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GPON OLT-121

CLI UserGuide

Command line format conventions

Format	Meaning
Bold type	The command-line keywords (the same portion of the command excluding parameters and optional parameters replaced by actual values) are written in bold.
italic type	The command line parameter (the part of the command that must be replaced by actual values) is represented in italics.
[ ]	It means that the section enclosed with "[ ]" is optional when the command is configured.
(x - y)	Represents a numerical value in the selected range.
< x | y | ... >	Indicates selecting one from two or more options.
[x | y | ...]	Indicates one or out of two or more options.
{ x | y | ... } *1	Select multiple options from two or more options, one less, and all more options.

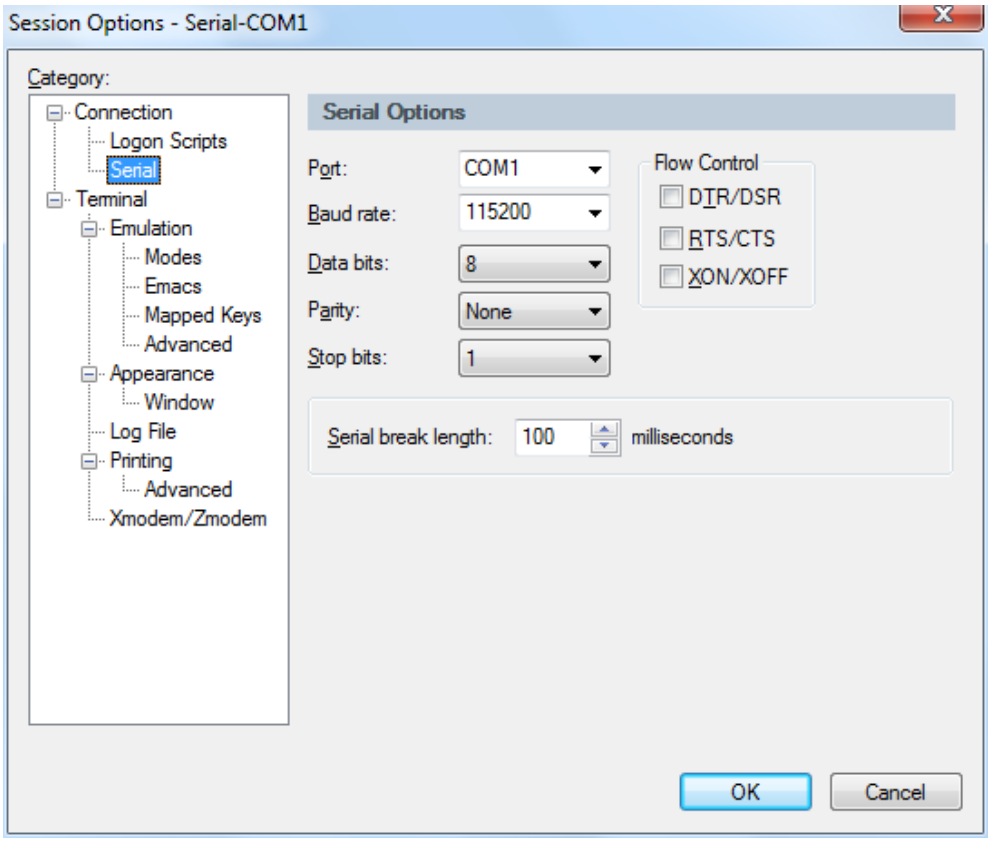
Example:
Bold type: gpon-olt(config)# **show running-config**
italic type: gpon-olt(config-aux)# **ip address** *A.B.C.D net-mask*
[ ]: gpon-olt(config)#**show pon statistics** [brief]
(x - y): gpon-olt(config)#**show vlan** (1-4094)
< x | y | ... >:
gpon-olt(config)#**erase** <web-logo|web-logo1|web-logo2|web-logo3>
[x | y | ...]:
gpon-olt(config)#**show idprom interface gpon** <*S/P*> [<vendor|manufacture>]
{ x | y | ... } *1:
gpon-olt(config)#**clear syslog** {[level]
[debug|info|notice|warning|major|critical|alert|emerg]}

CONTENTS

1. Access OLT

You can access OLT by CLI (Command Line Interface) via console cable or telnet. This chapter introduces how to access OLT CLI via console cable.

1. Connect PC serial port or USB-to-Serial port to OLT console port by console cable.
2. Run secureCRT or other simulation tools such as Putty in the PC, and set parameters as follows.
   - Baudrate: 115200
   - Data bits: 8
   - Parity: none
   - Stop bits: 1
   - Follow control: none



COM port properties

After turned on the power, there is boot information printing. After startup, press enter and input username and password to login.

Notice: *The default account is admin/Xpon@Olt9417#. For example,*

Login: **admin**
Password: **Xpon@Olt9417#**
gpon-olt> **enable**
Password: **Xpon@Olt9417#**
gpon-olt#

Input commands to configure or check device's status. Input "?" any time you need

help.
This document will introduce each command begin at next chapter.

2. Command Line Interface

2.1 Abstract

GPON OLT provides command line interface for configuration and management. The following is its specialties.

- Configure from console port.
- Input "?" any time you need help.
- Provide network test command, such as ping, for diagnosing connection.
- Provide FTP service for uploading and downloading files.
- Provide Doskey analogous function, you can execute a history command.
- Support ambiguous keywords searching, you just need to input unconflicted keywords and press "tab" or "?".

2.2 CLI Configuration Mode

GPON OLT provides three configuration modes.

- Privileged mode
- Global configuration mode
- Interface configuration mode

The following table shows specialties, commands to enter and prompts.

CLI mode	Specialty	Prompt	Command to enter	Command to exit
Privileged mode	Show configurations and execute system commands	gpon-olt#	/	**exit**
Global configuration mode	Configure system parameters	gpon-olt (config)#	**configure terminal**	**exit**
Interface configuration mode	Configure interface parameters	gpon-olt (config-if)#	**interface** *interface_type slot/port*	**exit**

2.3 CLI Characteristic

2.3.1 Online Help

GPON OLT CLI provides the following online help:

- Completely help
- Partly help

You can get some help information of CLI with the help above.

(1) Input "?" to get all commands and illustrations at any configuration mode.

```
gpon-olt(config)#
  access-list                    Access list entry
  acl                            Add an access list entry.
  alarm                          Specify alarm.
  alarm-event                    Specify alarm and event.
  allow-external-route-update    Allow FRR routes to be overwritten by external
processes
  arp                            Specify arp.
  auto-copy                      Auto copy configuration
  auto-upgrade                   Auto upgrade of ONU.
  bfd                            Configure BFD peers
  clean                          Clean system information.
  clear                          Clear system information.
  debug                          Debugging functions
  dhcp-relay                     Dhcp relay configure.
  dhcp-server                    Dhcp server group configuration
  dhcp-snooping                  Dhcp snooping configure.
  domainname                     Set system's domain name
  download                       Download file for software upgrade or load
user config.
  dst                            Set DST(Before using DST, please
configure commands to enable ntp server.)
  duid                           DHCP Unique Identifier
  enable                         Modify enable password parameters
  end                            End current mode and change to enable
mode
  erase                          Erase info from flash.
  event                          Specify event.
  evpn                           EVPN
  exec                           exec cmd
  exit                           Exit current mode and down to previous
mode
  fan                            Specify olt fan management.
  find                           Find CLI command matching a regular
```

expression
  fpm Forwarding Plane Manager configuration
  frr FRRouting global parameters
  gpon gpon.
  hostname Set system's network name
  interface Select an interface to configure
  ip System ip configuration.
  ip-dscp Configure egress ip dscp.
  ipv6 IPv6 Information
  key Authentication key management
  line Configure a terminal line
  list Print command list
  log Logging control
  log-filter Filter Logs
  login-access-list Login-access list entry.
  loopback Error detection on loopback
  mac MAC address
  monitor Configure SPAN mirroring.
  mpls MPLS information
  nexthop-group Nexthop Group configuration
  no Negate a command or set its defaults
  ntp Configure NTP
  onu Specify onu information.
  onu-schedule-reboot Schedule Reboot ONU task.
  output Direct vtysh output to file
  p2p Specify p2p feature.
  password Modify the terminal connection password
  ping Send echo messages
  profile Select profile to configure.
  pseudowire Static pseudowire configuration
  queue-scheduler Configure qos functionality.
  quit Exit current mode and down to previous mode
  reboot Reboot the switch.
  remote remote server config
  remove Negate a command or set its defaults
  rogue-onu-ctrl Rogue onu control.
  rogue-onu-detect Config rogue onu detection
  route-map Create route-map or enter route-map command mode
  router Enable a routing process
  router-id Manually set the router-id
  save Save system information.
  service Set up miscellaneous service

```
  set                                Set system configuration.
  show                               Show running system information
  snmp                               Snmp server config
  snmp-server                        Snmp server config
  software                           Software information.
  spanning-tree                      Config STPD information.
  ssh                                ssh server config
  sshd                               SSH Configuration interface
  syslog                             Specific system log save level, which syslog
level not less than level will save to flash.
  telnet                             Telnet Configuration interface
  terminal                           Set terminal line parameters
  time                               Specify system time configuration.
  timezone                           Set Time Zone.
  upgrade                            Specify upgrade system.
  upload                             Upload file for software or user config.
  user                               User
  vlan                               Vlan commands.Please input vlan ID you
want to create.
  vni                                VNI corresponding to the DEFAULT VRF
  vrf                                Select a VRF to configure
  web                                Specify web.
  write                              Write running configuration to memory,
network, or terminal
  zebra                              Zebra information
```

(2) Input "?" behind a command, it will display all key words and illustrations when this site should be a key word.

```
 gpon-olt(config)# interface
   gigabitEthernet    GigabitEthernet IEEE 802.3z.
   gpon               Specify gpon module.
   loopback           Config loopback interface
   vlan               Config vlan information.
   wan                System wan configuration.
```

(3) Input "?" behind a command, it will display description of parameters when this site should be a parameter.

```
 gpon-olt(config)# acl
   (1-7999)     Rule index.
   disable      Don't activate the entry.
   effective    Effective period.
   enable       Make entry active.
   ipv6         IPv6 access list.
```

(4) Input a character string end with "?", it will display all key words that Begin at this character string.

```
gpon-olt(config)# e
   enable    Modify enable password parameters
   end       End current mode and change to enable mode
   erase     Erase info from flash.
   event     Specify event.
   evpn      EVPN
   exec      exec cmd
   exit      Exit current mode and down to previous mode
```

(5) Input a command and a character string end with "?", it will display all key words Begin at this character sring.

```
gpon-olt (config)# show ver
   version    show version command.
```

(6) Input a character string end with "Tab", it will display completely key words that Begin at this character string when it is unique.

When the command is unique, the command is automatically fully completed:

```
gpon-olt(config)# g
gpon-olt(config)# gpon
```

If not unique, all commands that can be completed are displayed:

```
gpon-olt(config)# u
upgrade    upload      user
```

2.3.2 Display Characteristic

GPON OLT CLI provides the following display characteristic. There is a pause when the information displays a whole screen at a time. Users have two ways to choose.

Operation	function
Input <Ctrl+C>	Stop displaying and executing.
Input any key	Continue displaying next screen

2.3.3 History Commands

CLI provides Doskey analogous function. It can save history commands that executed before. Users can use direction key to invoke history command. The device can save at most ten commands.

Operation	action	result
Display history commands	**history**	Display all history commands.
Visit previous	Up direction key "↑" or	Display previous command

command	<Ctrl+P>	if there is early history command.
Visit next command	Down direction key "↓" or <Ctrl+N>	Display next command if there is later history command.

2.3.4 Error Messages

Every command will be executed if it passes syntax check. Otherwise it will come out error message. The following table shows some frequent errors.

Error messages	Reasons
Unknown command	No this command
	No this key word
	Parameter type error
	Parameter out of range
Command incomplete	Command is not complete
Too many parameters	Too many parameters
Ambiguous command	Command is ambiguous

2.3.5 Edit Characteristic

CLI provides basic edit function. Every command supports maximum 256 characters. The following table shows how to edit.

operation	function
Generally input	Insert character at cursor position and move cursor to right if edit buffer has enough space.
Backspace key	Delete the character in front of cursor.
Left direction key ← or <Ctrl+B>	Cursor moves one character position towards the left.
Right direction key → or <Ctrl+F>	Cursor moves one character position towards the right.
Up direction key↑or <Ctrl+P> Down direction key↓or <Ctrl+N>	Display history command.
Tab key	Input incomplete key words end with Tab key, CLI will provide partly help. If it is unique, the key word which matches what you input will be used and display in another row. If it should be parameter, or the key word is mismatched or matched but not unique, CLI will use what you input and display in another row.

3. OLT Management Configuration

3.1 Configure Inband Management

3.1.1 In-band Management IPv4 Address

This device provides inband management which can be managed from uplink port. Begin at privileged configuration mode, configure inband management IP address and mask as the following table shows.

	Command	**Function**
Step 1	**config terminal**	Enter global configuration mode.
Step 2	**vlan** *vlan_id*	Create VLAN.
Step 3	**exit**	Exit to global configuration mode.
Step 4	**interface vlan** *vlan_id*	Enter VLAN interface configuration mode. *vlan_id* range is 1－4094.
Step 5a	**ip address** *A.B.C.D net-mask*	Configure IP address and mask.
Step 5b	**no ip address** *A.B.C.D*	Delete IP address and mask.
Step 6	**exit**	Exit to global configuration mode.
Step 7	**show vlan** [*vlan_id*]	Show VLAN information.
Step 8	**write**	Save configurations.

3.1.2 In-band Management IPv6 Address

	Command	**Function**
Step 1	**config terminal**	Enter global configuration mode.
Step 2	**vlan** *vlan_id*	Create VLAN.
Step 3	**exit**	Exit to global configuration mode.

Step 4	**interface vlan** *vlan_id*	Enter VLAN interface configuration mode. *vlan_id* range is 1－4094.
Step 5a	**ipv6 address** *X:X::X:X/M* [eui-64]	Configure IPv6 address and prefix.
Step 5b	**no ipv6 address** [*X:X::X:X/M* [eui-64]]	Delete IPv6 address and mask.
Step 6	**exit**	Exit to global configuration mode.
Step 7	**show vlan** [*vlan_id*]	Show VLAN information.
Step 8	**write**	Save configurations.

3.2 Configure Management Gateway

3.2.1 Configure And Manage IPv4 Gateway

When OLT management IP and management server are not in the same network segment, it needs to configure a gateway.
Begin at privileged configuration mode, configure management gateway as the following table shows.

	Command	**Function**
Step 1	**config terminal**	Enter global configuration mode.
Step 2	**ip gateway** *A.B.C.D*	Configure management gateway.
Step 3	**no ip gateway**	Delete management gateway.
Step 4	**show ip gateway**	Show management gateway configuration.
Step 5	**write**	Save configurations.

3.2.2 Configure And Manage IPv6 Gateway

	Command	**Function**
Step 1	**config terminal**	Enter global configuration mode.

Step 2	**ipv6 gateway** *X:X::X:X* [**vlan** *vlan_id*]	Configure management IPv6 gateway.
Step 3	**no ipv6 gateway**	Delete management IPv6 gateway.
Step 4	**show ipv6 gateway**	Show management gateway configuration.
Step 5	**write**	Save configurations.

3.3 Configure DNS

3.3.1 Configure IPv4 DNS

It can configure two IPv4 DNS servers.

	Command	**Function**
Step 1	**config terminal**	Enter global configuration mode.
Step 2	**ip dns** *A.B.C.D [A.B.C.D]*	Configure DNS
Step 3	**show ip dns**	Show management gateway.
Step 4	**write**	Save configurations.

4. Port Configuration

4.1 Port Configuration

4.1.1 Enter Port Configuration Mode

Begin at privileged configuration mode, input the following commands to enter port configuration mode.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.

4.1.2 Enable/Disable Port

You can use these commands to enable or disable port. The ports are enabled by default. If you want a port not to transfer data, you can shutdown it.
Begin at privileged configuration mode, enable or disable ports as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**no shutdown**	Enable port
Step 3b	**shutdown**	Disable port.
Step 4	**exit**	Exit to gloable configuration mode.
Step 5	**show interface** *interface_type slot/port*	Show interface configurations.
Step 6	**write**	Save configurations.

4.1.3 Configure Port Description

This command is used to configure port description. There is no description by

default.
Begin at privileged configuration mode, configure port description as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**description** *string*	Configure port description.
Step 3b	**no description**	Delete description.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show interface** *interface_type slot/port*	Show interface configurations.
Step 6	**write**	Save configurations.

4.1.4 Configure Port Speed

When port speed mode is auto, the actual speed of port is determined by the automated negotiation result with opposite port. The speed is auto by default.
Begin at privileged configuration mode, configure port speed as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3	**speed** < 10 | 100 | 1000 | 10000|auto >	Configure port speed.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show interface** *interface_type slot/port*	Show interface configurations.
Step 6	**write**	Save configurations.

4.1.5 Configure Port Rate Limitation

Begin at privileged configuration mode, configure port rate limitation as the following table shows.

Command	**Function**

Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**line-rate** <ingress | egress> **bps** *value*	Configure port rate limitation. Value range: 64-1000000, it should be integral multiple of 64kbps.
Step 3b	**no line-rate** <ingress | egress>	Delete port rate limitation configurations.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show interface** *interface_type slot/port*	Show interface configurations.
Step6	**write**	Save configurations.

4.1.6 Configure Port VLAN Mode

Each port has three VLAN mode, access, trunk and hybrid.
Access mode is usually used for port that connects with PC or other terminals, only one VLAN can be set up. Trunk mode is usually used for port that connects with switch; one or more VLAN can be set up. Hybrid mode can be used for port that connects with PC or switch. Default VLAN mode is hybrid.
Begin at privileged configuration mode, configure port VLAN mode as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**switchport mode** < access | trunk | hybrid>	Configure port VLAN mode.
Step 3b	**no switchport** < access | trunk | hybrid> **vlan** *vlan_id*	Reset VLAN mode to default.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show interface** *interface_type slot/port*	Show interface configurations.
Step 6	**write**	Save configurations.

Notice:
All VLAN configurations will lose when you change port VLAN mode.

4.1.7 Configure Hybrid Port VLAN

Hybrid port can belong to several VLAN. It can be used to connect with switch or router, and also terminal host.
Begin at privileged configuration mode, configure hybrid port VLAN as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**switchport hybrid vlan** *vlan_id* <tagged | untagged>	Add specific VLAN to hybrid port.
Step 3b	**no switchport hybrid vlan** *vlan_id*	Remove VLAN from port.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show interface** *interface_type slot/port*	Show interface configurations.
Step 6	**write**	Save configurations.

Notice:
You must configure PVID for the port that if it is configured untagged mode. PVID is the same as VLAN ID. Please refer to 4.1.9.

4.1.8 Configure Trunk Port VLAN

Trunk mode port can belong to several VLAN. It is usually used to connect with switches routers.
Begin at privileged configuration mode, configure trunk port VLAN as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration
Step 2	**interface** *interface_type slot/port*	Enter interface configuration
Step 3a	**switchport trunk vlan** *vlan_id*	Add specific VLAN to trunk port. VLAN mode is tagged.
Step 3b	**no switchport trunk vlan** *vlan_id*	Remove VLAN from port.
Step 5	**exit**	Exit to global configuration mode.
Step 6	**show interface** *interface_type slot/port*	Show interface configurations.

Step 7	**write**	Save configurations.

Notice:
If PVID of trunk mode port is the same as VLAN ID, the VLAN will add to the port as untagged mode.

4.1.9 Configure Port PVID

Only under hybrid mode and trunk mode can set up PVID.
Begin at privileged configuration mode. Configure port PVID as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**switchport** <hybrid|trunk> **pvid vlan** *vlan_id*	Configure hybrid mode or trunk mode port PVID.
Step 3b	**switchport** <hybrid|trunk> **pvid vlan 1**	Reset hybrid or trunk port PVID to default 1.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show interface** *interface_type slot/port*	Show interface configurations.
Step 6	**write**	Save configurations.

