this parameter is not specified.
- **Command Mode:** Admin mode
- **Default:** N/A.
- **Usage Guide:** N/A.
- **Example:** Show the statistic information of link events on Ethernet 1/0/1.
- Switch#show ethernet-oam events local interface 1/0/1
- ethernet1/0/1 link-events:
- OAM_local_errored-symbol-period-events:
- -----
- event time stamp: 3539 errored symbol window(200ms): 5
- errored symbol low threshold: 1 errored symbol high threshold: none
- errored symbol: 1200120 errored running total: 2302512542
- event running total: 232

- OAM_local_errored-frame-period-events:
- -----
- event time stamp: 3539 errored frame window(200ms): 50
- errored frame low threshold: 1 errored frame high threshold: none
- errored frame: 1200120 errored running total: 2302512542
- event running total: 52

- OAM_local_errored-frame-events:
- -----
- event time stamp: 3539 errored frame window(200ms): 5
- errored frame low threshold: 1 errored frame high threshold: none
- errored frame: 1200120 errored running total: 2302512542
- event running total: 75

- OAM_local_errored-frame-seconds-summary-events:
- -----
- event time stamp: 3520 errored frame seconds summary window(200ms): 300
- errored frame low threshold: 1 errored frame high threshold: none
- errored frame: 1200120 errored running total: 2302512542
- event running total: 232

- OAM_local_link-fault: 0

- OAM_local_dying gasp: 0
- OAM_local_critical event: 0

Field	Description
OAM_local_errored-symbol-period-events	Statistic information of the local errored symbol events
OAM_local_errored-frame-period-events	Statistic information of the local errored frame period events
OAM_local_errored-frame-events	Statistic information of the local errored frame events
OAM_local_errored-frame-seconds-summary-events	Statistic information of the local errored frame seconds events
event time stamp	Time stamp of the event
window	Detection period of the event
low threshold	Low threshold of events detection
high threshold	High threshold of events detection
errored frame	the number of errored frames
errored symbol	the number of errored symbols
errored running total	Total number of errors occurred since the reset of OAM function
event running total	Total number of error events occurred since the reset of OAM function
OAM_local_link-fault	The number of the local link-fault faults

OAM_local_dying gasp	The number of the local dying-gasp faults
OAM_local_critical event	The number of the local critical-event faults

8.28 show ethernet-oam link-events configuration

- **Command:** `show ethernet-oam link-events configuration [interface {ethernet | } <IFNAME>]`
- **Function:** Show configuration of link events on specified or all ports with OAM enabled, including detection period and threshold of the events and so on.
- **Parameters:** `<IFNAME>`, the port that the statistic information of OAM link events needs to be shown, the statistic information of OAM link events for all ports will be shown if this parameter is not specified.
- **Command Mode:** Admin mode
- **Default:** N/A.
- **Usage Guide:** N/A.
- **Example:** Show configuration of link events on ethernet 1/0/1.
- Switch#show ethernet-oam link-events configuration interface ethernet 1/0/1
- Ethernet1/0/1 link-monitor configuration:
- event high-threshold low-threshold window(200ms)
- -----
- Err-symbol-Period none 1 2
- Err-frame-Period none 1 10
- Err-frame none 2 5
- Err-frame-second-summary none 2 600
- -----

Field	Description
Event	Event type
Err-symbol-Period	Errored symbol event
Err-frame-Period	Errored frame period event
Err-frame	Errored frame event

Err-frame-second-summary	Errored frame seconds event
high-threshold	High threshold
low-threshold	Low threshold
window(200ms)	Detection period, unit is 200ms

8.29 show ethernet-oam loopback status

- **Command:** `show ethernet-oam loopback status [interface {ethernet | } <IFNAME>]`
- **Function:** Show OAM loopback status of specified or all ports.
- **Parameters:** `<IFNAME>`, the port that OAM loopback status needs to be shown, OAM loopback status for all ports will be shown if this parameter is not specified.
- **Command Mode:** Admin mode
- **Default:** N/A.
- **Usage Guide:** N/A.
- **Example:** Show OAM loopback status of all ports.
- `Switch(config)#show ethernet-oam loopback status`
- OAM Loopback Status:
- ethernet 1/0/1: disable
- ethernet1/0/2: loopback_enable_waiting
- ethernet1/0/3: loopback_disable_waiting
- ethernet1/0/4: loopback_control
- ethernet1/0/5: loopback_underControl

Field	Description
Disable	OAM loopback support is not enabled
loopback_enable_waiting	The local side is the loopback control end with remote loopback request sent and is waiting for the confirmation packets
loopback_disable_waiting	The local side is the loopback control end with remote loopback cancellation request sent and is waiting for the confirmation packets
loopback_control	The local side is the loopback control end and is in the loopback process

loopback_undercontrol	The local side is the loopback control end and is in the loopback process
no_loopback	OAM loopback support is enabled but no loopback request is received