4.1.10 Configure Access Port VLAN

Only one untagged mode VLAN can be set to access port. Port's PVID is the same as VLAN ID.
Begin at privileged configuration mode, configure access port VLAN as the thable shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**switchport access vlan** *vlan_id*	Configure access port VLAN.
Step 3b	**no switchport access vlan** *vlan_id*	Delete access port VLAN

Step 4	**exit**	Exit to global configuration mode.
Step 5	**show interface** *interface_type slot/port*	Show interface configurations.
Step 6	**write**	Save configurations.

4.1.11 Configure Port Flow Control

Begin at privileged configuration mode, configure port flow control as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**flowcontrol on**	Enable flow control function.
Step 3b	**flowcontrol off**	Disable flow control function.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show interface** *interface_type slot/port*	Show interface configurations.
Step 6	**write**	Save configurations.

4.1.12 Configure Port Broadcast Suppression

Begin at privileged configuration mode, configure port broadcast suppression as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**storm-control broadcast bps** *value*	Configure broadcast suppression. Value range: 64-13000, it should be integral multiple of 64kbps.
Step 3b	**no storm-control broadcast**	Remove broadcast suppression.
Step 4	**exit**	Exit global configuration mode.

Step 5	**show interface** *interface_type slot/port*	Show interface configurations.
Step 6	**write**	Save configurations.

4.1.13 Configure Port Unknown Unicast Suppression

Begin at privileged configuration mode, configure port unknown unicast suppression as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**storm-control unknow bps** *value*	Configure unknown unicast suppression. Value range: 64-1000000, it should be integral multiple of 64kbps.
Step 3b	**no storm-control unknow**	Remove unknown unicast suppression.
Step 4	**exit**	Exit global configuration mode.
Step 5	**show interface** *interface_type slot/port*	Show interface configurations.
Step 6	**write**	Save configurations.

4.1.14 Configure Port Isolation

With this function, customers can add ports to a same isolation group so that these ports can be isolated among L2 and L3 steams. This will improve security of network and provide flexible networking scheme.
Begin at privileged configuration mode, configure port isolation as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.

Step 3a	**switchport isolate**	Add port to isolation group.
Step 3b	**no switchport isolate**	Remove port from isolation group.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show interface** *interface_type slot/port*	Show interface configurations.
Step 6	**write**	Save configurations.

4.1.15 Configure Port Loopback

Begin at privileged configuration mode, configure port loopback as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**loopback detect enable**	Enable port loopback detection.
Step 2b	**no loopback detect**	Disable port loopback detection.
Step 3	**show loopback detect**	Show port loopback detection status.
Step 4	**exit**	Exit to global configuration mode.

4.1.16 Show Port Statistics

Begin at privileged configuration mode, show port statistics as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3	**show statistics**	Show port statistics.
Step 4	**exit**	Exit to global configuration mode.

4.1.17 Clean Port Statistics

Begin at privileged configuration mode, clean port statistics as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**show statistics**	Show port statistics.
Step 3	**clean statistics**	Clean port statistics.

4.1.18 Show Interface Configurations

Operation	**Command**
Show interface configurations.	**show interface** *interface_type slot/port*

In the system, interface gigabitethernet 0/1~0/x stands for uplink port 1~x. Interface gpon0/1 stands for GPON port 1.For example, display configurations of uplink port 1.

```
gpon-olt(config)# show int gigabitethernet 0/1
  Interface gigabitEthernet 0/1's information.

      GigabitEthernet0/1 current state : up
      Description:
      Hardware Type is Gigabit Ethernet, Hardware address is 0:0:0:0:0:0
      The Maximum Transmit Unit is 1500
      Media type is twisted pair, loopback not set
      Link speed type: autonegotiation,          Link duplex type: autonegotiation
      Current link state: Up
      Current autonegotiation mode: enable
      Current link speed: 100Mbps,    Current link mode: full-duplex
      Inter Packet Gap: 0 ns(null)        Flow Control: disable
      jumboframe :disable          The Maximum Frame Length is 1536
      Broadcast storm control: 1496 Kbps
      Multicast storm control: disable
      Unknow unicast storm control: 1496 Kbps
      Ingress line rate control: no limit
      Egress line rate control: no limit
      mac address learn state : enable, no limit
      Port priority: 0
      Port combo mode: null
```

Isolate member : no
Port link-type: hybrid
PVID: 1
Untagged VLAN ID: 1
Tagged VLAN ID : 3000 100
Last 300 seconds input: 0 packets/sec Last 300 seconds output: 0 packet s/sec
Input(total): 27 packets, 1887 bytes
1 broadcasts, 0 multicast
Input(normal): 27 packets, 0 bytes
0 broadcasts, 0 multicast, 0 pauses
Input: 0 input errors, 0 runts, 0 giants, 0 throttles, 0 CRC
0 overruns, 0 aborts, 0 ignored, 0 parity errors
Output(total): 118 packets, 7691 bytes
20 broadcasts, 93 multicast
Output(normal): 118 packets, 0 bytes
20 broadcasts, 93 multicast, 0 pauses
Output: 0 output errors, 0 underruns, 0 buffer failures
0 aborts, 0 deferred, 0 collisions, 0 late collisions
0 lost carrier, 0 no carrier

4.1.19 Show Optical Module Parameters

Optical module parameters include transmit optical power, receive optical power, temperature, voltage, and bias current. These 5 parameters determine whether the optical module can work normally. Any of these exceptions can result in lost packets. begin at the privileged configuration mode, the port optical module parameters are displayed, as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**show gigabitethernet optical transceiver**	Show the information of the optical uplink port 3.
Step 3	**interface gpon 0/1**	Enter interface configuration mode.
Step 4	**show pon optical transceiver**	Show the information of the optical gpon port.

4.2 Example

Configure VLAN and broadcast suppression of trunk mode port.

1.Requirement

Uplink port 1 of OLT connects to switch, port mode is trunk. It can pass through VLAN 20 and VLAN 100, add VLAN tag 123 to untagged streams. Rate of broadcast streams is 64bps.

2.Framework

3.Steps

(1)Enter interface configuration mode.

gpon-olt (config)# interface gigabitethernet 0/1

gpon-olt (config-if-ge0/1) #

(2)Configure port mode and add VLAN

gpon-olt (config-if-ge0/1) # switchport mode trunk

gpon-olt (config-if-ge0/1) # switchport trunk vlan 20

gpon-olt (config-if-ge0/1) # switchport trunk vlan 100

PS. The VLAN must be added first. Please refer to 5.1.1.

(3)Configure port PVID

gpon-olt (config-if-ge0/1) # switchport trunk pvid vlan 123

(4)Configure port broadcast suppression

gpon-olt (config-if-ge0/1) # storm-control broadcast bps 64

5. VLAN Configuration

5.1 VLAN Configuration

VLAN configuration mainly contains:

- Create/delete VLAN
- Configure/delete VLAN description
- Configure/delete IP address and mask of VLAN

5.1.1 Create/Delete VLAN

Begin at privileged configuration mode, create or delete VLAN as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**vlan** *vlan_id*	Create VLAN or enter VLAN interface configuration mode. VLAN ID range is from 1 to 4094.
Step 2b	**no vlan** *vlan_id*	Delete specific VLAN.
Step 3	**exit**	Exit to global configuration mode.
Step 4a	**show vlan** *vlan_id*	Show VLAN configurations. Choosing *vlan_id* means display information of specific VLAN.
Step 4b	**show vlan**	Show information of all existed VLAN.
Step 5	**write**	Save configurations.

5.1.2 Configure/Delete VLAN Description

Begin at privileged configuration mode, configure or delete VLAN description as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**vlan** *vlan_id*	Create VLAN or enter VLAN configuration mode. VLAN ID range is from 1 to 4094.

Step 3a	**description** *string*	Configure VLAN description.
Step 3b	**no description**	Delete VLAN description.
Step 4	**exit**	Exit to bloble configuration mode.
Step 5	**show vlan** *vlan_id*	Show VLAN interface information.
Step 6	**write**	Save configurations.

Notice:
By default, VLAN description is VLAN ID, such as " vlan 1".

5.1.3 Configure/Delete IP Address And Mask of VLAN

Begin at privileged configuration mode, configure or delete IP address and mask of VLAN as the following table shows.

	Command	**Function**
Step 1	**config terminal**	Enter global configuration mode.
Step 2	**interface vlan** *vlan_id*	Enter VLAN interface configuration mode. VLAN ID range is from 1 to 4094.
Step 3a	**ip address** *A.B.C.D net-mask*	Configure IP address and mask of VLAN.
Step 3b	**no ip address**	Delete IP address and mask of VLAN.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show vlan** *vlan_id*	Show VLAN information.
Step 6	**write**	Save configurations.

5.2 Show VLAN Information

Input the following commands to Show VLAN information and port members.

Operation	Command
Show VLAN information	**show vlan**
Show VLAN port members	**show vlan** *vlan-id*

Example:
Show VLAN 3000 port members
gpon-olt(config)# show vlan 3000

Vlan ID : 3000

Name : vlan_3000
IPv6 Address :
Link-Local address:
fe80::6e68:a4ff:fe21:a68
Mac Address : 6c:68:a4:21:0a:68
Tagged Ports : ge0/1

Untagged Ports :

Notice:
By default, It have one vlan on system ,do not delete and edit.

Vlan ID : 1
Name : vlan_1
IP Address : 192.168.1.1/24
IPv6 Address :
Link-Local address:
fe80::6e68:a4ff:fe21:a68
Mac Address : 6c:68:a4:21:0a:68
Tagged Ports :

Untagged Ports : ge0/1 ge0/2 ge0/3

6. VLAN Translation/QinQ

6.1 Configure VLAN Translation/QinQ

Begin at privileged configuration mode, configure VLAN translation/QinQ as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**dot1q-tunnel vlan-mapping** (1-4094) <any|(0-7)> (1-4094) <any|(0-7)> <db-tagged|one-tagged>	Configure VLAN translation/QinQ. db-tag means QinQ. one-tag means translation.
Step 3b	**no dot1q-tunnel vlan-mapping** (1-4094) (1-4094)	Delete VLAN translation/QinQ.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show vlan dot1q-tunnel vlan-mapping**	Show VLAN translation/QinQ configurations.
Step 6	**write**	Save configurations.

6.2 Example

(1)VLAN Translation

Configure GE1 VLAN translation function, CVLAN is 100, priority is 1, and translated VLAN is 200, priority is 2.

```
gpon-olt (config)# interface gigabitethernet 0/1
gpon-olt (config-if)#switchport hybrid vlan 100 tagged
gpon-olt (config-if)#switchport hybrid vlan 200 tagged
gpon-olt(config-if)#dot1q-tunnel vlan-mapping 100 1 200 2 one-tagged
gpon-olt (config)#show vlan dot1q-tunnel vlan-mapping
```

(2)QinQ function

Configure GE2 QinQ function, CVLAN is 300, priority is 3, and SVLAN is 400, priority is 4.

```
gpon-olt (config)# interface gigabitethernet 0/2
```

```
gpon-olt (config-if)#switchport hybrid vlan 300 tagged
gpon-olt (config-if)#switchport hybrid vlan 400 tagged
gpon-olt (config-if)#dot1q-tunnel vlan-mapping 300 3 400 4 db-tagged
gpon-olt (config)#show vlan dot1q-tunnel vlan-mapping
```

7. MAC Address Configuration

7.1 Overview

In order to forward messages rapidly, a device need to maintain its MAC address table. MAC address table contains MAC addresses that connect with the device, ports, VLAN, type and aging status. Dynamic MAC addresses in the table are learnt by device. The process of learning is that: if port A receives a message, device will analyze the source MAC address (SrcMAC), and think of messages whose destination MAC address is SrcMAC can be forwarded to port A. If SrcMAC has been in the table, device will update it; if not, device will add this new address to the table.
For the messages whose destination MAC address can be found in MAC address table, they are forwarded by hardware. Otherwise, they flood to all ports. When flooded messages arrive to its destination, the destination device will respond. The device will add new MAC to the table. Then, messages with this destination MAC will be forwarded via the new table. However, when messages still can't find its destination by flood, device will discard them and tell sender destination is unreachable.

7.2 Configure MAC Address

MAC address management includes:

- Configure MAC address table
- Configure MAC address aging time

7.2.1 Configure MAC Address Table

You can add static MAC address entries, delete MAC address entries or clean MAC address table.
Begin at privileged configuration mode, configure MAC address table as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**mac address-table static vlan** *vlan_id xx:xx:xx:xx:xx:xx* **interface** *interface_type slot/port*	Add static MAC address entry.

Step 2b	**no mac address-table vlan** *vlan_id xx:xx:xx:xx:xx:xx*	Delete MAC address entry.
Step 2c	**clean mac address-table**	Clean MAC address table.
Step 3	**show mac address-table**	Show MAC address table.
Step 4	**write**	Save configurations.

7.2.2 Configure MAC Address Aging Time

There is aging time in device. If device doesn't receive any message from other devices in aging time, it will delete the MAC address from MAC table. But for static MAC in the table, aging time is not effective.
Begin at privileged configuration mode, configure MAC address aging time as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**mac address-table aging-time** *value*	Configure MAC address aging time, range is 10-1000000s. 0s means don't aging. Default is 300s.
Step 3	**show mac address-table aging-time**	Show aging time.
Step 4	**write**	Save configurations.

7.2.3 Clean MAC Address Table

Begin at privileged configuration mode, clean MAC address table as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**clean mac address-table** [interface *interface_type slot/port* | pon]	Clean MAC address table.

7.2.4 Configure Maximum Learnt MAC Enties of Port

Begin at privileged configuration mode, configure maximum learnt MAC entries of port as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3	**mac-address mac-limit** (0-16384)	0 means no limitation.
Step 4	**exit**	Exit to global configuration mode.

7.3 Show MAC Address Table

7.3.1 Show MAC Address Table

Begin at privileged configuration mode, show MAC address table as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**show mac address-table interface** *interface_type slot/port*	Show MAC address table based on Ethernet port.
Step 2b	**show mac address-table vlan** *vlan_id*	Show MAC address table based on VLAN ID.
Step 2c	**show mac address-table**	Show whole MAC address table.

7.3.2 Show MAC Address Aging Time

Begin at privileged configuration mode, show MAC address aging time as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**show mac address-table aging-time**	Show MAC address aging time.

8. Configure Port Mirroring

Port mirroring is to copy one or more ports' traffic to a specific port. It is usually used for network traffic analysis and diagnosis.
The device supports 4 mirroring sessions.

8.1 Configure Mirroring Destination Port

Begin at privileged configuration mode, configure mirroring destination port as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**monitor session** *session_number* **destination interface** *interface_type slot/port*	Configure mirroring destination port. Session number is 1.
Step 3	**show monitor session** *session_number*	Show mirroring configurations.
Step 4	**write**	Save configurations.

8.2 Configure Mirroring Source Port

Mirroring source port is the port we want to monitor. Data that pass through the port will be copied to mirroring destination port.
Begin at privileged configuration mode, configure mirroring source port as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**monitor session** *session_number* **source interface** *interface_type start_interface_num* [**-** *end_interface_num*] <both|rx|tx>	Configure mirroring source port. session_number is 1. **Both** means received data and transmitted data. **rx** means received data. **tx** means transmitted data.

Step 3	**show monitor session** *session_number*	Show mirroring configurations.
Step 4	**write**	Save configurations

8.3 Delete Port Mirroring

Begin at privileged configuration mode, delete port mirroring as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**no monitor session** *session_number*	Delete port mirroring. session_number is 1
Step 3	**show monitor session** *session_number*	Show mirroring configurations.

Example:

Mirror data from gpon 0/1 to uplink port 1.

gpon-olt(config)# monitor session 1 destination interface gigabitethernet 0/1

gpon-olt (config)# monitor session 1 source interface gpon 0/1 both

9. IGMP Configuration

9.1 IGMP Snooping

9.1.1 Enable/Disable IGMP Snooping

IGMP snooping is disabled by default. You should enable by the following command. Begin at privileged configuration mode, enable/disable IGMP snooping as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**ip igmp snooping enable**	Enable IGMP Snooping.
Step 2b	**no ip igmp snooping**	Disable IGMP snooping.
Step 3	**show ip igmp snooping configuration**	Show IGMP snooping configurations.
Step 4	**write**	Save configurations.

9.1.2 Configure Multicast Data Forwarding Mode

Begin at privileged configuration mode, configure multicast data forwarding mode as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**ip igmp snooping forward vlan** (1-4094) **mode** [flood｜forward｜strict-forward]	Configure multicast data forwarding mode.
Step 3	**write**	Save configurations.

9.1.3 Configure Port Multicast VLAN

After add VLAN to the port, you should also configure multicast VLAN for multicast service. Begin at privileged configuration mode, configure port multicast VLAN as

the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**ip igmp snooping user-vlan** (1-4094) **group-vlan** (1-4094) [tagged | untagged]	Configure port multicast VLAN. VLAN range is 1-4094.
Step 3b	**no ip igmp snooping group-vlan** (1-4094)	Delete port multicast VLAN.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show ip igmp snooping user-vlan**	Show multicast VLAN.
Step 6	**write**	Save configurations.

9.1.4 Configure Multicast Router Port

Multicast router port is used to forward IGMP messages. Usually, uplink port is configured as multicast router port.

Begin at privileged configuration mode, configure multicast router port as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**ip igmp snooping mrouter vlan** (1-4094) **interface** *interface_type slot/port*	Configure multcast router port . VLAN range is 1-4094.
Step 2b	**no ip igmp snooping mrouter vlan** (1-4094) **interface** *interface_type slot/port*	Delete multicast router port.
Step 3	**show ip igmp snooping mrouter vlan** [all | *vlan_id*]	Show multicast router mode configuration.
Step 4	**write**	Save configurations.

9.1.5 Configure Static Multicast

Begin at privileged configuration mode, configure static multicast as the following table shows.

Command	Function

Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**ip igmp snooping static vlan** (1-4094) *A.B.C.D* **interface** [gigabitEthernet |gpon] *slot:<0>/port:<1-x>*	Configure static multicast.
Step 2b	**no ip igmp snooping static vlan** (1-4094) *A.B.C.D* **interface** [gigabitEthernet |gpon] *slot:<0>/port:<1-x>*	Delete static multicast.
Step 3	**show ip igmp snooping configuration**	Show IGMP configurations.
Step 4	**write**	Save configurations.

9.1.6 Configure Fast Leave

Begin at privileged configuration mode, configure fast leave as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**ip igmp snooping immediate-leave**	Enable fast leave.
Step 3b	**no ip igmp snooping immediate-leave**	Disable fast leave.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show ip igmp snooping port information**	Show port IGMP information.
Step 6	**write**	Save configurations.

9.1.7 Configure Multicast Group Limit

Begin at privileged configuration mode, configure multicast group limitation as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**ip igmp snooping limit** (0-256)	Configure port multicast group limitation.

Step 3b	**no ip igmp snooping limit**	Reset multicast group limitation to default.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show ip igmp snooping port information**	Show port multicast information.
Step 6	**write**	Save configurations.

9.1.8 Configure Parameters of Special Query

Begin at privileged configuration mode, configure parameters of specific query as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**ip igmp snooping lastmember-querycount** (1-255)	Configure specific query count. Default is 2.
Step 2b	**ip igmp snooping lastmember-queryinterval** (1-255)	Configure specific query interval. Default is 1s.
Step 2c	**ip igmp snooping lastmember-queryresponse** (1-255)	Configure specific query response time. Default is 1s.
Step 3	**show ip igmp snooping configuration**	Show IGMP configurations.
Step 4	**write**	Save configurations.

9.1.9 Configure Parameters of General Query

Begin at privileged configuration mode, configure parameters of general query as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**ip igmp snooping general-query-packet** [enable|disable]	Enable or disable general query function. Default is disable.
Step 2b	**ip igmp snooping general-query-time** (10-255)	Configure general query interval. Default is 126s.
Step 3	**show ip igmp snooping configuration**	Show IGMP configurations.
Step 4	**write**	Save configurations.

9.1.10 Configure Source IP of Query

Begin at privileged configuration mode, configure source IP of query message as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**ip igmp snooping member-query source-ip** *A.B.C.D*	Configure source IP of query message. Default is 1.1.1.1.
Step 3	**show ip igmp snooping configuration**	Show IGMP configurations.
Step 4	**write**	Save configurations.