Chapter 9 COMMANDS FOR BPDU-TUNNEL

9.1 bpdu-tunnel dmac

- **Command:** `bpdu-tunnel dmac <mac>`
- **no bpdu-tunnel dmac**
- **Function:** Configure the tunnel MAC address globally, the no command restores the default tunnel MAC address.
- **Parameter:** `<mac>`: MAC address
- **Command Mode:** Global mode
- **Default:** Default MAC address.
- **Usage Guide:** Configure the tunnel MAC address globally, use the configured MAC (it must be multicast MAC address) to forward the specified protocol across the tunnel.
- **Example:** Configure the tunnel MAC address.
- `Switch(Config)# bpdu-tunnel dmac 01-02-03-04-05-06`

9.2 bpdu-tunnel stp

- **Command:** `bpdu-tunnel stp`
 - **no bpdu-tunnel stp**
- **Function:** Configure the specified port to forward stp packets across the tunnel, the no command cancels the operation.
- **Parameter:** None.
- **Command Mode:** Port mode
- **Default:** Port does not forward any protocol packets across the tunnel.
- **Usage Guide:** Disable stp function on the port before configuring this command.
- **Example:** Configure Ethernet 1/0/5 to forward stp packets across the tunnel.
- `Switch(Config)#in Ethernet 1/0/5`
- `Switch(Config-if-ethernet 1/0/5)#bpdu-tunnel stp`

9.3 bpdu-tunnel gvrp

- **Command:** `bpdu-tunnel gvrp`
 - **no bpdu-tunnel gvrp**
- **Function:** Configure the specified port to forward gvrp packets across the tunnel, the no command cancels the operation.
- **Parameter:** None.
- **Command Mode:** Port mode
- **Default:** Port does not forward any protocol packets across the tunnel.
- **Usage Guide:** Disable gvrp function on the port before configuring this command.
- **Example:** Configure Ethernet 1/0/5 to forward gvrp packets across the tunnel.

- Switch(Config)#in ethernet 1/0/5
- Switch(Config-if-ethernet 1/0/5)#bpdu-tunnel gvrp

9.4 bpdu-tunnel uldp

- **Command:** bpdu-tunnel uldp
 - no bpdu-tunnel uldp
- **Function:** Configure the specified port to forward uldp packets across the tunnel, the no command cancels the operation.
- **Parameter:** None.
- **Command Mode:** Port mode
- **Default:** Port does not forward any protocol packets across the tunnel.
- **Usage Guide:** Disable uldp function on the port before configuring this command.
- **Example:** Configure Ethernet 1/0/5 to forward uldp packets across the tunnel.
- Switch(Config)#in ethernet 1/0/5
- Switch(Config-if-ethernet 1/0/5)#bpdu-tunnel uldp

9.5 bpdu-tunnel lacp

- **Command:** bpdu-tunnel lacp
 - no bpdu-tunnel lacp
- **Function:** Configure the specified port to forward lacp packets across the tunnel, the no command cancels the operation.
- **Parameter:** None.
- **Command Mode:** Port mode
- **Default:** Port does not forward any protocol packets across the tunnel.
- **Usage Guide:** Disable lacp function on the port before configuring this command.
- **Example:** Configure Ethernet 1/0/5 to forward lacp packets across the tunnel.
- Switch(Config)#in ethernet 1/0/5
- Switch(Config-if-ethernet 1/0/5)#bpdu-tunnel lacp

9.6 bpdu-tunnel dot1x

- **Command:** bpdu-tunnel dot1x
 - no bpdu-tunnel dot1x
- **Function:** Configure the specified port to forward dot1x packets across the tunnel, the no command cancels the operation.
- **Parameter:** None.
- **Command Mode:** Port mode
- **Default:** Port does not forward any protocol packets across the tunnel.
- **Usage Guide:** Disable dot1x function on the port before configuring this command.
- **Example:** Configure Ethernet 1/0/5 to forward dot1x packets across the tunnel.

- Switch(Config)#in ethernet 1/0/5
- Switch(Config-if-ethernet 1/0/5)#bpdu-tunnel dot1x

Chapter 10 COMMANDS FOR LLDP-MED

10.1 civic location

- **Command:** `civic location {dhcp server | switch | endpointDev} <country-code>`
- **no civic location**
- **Function:** Configure device type and country code of the location with Civic Address LCI format and enter Civic Address LCI address mode. The no command cancels all configurations of the location with Civic Address LCI format.
- **Parameters:** dhcp server: Set device type to be DHCP server
- **?** switch: Set device type to be Switch
- **?** endpointDev: Set device type to be LLDP-MED Endpoint
- **?** country-code: Set country code which consist of 2 letters, such as DE or US, it should accord the country code of ISO 3166 standard.
- **Default:** No location with Civic Address LCI format is configured on the port.
- **Command Mode:** Port mode
- **Usage Guide:** Configure device type and country code of the location with Civic Address LCI format and enter Civic Address LCI address mode to configure the more detailed location.
- **Example:** Configure device type as switch and country code as US for the location with Civic Address LCI format on Ethernet 19.
- `Switch(Config-If-Ethernet1/0/19)# civic location switch US`
- `Switch(Med-Civic)#`