9.1.11 Configure Multicast Member Aging Time

If the port doesn't receive any report message from member in aging time, device will delete this port from group members.
Begin at privileged configuration mode, configure muticast member aging time as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**ip igmp snooping host-aging-time** *seconds*	Configure multicast port member aging time. Value range is 10-3600s, defaultis260s.
Step 3	**show ip igmp snooping configuration**	Show IGMP configurations.
Step 4	**write**	Save configurations.

9.1.12 Show Multicast Group Information

If there is member join a group, you can use the following commands to show multicast group information.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**show ip igmp snooping vlan** [(1-4096) | all]	Show multicast group information.
Step 2b	**show ip igmp snooping statistic**	Show multicast statistic.

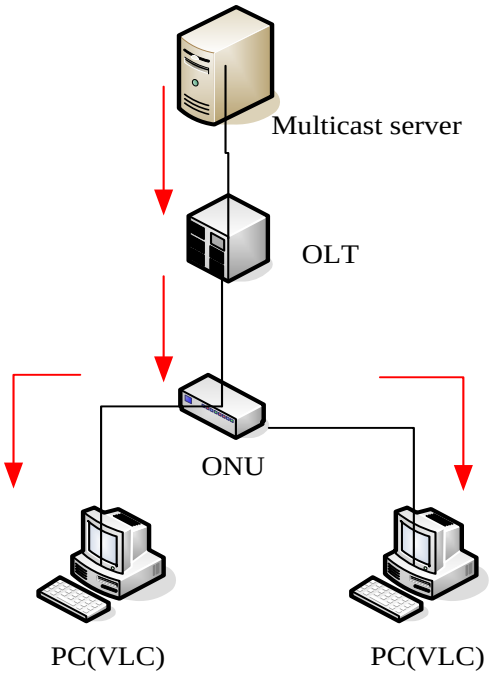
9.2 Example

This example introduces how to configure IGMP snooping function, including multicast VLAN, multicast router port and ONU LAN port, etc.

1. Requirement

In order to achieve multicast function, you should enable IGMP Snooping, configure multicast VLAN, multicast router port, and so on. The requirement contains:
multicast is VLAN 100.
Multicast server connects to uplink port 1.
ONU connects to PON 1.
Client, such as a PC, connects to ONU LAN 1.

2. Framework



3. Steps

(1)Create VLAN

```
gpon-olt (config)# vlan 100
gpon-olt (config-vlan-100)# exit
```

(2)Configure multcast VLAN100

```
gpon-olt (config)# interface gigabitethernet 0/1
gpon-olt (config-if-ge0/1)# switchport hybrid vlan 100 tagged
gpon-olt (config-if-ge0/1)# exit
gpon-olt (config)# interface gpon 0/1
gpon-olt(config-pon-0/1)# ip igmp snooping user-vlan 100 group-vlan 100 tagged
gpon-olt(config-pon-0/1)# exit
```

(3)Enable IGMP Snooping

gpon-olt(config)# ip igmp snooping enable

(4)Configure the G0/1 to multcast router port

gpon-olt(config)# ip igmp snooping mrouter vlan 100 interface gigabitethernet 0/1

(5)Configure the onu

gpon-olt(config)# interface gpon 0/1

gpon-olt(config-pon-0/1)#onu add 1 profile default sn MONU002b5791 us-rate 1g

gpon-olt(config-pon-0/1)# onu 1 tcont 1 dba default1

gpon-olt(config-pon-0/1)# onu 1 gemport 1 tcont 1 gemport_name gem_1

gpon-olt(config-pon-0/1)#onu 1 service ser_1 gemport 1 vlan 100

gpon-olt(config-pon-0/1)#onu 1 portvlan eth 1 mode tag vlan 100

gpon-olt(config-pon-0/1)# onu 1 mvlan 100

10. IPv6 MLD Configuration

10.1 MLD Snooping

10.1.1 Enable/Disable IGMP Snooping

MLD snooping is disabled by default. You should enable by the following command. Begin at privileged configuration mode, enable/disable MLD snooping as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**ipv6 mld snooping**	Enable MLD Snooping.
Step 2b	**no ipv6 mld snooping**	Disable MLD snooping.
Step 3	**show ipv6 mld snooping**	Show MLD snooping configurations.
Step 4	**write**	Save configurations.

10.1.2 Configure Port Multicast VLAN

After add VLAN to the port, you should also configure multicast VLAN for multicast service. Begin at privileged configuration mode, configure port multicast VLAN as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**Ipv6 mld snooping user-vlan** (1-4094) **group-vlan** (1-4094)	Configure port multicast VLAN. VLAN range is 1-4094.
Step 3b	**no ipv6 mld snooping user-vlan** (1-4094) **group-vlan** (1-4094)	Delete port multicast VLAN.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show ipv6 mld snooping user-vlan**	Show multicast VLAN.

Step 6	**write**	Save configurations.

10.1.3 Configure Multicast Router Port

Multicast router port is used to forward MLD messages. Usually, uplink port is configured as multicast router port.
Begin at privileged configuration mode, configure multicast router port as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**ipv6 mld snooping vlan** (1-4094) **mrouter interface gigabitethernet** *slot:<0>/port:<1-x>*	Configure multcast router port . VLAN range is 1-4094.
Step 2b	**no ipv6 mld snooping vlan** (1-4094) **mrouter interface gigabitethernet** *slot:<0>/port:<1-x>*	Delete multicast router port.
Step 3	**show ipv6 mld snooping mroute**	Show multicast router mode configuration.
Step 4	**write**	Save configurations.

10.1.4 Configure Static Multicast

Begin at privileged configuration mode, configure static multicast as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**Ipv6 mld snooping vlan** (1-4094) **static** *X:X::X:X* **interface** <gigabitethernet *slot:<0>/port:<1-x>* | gpon *slot:<0>/port:<1-x>>*	Configure static multicast.
Step 2b	**no ipv6 mld snooping vlan** (1-4094) **static** *X:X::X:X* **interface** <gigabitethernet *slot:<0>/port:<1-x>* | gpon *slot:<0>/port:<1-x>>*	Delete static multicast.
Step 3	**show ipv6 mld snooping address**	Show static MLD configurations.
Step 4	**write**	Save configurations.

10.1.5 Configure Fast Leave

Begin at privileged configuration mode, configure fast leave as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**ipv6 mld snooping immediate-leave**	Enable fast leave.
Step 3b	**no ipv6 mld snooping immediate-leave**	Disable fast leave.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show ipv6 mld snooping interface**	Show port mld information.
Step 6	**write**	Save configurations.

10.1.6 Configure Multicast Group Limit

Begin at privileged configuration mode, configure multicast group limitation as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *interface_type slot/port*	Enter interface configuration mode.
Step 3a	**ipv6 mld snooping group-limit** (0-256)	Configure port multicast group limitation.
Step 3b	**no ipv6 mld snooping group-limit**	Reset multicast group limitation to default.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show ipv6 mld snooping interface**	Show port multicast information.
Step 6	**write**	Save configurations.

10.1.7 Configure Parameters of Special Query

Begin at privileged configuration mode, configure parameters of specific query as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**ipv6 mld snooping last-listener-query-count** (1-7)	Configure specific query count. Default is 2.
Step 2b	**ipv6 mld snooping last-listener-query-interval** (1-255)	Configure specific query interval. Default is 1s.
Step 2c	**ipv6 mld snooping last-listener-query-response** (1-255)	Configure specific query response time. Default is 1s.
Step 3	**show ipv6 mld snooping**	Show IGMP configurations.
Step 4	**write**	Save configurations.

10.1.8 Configure Parameters of General Query

Begin at privileged configuration mode, configure parameters of general query as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**Ipv6 mld snooping general-query-packet**	Enable general query function. Default is disable.
Step 2b	**no Ipv6 mld snooping general-query-packet**	Disable general query function. Default is disable.
Step 2b	**ipv6 mld snooping general-query-interval** (10-3600)	Configure general query interval. Default is 126s.
Step 3	**show ipv6 mld snooping**	Show IGMP configurations.
Step 4	**write**	Save configurations.

10.1.9 Configure Source IP of Query

Begin at privileged configuration mode, configure source IP of query message as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**ipv6 mld snooping general-query-source-ip** *X:X::X:X*	Configure source IP of query message. Default is fe80::1.

Step 3	**show ipv6 mld snooping**	Show MLD configurations.
Step 4	**write**	Save configurations.

10.1.10 Configure Multicast Member Aging Time

If the port doesn't receive any report message from member in aging time, device will delete this port from group members.
Begin at privileged configuration mode, configure muticast member aging time as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**ipv6 mld snooping query-response-interval** (1-64)	Configure multicast port member aging time. Value range is 1-64s, defaultis10s.
Step 3	**show ipv6 mld snooping**	Show IGMP configurations.
Step 4	**write**	Save configurations.

10.1.11 Show Multicast Group Information

If there is member join a group, you can use the following commands to show multicast group information.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2a	**show ipv6 mld snooping address**	Show multicast group information.
Step 2b	**show ipv6 mld snooping statistics**	Show multicast statistic.

10.2 Example

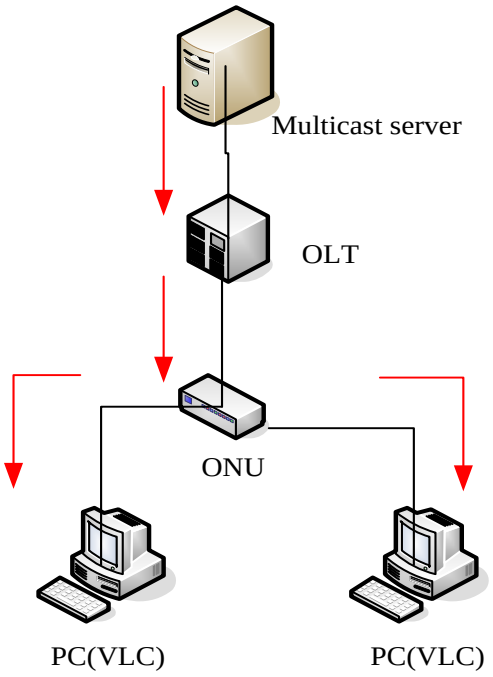
This example introduces how to configure MLD snooping function, including multicast VLAN, multicast router port and ONU LAN port, etc.

10.2.1 Requirement

In order to achieve multicast function, you should enable MLD Snooping, configure

multicast VLAN, multicast router port, and so on. The requirement contains:
multicast is VLAN 100.
Multicast server connects to uplink port 1.
ONU connects to PON 1.
Client, such as a PC, connects to ONU LAN 1.

10.2.2 Framework



10.2.3 Steps

(1)Create VLAN
gpon-olt (config)# vlan 100
gpon-olt (config-vlan-100)# exit
(2)Configure multcast VLAN100
gpon-olt (config)# interface gigabitethernet 0/1
gpon-olt (config-if-ge0/1)# switchport hybrid vlan 100 tagged
gpon-olt (config-if-ge0/1)# exit
gpon-olt (config)# interface gpon 0/1
gpon-olt(config-pon-0/1)# ipv6 mld snooping user-vlan 100 group-vlan 100
gpon-olt(config-pon-0/1)# exit
(3)Enable MLD Snooping
gpon-olt(config)# ipv6 mld snooping
(4)Configure the G0/1 to multcast router port
gpon-olt(config)# ipv6 mld snooping vlan 100 mroute interface gigabitethernet

0/1

(5)Configure the onu

```
gpon-olt(config)# interface gpon 0/1
gpon-olt(config-pon-0/1)#onu add 1 profile default sn MONU002b5791 us-rate 1g
gpon-olt(config-pon-0/1)# onu 1 tcont 1 dba default1
gpon-olt(config-pon-0/1)# onu 1 gemport 1 tcont 1 gemport_name gem_1
gpon-olt(config-pon-0/1)#onu 1 service ser_1 gemport 1 vlan 100
gpon-olt(config-pon-0/1)#onu 1 portvlan eth 1 mode tag vlan 100
gpon-olt(config-pon-0/1)# onu 1 mvlan 100
```

11. ACL Configuration

11.1 Overview

In order to filter data packages, network equipment needs to setup a series of rules for identifying what need to be filtered. Only matched with the rules the data packages can be filtered. ACL can achieve this function. Matched conditions of ACL rules can be source address, destination address, Ethernet type, VLAN, protocol port, and so on. These ACL rules also can be used in other situations, such as classification of stream in QoS. An ACL rule may contain one or several sub-rules, which have different matched conditions.

This device supports the following types of ACL.

- IP Standard ACL.
- IP Extended ACL.
- ACL based on MAC address
- ACL based on port binding.
- ACL based on QoS.

Limitation of each ACL rule:

ACL type	ACL index	Maximum rules
IP Standard ACL	0-999	1000
IP Extended ACL	1000-1999	1000
ACL based on MAC address	2000-2999	1000
ACL based on port binding	5000-5999	1000
ACL based on QoS	6000-6999	1000

11.2 ACL Confiuration

11.2.1 Configure IP Standard ACL

Begin at privileged configuration mode, configure IP standard ACL as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**acl** *rule index.*	Enter ACL configuration mode. rule index range:1-999.

Step 3a	**subset** < permit | deny > < both | in | out > **subset** < permit | deny > < both | in | out > < dest-ip | src-ip > *A.B.C.D net-mask*	Configure ACL rule. define based on interface ACL rule. A.B.C.D: define based on source/destination IP address and mask ACL rule.
Step 3b	**exit**	Exit to global configuration mode.
Step 3c	**acl disable**	Disable ACL.
Step 3d	**no acl** *index*	Delete the acl
Step 4	**show acl** < *rule index* | all >	Show ACL configurations.
Step 5	**write**	Save configurations.

11.2.2 Configure IP Extended ACL

Begin at privileged configuration mode, configure IP extended ACL as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**acl** *rule index.*	Enter ACL configuration mode. rule index range:1000-1999.
Step 3a	**subset** < permit | deny > < both | in | out > < dest-ip *A.B.C.D net-mask* | src-ip *A.B.C.D net-mask* dest-ip *A.B.C.D net-mask*| protocol < (0-255) | egp | gre | icmp | igmp | ipinip | ospf | pim | rsvp | tcp | udp > [dest-ip *A.B.C.D net-mask* | src-ip [dest-ip *A.B.C.D net-mask*] >	Configure IP extended ACL rule. Parameter *protocol* should be icmp, igmp, egp, ipinip, ospf, pim, tcp, or udp, etc. it also can be replaced by protocol code 0~255.
Step 3b	**exit**	Exit to global configuration mode.
Step 3c	**acl disable**	Disable ACL.
Step 3d	**no acl** *index*	Delete the acl
Step 4	**show acl** < *rule index* | all >	Show ACL configurations.
Step 5	**write**	Save configurations.

11.2.3 Configure ACL Based on IP Address

begin at the privilege configuration mode, apply the ACL rules to the IP as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**acl** (1000-1999)	Enter ACL configuration mode. range:1000-1999.
Step 3a	**subset** < permit | deny > < both | in | out > < dest-ip *A.B.C.D net-mask* | src-ip *A.B.C.D net-mask* dest-ip *A.B.C.D net-mask*| protocol < (0-255) | egp | gre | icmp | igmp | ipinip | ospf | pim | rsvp | tcp | udp > [dest-ip *A.B.C.D net-mask* | src-ip [dest-ip *A.B.C.D net-mask*]]>	Configure IP ACL rule.
Step 3b	**exit**	Exit to global configuration mode.
Step 3c	**acl disable**	Disable ACL.
Step 3d	**no acl** *index*	Delete the acl
Step 4	**show acl** < *rule index* | all >	Show ACL configurations.
Step 5	**write**	Save configurations.

11.2.4 Configure ACL Based on MAC Address

begin at the privilege configuration mode, apply the ACL rules to the MAC as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**acl** (2000-2999)	Enter ACL configuration mode. range:2000-2999.
Step 3a	**subset** < permit | deny > **in src-mac** *X:X:X:X:X:X*	Configure IP extended ACL rule.
Step 3b	**exit**	Exit to global configuration mode.

Step 3c	**acl disable**	Disable ACL.
Step 3d	**no acl** *index*	Delete the acl
Step 4	**show acl** < *rule index* | all >	Show ACL configurations.
Step 5	**write**	Save configurations.

11.2.5 Configure ACL Based on MAC And IP Address

begin at the privilege configuration mode, apply the ACL rules to the MAC and IP as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**acl** (5000-5999)	Enter ACL configuration mode. *access-list-number* is ACL index. range:5000-5999.
Step 3a	**subset** < permit | deny > **in src-mac** *X:X:X:X:X:X* < dest-ip *A.B.C.D net-mask* | src-ip *A.B.C.D net-mask* [dest-ip *A.B.C.D net-mask*] >	Permit:Permit data stream which match the rule passing through. Deny:Do not permit data stream which match the rule passing through. src-mac :source MAC address *X:X:X:X:X:X*： MAC address mask
Step 3b	**exit**	Exit to global configuration mode.
Step 3c	**acl disable**	Disable ACL.
Step 3d	**no acl** *index*	Delete the acl
Step 4	**show acl** < *rule index* | all >	Show ACL configurations.
Step 5	**write**	Save configurations.

11.2.6 Configure ACL Based on Ports

This type of ACL includes other types.
Start from the privilege configuration mode and configure ACLs based on port binding, as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**acl** (5000-5999)	Enter the ACL configuration mode. The ID of the access list is an ACL index. The value ranges from 5000-5999.

Step 3a	**subset** < permit | deny > < both | in | out > **protocol** < tcp | udp > { dest-port (0-65535) | src-port (0-65535) | src-ip *A.B.C.D net-mask* | src-ip *A.B.C.D net-mask* }*1	src ip: indicates the source ip address dest ip: indicates the destination ip address Protocol: IP protocol type src-port: indicates the Layer 4 source port dest-port: indicates the Layer 4 destination port
Step 3b	**exit**	Exit to global configuration mode.
Step 3c	**acl disable**	Disable ACL.
Step 3d	**no acl** *index*	Delete the acl
Step 4	**show acl** < *rule index* | all >	Show ACL configurations.
Step 5	**write**	Save configurations.

11.2.7 Configure IPv6 Standard ACL

begin at the privileged configuration mode, configure the IPV6 standard ACL according to the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**acl ipv6** (1-999)	Enter the ACL configuration mode. An access list is an ACL index. The value ranges from 1 to 999.
Step 3a	**subset** < permit | deny > < both | in | out > **subset** < permit | deny > < both | in | out > < dest-ipv6 | src-ipv6 > *X:X::X:X/M*	Configure ACL rule. define based on interface ACL rule.
Step 3b	**exit**	Exit to global configuration mode.
Step 3c	**acl ipv6 disable**	Disable ACL.
Step 3d	**no acl ipv6** *index*	Delete the acl

Step 4	**show acl ipv6** < *rule index* | all >	Show ACL configurations.
Step 5	**write**	Save configurations.

11.2.8 Configure IPv6 Extended ACL

begin at the privileged configuration mode, configure the IPV6 extended ACL according to the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**acl ipv6** (1000-1999)	Enter the ACL configuration mode. The ID of the access list is an ACL index. The value ranges from 1000 to 1999.
Step 3a	**subset** < permit | deny > < both | in | out > < dest-ipv6 *X:X::X:X/M* | src-ipv6 *X:X::X:X/M* dest-ipv6 *X:X::X:X/M* | protocol < (0-255) | icmpv6 | ospf | tcp | udp > [dest-ip *A.B.C.D net-mask* | src-ip [dest-ip *A.B.C.D net-mask*] >	Configure IP extended ACL rule. Parameter *protocol* should be icmpv6,ospf, tcp, or udp. it also can be replaced by protocol code 0~255.
Step 3b	**exit**	Exit to global configuration mode.
Step 3c	**acl ipv6 disable**	Disable ACL.
Step 3d	**no acl ipv6** *index*	Delete the acl
Step 4	**show acl ipv6** < *rule index* | all >	Show ACL configurations.
Step 5	**write**	Save configurations.