10.2 {description-language | province-state | city | county | street | locationNum | location | floor | room | postal | otherInfo}

- **Command:** `{description-language | province-state | city | county | street | locationNum | location | floor | room | postal | otherInfo} <address>`
 - **no {description-language | province-state | city | county | street | locationNum | location | floor | room | postal | otherInfo}**
- **Function:** Configure the detailed location after enter Civic Address LCI address mode of the port.
- **Parameters:** description-language: language for describing location, such as 'English'
 - province-state: state, canton, region, province prefecture, and so on, such as 'clara'
 - city: city, such as 'New York'
 - county: county, parish, such as 'santa clara'
 - street: street, such as '1301 Shoreway Road'
 - locationNum: house number, such as '9'
 - location: name and occupant of a location, such as 'Carrillo's Holiday Market'

- floor: floor number, such as '13'
- room: room number, such as '1308'
- postal: postal/zip code, such as '10027-1234'
- otherInfo: Additional location information, such as 'South Wing'
- address: detailed address information, it cannot exceed 250 characters
- **Default:** No detailed information of the location with Civic Address LCI is configured on the port.
- **Command Mode:** Civic Address LCI address mode
- **Usage Guide:** With this command, configure the detailed information of the location with Civic Address LCI on the port, it is able to configure 10 kinds of address types at most.
- **Example:** Configure the detailed location information in Civic Address LCI address mode.
- Switch(Med-Civic)# city Beijing
- Switch(Med-Civic)# street shangdi

10.3 ecs location

- **Command:** `ecs location <tel-number>`
 - **no ecs location**
- **Function:** Configure the location with ECS ELIN format on the port, the no command cancels the configured location.
- **Parameter:** `<tel-number>`: location characters with ECS ELIN format, such as emergent telephone number, it is character string with the length between 10 and 25.
- **Default:** No location with ECS ELIN format is configured.
- **Command Mode:** Port mode
- **Usage Guide:** Length range of the location character string between 10 and 25 with ECS ELIN format.
- **Example:** Configure the location of ECS ELIN format on port 19.
- Switch(Config-If-Ethernet1/0/19)# ecs location 880-445-3381

10.4 lldp med fast count

- **Command:** `lldp med fast count <value>`
 - **no lldp med fast count**
- **Function:** When the fast LLDP-MED startup mechanism is enabled, it needs to fast send LLDP packets with LLDP-MED TLV, this command sets the value of sending the packets fast, the no command restores the default value.
- **Parameter:** value: The number of sending the packets fast, its range from 1 to 10, unit is entries.
- **Default:** 4.
- **Command Mode:** Global mode

- **Usage Guide:** With this command, set the number for sending the packets fast.
- **Example:**
- Switch(config)#lldp med fast count 5

10.5 lldp med trap

- **Command:** lldp med trap {enable | disable}
- **Function:** Configure the specified port to enable or disable the function for sending TRAP message when LLDP-MED network topology is changed.
- **Parameters:** enable: Enable LLDP-MED TRAP for the port
 - disable: Disable LLDP-MED TRAP for the port
- **Default:** Disable LLDP-MED TRAP.
- **Command Mode:** Port mode
- **Usage Guide:** Enable or disable LLDP-MED TRAP of the port.
- **Example:** Enable LLDP-MED TRAP of the port 19.
- Switch(Config-If-Ethernet1/0/19)# lldp med trap enable

10.6 lldp transmit med tlv all

- **Command:** lldp transmit med tlv all
 - no lldp transmit med tlv all
- **Function:** Configure the specified port to send all LLDP-MED TLVs, the no command disables the function.
- **Parameter:** None.
- **Default:** Port does not enable the function for Sending LLDP-MED TLV.
- **Command Mode:** Port mode
- **Usage Guide:** After configuring this command, if the port is able to send LLDP-MED TLV, the sent LLDP packets with LLDP-MED TLV supported by all switches. However, LLDP packets sent by the port without any LLDP-MED TLV after the switch configured the corresponding no command.
- **Example:** Port 19 enables the function for sending LLDP-MED TLV.
- Switch(Config-If-Ethernet1/0/19)# lldp transmit med tlv all