11.2.9 Configure ACL Based on IPv6 Addresses

begin at the privileged configuration mode, apply ACL rules to IP addresses, as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**acl ipv6** (1000-1999)	Enter ACL configuration mode. range:1000-1999.
Step 3a	**subset** < permit | deny > < both | in | out > < dest-ipv6 *X:X::X:X/M* | src-ipv6 *X:X::X:X/M* dest-ipv6 *X:X::X:X/M*| protocol < (0-255) | icmpv6 | ospf | tcp | udp > [dest-ipv6 *X:X::X:X/M* | src-ipv6 [dest-ipv6 *X:X::X:X/M*]] >	Configure IP ACL rule.
Step 3b	**exit**	Exit to global configuration mode.
Step 3c	**acl ipv6 disable**	Disable ACL.
Step 3d	**no acl ipv6** *index*	Delete the acl
Step 4	**show acl ipv6** < *rule index* | all >	Show ACL configurations.
Step 5	**write**	Save configurations.

11.2.10 Configure ACL Based on IPv6 And MAC Addresses

begin at the privilege configuration mode, ACL rules are applied to both IP and MAC addresses, as shown in the following table

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**acl ipv6** (5000-5999)	Enter the ACL configuration mode. The ID of the access list is an ACL index. The value ranges from 5000-5999.

Step 3a	**subset** < permit | deny > **in src-mac** *X:X:X:X:X:X* < dest-ipv6 *X:X::X:X/M* | src-ipv6 *X:X::X:X/M* [dest-ipv6 *X:X::X:X/M*] >	Permit:Permit data stream which match the rule passing through. Deny:Do not permit data stream which match the rule passing through. src-mac :source MAC address *X:X:X:X:X:X*：MAC address mask
Step 3b	**exit**	Exit to global configuration mode.
Step 3c	**acl ipv6 disable**	Disable ACL.
Step 3d	**no acl ipv6** *index*	Delete the acl
Step 4	**show acl ipv6** < *rule index* | all >	Show ACL configurations.
Step 5	**write**	Save configurations.

11.3 Examples

(1)Reject packets with specific IP addresses

PON1 denies the packet whose source IP address is 192.168.100.10.

```
gpon-olt(config)# acl enable
gpon-olt(config)# acl 5000
gpon-olt(config-acl-5000)#  subset deny both src-ip 192.168.100.10 255.255.255.255
gpon-olt(config-acl-5000)#  exit
```

(2)Allow packets with specific MAC addresses to pass through

PON1 allows IP packets whose source MAC address is B8:97:55:72:37:8D to pass.

```
gpon-olt(config)# acl enable
gpon-olt(config)#acl 2000
gpon-olt(config-acl-2000)# subset deny in
gpon-olt(config-acl-2000)#exit
gpon-olt(config)# acl 2001
gpon-olt(config-acl-2001)#  subset permit in src-mac b8:97:5a:72:37:8d ff:ff:ff:ff:ff:ff
gpon-olt(config-acl-2001) # exit
```

12. QoS Configuration

12.1 Configure Queue Scheduling Mode

Queue scheduling modes include strict priority, weighted cyclic scheduling and mixed scheduling. The device supports a total of eight queues.
begin at the privilege configuration mode, configure the queue scheduling mode as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2a	**queue-scheduler sp**	Configure the strict priority scheduling mode
Step 2b	**queue-scheduler wrr** [*queue1*|*queue2*|*queue3*|*queue4*]	Set the weighted cyclic scheduling mode. Queuex is the weight of queue x. The value ranges from 1 to 100.
Step 3	**show queue-scheduler**	Displays the queue scheduling configuration.
Step 4	**write**	Save configuration

13. STP Configuration(Not Supported Yet)

13.1 STP Default Settings

STP Default Settings：

Speciality	**Default value**
Enable status	STP disabled
Bridge priority	32768
STP port priority	128
STP port cost	10-Gigabit Ethernet :20000 Gigabit Ethernet :20000
Hello time	2s
Forward delay time	15s
Maxmum aging time	20s
Mode	RSTP

13.2 STP Configure

STP configuration includes:

- Enables the STP function of the device
- Enable the STP function on the port
- Configuring the STP Mode
- Configure the bridge priority of the device
- The forwarding delay of the device is configured
- The hello time of the device was set
- The maximum service life of a specified device is specified
- Configures the priority of a specified port
- The path cost of a specified port is specified

13.2.1 Enable STP Function

begin at the privileged configuration mode, enable the STP function on the device, as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2a	**spanning-tree on**	Enable the STP function on the device. By default, STP is disabled.

Step 2b	**no spanning-tree**	The STP function of the device is disabled
Step 3a	**interface vlan** *vlan_id*	Enter VLAN interface configuration mode.
Step 3b	**show spanning-tree**	Show STP configuration
Step 4	**exit**	Exit to global configuration mode.
Step 5	**write**	Save configuration

13.2.2 Enable STP on Port

In order to work flexibly, you can disable some specific ports' STP function.
begin at the privileged configuration mode, enable the STP function on the port, as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface** *interface_type slot/port*	The port configuration mode is displayed
Step 3a	**spanning-tree on**	The STP function on the port is enabled
Step 3b	**no spanning-tree**	The STP function on a port is disabled
Step 4	**exit**	Exit the global configuration mode
Step 5	**show running-config**	The STP configuration of the port is displayed
Step 6	**write**	Save configuration

13.2.3 Configure Bridge Priority

The bridge priority of the device determines whether it will be selected as the root of the tree.
begin at the privilege configuration mode, configure the bridge priority of the device as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**spanning-tree priority** *bridge-priority*	Configure the bridge priority of the device. The priority

		ranges from 0 to 61440. The default value is 32768.
Step 3	**show running-config**	Show STP configuration
Step 4	**write**	Save configuration

13.2.4 Configure Forwarding Latency

When a link failure occurs in the network, the network recalculates the spanning tree. The structure of the spanning tree will also change. However, the new STP PDUs cannot be recycled over the network. In this case, a temporary loop occurs if the new root port and the specified port immediately forward the data. Therefore, STP uses a state transition mechanism. The root port and the specified port are in an intermediate state before the data is re-forwarded. After the forwarding delay in the intermediate state times out, the new STP PDU circulates in the network, and then the root port and the specified port start to forward data.

begin at the privileged configuration mode, configure the forwarding delay of the device according to the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**spanning-tree forwardDelay** *seconds*	The forwarding delay of the device is configured. The bridging priority ranges from 4 to 30. The default value is 15.
Step 3	**show running-config**	Show STP configuration
Step 4	**write**	Save configuration

The forwarding delay is related to the size of the network. Generally, the larger the network, the longer the forwarding delay to be configured. If the forwarding delay is too small, temporary redundant paths may exist. Although it is too big, the network will need more time to restore the connection. If you don't know this, we recommend that you use the default values.

Attention:

Hello Time, Forward Delay, and Max Age are the time parameters of the root device. These three parameters should meet the following formula, otherwise, the network will be unstable.

2 × (forward delay-1) >= maximum age

maximum age >= 2 × (hello + 1)

The unit of “1” in formula is second.

13.2.5 Configure Hello Time

The bridge will periodically send greeting messages to other nearby Bridges to verify the link connection. An appropriate hello time ensures that the device detects link faults in time without occupying more network resources. If the hello time is too large, the device misidentifies the link as faulty when it loses data packets. The network device then recalculates the spanning tree. If it is too small, the network device will frequently send repeated STP PDUs. This will increase the load on the device and waste network resources.

begin at the privileged configuration mode, configure the hello time of the device, as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**spanning-tree hellotime** *seconds*	Configure the greeting time of the device. The greeting time ranges from 1 to 10. The default value is 2.
Step 3	**show running-config**	Show STP configuration
Step 4	**write**	Save Configure

13.2.6 Configure Maximum Aging Time

The maximum aging time is the maximum service life of the configuration message. When the message duration is greater than the maximum, the configuration message is discarded.

begin at the privileged configuration mode, set the maximum aging time according to the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**spanning-tree max-age** *seconds*	The maximum aging time of the device is specified. The maximum aging time ranges from 6 to 40, and the default value is 20
Step 3	**show running-config**	Show STP configuration
Step 4	**write**	Save configure

13.2.7 Configure Priority of Port

Port priority determines whether the port can be selected as the root port. Under the same conditions, the port with a higher priority is selected as the root port. Generally, the smaller the priority value, the higher the priority of the port. If all ports have the same priority value, their priority is determined by their port number.
begin at privilege configuration mode, configure the priority of the specified port as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface** *interface_type slot/port*	The port configuration mode is displayed
Step 3	**spanning-tree port-priority** *priority*	Configures the priority of a specified port. The priority ranges from 0 to 240. The default value is 128.
Step 4	**exit**	Exit the global configuration mode
Step 5	**show running-config**	The STP configuration of the port is displayed
Step 6	**write**	Save configure

13.2.8 Configure Path Cost of Port

The path cost is related to the speed of the link connected to the port. On an STP switch, different path costs can be configured for a port.
begin at privileged configuration mode, configure the path cost of the specified port, as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface** *interface_type slot/port*	The port configuration mode is displayed
Step 3	**spanning-tree cost** [*value* | auto]	The path cost of a specified port is specified. The path cost ranges from 1 to 200000000. The default value is 200000.
Step 4	**exit**	Exit the global configuration mode
Step 5	**show running-config**	The STP configuration of the port is displayed

Step 6	**write**	Save configure

13.2.9 Configure Edge Ports

The port connected to the terminal host is an edge port. During the spanning tree recalculation, the edge port can be directly converted to the forward state, thus reducing the transmission time. Since RSTP cannot detect whether a port is an edge port, it is best to configure a port as an edge port if it is not connected to a switch. However, when a port is connected to a switch, RSTP can detect and configure it as a non-edge port. By default, all ports are configured as non-edge ports.
Starting in privileged configuration mode, configure the edge port as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface** *interface_type slot/port*	The port configuration mode is displayed
Step 3a	**spanning-tree operEdge**	Configure the port as an edge port
Step 3b	**no spanning-tree operEdge**	Reset the spanning tree port to the default value
Step 4	**exit**	Exit the global configuration mode
Step 5	**show running-config**	The STP configuration of the port is displayed
Step 6	**write**	Save configure

13.2.10 Configure The Point-to-Point Mode

Point-to-point mode is usually a link to a switch. A port connected by a point-to-point link can quickly transition to the forwarding state by sending synchronous packets when certain port role conditions are met, thus reducing unnecessary forwarding delay.
begin at the privileged configuration mode, configure the port point-to-point link, as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface** *interface_type slot/port*	The port configuration mode is displayed
Step 3a	**spanning-tree point-to-point** [auto]	Configure the port as a

		point-to-point port. By default, all ports are configured as point-to-point ports.
Step 3b	**no spanning-tree point-to-point**	Example Delete the configuration of a point-to-point port
Step 4	**exit**	Exit the global configuration mode
Step 5	**show running-config**	The STP configuration of the port is displayed
Step 6	**write**	The STP configuration of the port is displayed

13.3 Display STP Information

After the configuration, run the following command to display STP information.

Command	**Function**
show spanning-tree	Displays the STP configuration and running status
show running-config	Displays the STP configuration and port running status

14. Loop Detection Configuration

14.1 Configure Loop Detection

14.1.1 Enable/Disable Loop Detection Function

Loopback Detect is disabled by default. You can enable it with the following command.
begin at the privileged configuration mode, enable/disable Loopback Detect listening, as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2a	**loopback detect enable**	Enable loopback-detect Feature
Step 2b	**no loopback detect**	loopback-detect is disabled Feature
Step 3	**show loopback detect**	The loopback-detect configuration is displayed
Step 4	**write**	Save configure

14.1.2 Configure Loop Detection Mode

If different loop detection modes are configured, the device processes loops in different ways after detecting loops. If the mode is Auto recovery, the device automatically turns down the port after detecting a loop and automatically turns up the port after a period of time. If the configuration mode is manual recovery, the device will down the port after detecting a loop, and you need to enable the port. If the configuration mode is alarm only, the device only sends an alarm message after detecting a loop and does not process the port. The following table describes the command configuration.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**loopback mode auto-recovery**	Set the loop detection mode to automatic recovery
Step 3	**loopback mode manual-recovery**	Set the loop detection

		mode to manual recovery
Step 4	**loopback mode only-alarm**	Set the loop detection mode to alarm only
Step 5	**write**	Save configure

14.1.3 Configure Aging Time of Loop Detection Information

Aging time is the maximum service life of loop messages. Loop messages are discarded when the message duration is greater than the maximum. When a loop occurs on the network, the device displays the detected loop information. After the aging time is reached, the information is deleted and no longer displayed. The following table shows the specific configurations.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**loopback aging-time** (10-3600)	The aging time of loop detection ranges from 10 to 3600s
Step 3	**show loopback detect**	The loopback-detect configuration is displayed
Step 4	**write**	Save configure

14.1.4 Configure loop Detection Packet Send Way

Loop detection packets can be sent by port or vlan, as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**loopback packet-send port-base** (1-720)	Set the packet sending mode to the port
Step 3	**loopback packet-send vlan-base** (1-720)	Set the packet sending mode to the vlan
Step 4	**write**	Save configure

14.1.5 Configure Time For Sending Data Packets

This parameter is used to determine the interval for sending loop data packets, as shown in the following table.

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**loopback packet-send** < port-base | vlan-base > (1-720)	Set the packet sending interval,range:1-720
Step 3	**show loopback detect**	Display loop information
Step 4	**write**	Save configure

14.2 Configure Loop Detection Port

Access the port and enable loop detection for the port, as shown in the following table.

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface** *interface_type slot/port*	The port configuration mode is displayed
Step 3	**loopback enable**	Loop detection is enabled for the port
Step 4	**loopback disable**	The loop detection function is disabled on the port
Step 5	**exit**	Exit the port configuration mode
Step 6	**show loopback detect port**	Displays loop detection configurations
Step 7	**write**	Save configure

14.3 Display Loop Detection Information

After the configuration, run the following command to display loopback-detect information.

Command	Function
show loopback detect port	Displays loop detection information and port configuration status

15. DHCP Management Configuration

15.1 Configure DHCP Server

Now, more and more IP addresses need to be assigned. DHCP (Dynamic Host Configuration Protocol) was created to solve this problem. It includes a DHCP server and a DHCP client. The IP address is assigned by the server at the request of the client. Configure the DHCP server as shown in the following table:

	Command	**Function**
Step 1	**config terminal**	Enter the global configuration mode
Step 2a	**dhcp-server interface vlan** *vlan_id*	Configure the vlan based on which the DHCP address pool is based
Step 2b	**dhcp-server address** *hostname*	Configure the hostname of the DHCP IP address pool
Step 2c	**dhcp-server startip** *A.B.C.D* **endip** *A.B.C.D*	Configure the range of the DHCP IP address pool
Step 2d	**dhcp-server subnet** *A.B.C.D*	Configure the DHCP mask
Step 2e	**dhcp-server wins** *A.B.C.D*	The DHCP WINS server is configured
Step 2f	**dhcp-server gateway** *A.B.C.D*	Configuring a DHCP Gateway
Step 2g	**dhcp-server dns1** *A.B.C.D* **dhcp-server dns2** *A.B.C.D* **dhcp-server dns3** *A.B.C.D*	Configure the dns of the DHCP IP address pool
Step 2h	**dhcp-server leasetime** *leasetime*	Configure the IP address lease time.range:60s-864000s.default lease time is 864000s.
Step 3	**dhcp-server enable**	Enable dhcp ip address pool
Step 4	**show dhcp-server**	The DHCP server configuration is displayed
Step 5	**write**	Save configure

15.2 Configure DHCP Relay

Because the DHCP receiving need to broadcast, so the server and the client should be in the same network. The DHCP relay can save this issue effective. Configure DHCP relay as the following table show:

1.Single DHCP relay configuration：

	Command	**Function**
Step 1	**config terminal**	Enter global configuration mode
Step 2	**interface vlan** (1-4094)	Add VLAN and enter VLAN interface configuration *vlan_id(*1－4094)
Step 3	**dhcp relay** *A.B.C.D*	Configure the DHP relay server IP address, and enable the DHCP relay
Step 3b	**no ip dhcp relay** *A.B.C.D*	Delete DHCP relay
Step 4	**exit**	Exit to global configuration mode
Step 5	**show dhcp-relay configure**	Show the DHCP relay configuration
Step 6	**write**	Save the configuration

15.3 Configure DHCP Snooping

To prevent the DHCP message attacking and protect your network to get a useful IP address. DHCP Snooping is used for doing that. Configure DHCP Snooping as the following table show:

A. DHCP Snooping enable/disable

	Command	**Function**
Step 1	**config terminal**	Enter global configuration mode.
Step 2a	**dhcp-snooping enable**	Enable DHCP Snooping.（DHCP Snooping enable，can not open dhcp server and dhcp relay）
Step 2b	**dhcp-snooping disable**	disable DHCP Snooping
Step 3a	**dhcp-snooping vlan** (1-4094) [to (1-4094)]	Configure DHCP Snooping vlan list

Step3b	**no dhcp-snooping vlan** (1-4094) [to (1-4094)]	Delete DHCP Snooping vlan list
Step 4	**show dhcp-snooping configuration**	Show DHCP Snooping configuration
Step 5	**write**	Save configuration

B.Configure DHCP Snooping option82

	Command	**Function**
Step 1	**config terminal**	Enter global configuration mode
Step 2	**dhcp-snooping information option** <enable|disable>	Enable/disable DHCP Snooping option82
Step 3	**dhcp-snooping information strategy** <drop|keep|merge|replease>	Configure the message with option82，drop、keep and replace
Step 4	**exit**	Exit to global configuration mode
Step 5	**show dhcp-snooping configuration**	Show DHCP Snooping configuration
Step 6	**write**	Save configuration

C.Configure DHCP Snooping binding list

	Command	**Function**
Step 1	**config terminal**	Enter global configuration mode
Step 2	**dhcp-snooping binding** *X:X:X:X:X:X* **vlan** (1-4094) *A.B.C.D* **interface** *interface_type slot/port* **lease** (60-1000000)	Add the static DHCP binding list
	no dhcp-snooping binding mac *X:X:X:X:X:X*	Delete MAC binding list
	no dhcp-snooping binding <all|static|dynamic>	Delete DHCP binding list.can delete all、static、dynamic
Step 3	**dhcp-snooping binding delete-time**	Configure the biding list aging time and delete time

	(1-3600)	
Step 4	**show dhcp-snooping configuration**	Show DHCP Snooping configuration
Step 5	**write**	Save configuration

D.Configure DHCP Snooping port

	Command	**Function**
Step 1	**config terminal**	Enter global configuration mode
Step 2	**interface** *interface_type slot/port*	Enter the interface configuration
Step 3a	**dhcp-snooping trust**	Configure the trust port. All the port are untrust in default
Step 3b	**dhcp-snooping untrust**	Delete trust port.
Step 3c	**dhcp-snooping information circuit-id string** *string*	Configure the option82 circuit-id value
Step 3d	**no dhcp-snooping information circuit-id string**	Delete option82 circuit-id value,load default value
Step 3e	**dhcp-snooping information remote-id string** *string*	Configure option82 remote-id value
Step 3f	**no dhcp-snooping information remote-id string**	Delete option82 remote-id value，load default value
Step 3g	**dhcp-snooping limit rate** (0-4096)	Configure the port max speed of receiving the DHCP packet. It doesn't limit by default
Step 3h	**no dhcp-snooping limit rate**	No limit speed
Step 4	**exit**	Exit to the global configuration mode
Step 5a	**dhcp-snooping errdisable recovery** <enable|disable>	CConfigure whether the port get down when the DHCP packetreceiving speed larger then the limit speed .The default is disable
Step 5b	**dhcp-snooping errdisable recovery interval** (3-3600)	Configure the time when the port recovery after getting down
Step 6	**show dhcp-snooping configure interface** <all |*interface_type slot/port* >	Show DHCP Snooping configuration

Step 7	**write**	Save configuration

16. L3 Route Configuration

16.1 Configure Static Route

Static route is usually used in a simple network. This device supports maximum 512 static route rules.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode
Step 2	**ip route** *<A.B.C.D A.B.C.D|A.B.C.D/M > A.B.C.D*	Add static route rule
Step 3	**no ip route** *<A.B.C.D A.B.C.D|A.B.C.D/M > A.B.C.D*	Delete static route rule
Step 4	**show ip route**	Show route rules

17. IPv6

17.1 Configure VLAN IPv6 Address

Begin at privileged configuration mode, configure or delete IPv6 address and prefix of VLAN as the following table shows.