10.7 lldp transmit med tlv capability

- **Command:** lldp transmit med tlv capability
 - no lldp transmit med tlv capability
- **Function:** Configure the specified port to send LLDP-MED Capability TLV. The no command disables the capability.
- **Parameter:** None.
- **Default:** The function is disabled for sending LLDP-MED Capability TLV.
- **Command Mode:** Port mode

- **Usage Guide:** After configuring this command, if the port is able to send LLDP-MED TLV, the sent LLDP packets with LLDP-MED Capability TLV. However, LLDP packets sent by the port without LLDP-MED Capability TLV after the switch configured the corresponding no command. Note: LLDP-MED Capability TLV is the important LLDP-MED TLV, if do not configure the port to send LLDP-MED Capability TLV firstly, other LLDP-MED TLV will not be sent.
- **Example:** Port 19 enables the function for sending LLDP-MED Capability TLV.
- Switch(Config-If-Ethernet1/0/19)# lldp transmit med tlv capability

10.8 lldp transmit med tlv extendPoe

- **Command:** lldp transmit med tlv extendPoe
- **no lldp transmit med tlv extendPoe**
- **Function:** Configure the specified port to send LLDP-MED Extended Power-Via-MDI TLV. The no command disables the capability.
- **Parameter:** None.
- **Default:** The function is disabled for sending LLDP-MED Extended Power-Via-MDI TLV.
- **Command Mode:** Port mode
- **Usage Guide:** After configuring this command, if the port is able to send LLDP-MED TLV, LLDP packets with LLDP-MED Extended Power-Via-MDI TLV sent by the port. However, LLDP packets without LLDP-MED Extended Power-Via-MDI TLV sent by the port after the switch configured the corresponding no command. Note: LLDP-MED Capability TLV sent by the port must be configured before sending LLDP-MED Extended Power-Via-MDI TLV, or else the configuration cannot be successful. If the device does not support PoE or PoE function of the port is disabled, although configuring this command, LLDP-MED Extended Power-Via-MDI TLV will not be sent.
- **Example:** Port 19 enables the function for sending LLDP-MED Extended Power-Via-MDI TLV.
- Switch(Config-If-Ethernet1/0/19)# lldp transmit med tlv extendPoe

10.9 lldp transmit med tlv inventory

- **Command:** lldp transmit med tlv inventory
 - **no lldp transmit med tlv inventory**
- **Function:** Configure the specified port to send LLDP-MED Inventory Management TLVs aggregation, TLVs aggregation includes 7 TLVs, they are Hardware Revision TLV, Firmware Revision TLV, Software Revision TLV, Serial Number TLV, Manufacturer Name TLV, Model Name TLV, Asset ID TLV. The no command disables the capability.
- **Parameter:** None.
- **Default:** The function is disabled for sending LLDP-MED Inventory Management TLVs.
- **Command Mode:** Port mode

- **Usage Guide:** After configuring this command, if the port is able to send LLDP-MED TLV, LLDP packets with LLDP-MED Inventory Management TLVs sent by the port. However, LLDP packets without LLDP-MED Inventory Management TLVs sent by the port after the switch configured the corresponding no command. Note: LLDP-MED Capability TLV sent by the port must be configured before sending LLDP-MED Inventory Management TLVs, or else the configuration cannot be successful.
- **Example:** Port 19 enables the function for sending LLDP-MED Inventory Management TLVs.
- Switch(Config-If-Ethernet1/0/19)# lldp transmit med tlv inventory

10.10 lldp transmit med tlv networkPolicy

- **Command:** lldp transmit med tlv networkPolicy
 - no lldp transmit med tlv networkPolicy
- **Function:** Configure the specified port to send LLDP-MED Network Policy TLV. The no command disables the capability.
- **Parameter:** None.
- **Default:** The function is disabled for sending LLDP-MED Network Policy TLV.
- **Command Mode:** Port mode
- **Usage Guide:** After configuring this command, if the port is able to send LLDP-MED TLV, LLDP packets with LLDP-MED Network Policy TLV sent by the port. However, LLDP packets without LLDP-MED Network Policy TLV sent by the port after the switch configured the corresponding no command. Note: LLDP-MED Capability TLV sent by the port must be configured before sending LLDP-MED Network Policy TLV, or else the configuration cannot be successful.
- **Example:** Port 19 enables the function for sending LLDP-MED Network Policy TLV.
- Switch(Config-If-Ethernet1/0/19)# lldp transmit med tlv networkPolicy

10.11 network policy

- **Command:** network policy {voice | voice-signaling | guest-voice | guest-voice-signaling | softphone-voice | video-conferencing | streaming-video | video-signaling} [status {enable | disable}] [tag {tagged | untagged}] [vid {<vlan-id> | dot1p}] [cos <cos-value>] [dscp <dscp-value>]
 - no network policy {voice | voice-signaling | guest-voice | guest-voice-signaling | softphone-voice | video-conferencing | streaming- video | video-signaling}
- **Function:** Configure the network policy of the port, including VLAN ID, the supported application (such as voice and video), the application priority and the used policy, and so on.