	Command	Function
Step 1	**config terminal**	Enter global configuration mode.
Step 2	**interface vlan** (1-4094)	enter VLAN interface configuration *vlan_id* range:1~4094
Step 3a	**ipv6 address** *X:X::X:X/M[eui-64]*	Configure the IPv6 address and prefix length of the vlan interface. By default, the interface automatically generates a link-local address. **Eui-64**, which is an optional parameter, is used to automatically fill the low 64-bit of IPv6 address according to the eui-64 specification.
	ipv6 address *X:X::X:X* **link-local**	Configure the IPv6 link-local address of the vlan interface.
Step 3b	**no ipv6 address** *X:X::X:X/M*	Delete specified IPv6 address of VLAN interface.
	no ipv6 address	Delete all IPv6 addresses of the VLAN interface.
	no ipv6 address *X:X::X:X* **link-local**	Restore the default link-local address of VLAN interface.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show vlan** (1-4094)	Verify the configuration information.
Step 6	**write**	Save configurations.

17.2 IPv6 SLAAC

An IPv6 address consists of two parts: prefix and interface ID. A big feature of IPv6 is that it supports plug and play. IPv6 address stateless autoconfiguration means that the node configures an IPv6 address automatically based on the information assigned by the router discovery/prefix discovery. Router discovery/prefix discovery means that when a node is connected to an IPv6 link, it can discover the local router, obtain the neighbor router information and the prefix of the network, and other configuration parameters from the received RA message but not by Dynamic Host Configuration Protocol (DHCPv6).
The device can obtain the IPv6 address prefix which carried in the RA message (Router-Advertisement, ICMPv6 Type 134), and generate the interface ID automatically through the interface, so as to get a completed 128-bit IPv6 address. By default, the RA message is sent once every 600s. The device can also send an RS (router solicit, ICMPv6 Type = 133) message to obtain the prefix.
Parameter Discovery: A node can discover the parameters of the link it is connected to, such as the MTU of the link and the hop limit.

17.2.1 IPv6 SLAAC Work Processes

The router discovery/prefix discovery is implemented by router solicitation message RS and router advertisement message RA. The specific process is as follows:
(1) When the node starts up, it sends a request to the router through RS message, requesting the prefix and other configuration information for the configuration of the node.
(2) The router responds a RA message, which includes the prefix information option (the router also sends the RA message periodically). The prefix information option includes not only the prefix information of IPv6 address but also the preferred lifetime and valid lifetime of the prefix. After receiving the periodical RA message, the node will update the preferred lifetime and valid lifetime of the prefix based on the message.
(3) The node configures IPv6 address and other information of the interface automatically by using the prefix and other configuration parameters in the RA message responded by the router. During the valid lifetime, the automatically generated address can be used normally; after the valid lifetime expired, the automatically generated address will be deleted.

17.2.2 Configure IPv6 SLAAC

Begin at privileged configuration mode, configure or delete IPv6 address and prefix of VLAN as the following table shows

Command	Function

Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface vlan** (1-4094)	Enter VLAN interface configuration. *vlan_id* range: 1-4094.
Step 3	**no ipv6 nd suppress-ra** **ipv6 nd suppress-ra**	Disable RA message suppression. The interface sends RA messages periodically (default 600S). By default, RA message suppression is enabled. Enable RA message suppression.
Setp 4a	**ipv6 nd ra-interval** (1-1800)	Configure the interval for sending RA messages in second. The minimum value is 1s and the maximum value is 1800s. The default is 600s.
Step 4b	**ipv6 nd ra-interval msec** (70-1800000)	Configure the interval for sending RA messages in millisecond. The minimum value is 70ms and the maximum value is 1800000ms. The default is 600000ms.
Step 5	**ipv6 nd ra-lifetime** (0-9000)	Configure the lifetime of the RA message. The minimum value is 0s and the maximum value is 9000s. The default is 1800s.
Step 6	**ipv6 nd reachable-time** (1-3600000)	Specify the reachability interval of a new neighbor. It is used to detect neighbors that are unreachable in the neighbor discovery table. The minimum value is 1s and the maximum value is 3600000s. The default is 0s.
Step 7	**ipv6 nd home-agent-config-flag**	The set/unset flag in IPv6 router advertisement message is used to indicate to the host that the router acts as a home agent and includes the home agent option. It is not set by default.
Step 8	**ipv6 nd home-agent-preference** (0-65535)	When the local proxy configuration flag is set, this value indicates the host proxy preference. The default value 0 indicates the lowest priority.
Step 9	**ipv6 nd home-agent-lifetime** (0-65520)	When the local proxy configuration flag is set, this value indicates the host agent lifetime. The default value is 0.
Step 10	**ipv6 nd adv-interval-option**	Advertisement Interval option indicates the maximum time (in milliseconds) between consecutive unsolicited router advertisements.

Step 11	**ipv6 nd managed-config-flag**	This flag bit indicates which automatic configuration mode is used to obtain the IPv6 address. When the M bit is set to 1, the device that received this RA message will use the configuration protocol (such as DHCPv6) to obtain an IPv6 address. By default, this flag bit is 0.
Step 12	**ipv6 nd other-config-flag**	This flag bit indicates which mode is used to configure other configuration information (such as DNS, domain name, etc.) except IPv6 address. When the O bit is set to 1, the device that received this RA message will use the configuration protocol (such as DHCPv6) to obtain configuration information except IPv6 address. By default, this flag bit is 0.
Step 13	**ipv6 nd prefix** *X:X::X:X/M* [{ (0-4294967295) | off-link | infinite | no-autoconfig | router-address } *1]	Configure the parameters of the prefix declared on the network interface; **Valid-lifetime:** The length of time (in seconds) that the prefix is valid. The value *infinite* means infinity. Range: <0-4294967295| infinite> Default: 2592000 **Preferred-lifetime:** The preferred length of time (in seconds) for the prefix. Range: <0-4294967295| infinite> Default: 604800 **off-link:** Indicates that the link or link attribute does not declare a prefix. **no-autoconfig**: Indicates to the device on the link that the specified prefix cannot be used for IPv6 autoconfiguration. **router-address**: The R flag indicates to the host on the local link that the specified prefix contains the full IPv6 address.
Step 14	**ipv6 nd router-preference** < high|medium|low >	Set router preferences.
Step 15	**ipv6 nd mtu** (1-65535)	Configure the interface MTU. MTU range: 1-65535. The default is 0.

17.3 DHCPv6

17.3.1 DHCPv6 Overview

DHCPv6 (Dynamic Host Configuration Protocol for IPv6) is a protocol designed for IPv6 addressing schemes that assigns IPv6 prefixes, IPv6 addresses, and other network configuration parameters to hosts.

Compared with other IPv6 address allocation methods (manual configuration, stateless autoconfiguration through network prefix in router advertisement messages, etc.), DHCPv6 has the following advantages:

- Not only IPv6 addresses, but also IPv6 prefixes can be assigned to facilitate automatic configuration and management of the whole network.
- Better control of address allocation. Not only can DHCPv6 record the address/prefix assigned to the host, but it can also assign a specific address/prefix to a specific host for network management.
- In addition to the IPv6 prefix and IPv6 address, it can also assign network configuration parameters such as DNS server and domain name to the host.

17.3.1.1 DHCPv6 Network Composition

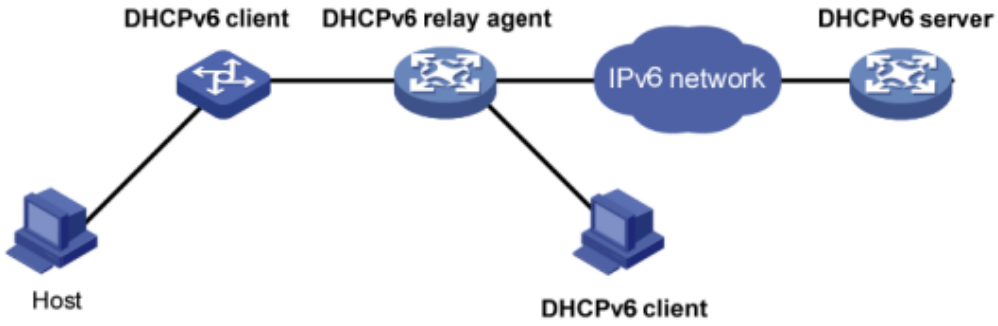


Figure 1：DHCPv6 network Composition

As shown in figure 1, the DHCPv6 networking includes the following three roles:

DHCPv6 client: A device that dynamically obtains IPv6 addresses, IPv6 prefixes, or other network configuration parameters.

DHCPv6 server: A device responsible for assigning IPv6 addresses, IPv6 prefixes, and other network configuration parameters to DHCPv6 clients. A DHCPv6 server can not only assign an IPv6 address to a DHCPv6 client, but also assign an IPv6 prefix to it. As shown in figure 1, after the DHCPv6 server assigns an IPv6 prefix to the DHCPv6 client, the DHCPv6 client sends an RA message containing the prefix information to the network, so that hosts on the network automatically configure an IPv6 address based on the prefix.

DHCPv6 relay: The DHCPv6 client communicates with the DHCPv6 server through

the link-local multicast address to obtain IPv6 addresses and other network configuration parameters. If the server and the client are not on the same link, you need to forward packets through the DHCPv6 relay. This prevents the DHCPv6 server from being deployed on each link. This saves costs and facilitates centralized management.

17.3.1.2 Configure DHCPv6 DUID

The server uses the DUID (DHCP Unique Identifier) to identify different clients, and the client uses the DUID to identify the server. The contents of the client and server DUID are carried in the Client Identifier and Server Identifier options in the DHCPv6 message. The format of the two options is the same. The value of the option-code field is used to distinguish between the Client Identifier and the Server Identifier option.
The minimum length is 12 bytes (96 bits) and the maximum length is 20 bytes (160 bits). The actual length depends on its type. The server compares the DUID to its database and sends the configuration data (address, lease, DNS server, etc.) to the client

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**duid** <duid-llt|duid-ll|duid-en|duid-uuid> (1-4294967295) identifier *Identifier string*	Configure DUID.
Step 3	**show ipv6 dhcp duid**	Display DUID configuration.
Setp 4	**write**	Save configuration.

17.3.2 DHCPv6 Server

17.3.2.1 DHCPv6 Address/Prefix Allocation Process

The process of assigning addresses/prefixes to clients by the DHCPv6 server is divided into two categories:

- Quickly allocation process with two messages exchanging.
- Allocation process with four messages exchanging.

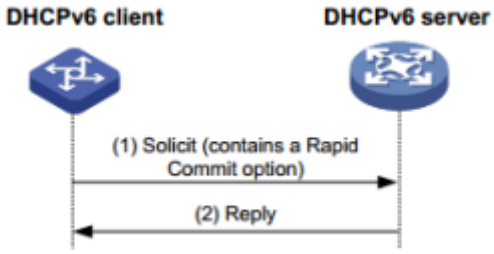


Figure 2：Quickly allocation process with two messages exchanging

As shown in figure 2, the address/prefix quick assignment process is:

(1) The DHCPv6 client carries the Rapid Commit option in the sent Solicit message, indicating that the client wants the server to quickly assign an address/prefix and network configuration parameters to it;

(2) If the DHCPv6 server supports the fast allocation process, it directly returns a Reply message to assign the IPv6 address/prefix and other network configuration parameters to the client. If the DHCPv6 server does not support the fast assignment process, the client is assigned an IPv6 address/prefix and other network configuration parameters using an assignment process that interacts with four messages.

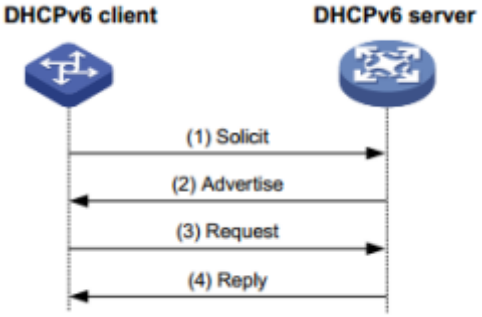


Figure 3：Allocation process with four messages exchanging

Step	Message type	Description
(1)	Solicit	The DHCPv6 client sends the message requesting the DHCPv6 server to assign an IPv6 address/prefix and network configuration parameters to it.
(2)	Advertise	If the Rapid Commit option is not carried in the Solicit message, or the Rapid Commit option is carried in the Solicit message, but the server does not support the fast allocation process, the DHCPv6 server replies to the message, notifying the client of the address/prefix and network configuration parameters that can be assigned to it.
(3)	Request	If the DHCPv6 client receives Advertise messages from multiple servers, it selects one of the servers according to the order in which the messages are received, the server priority, etc., and sends a Request message to the server, requesting the server to confirm the address/prefix. And network configuration parameters

(4)	Reply	The DHCPv6 server replies to the message, confirming that the address/prefix and network configuration parameters are assigned to the client.

17.3.2.2 DHCPv6 Server Lease Renewal Process

The IPv6 address/prefix assigned to the client by the DHCPv6 server has a certain lease term. The rental period is determined by the valid life period (Valid Lifetime). After the lease time of the address/prefix reaches the valid lifetime, the DHCPv6 client can no longer use the address/prefix. If the DHCPv6 client wishes to continue using the address/prefix before the valid lifetime expires, the address/prefix lease needs to be updated.

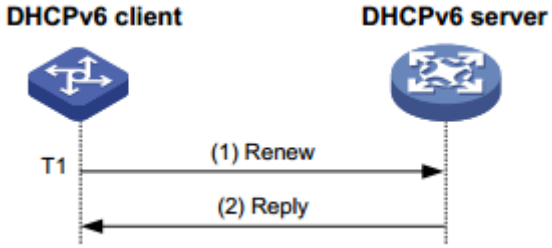


Figure 4：Update address/prefix lease by renew

As shown in Figure 4, when the address/prefix lease time arrival time T1 (the recommended value is half of the preferred lifetime Preferred Lifetime), the DHCPv6 client unicasts the Renew message to the DHCPv6 server that assigns the address/prefix to it. Update the address/prefix lease. If the client can continue to use the address/prefix, the DHCPv6 server responds with a successful Reply packet, informing the DHCPv6 client that the address/prefix lease has been successfully updated; if the address/prefix cannot be reassigned to the client, The DHCPv6 server responds with a Reply packet that failed to renew, notifying the client that it cannot obtain a new lease

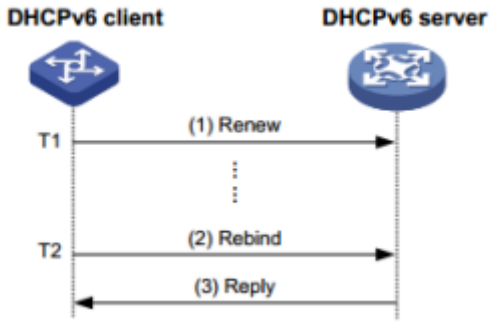


Figure 5：Update address/prefix lease by rebind

As shown in Figure 5, if Renew is sent to update the lease at T1, but the response packet from the DHCPv6 server is not received, the DHCPv6 client will send all DHCPv6 to T2 (recommended value is 0.8 times of the preferred lifetime). The server multicasts the Rebind message and requests to update the lease. If the client can

continue to use the address/prefix, the DHCPv6 server responds with a successful Reply message, informing the DHCPv6 client that the address/prefix lease has been successfully updated; if the address/prefix cannot be reassigned to the client, The DHCPv6 server responds to the Reply packet with the renewal failure, notifying the client that the new lease cannot be obtained. If the DHCPv6 client does not receive the response packet from the server, the client stops using the address/prefix after the valid lifetime expires.

17.3.2.3 DHCPv6 Server Stateless Configuration

The DHCPv6 server can assign additional network configuration parameters to clients that already have an IPv6 address/prefix. This process is called a DHCPv6 stateless configuration.

After the DHCPv6 client successfully obtains an IPv6 address through the stateless auto-configuration function, the M flag (Managed address configuration flag) in the RA (Router Advertisement, Router Advertisement) packet is 0. If the other stateful configuration flag (1), the DHCPv6 client automatically starts the DHCPv6 stateless configuration function to obtain other network configuration parameters except the address/prefix.

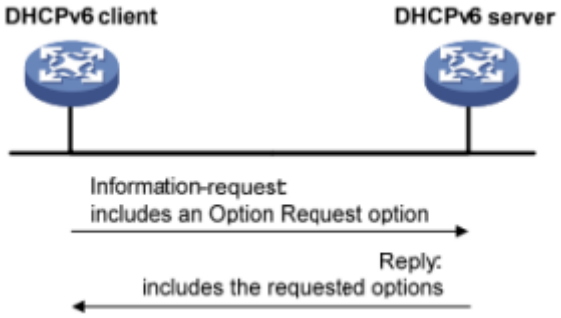


Figure 6：DHCPv6 stateless configuration process

As shown in Figure 6, the specific process of DHCPv6 stateless configuration is as follows:

(1) The client sends an Information-request packet to the DHCPv6 server in multicast mode. The packet carries the Option Request option to specify the configuration parameters that the client needs to obtain from the server.

(2) After receiving the Information-request packet, the server allocates network configuration parameters to the client and sends a Reply packet to the client to return the network configuration parameters to the client.

(3) The client provides the information provided in the Reply packet. If the configuration parameter is the same as the one specified in the Reply message, the network configuration is performed according to the parameters provided in the Reply packet. Otherwise, the parameter is ignored. If multiple Reply packets are received, the client selects the first reply packet and completes the stateless configuration of the client according to the parameters provided in the packet.

17.3.2.4 Configure DHCPv6 Server

Begin at privileged configuration mode, configure DHCPv6 server as the following table shows.

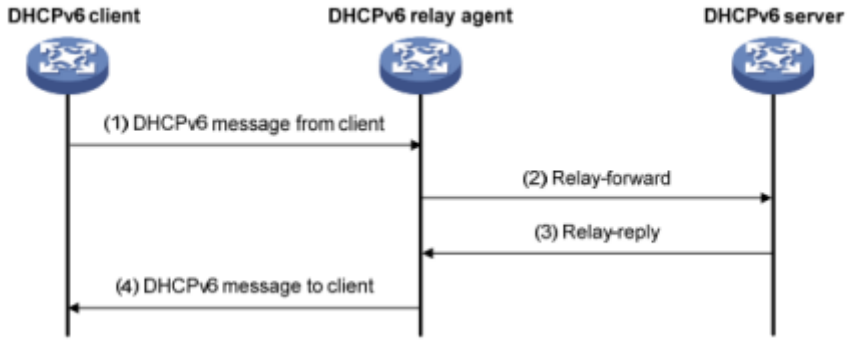
	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**ipv6 dhcp pool** *DHCP pool name*	Configure an IPv6 DHCP address pool.
Step 3	**prefix-delegation** *X:X::X:X/M X:X::X:X/M* [lifetime < (60-4294967295)|infinite> < (60-4294967295)|infinite>]	Configure prefix delegation and its lifetime.
Setp 4	**address** *X:X::X:X/M X:X::X:X/M* [lifetime < (60-4294967295)|infinite> < (60-4294967295)|infinite>]	Configure IPv6 address prdfix and its lifetime.
Step 5	**dns-sever** *X:X::X:X*	Configure the DNS server IPv6 address.
Step 6	**domain-name** *A domain name*	Configure domain name.
Step 7	**interface vlan** (1-4094)	Add VLAN and enter VLAN interface configuration. vlan_id(1－4094)；
Step 8	**ipv6 dhcp server** *Name of IPv6 DHCP pool* [preference (0-255) |allow-hint | rapid-commit]	Configure and enable the DHCPv6 server address of the network segment on the interface.
Step 9	**exit**	Exit to global configuration mode.
Step 10	**show ipv6 dhcp pool**	View DHCPv6 address pool information.
Step 11	**show ipv6 dhcp interface vlan** (1-4094)	Show information about the device DHCPv6 interface
Step 12	**write**	Add VLAN and enter VLAN interface configuration. vlan_id(1－4094)；

17.3.3 DHCPv6 Relay

17.3.3.1 DHCPv6 Relay Work Processes

During the process of obtaining the IPv6 address/prefix and other network configuration parameters dynamically through the DHCPv6 relay, the DHCPv6 client and the DHCPv6 server are processed in the same way as when the DHCPv6 relay is not processed.

DHCPv6 relay forwarding process：



(1) The DHCPv6 client sends a request to the multicast address FF02::1:2 of all DHCPv6 servers and relays;

(2) After receiving the request, the DHCPv6 relay encapsulates the relay-forward packet in the relay message option and sends the relay-forward packet to the DHCPv6 server.

(3) The DHCPv6 server parses the client's request from the relay-forward packet, selects the IPv6 address and other parameters for the client, constructs a response message, and encapsulates the response message in the relay message option of the Relay-reply message. Send the Relay-reply message to the DHCPv6 relay.

(4) The DHCPv6 relay resolves the response from the server to the DHCPv6 client from the relay-reply packet. The DHCPv6 client performs network configuration based on the IPv6 address/prefix and other parameters assigned by the DHCPv6 server.

17.3.3.2 DHCPv6 Relay Configuration

Begin at privileged configuration mode, configure DHCPv6 relay as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface vlan** (1-4094)	Add VLAN and enter VLAN interface

		configuration *vlan_id(*1-4094)；
Step 3	**ipv6 dhcp relay destination** *X:X::X:X*	Configure the DHCPv6 relay server address on the network segment of the interface and enable the DHCPv6 relay service.
Setp 4	**exit**	Exit to global configuration mode.
Step 5	**show ipv6 dhcp interface**	Show information about the device DHCPv6 interface.
Step 6	**write**	Save configurations.

17.3.3.3 Configure DHCPv6 Relay Option 37

Begin at privileged configuration mode, configure DHCPv6 relay option 37 as the following table shows.

Step 1	**configure terminal**	Enter global configuration mode.
	ipv6 dhcp relay remote-id option	Enable relay support option 38 option function
Step 2	**interface vlan** (1-4094)	Add VLAN and enter VLAN interface configuration.vlan_id(1-4094)；
Step 3	**ipv6 dhcp relay remote-id** *remote id*	Configure the remote-id value of the custom option37.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show ipv6 dhcp relay option**	Display configuration information about trunk related options.
Step 6	**write**	Save configurations.

17.3.3.4 Configure DHCPv6 Relay Option 38

Begin at privileged configuration mode, configure DHCPv6 relay option 38 as the following table shows.

Command	**Function**

Step 1	**configure terminal**	Enter global configuration mode.
	ipv6 dhcp relay subscriber-id option	Enable relay support option 38 option function
Step 2	**interface vlan** (1-4094)	Add VLAN and enter VLAN interface configuration.vlan_id(1-4094);
Step 3	**ipv6 dhcp relay subscriber-id** *subscriber id*	Configure the custom subscriber-id value of option38.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show ipv6 dhcp relay option**	Display configuration information about trunk related options.
Step 6	**write**	Save configurations.

17.4 IPv6 Route

17.4.1 Configure IPv6 Static Route

IPv6 Static Routes Introduction

A static route is a special type of route that is manually configured by an administrator. When the network structure is relatively simple, you only need to configure a static route to make the network work normally. Static routes cannot automatically adapt to changes in network topology. After the network fails or the topology changes, the configuration must be manually modified by the network administrator. IPv6 static routes are similar to IPv4 static routes and are suitable for some IPv6 networks with simple structures.

Default Routes Introduction

The IPv6 default route is the route used when the router does not find a matching IPv6 routing entry. There are two ways to generate IPv6 default routes:

- The first type is manually configured by the network administrator. The function address specified during configuration is ::/0 (prefix length is 0).
- The second type is dynamic routing protocol generation (such as OSPFv3, IPv6 IS-IS, and RIPng). Routers with strong routing capabilities advertise IPv6 default routes to other routers. Other routers generate pointers to them in their routing tables. The default route of the router.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.

Step 2	**ipv6 route** *X:X::X:X/M X:X::X:X*	Add a static route.
Step 3	**no ipv6 route** *X:X::X:X/M X:X::X:X*	Delete static route.
Step 4	**show ipv6 route**	Show current routing configuration

17.5 IPv6 Connectivity Test

Ping6 is mainly used to check network connectivity and host reachability for IPv6.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**ping ipv6** [*X:X::X:X* |-c *count* |*ipv6 name*]	Packetize: The length of the packet to be sent, in bytes. Ping the link local address to specify the interface.

18. WAN Function

The OLT supports the 10 Gbit/s uplink port as the WAN port. Other ports are used only as the LAN port. This configuration enables the OLT to be used as a router/gateway.

18.1 WAN Configuration

To configure the 10G upper interface as the WAN interface, perform the following steps.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface wan**	Enter wan interface configuration mode.
Step 3a	**wan ipversion** <both | ipv4 | ipv6>	Set the IP address type for the WAN connection.
Step 3b	**wan mode** <dhcp | pppoe | static>	Configure the WAN connection type.
Step 4a	**wan ip address** *A.B.C.D/M* **wan ip gateway** *A.B.C.D* **wan ipv6 address** *X:X::X:X/M* **wan ipv6 gateway** *X:X::X:X*	Configure static WAN connections of IPv4 or IPv6 type.
Step 5a	**wan pppoe server** *PPPoE server ip or hostname*	Configure the IP address or name of the PPPoE server for the WAN connection.
Step 5b	**pppoe user name** *name* **password** *password*	Configure the PPPoE WAN account password.
Step 6	**wan mtu** (576-1500)	Configure MTU of the WAN connection.
Step 7	**wan vlan** <*vlan_id* | default>	The VLAN ID configured for the WAN connection takes effect with the VLAN ID configured for the LAN.
Step 8	**wan startup**	Enable the WAN function and submit the WAN connection configuration.
Step 9	**wan stop**	Disable the WAN function.
Step 10	**show pppoe** **show wan** <ip | mode | mtu | vlan>	Show WAN configuration.

Step 11	**multicast proxy** <enable | disable>	The multicast proxy for the WAN was enabled or disabled.
Step 12	**wan ipv6 dhcp prefix-delegation** <enable|disable>	Enable or disable obtaining IPv6 WAN prefixes.
Step 13	**exit**	Exit the global configuration mode
Step 14	**write**	Save configure

18.2 LAN Configuration

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface wan**	Enter wan interface configuration mode.
Step 3	**lan ip address** *A.B.C.D/M*	Configure the LAN IP address and mask.

18.3 NAT Configuration

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface wan**	Enter wan interface configuration mode.
Step 3	**nat type** < nat1 | nat2 | nat4>	The NAT type is specified.
Step 4a	**dmz enable ip address** *A.B.C.D*	Configure a host address for the DMZ. The DMZ must be enabled.
Step 4b	**dmz disable**	Disable DMZ.
Step 5	**show nat type**	Displays the configuration of the NAT type.

Step 6	**show dmz**	Show DMZ configuration.
Step 7	**exit**	Exit the global configuration mode
Step 8	**write**	Save configure

19. PON Management

19.1 Show PON Port Info

19.1.1 Show PON Port Info And Optical Power

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON interface configuration mode.
Step 3	**show pon statistics**	Enter PON interface configuration mode.

19.1.2 Show PON Port Optical Power

Optical module parameters contain transmit optical power, receive optical power, temperature, voltage and bias current. These 5 parameters decide whether the optical module can work normal or not. Any of them is abnormal may cause ONU deregister or lose packets.
Begin at privileged configuration mode, show PON port optical module parameters as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON interface configuration mode.
Step 3	**show pon optical transceiver**	Show pon optical parameters.

19.1.3 Show ONU Optical Transceiver

	Command	Function
Step 1	**configure terminal**	Enter global configuration

		mode.
Step 2	**interface gpon** *slot/port*	Enter PON interface configuration mode.
Step 3	**show pon rx-power onu** [(1-128)|all]	Show ONU optical transceiver

19.2 PON Port Configuration

19.2.1 Enable/Disable PON

Begin at privileged configuration mode, enable or disable PON port as the following table shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON interface configuration mode.
Step 3a	**shutdown**	Disable pon port
Step 3b	**no shutdown**	Enable pon port

19.2.2 Configure P2P Function On The PON Port

begin at the privilege configuration mode, enable or disable the PON port P2P function, as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**show p2p**	Show PON port P2P configuration
Step 3	**show p2p info**	Show P2P configurations of interfaces in different PON modes
Step 4	**p2p** <enable|disable>	Enable/disable P2P function

19.2.3 Configure PON Port Range Function

begin at the privilege configuration mode, configure the PON port Range function, as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3	**show pon range**	Show PON port registration distance configuration
Step 4	**range min** (0-599) **max** (1 -600)	Configure PON Minimum and maximum registered distance of a PON port
Step 5	**no range min** (0-599) **max** (1-600)	Delect Minimum and maximum registered distance of a PON port
Step 6	**show pon range**	Show The registered distance of the current PON port is specified

20. ONU Management

20.1 ONU Basic Configuration

20.1.1 Display Auto-find ONU

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3	**show onu auto-find**	Display auto-find ONU
Step 4	**show onu auto-find aging-time**	Display auto-find indicates the aging time of the ONU

20.1.2 Display ONU Automatic Authorization

OLT enables/disables automatic authorization mode. When the ONU is online, the ONU will automatically authorize the ONU.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3	**show onu auto-learn**	Display auto-learn

20.1.3 Display ONU Authorization Information

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3	**show onu info**	Diaplay authorization

	message

20.1.4 Display ONU Authorization Details

It can display ONU vendor ID, version, serial number, product code...

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3	**show onu info**	Displays onu details

20.1.5 Activate/Deactivate The ONU

When you activate/deactivate the ONU, the ONU goes online/offline

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3a	**onu** [all|(1-128)] [active|deactivate]	Activate/disable the ONU on the PON port

20.1.6 ONU Authorization

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3a	**onu add** (1-128) **profile** *onu_profile_name* [loid|sn+loid|sn]	Authorization ONU

20.1.7 Configure ONU Description

Command	**Function**

Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3	**onu** *onuid* **desc** *string*(1-31)	ONU add description string
Step 4	**show onu desc**	Display ONU description

20.1.8 Configure ONU Whitelist

Whitelist To enable ONU authentication. Supports filtering based on the source SN and Vendor ID.
begin at the privilege configuration mode, configure the onu whitelist function of the device, as shown in the following table:

	Command	**Function**
Step 1a	**onu allowlist sn-auth** *Vendor(4 chars)*	Whitelist based on Vendor ID. The value is a four-digit string
Step 1b	**no onu allowlist sn-auth** *Vendor(4 chars)*	Delete the whitelist based on the Vendor ID
Step 2a	**onu allowlist sn-auth** *SN(12 chars)* [*END SN(12 chars)*]	Whitelist based on SN. The value is a 12-digit string. You can set only the start SN or the range SN (start SN and end SN).
Step 2b	**no onu allowlist sn-auth** *SN(12 chars)* [*END SN(12 chars)*]	Delete the SN whitelist

20.1.9 Display ONU Statistics

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON port
Step 3	**show onu all statistics**	Display ONU send and receive data messages

20.1.10 Configure Plug and Play

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON port
Step 3	**onu plug-and-play** <enable|disable> *vlan*(1-4094)	Configure ONU plug and play and VLAN

20.1.11 Configure ONU Delete Automatically

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**onu auto-delete** *enable*	Enable ONU automatic deletion function
Step 3	**onu auto-delete timeout** <(5-44640)|default>	Set Time when the ONU is automatically deleted
Step 4	**onu auto-delete timeout** *default*	Restores the default time when the ONU is automatically deleted
Step 5	**show onu auto-delete**	Display ONU auto-delete configuration

20.2 ONU Remote Configuration

20.2.1 Display ONU SFP Information

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3	**show onu optical-info**	Display onu SFP information

20.2.2 Upgrade The ONU

The ONU can only be upgraded if the ONU has authorization on the OLT.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**upgrade load tftp image** *filename A.B.C.D*	Configure the ONU firmware name and TFTP server
Step 3	**upgrade select pon 1 onu** <all|*onu_list*>	Select ONU
Step 4	**upgrade start** [activate|commit|download|mix|quick-active]	Download the ONU firmware and save it in memory, then update the ONU
Step 5	**upgrade stop**	Delete firmware from memory and delete the upgrade program information
Step 6	**show upgrade** [status|info| onu-version|onu-firmware] [pon 1 onu <all|*onu_list*>]	Displays the gpon upgrade status, upgrade information, and firmware information

attention：

1. Do not turn off the power when updating. When the update is complete, the OLT notifies the ONU that the update was successful and resets the ONU with the new firmware.
2. After the ONU update restarts, the OLT sends the commit command to confirm the new version.
3. Run the upgrade load image <filename> delete command to delete the firmware and upgrade Settings.
4. Run the show upgrade status command to display the upgrade progress of the ONU.
5. Run the show upgrade info command to display the ONU upgrade Settings.
6. Run the upgrade stop command to stop the ONU upgrade.

20.2.3 ONU Automatic Upgrade

The OLT will compare the device id and onu information, and if they agree, the upgrade will begin

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration

		mode.
Step 2	**auto-upgrade onu equipment_id** *string* **version** *string* **image** *filename* **tftp** *A.B.C.D*	Configure the onu device, id, version, file name, and file address
Step 3	**no auto-upgrade onu equipment_id** *string*	Delete an onu
Step 4	**show auto-upgrade** <status|config>	Display automatic upgrade

20.2.4 Restart The ONU

Restart the authorized ONU

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3a	**onu** [all|(1-128)] **reboot**	Restart one of the ONUs or all ONUs on the PON

20.2.5 T-cont Configuration

Create/modify TCONT and bind it to the DBA configuration file.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3a	**onu** (1-128) **tcont** (1-255) *{[name] string}*1 {[dba] string}*1*	Configure the created ONU TCONT, dba
Step 3b	**no onu** (1-128) **tcont** (1-255)	删除TCONT

20.2.6 GEMPORT Configuration

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.

Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3a	**onu** (1-128) **gemport** (1-255) **tcont**(1-255) {[gemport_name] *gemport_name*}*1 {[portid] (129-4095)}*1	Configure GEMPORT to bind TCONT. You can also select the port id
Step 4	**no onu** (1-128) **gemport** (1-255)	Delete the ONU GEMPORT

20.2.7 ONU Service Configuration

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3a	**onu** (1-128) **service** *service_name* **gemport** (1-255) **vlan** vlan_list {[iphost|eth] (1-255)}*1	Configure the ONU service using vlans
Step 3b	**onu** (1-128) **service** *service_name* **gemport** (1-255) [untag] {[eth] port_id(1-32)}*1 {[iphost] port_id(1-255)}*1 {[vlan] *vlan_id* (1-4094)}*1	Configure the ONU service without vlan
Step 4	**no onu** (1-128) **service** *service_name*	Delete the ONU service

20.2.8 ONU UNI Configuration

Including LAN, VEIP, IPHOST

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3a	**onu** (1-128) **portvlan** [eth|wifi|veip] (1-32) **mode transparent**	Set the UNI mode to transparent
Step 3b	**onu** (1-128) **portvlan** [eth|wifi|veip] (1-32) **mode trunk**	Set the UNI mode to trunk
Step 3c	**onu** (1-128) **portvlan** [eth|wifi|veip]	Set the UNI mode to access

	(1-32) [mode] [tag] **vlan** (1-4094) pri (0-7)	and bind vlan
Step 3d	**onu (**1-128) **portvlan** [eth|wifi|veip] (1-32) **mode hybrid def_vlan** (1-4094) def_pri (0-7)	Set the UNI mode to hybrid and bind vlan
Step 3e	**onu (**1-128) **portvlan** [eth|wifi|veip] (1-32) **vlan** *vlan_list*	Set UNI vlan list

20.2.9 Display ONU Service

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3	**show running-config onu** (1-128)	Display ONU service

20.2.10 Display The ONU Capability

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3	**show onu capability** *onu_list*	Displays ONU capability values

20.3 ONU Remote Port Configuration

20.3.1 Enable/Disable ONU Port

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3	**onu** (1-128) **eth** (1-32) **state**	disable / enable a port

<disable|enable>	

20.3.2 Configure ONU Port Auto-negotiation

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3	**onu** (1-128) **eth** (1-32) **speed** [auto|full-10|full-100|full-1000|half-10|half-100|half-1000]	ONU Port auto-negotiation

20.3.3 Configure Port Flow Control Of ONU

begin at privileged configuration mode, configure ONU port flow control, as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3	**onu** *onuid* **eth pau** *eth_id*(1-32) **pause-time** (0-65535)	Configure flow control

20.3.4 Configure Multicast VLAN

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3a	**onu** (1-128) **mvlan** *vlanList*	Add a multicast vlan
Step 3b	**no onu** (1-128) **mvlan** [all|*vlanList*]	Delete a multicast vlan

20.3.5 Configure ONU Iphost

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3a	**onu** (1-128) **iphost** (1-255) **dhcp**	Set this parameter to dhcp mode
Step 3b	**onu** (1-128) **iphost** (1-255) **static-ip** *A.B.C.D A.B.C.D* [gateway] *A.B.C.D*	Set this parameter to static mode, subnet mask, and gateway
Step 3c	**onu** (1-128) **iphost** (1-255) **primary-dns** *A.B.C.D* {[second-dns] *A.B.C.D}*1*	Configure DNS
Step 3d	**no onu** (1-128) **iphost** (1-255)	Delete an iphost configuration

20.3.6 Configure Port Multicast Label Of ONU

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON Interface configuration mode
Step 3a	**onu** (1-128) **mvlan** [tag-strip] **eth** (1-32)	Configure the multicast label
Step 3b	**no onu** (1-128) **mvlan** [tag-strip] **eth** (1-32)	Delete configuration

20.3.7 SFU Example

1GE ONU with vlan 100. Upstream DBA mode: 10 Mbit/s maximum.