- **Parameters:** voice, voice-signaling, guest-voice, guest-voice-signaling, softphone-voice, video-conferencing, streaming-video and video-signaling: the application types are supported by the port.
 - status: Whether the network policy is usable.
 - enable: Network Policy of the specified application type has been defined, enable is the default value of the network policy.
 - disable: Network Policy of the specified application type is unknown, the fields (such as VLAN ID, L2 priority and DSCP) are ignored, network connection device will not send TLV of the specified application type.
 - tag: Configure the specified application to uses **tagged** or **untagged** VLAN method.
 - tagged: Configure the flow of the specified application to use the tagged vlan method, here, the fields (such as VLAN ID, Layer2 priority and DSCP value) are take effect.
 - untagged: Configure the flow without tag for the specified application, the fields (such as VLAN ID, Layer2 priority) are ignored, only DSCP value field takes effect. Untagged is the default value of VLAN method.
 - vid: Configure VLAN ID that the specified application belongs to. When the peer sends the flow of the specified application, it will tag the notified VLAN ID, or else the vlan-id value is 1.
 - vlan-id: Configure the value of VLAN ID, its range from 1 to 4094.
 - dot1p: Configure the specified application to tag the flow by using 802.1p priority, at the same time, use vlan 0 to load the flow.
 - cos: Configure the priority of Ethernet frame for VLAN.
 - cos-value: Configure the value of Ethernet frame priority for VLAN, its range from 0 to 7, the default value is 5.
 - dscp: Configure DSCP of VLAN.
 - dscp-value: DSCP value input by the user, its range from 0 to 63, the default value is 46.
- **Default:** No network policy is configured on the port.
- **Command Mode:** Port mode
- **Usage Guide:** User is able to configure the network policy of many kinds on a port, but their application types cannot repeat, and a kind of network policy corresponds to a LLDP-MED network policy TLV. If user configures multi-policy for a port, it will send multi-LLDP-MED network policy TLV to a LLDP packet. If user does not configure any network policy, no LLDP-MED network policy TLV is sent to LLDP packet.
- **Example:** Configure the network policy with the application type of voice on port 19.
- Switch(Config-If-Ethernet1/0/19)# network policy voice tag tagged vid 2 cos 6 dscp 23

10.12 show lldp

- **Command:** show lldp
- **Function:** Show the global LLDP and LLDP-MED configuration.

- **Parameter:** None.
- **Default:** None.
- **Command Mode:** Admin mode
- **Usage Guide:** None.
- **Example:** Show the global LLDP and LLDP-MED configuration.
- Switch#show lldp
- -----LLDP GLOBAL INFORMATIONS-----
- LLDP has been enabled globally.
- LLDP enabled port : Ethernet1/0/19
- LLDP interval :5
- LLDP txTTL :20
- LLDP NotificationInterval :5
- LLDP txDelay :1
- LLDP-MED FastStart Repeat Count :4
- -----END-----

10.13 show lldp [interface ethernet <IFNAME>]

- **Command:** show lldp [interface ethernet <IFNAME>]
- **Function:** Show LLDP and LLDP-MED configurations on the current port.
- **Parameter:** [interface ethernet <IFNAME>]: Port name
- **Command Mode:** Admin mode
- **Default:** None.
- **Usage Guide:** None.
- **Example:** Show LLDP and LLDP-MED configuration of the port 19.
- Switch#show lldp interface ethernet 1/0/19

- Port name :Ethernet1/0/19
- LLDP Agent Adminstatus : Both
- LLDP Operation TLV : default
- LLDP Trap Status : disable
- LLDP maxRemote :100
- LLDP Overflow handle : discard
- LLDP interface remote status : Free

- MED Optional TLV : capabilities networkPolicy location power inventory
- MED Trap Status:Enable
- MED TLV Transmit Status:Disable
- MED Fast Transmit Status:Disable

10.14 show lldp neighbors

- **Command:** show lldp neighbors [interface ethernet <IFNAME>]
 - **Function:** Show LLDP and LLDP-MED information of the neighbors for the port.
 - **Parameter:** None.
 - **Default:** None.
 - **Command Mode:** Admin mode
 - **Usage Guide:** With this command, checking LLDP and LLDP-MED information of the neighbors after the port received LLDP packets sent by the neighbors.
 - **Example:** Show the neighbor information on port 1.
 - Switch #show lldp neighbors interface ethernet 1/0/1
-
- Port name : Ethernet1/0/1
 - Port Remote Counter : 1
 - TimeMark :20
 - ChassisIdSubtype :4
 - ChassisId :00-03-0f-00-00-02
 - PortIdSubtype :Local
 - PortId :3
 - PortDesc :Ethernet1/0/1
 - SysName :switch
 - SysDesc :switch Device, Compiled Feb 12 17:39:53 2011
 - SoftWare Version 6.2.30.0
 - BootRom Version 4.0.1
 - HardWare Version
 - Device serial number
 - Copyright (C) 2001-2011 by Vendor.
 - All rights reserved

Chapter 11 COMMANDS FOR PORT SECURITY

11.1 clear port-security

- **Command:** `clear port-security {all | configured | dynamic | sticky} [[address <mac-addr> | interface <interface-id>] [vlan <vlan-id>]]`
- **Function:** Clear the secure MAC entries for the interfaces.
- **Parameter: all:** All secure MAC entries on the interfaces
 - **configured:** The configured secure MAC
 - **dynamic:** The dynamic secure MAC learnt by the interface
 - **sticky:** The secure MAC of sticky
 - **mac-addr:** The specified secure MAC address
 - **interface-id:** The secure MAC entries of the specified interface
 - **vlan-id:** The specified VLAN
- **Default:** None.
- **Command Mode:** Admin mode
- **Usage Guide:** None.
- **Example:** Clear all secure MACs on the interface.
- `Switch#clear port-security all`

11.2 show port-security

- **Command:** `show port-security [interface <interface-id>] [address | vlan]`
- **Function:** Show port-security configuration.
- **Parameter: interface-id:** Show port-security configuration of the interface.
 - **address:** Show the secure address of the interface.
 - **vlan:** Show the maximum number of each VLAN configured on trunk/hybrid interface.
- **Default:** None.
- **Command Mode:** Any modes
- **Usage Guide:** None.
- **Example:** Show all secure MACs on the interfaces.
- `Switch# show port-security address interface ethernet 1/0/1`

11.3 switchport port-security

- **Command:** `switchport port-security`
 - `no switchport port-security`
- **Function:** Configure port-security function for the interface, the no command disables port-security.
- **Parameter:** None.

- **Default:** Disable.
- **Command Mode:** Port mode
- **Usage Guide:** Clear all dynamic MACs after the interface enabled port-security, and all MACs learnt from the interfaces are tagged with FDB_TYPE_PORT_SECURITY_DYNAMIC. After disabling port-security of the interfaces, clear all secure MACs or change them into the dynamic MACs.
- **Example:** Enable port-security on the interface.
- Switch(config-if- ethernet1/0/1)#switchport port-security

11.4 switchport port-security aging

- **Command:** `switchport port-security aging {static | time <value> | type {absolute | inactivity}}`
 - `no switchport port-security violation aging {static | time | type}`
- **Function:** Enable the aging entries of port-security, and specify the aging time and type on the interface.
- **Parameter: static:** Enable the aging of the static MAC address configured on the specified interface.
 - **time <value>:** Specify MAC aging time of the interface, its range from 1 to 1440mins. The default value is 0, that means disable the aging.
 - **type:** Specify the aging type
 - **absolute:** The expiration of the aging timer on the interface, all secure MACs of the interfaces will get aged and be removed from the MAC table.
 - **inactivity:** The expiration of the aging timer on the interface, the entries will get aged without the traffic, the entries are still kept in the aging period with the traffic.
- **Default:** Do not enable port-security aging, the default aging time is 0.
- Aging mode is absolute by default.
- The static entries are not aged by default.
- **Command Mode:** Port mode
- **Usage Guide:** None.
- **Example:** Configure the aging time of the secure MAC as 1 second on the interface.
- Switch (config-if- ethernet1/0/1)# switchport port-security aging time 1

11.5 switchport port-security mac-address

- **Command:** `switchport port-security mac-address <mac-address> [vlan <vlan-id>]`
 - `no switchport port-security mac-address <mac-address> [vlan <vlan-id>]`
- **Function:** Configure the static secure MAC on the interface, the no command cancels the configuration.

- **Parameter: mac-address:** Configure the specified MAC address as the static secure MAC.
 - **vlan-id:** The specified VLAN of the MAC address, it only takes effect on trunk and hybrid interfaces.
- **Default:** No secure MAC is bound by the interface.
- **Command Mode:** Port mode
- **Usage Guide:** When configuring the static secure MAC, pay attention to the number of the current secure MAC whether exceed the maximum MAC limit allowed by the interface. If exceeding the maximum MAC limit, it will result in violation operation.
- **Example:** Configure the secure MAC address on the interface.
- Switch (config-if- ethernet1/0/1)# switchport port-security mac-address 00-00-00-00-00-01