1. Create an onu configuration file with one eth port
   profile onu name 1GE_SFU
   port eth 1
   commit
   exit
2. Create a dba configuration file. Ensure that a maximum of 10 MB is 20 MB
   profile dba name 20M
   type 3 assured 10240 maximum 20480

commit
exit
Register the onu and configure the service
interface gpon 0/1
show onu auto-find
onu add 1 profile 1GE_SFU sn GPON00000031
onu 1 tcont 1 dba 20M
onu 1 gemport 1 tcont 1
onu 1 service 1 gemport 1 vlan 100
onu 1 portvlan eth 1 mode tag vlan 100
3. Create vlan 100
vlan 100
exit
4. Bind the vlan to the uplink port
interface gigabitethernet 0/1
switchport hybrid pvid vlan 100

20.3.8 HGU Example

4FE ONUs with vlan 41 and vlan 46. Upstream DBA mode: 10 Mbit/s maximum. vlan 46 is used for tr069, DBA mode: fixed 2M

1. Create an onu profile with one veip port
profile onu name HGU
port veip 1
commit
exit
2. Create a dba configuration fileprofile dba name 20M
type 3 assured 10240 maximum 20480
commit
exit
profile dba name 2M
type 1 fixed 2048
commit
exit
3. Register the onu and configure the service
interface gpon 0/1
show onu auto-find
onu add 1 profile HGU sn GPON000000AB
onu 1 tcont 1 dba 20M
onu 1 tcont 2 dba 2M
onu 1 gemport 1 tcont 1
onu 1 service HSI gemport 1 vlan 41
onu 1 gemport 2 tcont 2
onu 1 service TR69 gemport 2 vlan 46

onu 1 portvlan veip 1 mode transparent

3. Create vlan41 and VLAN46 and bind them to uplink ports

vlan 41
exit
vlan 46
exit
interface gigabitethernet 0/10
switchport mode trunk
switchport trunk vlan 41
switchport trunk vlan 46

4. Log in to the onu network interface and create two WAN connections, one is the Internet using vlan41; The other is tr069 with vlan46

20.4 Private Configuration

20.4.1 Configure ONU ACL Rules

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri acl** [fttp|http|https|ping|ssh|telnet|tftp] [disable|enable]	Configure the corresponding acl rules
Step 4	**show onu** (1-128) **pri**	Show results

20.4.2 Configure ONU CATV Status

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri catv** <disable|enable>	Configure the catv status
Step 4	**show onu** (1-128) **pri catv_status**	Show results

20.4.3 Configure ONU Dhcp Server

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri dhcp_server** *A.B.C.D A.B.C.D* <enable|disable|relay>	Configure the dhcp server status
Step 4	**onu** *1* **pri dhcp_server** *192.168.1.1 255.255.255.0* **enable** *10000 192.168.1.2 192.168.1.254* **stb** *8.8.8.8 114.114.114.114 192.168.1.1*	Example of configuring the dhcp server state: Create a dhcp server whose gateway is 192.168.1.1, address pool is 192.168.1.2 to 192.168.1.254, lease is 10000S, and DNS is 8.8.8.8 114.114.114.114
Step 5	**show onu** (1-128) **pri dhcp_server**	Display result

20.4.4 Configure ONU Dhcpv6 Server

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**Interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**Onu** (*1-128*) **pri dhcp_server ipv6** *X:X::X:X* <enable|disable|relay>	Configure the dhcpv6 server status
Step 4	**onu** *1* **pri dhcp_server ipv6** *2550::11* **prefix_mode auto server enable preference** *10000* **valid** *5000 2000::1 2000::10* stb dns *204f::1 204f::2* gw *2550::11*	Example: Create a gateway with 2550::1,PD mode is automatic, preference time is 10000s, live time is 5000s, address pool range is 2000::1 to 2000::10,dns The dhcpv6 server is 204f::1 204f::2
Step 5	**show onu** (1-128) **pri dhcp_server_ipv6**	Display result

20.4.5 Configure ONU Equid Server

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri equid** *word*	Example Change the id of an ONU device
Step 4	**show running-config onu** (1-128)	Display result

20.4.6 Restore ONU To Factory Defaults

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri factory_reset**	Restore the ONU to factory defaults

20.4.7 Configure ONU Firewall

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri firewall level** {disable|low|middle|high}*1	Configure the ONU firewall

20.4.8 Configure ONU IGMP Mode

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding

		PON port
Step 3	**onu** (1-128) **pri igmp** [enable|disable]	Configure ONU igmp
Step 4	**show onu** (1-128) **pri igmp_status**	Display result

20.4.9 Configure ONU LAN Binding Mode

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri lan_bind_mode port (**1-255) **mode vlan lanVlan0** (1-4094) **wanVlan0** (1-4094)	Set the ONU LAN binding mode to vlan
Step 4	**onu** (1-128) **pri lan_bind_mode port** (1-255) **mode port**	Set the ONU LAN binding mode to vlan
Step 5	**show onu** (1-128) **pri lan_bind_mode**	Display result

20.4.10 Configure ONU Loopback

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri loopback_detect** <disable|enable>	Configure ONU loopback
Step 4	**show onu** (1-128) **pri loopback**	Display result

20.4.11 Configure ONU MAC Connection

	Command	**Function**
Step 1	**configure terminal**	Enter the global

		configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri mac_aging_time** (0-65535)	Set the ONU MAC aging time
Step 4	**onu** (1-128) **pri mac_clean**	Clear the ONU mac table
Step 5	**onu** (1-128) **pri mac_limit pon** (0-65535)	Example Set the aging time of an ONU mac address
	show onu (1-128) **pri mac_addr_table**	The ONU MAC table is displayed

20.4.12 Configure ONU Port Isolation

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri port** <disable|enable>	Configure ONU port isolation

20.4.13 Configure ONU Voice Port

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri pots** [all|(1-255)] **sip_user_config active enable acconut** *word max length 16* **name** *word max length 16* **pwd** *word max length 16*	Configure ONU voice port information
Step 4	**show onu** (1-128) **pri pots** [all|(1-255)]	Display result

20.4.14 Save ONU Configuration

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri save_config**	Save The ONU configuration

20.4.15 Configure ONU Voice SIP Service

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri sip_global_param mg_port** (0-65535) **proxy_serv** word (0-65535) **backup_proxy_serv** *word* (0-65535) **reg_serv** *word* (0-65535)	Configure ONU sip server information
Step 4	**show onu** (1-128) **pri sip**	Display result

20.4.16 Configure ONU RSTP

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri spanning_tree** <disable|enable>	Configure ONU RSTP

20.4.17 Configure ONU Uplink Upstream Speed Limit

Command	**Function**

Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri speed_limit us** (1-1244000,kbps)	Configure ONU uplink limiting

20.4.18 Configure ONU TR069 Management Information

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**Interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri tr069_mng enable ace_server url** *word* **username** *word* **password** *word* **certificate** <disable|enable> **inform** <disable|enable> **inform_interval** (0-4294967295)	Configure ONU TR069 management information
Step 4	**onu** (1-128) **pri tr069_stun** <disable|enable> **server** *word* **port** (1-65535) **username** *word* **password** *word*	Configure the ONU TR069 Stun server
Step 5	**show onu** (1-128) **pri tr069**	Display result

20.4.19 Configure ONU UPNP

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri upnp status** <disable|enable> **wan_index** (1-8)	Configure ONU UPNP

20.4.20 Configure ONU WAN Information

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri wan_adv index** (1-8) **route** [ipv4|ipv6|both] [dhcp|pppoe|static] [dns] primary *A.B.C.D* [nat] <disable|enable>	Example of configuring ONU route wan
Step 4	**onu** (1-128) **pri wan_adv index** (1-8) **bridge** [internet|other] [ipv4|ipv6|both|mtu]	Example of configuring ONU bridge wan
Step 5	**onu** (1-128) **pri wan_adv index** (1-8) **bind** [lan|ssid]	Configure WAN bond ports
Step 6	**onu** (1-128) **pri wan_adv index** (1-8) **delete**	Deleting a WAN
Step 7	**onu** (1-128) **pri wan_adv commit**	Commit WAN
Step 8	**show onu** (1-128) **pri wan_adv**	Display result

20.4.21 Configure ONU WIFI SSID

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the corresponding PON port
Step 3	**onu** (1-128) **pri wifi_ssid** (1-8) **disable**	Turn off wifi
Step 4	**onu** (1-128) **pri wifi_ssid** (1-8) **name** *word* **hide** <disable|enable>	Set whether the WIFI SSID is hidden
Step 5	**onu** (1-128) **pri wifi_ssid** (1-8) **name** *word* **hide disable**	Configure WAN bond ports
Step 6	**onu** (1-128) **pri wifi_switch** (1-2) **enable**[fcc|etsi|ic|spain|france|mkk|isreal|mk k2|mkk3|russian|cn|global|world-wide|mkk1|ncc][auto|chl_34|chl_36|chl_38|chl_40|chl_42|ch l_44|chl_46|chl_48|chl_52|chl_56|chl_60	Configure WIFI channels, protocols, etc

	|chl_64|chl_100|chl_104|chl_108|chl_112|chl_116|chl_120|chl_124|chl_128|chl_132|chl_136|chl_140|chl_144|chl_149|chl_153|chl_157|chl_161|chl_165]{80211ac0|80211acA|80211acN|80211acAN|80211acNAC|80211acANAC|80211acax|80211acanacax}*(0-20) [cw20|cw40|cw80|cw20/40|cw20/40/80|cw160] [easy_mesh] <enable|disable>	
Step 7	**show onu** (1-128) **pri wifi_ssid** (1-8)	The wifi ssid information is displayed
Step 8	**show onu** (1-128) **pri wifi_switch**	The wifi channel information is displayed

20.5 Rogue ONU Configuration

An ONU that does not follow the specified timestamp to send an optical signal is called a rogue ONU.
There are two main types of rogue ONUs:
1) Long time Glowing rogue ONU: ONU is glowing (glowing at any time).
2) Luminous rogue ONU: The ONU is not assigned a timestamp in the OLT, which may be premature luminous, or delayed shutdown, and so on.

20.5.1 Configure Rogue ONU Detection

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**rogue-onu-detect** <enable|disable>	Enter the corresponding PON port
Step 3	**show rogue-onu-detect config|**	Display configuration
Step 4	**show rogue-onu-detect info** pon (1-8)	Display result

20.5.2 Display Rogue ONU Status

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**show rogue-onu-detect config**	Display configuration

21. ONU Profile Management

21.1 Summary Of ONU Profile

The template is under the "config" node, and the operation steps are as follows:
1. Create the profile
profile {onu|dba|format|igmp|line|srv|pri} {id <1-32767>}*1 {name <string>}*1
2.Enter the corresponding profile node via profile_id
profile {onu|dba|format|igmp|line|srv|pri} {id <1-32767>}*1 {name <string>}*1
3.Modifying profile parameters
modify …
4.Exit profile node
exit
5.Bind the profile to the onu device
Interface gpon *slot/port*
onu add *1* **profile** *<string>*
onu <onuid> **profile** {line|srv} *<string>*
6.Query the onu device binding profile
Interface gpon *slot/port*
show profile {onu|dba|format|igmp|line|srv|pri} *{id <1-32767>}*1 {name <string>}*1*
7.Query profile configuration information
Show profile {onu|dba|format|igmp|line|srv|pri} *{id <1-32767>}*1 {name <string>}*1 used-info*

21.2 ONU Profile Configuration

ONU profile are used for ONU authorization, and only one ONU profile can be specified for each ONU during authorization. The ONU template specifies the capabilities of that ONU.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode
Step 2	**profile onu** [id] (1-32767) [name] *string*	Create or enter the onu profile you created earlier.
Step 3a	**tcont-num** (1-255) **gemport-num** (1-255)	Configure the maximum tcont and gemport supported by the onu.
Step 3b	**port-num** [eth](0-64) [pots](0-64)	Configure onu

	[iphost] (0-255) [ipv6host] (0-255) [veip] (0-127)	eth/pots/iphost/ipv6host/veip
Step 4	**commit**	Commit the configuration file. The Settings can only be committed by typing "commit"
Step 5	**exit**	

21.3 DBA Profile Configuration

The default system will have a dba profile with id 0, this template parameter cannot be modified, and all ONUs will be in the template when the default binding is created. Each ONU must bind a dba template.
It have 5 dba filre:
Typr1: fix, integral
Type2: assure, integral
Type5: fix, assure, max, integral
Fix<=assure<=max.

BW Type	Delay Sensitive	Applicable T-CONT types				
		Type 1	Type 2	Type 3	Type 4	Type 5
Fixed	Yes	X				X
Assured	No		X	X		X
Non-Assured	No			X		X
Best Effort	No				X	X
Max.	No			X	X	X

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode
Step 2	**profile dba** [id] (1-32767) [name] *word*	Create/modify dba configuration files
Step 3a	**type** [1] **fixed** (128-9953280)	Configure type 1 to be fixed
Step 3b	**type** [2] **assured** (128-9953280)	Configure type 2 to be guaranteed

Step 3c	**type** [3] **assured** (128-9953280) **maximum** (128-9953280)	Configure type 3 with guaranteed and maximum values
Step 3d	**type** [4] **maximum** (128-9953280)	Configures type 4 with the maximum value
Step 3e	**type** [5] **fixed** (128-9953280) **assured** (128-9953280) **maximum** (128-9953280)	Configure type 5 with fixed, guaranteed, maximum values

21.4 Line Profile Configuration

The default system will have a line profile with id 0, this profile parameter cannot be modified

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode
Step 2	**profile line** [id] (1-32767) [name] *word*	Create a modified line profile
Step 3	**tcont** (1-255) [id] (1-32767) [name] *word*	Bind the tcont configuration file
Step 4	**gemport** (1-255) **tcont** (1-255) *gemport_name*	Binding the gemport configuration file
Step 5a	**service** *service_name* **gemport** (1-255) **vlan** *VLAN_LIST* **[ethuni]** (1-32) **[iphost]** (1-255)	Bind gemport with vlan to the service
Step 5b	**service** *service_name* **gemport** (1-255) [untag] [ethuni] (1-32) [iphost] (1-255) [vlan](1-4094)	Bind gemport without vlan to the service
Step 5c	**mvlan** *vlanlist*	Create a multicast vlan
Step 6	**commit**	Submitting configuration
Step 7	**no mvlan** [all|*vl*anlist]	Delete the multicast vlan
Step 8	**no tcont** (1-255)	Delete tcont
Step 9	**no gemport** (1-255)	Delete gemport
Step 10	**no service** *service_name*	Delete service
Step 11	**exit**	

21.5 Service Profile Configuration

The system will have an SRV profile with id 0 by default and this template parameter cannot be modified

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode
Step 2	**profile srv** *id* (1-32767) *name string*	Create/modify srv profile
Step 3a	**portvlan** {eth|wifi|veip}*1 (1-32) **mode** transparent	Configure portvlan mode to transparent
Step 3b	**portvlan** {eth|wifi|veip}*1 (1-32) **mode** trunk	Configure the portvlan mode to trunk
Step 3c	**portvlan** {eth|wifi|veip}*1 (1-32) **mode tag** *vlan* (1-4094) **pri** (0-7*)*	Configure portvlan mode to tag, and configure pri
Step 3d	**portvlan** {eth|wifi|veip}*1 (1-32) **mode hybrid def_vlan** (1-4094) **def_pri** (0-7)	Configure portvlan mode to hybird
Step 4a	**mvlan *tag-strip eth*** (1-32)	Configure the LAN port to untag mode
Step 4b	**no mvlan tag-strip eth** (1-32)	Remove LAN port untag mode
Step 5a	**iphost** (1-255) [desc] string	Configure the iphost description
Step 5b	**iphost** (1-255) [dhcp]	Configure iphost to dhcp mode
Step 5c	**iphost**(1-255) **static-ip** *A.B.C.D A.B.C.D* **gateway** *A.B.C.D*	Configure iphost to static mode
Step 5d	**iphost** (1-255) **primary-dns** *A.B.C.D* **second-dns** *A.B.C.D*	Configuring DNS
Step 5e	**no iphost** (1-255)	Delete the iphost configuration
Step 6	**commit**	Submitting configuration
Step 7	**exit**	

21.6 Alarm Threshold Profile Configuration

Alarm thresholds can only be configured via profile. begin at the privilege configuration mode, configure the alarm threshold profile as shown in the following table.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode
Step 2	**profile alarm** [id] (1-32767)[name] *string*	Create or enter a configuration file
Step 3a	**sf-sd-threshold sf** (3-8) **sd** (4-10)	Configure the range of sf

		and sd
Step 3b	**rx-optical low** (-27~-8) **high** (-27~-8)	Configure rx optical range
Step 3c	**tx-optical low** (1-5) **upper** (1-10)	Configure the range of tx optical
Step 4	**commit**	Submitting configuration
Step 5	**exit**	

21.7 Private Profile Configuration

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode
Step 2	**profile pri** [id] (1-128) [name] *string*	Create/modify the pri profile
Step 3	**wan_adv add** <bridge|route>	Add a route/bridge WAN
Step 4	**wan_adv index** (1-8) **bind** {lan1|lan2|lan3|lan4|lan5|lan6|lan7|lan8|ssid1|ssid2|ssid3|ssid4|ssid5|ssid6|ssid7|ssid8|ssid9|ssid10}*1	Binding port
Step 5	**wan_adv index** (1-8) **bridge** <internet|other> [mtu] (576-1500) [ipv4|ipv6|both]	Configuring Bridge WAN
Step 6a	**wan_adv index** (1-8) **route both pppoe proxy** <enable|disable> **user** *NAME* **pwd** *word* server *servername* **mode** <auto|payload> **nat** <enable|disable> **slaac** <enable|disable>	Configure pppoe mode routing WAN
Step 6b	**wan_adv index** (1-8) **route both static ipv4** *A.B.C.D* **mask** *A.B.C.D* **gw** *A.B.C.D* **dns** primary *A.B.C.D* secondary *A.B.C.D* **nat** <enable|disable> **ipv6** *X:X::X:X/M* **gw** *X:X::X:X* **dns** primary *X:X::X:X* secondary *X:X::X:X*	Configuring a routing WAN in static mode
Step 6c	**wan_adv index** (1-8) **route** <both|ipv6> **client_address** <enable|disable> **client_prifix** <enable|disable>	Configure the client_address, client_prifix, and aftr_mode of the routing WAN
Step 6d	**wan_adv index** (1-8) **route both dhcp** [dns-v4] primary A.B.C.D secondary A.B.C.D [nat] <enable|disable> [dns-v6] primary *X:X::X:X* secondary *X:X::X:X* [slaac] <enable|disable>	Configure dhcp mode routing WAN

Step 7	**wan_adv index** (1-8) **route mode** [internet|multicast|tr069|tr069_internet|tr069_voip|voip_internet|tr069_voip_internet|voip|other] [mtu](576-1500)	Configure the mode of routing WAN
Step 8a	**wan_adv index** (1-8) **vlan disable** [qos]<*enable*|*disable*>	VLAN to disenable WAN
Step 8b	**wan_adv index** (1-8) **vlan tag** [wan_vlan] (1-4095) cos (0-7) [qinq] tpid (1-65534) vlan (1-4095) cos (0-7) [qos] <enable|disable>	Configure the VLAN mode to tag
Step 8c	**wan_adv index** (1-8) **vlan transparent** [wan_vlan] (1-4095) (0-7)] [tranlation] (1-4095) (0-7) [qinq] tpid (1-65534) vlan (1-4095) cos (0-7) [qos] <enable|disable>	Configure VLAN mode to transparent
Step 9	**wan_adv index** (1-8) **bin*d*** <lan|ssid>	Bind lan port and ssid
Step 10	**wan_adv commit**	Submitting WAN
Step 11	**wan_adv index** (1-8) **delete**	Removing index
Step 12	**dhcp_server** *A.B.C.D A.B.C.D* **disable**	disenable the dhcp server
Step 13a	**dhcp_server** *A.B.C.D A.B.C.D* **enable** (0-4294967295) *A.B.C.D A.B.C.D* [pc|camera|stb|ip_phone] *A.B.C.D A.B.C.D A.B.C.D*	Configure the dhcp server
Step 13b	**dhcp_server ipv6** *X:X::X:X* **prefix_mode** {auto|static *X:X::X:X/M*|wan_delegated (1-8)}*1 **server enable preference** (0-4294967295) **valid** (0-4294967295) *HHHH:HHHH:HHHH:HHHH HHHH:HHHH:HHHH:HHHH* {pc|camera|stb|ip_phone}*1 **dns** *X:X::X:X X:X::X:X* **gw** *X:X::X:X* [ra manage] <enable|disable> [other] <enable|disable> max_interval (1-1800) min_interval (1-1800)	Configure the dhcpv6 server
Step 13c	**dhcp_server ipv6** *X:X::X:X* **prefix_mode** {auto|static *X:X::X:X/M*|wan_delegated (1-8)}*1 **server disable** [ra manage] <enable|disable>[other] <enable|disable> max_interval (1-1800) min_interval (1-1800)	To enable dhcpv6 server
Step 13d	**dhcp_server ipv6** *X:X::X:X*	Configuring dhcpv6 in static