11.6 switchport port-security mac-address sticky

- **Command: switchport port-security mac-address sticky [mac-address] [vlan <vlan-id>]**
 - **no switchport port-security mac-address sticky [mac-address] [vlan <vlan-id>]**
- **Function:** Configure the static secure MAC with the sticky type on the interface, the no command cancels the configured secure MAC.
- **Parameter: mac-address:** Configure the specified MAC address as the static secure MAC with the sticky type.
 - **vlan-id:** The specified VLAN of the MAC address, it only takes effect on trunk and hybrid interfaces.
- **Default:** No secure MAC is bound by the interface with the sticky type.
- **Command Mode:** Port mode
- **Usage Guide:** When configuring the static secure MAC with sticky type, pay attention to the number of the current secure MAC whether exceed the maximum MAC limit allowed by the interface. If exceeding the maximum MAC limit, it will result in violation operation.
- **Example:** Configure the secure MAC address on the interface.
- Switch(config-if-ethernet1/0/1)#switchport port-security mac-address sticky 00-00-00-00-00-01

11.7 switchport port-security maximum

- **Command: switchport port-security maximum <value> [vlan <vlan-list>]**
 - **no switchport port-security maximum <value> [vlan <vlan-list>]**
- **Function:** Configure the maximum number of the secure MAC allowed by the interface, if specifying VLAN parameter, it means the maximum number in the configured VLANs. The no command cancels the maximum number of the secure MAC configured by the interface.

- **Parameter: value:** Configure the maximum number of the secure MAC allowed by the interface, its range between 1 and 128. It is determined by the maximum MAC number of the device.
 - **vlan-id:** Configure the maximum value for the specified VLAN, it only takes effect on trunk and hybrid interfaces.
- **Default:** After enabling port-security, if there is no other configuration, the maximum number of the secure MAC is 1 on the interface. The interface number in VLAN is no limit by default
- **Command Mode:** Port mode
- **Usage Guide:** Pay attention to the coupling relation about the number between the interface and VLAN, set the maximum number configured by the interface as the standard firstly.
- **Example:** Configure the maximum number of the secure MAC on the interface.
- Switch(config-if- ethernet1/0/1)# switchport port-security maximum 100

11.8 switchport port-security violation

- **Command:** `switchport port-security violation {protect | restrict | shutdown}`
 - **no switchport port-security violation**
- **Function:** When exceeding the maximum number of the configured MAC addresses, MAC address accessing the interface does not belongs to this interface in MAC address table or a MAC address is configured to several interfaces in same VLAN, both of them will violate the security of the MAC address.
- **Parameter:** protect: Protect mode, it will trigger the action that do not learn the new MAC, drop the package and do not send the warning.
 - restrict: Restrict mode, it will trigger the action that do not learn the new MAC, drop the package, send snmp trap and record the configuration in syslog.
 - shutdown: Shutdown mode is the default mode. Under this condition, the interface is disabled directly, send snmp trap and record the configuration in syslog.
- **Default:** Shutdown.
- **Command Mode:** Port mode
- **Usage Guide:** None.
- **Example:** Configure violation mode as protect for the interface.
- Switch(config-if-ethernet1/0/1)#switchport port-security violation protect

Chapter 12 COMMANDS FOR DDM

12.1 clear transceiver threshold-violation

- **Command:** clear transceiver threshold-violation [interface ethernet <interface-list>]
- **Function:** Clear the threshold violation of the transceiver monitoring.
- **Parameter:** interface ethernet <interface-list>: The interface list that the threshold violation of the transceiver monitoring needs to be cleared.
- **Command Mode:** Admin mode
- **Default:** None.
- **Usage Guide:** None.
- **Example:** Clear the threshold violation of the transceiver monitoring on port 21, 25, 26, 28.
- Switch#clear transceiver threshold-violation interface ethernet 1/0/21;25-26;28

12.2 debug transceiver

- **Command:** debug transceiver {on | off}
- **Function:** Enable/disable DDM debugging.
- **Parameter:** on/off: Enable or disable the debugging.
- **Command Mode:** Admin mode
- **Default:** Off.
- **Usage Guide:** Disable the DDM debugging with ctrl+o.
- **Example:** Enable DDM debugging.
- Switch#debug transceiver on

12.3 show transceiver

- **Command:** show transceiver [interface ethernet <interface-list>] [detail]
- **Function:** Show the monitoring of the transceiver.
- **Parameter:** interface ethernet <interface-list>: The interface list that the monitoring of the transceiver needs to be shown.
- **detail:** Show the detailed monitoring of the transceiver.
- **Command Mode:** User mode, admin mode and global mode
- **Default:** None.
- **Usage Guide:** Temperature can be accurate to the integer, other values can be accurate to the second bit after the radix point. When the parameter exceeds the warning threshold, it is shown with 'W+' or 'W-', when the parameter exceeds the alarm threshold, it is shown with 'A+' or 'A-', no tagged parameter is normal.
- **Example:** Show the brief DDM information of all ports.
- Switch#show transceiver

- Interface Temp (°C) Voltage (V) Bias (mA) RX Power (dBm) TX Power (dBm)
- 1/0/21 33 3.31 6.11 -30.54(A-) -6.01
- 1/0/23 33 5.00 (W+) 6.11 -20.54(W-) -6.02

12.4 show transceiver threshold-violation

- **Command:** show transceiver threshold-violation [interface ethernet <interface-list>]
- **Function:** Show the transceiver monitoring.
- **Parameter:** interface ethernet <interface-list>: The interface list that the transceiver monitoring needs to be shown.
- **Command Mode:** Admin mode and global mode
- **Default:** None.
- **Usage Guide:** None.
- **Example:** Show the transceiver monitoring.
- Switch(config)#show transceiver threshold-violation interface ethernet 1/0/21-22
- Ethernet 1/0/21 transceiver threshold-violation information:
- Transceiver monitor is enabled. Monitor interval is set to 30 minutes.
- The current time is Jan 02 12:30:50 2010.
- The last threshold-violation time is Jan 01 1:30:50 2010.
- Brief alarm information:
- RX loss of signal
- RX power low
- Detail diagnostic and threshold information:
 - Diagnostic
 - Threshold
- Realtime Value High Alarm Low Alarm High Warn Low Warn
- -----
- Temperature (°C) 33 70 0 70 0
- Voltage (V) 7.31 10.00 0.00 5.00 0.00
- Bias current (mA) 3.11 10.30 0.00 5.00 0.00
- RX Power (dBm) -30.54(A-) 9.00 -25.00 (-34) 9.00 -25.00
- TX Power (dBm) -1.01 9.00 -12.05 9.00 -10.00
- Ethernet 1/0/22 transceiver threshold-violation information:
- Transceiver monitor is disabled. Monitor interval is set to 30 minutes.
- The last threshold-violation doesn't exist.

12.5 transceiver-monitoring

- **Command:** transceiver-monitoring {enable | disable}
- **Function:** Enable/ disable the transceiver monitoring.

- **Parameter: enable/ disable:** Enable or disable the function.
- **Command Mode:** Port mode
- **Default:** Disable.
- **Usage Guide:** None.
- **Example:** Enable the transceiver monitoring of ethernet1/0/1.
- Switch(config-if-ethernet1/0/1)#transceiver-monitoring enable

12.6 transceiver-monitoring interval

- **Command:** transceiver-monitoring interval <minutes>
- **no transceiver-monitoring interval**
- **Function:** Set the interval of the transceiver monitoring. The no command sets the interval to be the default interval of 15 minutes.
- **Parameter: <minutes>:** The interval of the transceiver monitoring needs to be set.
- **Command Mode:** Global mode
- **Default:** 15 minutes.
- **Usage Guide:** None.
- **Example:** Set the interval of the transceiver monitoring as 1 minute.
- Switch(config)#transceiver-monitoring interval 1

12.7 transceiver threshold

- **Command:** transceiver threshold {default | {temperature | voltage | bias | rx-power | tx-power} {high-alarm | low-alarm | high-warn | low-warn} {<value> | default}}
- **Function:** Set the threshold defined by the user.
- **Parameters: default:** Restore the threshold as the default threshold set by the manufacturer. If the monitoring index is not specified, restore all thresholds, if the monitoring index is specified, restore the corresponding threshold only.
 - **temperature:** The monitoring index—temperature
 - **voltage:** The monitoring index—voltage
 - **bias:** The monitoring index—bias current
 - **rx-power:** The monitoring index—receiving power
 - **tx-power:** The monitoring index—sending power
 - **high-alarm:** High-alarm of the monitoring index, namely there is alarm with A+ if exceeding the threshold.
 - **low-alarm:** Low-alarm of the monitoring index, namely there is alarm with A- if exceeding the threshold.
 - **high-warn:** High-warn of the monitoring index, namely there is warning with W+ if exceeding the threshold.
 - **low-warn:** Low-warn of the monitoring index, namely there is warning with W- if exceeding the threshold.
- **Command Mode:** Port mode

- **Default:** The threshold is set by the manufacturer.
- **Usage Guide:** The range of the threshold parameters is shown for each monitoring index in the following:
 - Temperature: -128.00~128.00 °C
 - Voltage: 0.00~7.00 V
 - Bias current: 0.00~140.00 mA
 - x-power: -50.00~9.00 dBm
 - tx-power: -50.00~9.00 dBm
- The maximum length of the threshold parameter configured by the user is 20 bits. After the user configured a parameter threshold, the threshold set by the manufacturer will be labeled with the bracket when showing the threshold, and decide whether give an alarm according to the user's configuration.
- **Example:** Configure tx-power threshold of the fiber module, the low-warn threshold is configured as -12 on ethernet1/0/1.
- Switch(config-if-ethernet1/0/1)#transceiver threshold tx-power low-warning -12