	[prefix_mode] static *X:X::X:X/M*	mode server
Step 13e	**dhcp_server ipv6** *X:X::X:X* [prefix_mode] *wan_delegated* (1-8)	Configure the dhcpv6 server in wan_delegated mode
Step 14a	**wifi_ssid** (1-8) **name** *WORD* **hide** <enable|disable> **auth_mode** {open|shared|wepauto}*1 **encrypt_type** *wep* **encryptionlevel** <64|128> **keyindex** (1-4) **key1** *WORD* **key2** *WORD* **key3** *WORD* **key4** *WORD*	Configure the dhcpv6 server in wan_delegated mode
Step 14b	**wifi_ssid** (1-8) **name** *WORD* **hide** <enable|disable> **auth_mode** {wpapsk|wpa2psk|wpapsk_wpa2psk|wpa3psk|wpa2psk_wpa3psk}*1 **encrypt_type** {tkip|aes|tkipaes}*1 **shared_key** *WORD* [rekey_interval] (0-4194303)	Configure the dhcpv6 server in wan_delegated mode
Step 15	**wifi_ssid** (1-8) **disable name** *WORD*	To enable ssid
Step 16a	**wifi_switch** (1-2) **enable** {fcc|etsi|ic|spain|france|mkk|isreal|mkk2|mkk3|russian|cn|global|world-wide|mkk1|ncc}* (0-14) {80211b|80211g|80211bg|80211n|80211bgn|80211ax|80211bgnax|80211gn}* (0-20) <20|40|20/40>	Configure 2.4G wifi_switch
Step 16b	**wifi_switch** (1-2) **enable** [fcc|etsi|ic|spain|france|mkk|isreal|mkk2|mkk3|russian|cn|global|world-wide|mkk1|ncc] [auto|chl_34|chl_36|chl_38|chl_40|chl_42|chl_44|chl_46|chl_48|chl_52|chl_56|chl_60|chl_64|chl_100|chl_104|chl_108|chl_112|chl_116|chl_120|chl_124|chl_128|chl_132|chl_136|chl_140|chl_144|chl_149|chl_153|chl_157|chl_161|chl_165] {80211ac0|80211acA|80211acN|80211acAN|80211acNAC|80211acANAC|80211acax|80211acanacax}* (0-20) <20|40|80|20/40|20/40/80|160>[easy_mesh] <*enable*|*disable*>	Config 5G wifi_switch
Step 17	**wifi_switch** (1-2) **disable**	Disable the wifi
Step 18	**no wifi_ssid** (1-8)	Delete Wi-Fi ssid configuration
Step 19	**no wifi_switch** (1-2)	Delete Wi-Fi switch Configuration

Step 20a	**sip_global_param mg_port** (0-65535) **proxy_serv** *WORD* (0-65535) [backup_proxy_serv WORD](0-65535) **reg_serv** *WORD* (0-65535) [backup_reg_serv WORD](0-65535) **out_bound_serv WORD** (0-65535) **reg_interval** (1-10000000) **heartbeat** <active|passive> (1-65535) (1-65535)	Configure SIP to enable heartbeat packets.
Step 20b	**sip_global_param mg_port** (0-65535) **proxy_serv** *WORD* (0-65535) [backup_proxy_serv WORD](0-65535) **reg_serv** *WORD* (0-65535) [backup_reg_serv WORD](0-65535) **out_bound_serv** *WORD* (0-65535*)* **reg_interval** (0-10000000) **heartbeat** disable	Configure SIP to close heartbeat packets
Step 21	**no sip_global_param**	Delete SIP configuration
Step 22	**pots** (1-255) **parameter vad** <enable|disable> **echo_cancel** <enable|disable> **input_gain** *WORD*(-32-32) **output_gain** *WORD*(-32-32) **dtmf_mode** <transparent|rfc2833|rfc2833_redundancy|outband>	Configure pots advanced parameters
Step 23a	**pots** (1-255) **sip_user_config active** *disable*	Disable pots
Step 23b	**pots** (1-255) **sip_user_config active** enable **account** *WORD* **name** *WORD* **pwd** *WORD*	Configure the pots user parameters
Step 24	**no pots** (1-255) **parameter**	Delete the pots' configuration
Step 25a	<port_isolate|spanning_tree|catv|igmp> <enable|disable>	Configure port isolation、stp、catv、igmp
Step 25b	**speed_limit us** (1-9953000) **ds** (1-9953000)	Configure rate limit
Step 25c	**mac_aging_time** (0-65535)	Configure the mac aging time
Step 25d	**mac_limit pon** (0-65535) **lan** (0-65535)	Configure the mac aging time
Step 26a	**nat_type** <nat1|nat2|nat3|nat4-napt>	Configure the nat type
Step 26b	**upnp status disable**	Disable the upnp
Step 26c	**upnp status enable wan_index** (1-8)	Configure upnp
Step 26d	**no** <nat_type|upnp>	Delete NAT/UPNP configuration

Step 27a	**onu_mode status** disable	Disable the onu mode state
Step 27b	**onu_mode status** enable **mode** <sfu|hgu|auto>	Configure the onu mode status
Step 28	**username admin_control enable** *WORD WORD* **user_control enable** *WORD WORD*	Configure the account number and password of the admin users and user users
Step 29	**firewall level** <disable|low|middle|high>	Configure firewall
Step 30	**acl** <telnet|ftp|http|https|tftp|ping|ssh> **control enable lan** <enable|disable> **wan enable ipv4_control enable** *A.B.C.D A.B.C.D* **ipv6_control enable** *X:X::X:X/M* [port](0-65535)	Configure ACL
Step 31	**loopback_detect** <enable|disable> [loopcheck_interval] (1-60000) [recover_interval] (1-1800) [ethernet_type]*WORD* [vlan](1-4094) [dest_mac_type] <broadcast_address|bpdu_address> [port_closing_time] (1-1800) [alarm]<enable|disable> [portdislooped]<enable|disable>	Configure loop detection
Step 32a	**tr069_mng** disable	Disable tr069 manage
Step 3b	**tr069_mng** enable **acs_server url** *WORD* **username** *WORD* **password** *WORD* **certificate** <enable|disable> **inform** <disable|enable> *i*nform_interval (0-4294967295) **reverse_connection username** *WORD* **password** *WORD*	Disable tr069 manage
Step 32c	**tr069_stun** disable	Disable tr069 stun
Step 32d	**tr069_stun** enable **server** *WORD* **port** (1-65535) [username] *WORD* [password] *WORD*	Configure tr069 stun
Step 33	**show profile pri** id (1-32767) name *string*	Show the private profile configuration
Step 34	**exit**	Exit

21.8 IGMP Profile Configuration

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**profile igmp** [id] (1-128) [name] *string*	Configure the igmp profile

Step 3	**igmp-mode** <snooping|spr|proxy>	Configure the igmp mode
Step 4	**igmp-rate-limit** (0-4294967294)	Configure the igmp rate limit
Step 5	**igmp-version** <igmp-v1|igmp-v2|igmp-v3|mld-v1|mld-v2>	Configure the igmp version
Step 6	**show profile igmp** [id] (1-32767) [name] *WORD* running-config	Show the igmp configuration

21.9 Format Profile Configuration

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**profile format** [id] (1-128) [name] *string*	Configure the format profile
Step 3	**switch** [option82] <enable|disable> [option18] <enable|disable> [option37] <enable|disable> [pppoe-plus] <enable|disable>	Add exchange configuration
Step 4	**format type** <custom|ctc|unicom>	Configure the format type
Step 5	<circuit-id|remote-id> **index** (1-22) <cvlan|devtype|acnoid|slotno|ponno|onuno|onutype|onusn>	Configure the circuit-id and remote-id parameters
Step 6	**show profile format** [id] (1-32767)*[*name] *WORD* running-config	Show the format configuration

21.10 ONU Binding Profile Configuration

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**interface gpon** *slot/port*	Enter the PON interface configuration mode
Step 3	**onu** <all|*onu_list*> **profile** <line|srv|alarm|pri|format> <name *WORD*|id (1-32767)>	Give the ONU binding profile configuration
Step 4	**no onu** <all|*onu_list*> **profile** [<line|srv|alarm|pri|format>]	Give the ONU to unbind the profile configuration

Step 5	**show onu** <all|*onu_list*> **profile**	Show the ONU profile configuration

21.11 Show/Delete The Profile

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**no profile** [onu|dba|format|igmp|line|srv|pri] **id** (1-32767)	Remove the profile
Step 3a	**show profile** [onu|dba|format|igmp|line|srv|pri] **id** (1-32767)	Show the profile

22.

22. ONU Auto-learn Configuration

22.1 Enable Automatic Learn

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface gpon** *slot/port*	Enter PON interface configuration mode.
Step 3a	**onu auto-learn** [alarm-profile|format-profile|line-profile| pri-profile|srv-profile][name] *string* [id] (1-32767)	Enable the auto-learn function.It support to select onu profile.will bind the default profile if not select.
Step 3b	**no onu auto-learn**	Disable the auto-learn
Step 4	**show onu auto-learn**	Show the auto-learn

23. System Management

23.1 Configure Management

23.1.1 Save The Configuration

After you modify the configurations, you should hold them unchanged so that they can take effect on the next restart. Save the configuration by using the following command.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**write**	Save the configuration

23.1.2 Erase Configuration

If you need to reset to factory defaults, you can erase all configurations using the following command. After the erase, the device will automatically restart.

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**erase startup-config**	Erase all configurations

23.1.3 Show The Boot Configuration

Use the following command to display the saved configuration.。

	Command	Function
Step 1	**configure terminal**	Use the following command to display the saved configuration.
Step 2	**show startup-config**	Show the configuration

23.1.4 Show The Running Configuration

Use the following command to display the running configuration. These running

configurations may not be saved in the flash memory。

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**show running-config**	Show the running configuration

23.1.5 Upload/Download The Configuration File

Use the following command to upload the configuration file to the PC, and download the configuration file to the device.

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**debug-mode**	Enter the debug mode
Step 3a	**upload tftp configuration** *filename A.B.C.D*	filename Is the upgrade file, A.B.C. D is the TFTP server IP
Step 3b	**download tftp configuration** *filename A.B.C.D*	filename Is the upgrade file, A.B.C. D is the TFTP server IP

23.2 Display System Information

23.2.1 Display System Operation Information

Use the following command to view the system information.

Command	Function
show sys arp	Show the ARP table
show top	Show the CPU utilization rate
show task	Show the thread name

23.2.2 Display Version Information

Use the following command to check the version information, including the hardware version, software version, software creation time, etc.

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode

Step 2	**show version**	Show the version information

23.3 System Basic Configuration

23.3.1 Configure The System Name

Change the system name by using the following command. This modification will take effect immediately. You will see it in the command-prompt prefix. begin at the privileged configuration mode, press the configuration system name as shown in the table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**hostname** *name*	Configure the system name. It must begin with a letter.

23.3.2 Configure The Terminal Timeout Value

Use the following command to configure the terminal timeout value. The default value is for 10 minutes.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**line vty**	Enter the line node
Step 3a	**exec-timeout** (0-35791)	Set the command-line timeout time
Step 3b	**no exec-timeout**	Set the command line timeout to the default value
Step 4	**show exec-timeout**	Show plays command line timeout

23.4 System Basic Operations

23.4.1 Upgrade The System

Upgrade the device by using the following command.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode

Step 2	**debug mode**	Enter the debug mode
Step 3	**download tftp image** *filename A.B.C.D*	Filename Is the upgrade file with a header h,A.B.C. D is the TFTP server IP

23.4.2 Restart The System

Restart the system by using the following command

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**reboot**	Restart the system

23.4.3 Telnet

You can remotely connect to the system via an out-of-band or in-band management IP. The default management IP is 192.168.8.100.

	Command	**Function**
Step 1	**telnet 192.168.8.100**	Telnet To the application layer of the system. Login name is admin and password is Xpon@Olt9417#.

23.4.4 Configure The RTC System Time

Use the following command to configure the RTC system time

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**time set year** (2000-2099)**month** (1-12) **day** (1-31) **hour** (0-23)**minute** (0-59)**second** (0-59)	Configure the RTC clock
Step 3	**show time**	Show the system time

23.4.5 NTP Client

When you enable NTP, the device automatically updates the time

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**ntp server** *HOSTNAME*	Configure the NTP server and enable it
Step 3	**ntp disable**	Disable the NTP server
Step 4	**show time**	Show the system time

23.4.6 Configure Time Zone

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**timezone offset** *name*	Configure time zone
Step 3	**show timezone**	Show time zone

23.4.7 Fan Control

Use the following command to control the fan running attributes.

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**fan temperature** (20-80)	Configure fan temperature
Step 3	**fan mode** <open|close|auto>	Configure the fan operation mode
Step 4	**show fan**	Show the fan configuration and the current device temperature

24. User Management

24.1 User Privilege

The user has two permissions, the administrator user and the ordinary user. Ordinary users are read-only users, who can only view the system information, but can not view the user information, configuration. The administrator user can view all the information and configure all the parameters.

24.2 Default User

By default, there is an administrator user, admin, whose password is Xpon@Olt9417#. The default user cannot be deleted, modify, but you can change their password.

24.3 Add User Account

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**user manager**	Enter the manager mode
Step 3	**user add** *user-name* **login-password** *login-password*	Add a new user account
Step 4	**user role** *user-name* [admin|normal|config] **enable-password** *enable-password*	Specify the user role, the new user is the normal privileged user

24.4 Display List of User Accounts

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**user manager**	Enter the manager mode
Step 3	**user list**	Show a list of user accounts

24.5 Delete User Account

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**user manager**	Enter the manager mode
Step 3	**user delete** *username*	Delete user account

24.6 Change Password

Each user can change their own password, while administrator users can change the passwords of other users. Change the password, as shown in the table below.

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**user manager**	Enter the manager mode
Step 3	**user login-password** *user-name login_passwd*	Configure the user's login password
Step 4	**user enable-password** *user-name enable_passwd*	Configure the user's configuration mode password

25. Login Management

25.1 Overview

Login management is mainly used as a way to manage access to olt, service port number, login verification code, timeout time, and modify the language of the web page. In addition, we can only see the number of users of telnet logged in.

25.2 Login Access List Configuration

	Command	**Function**
Step 1	**config terminal**	Enter the global configuration mode
Step 2	**login-access-list** <enable|disable>	Open / close the login access control list
Step 3	**login-access-list** <deny|permit> <web|telnet|snmp|ssh> *A.B.C.D A.B.C.D*	Configure the login access list
Step 4	**no login-access-list** <deny|permit> <web|telnet|snmp|ssh|ping> *A.B.C.D A.B.C.D*	Clear the login access list configuration
Step 5	**show login-access-list**	Show the login access list configuration

25.3 Service Port Configuration

begin at the privileged configuration mode, configure the group name as shown in the table.

	Command	**Function**
Step 1	**config terminal**	Enter the global configuration mode
Step 2	**telnet**	Enter the telnet mode
Step 3	**telnet port** <(1-65535)|default>	Configure the service port for the telnet
Step 4	**exit**	Returns to the global configuration mode
Step 5	**sshd**	Enter the ssh mode

Step 6	**ip ssh port** <(1-65535)|default>	Configure the service port for the ssh
Step 7	**exit**	Returns to the global configuration mode
Step 8	**snmp-server agent port** (1-65535)	Configure the service port for the snmp
Step 9	**exit**	Returns to the global configuration mode
Step 10	**web port** <(1-65535)|default>	Configure the service port for the web
Step 11	**exit**	Returns to the global configuration mode
Step 12	**write**	Save configuration

25.4 Login Configuration

	Command	**Function**
Step 1	**config terminal**	Enter the global configuration mode
Step 2	**web login timeout** (1-30)	Configure the login time-out time for the web
Step 3	**show web login timeout**	Show the login timeout time of the web
Step 4	**web verification-code** <enable|disable>	Configure the login verification code for the web
Step 5	**show web verification-code**	Show the login verification code enabling status of the web

25.5 Language Configuration

	Command	**Function**
Step 1	**config terminal**	Enter the global configuration mode
Step 2	**web language** [english|chinese|portuguese]	Configure the web language
Step 3	**show web language**	Show the web-language configuration

Step 4	**exit**	Returns to the global configuration mode

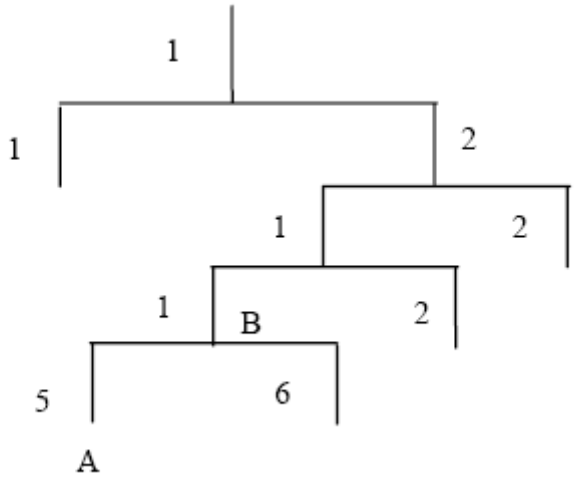
26. SNMP Configuration

26.1 Overview

SNMP(Simple Network Management Protocol)is a currently widely used network management protocol. It is an industry standard for transmitting management information between two devices. Network administrators can search for information, modify information, troubleshoot, diagnose faults, plan capacity, and generate responses. SNMP uses a polling mechanism that provides basic functions, especially suitable for small, fast, and low-cost situations. It is based on the transport layer protocol UDP.
SNMP has two parts, NMS (Network Management Station) and agent. The NMS is a workstation running a client program, while the agent is a server program running in the device. The NMS can send the GetRequest, GetNextRequest, and SetRequest messages to the agent. The agent will then execute the read or write commands and respond to the NMS. The agent also sends a trap message to the NMS when the device is abnormal.

26.2 SNMP Version And MIB

To uniquely label the management variables of the device, SNMP identifies management objects through a hierarchy name scheme. The object set is like a tree, and the nodes represent the managed objects, as shown in the figure below.



MIB(Management Information Base)is a set of variable definitions of devices used to describe the hierarchy of the tree. For the curated object B in the figure above, we can uniquely describe it using a string of numbers {1.2.1.1}. This number string is the object identifier. GPON OLT Support for SNMP V1, V2C, and V3. Common MIB is

shown in the table below.

MIB attribute	MIB content	Refer to
Public MIB	MIB II based on TCP/IP	RFC1213
	RMON MIB	RFC2819
	Ethernet MIB	RFC2665
Private MIB	VLAN MIB	
	Device management	
	Interface management	

26.3 SNMP Configuration

26.3.1 Configure The Group Name

begin at the privileged configuration mode, configure the group name as shown in the table.

	Command	Function
Step 1	**config terminal**	Enter the global configuration mode
Step 2	**snmp-server community** *name* [ro| rw]	Configure the SNMP community string
Step 3	**show snmp-server community**	Show the SNMP community configuration
Step 4	**exit**	Returns the privileged user configuration mode from the global configuration mode
Step5	**write**	Save configuration

26.3.2 Configure The Trap Server Address

Use the following command to configure or delete the target host IP address. begin at the privileged configuration mode, configure the trap target host address, as shown in the following table.

	Command	Function
Step 1	**config terminal**	Enter the global configuration mode
Step 2a	**snmp-server host** *A.B.C.D* community *WORD* udp-port (1-65535) version <1|2c|3>	Configure the trap target host address. Configure the community string value

Step 3b	**no snmp-server host** *A.B.C.D* **version** <1|2c|3> *community_string or user_name*	Remove the trap target host address
Step 3	**write**	Save configuration

26.3.3 Configure Association Information

begin at the privileged configuration mode, configure the association information, as shown in the following table.

	Command	**Function**
Step 1	**config terminal**	Enter the global configuration mode
Step 2	**snmp-server contact** *line*	Configure the contact string value
Step 3	**show snmp-server contact**	Check the SNMP contact configuration
Step 4	**write**	Save configuration

26.3.4 Configure Location Information

begin at the privilege configuration mode, configure the location information, as shown in the following table.

	Command	**Function**
Step 1	**config terminal**	Enter the global configuration mode
Step 2	**snmp-server location** *line*	Configure the location string value
Step 3	**show snmp-server location**	Check the SNMP location configuration
Step 4	**write**	Save the configuration.

27. Alarm And Event Management

27.1 Description Of Alarms And Events

If you enable alarm reporting, it will trigger an alarm event when the system makes an error or performs some important action. Alarm information will be saved in the buffer; You can run commands such as show syslog to display this. All alerts can be sent to specific service providers. Alarm includes fault alarm and recovery alarm. The fault alert will not go away until the fault is fixed and the alarm cleared. Events include runtime environment and security events, which are notifications that are generated and notified to administrators under normal circumstances. The difference between an event and an alert is that an event is generated under normal conditions, while an alert is generated under abnormal conditions. The "Show Alarm Event Information" command is used to display the description, level, type, and category of all alarms and events.

27.2 Alarm Management

Alert severity levels include major, major, minor, and warning. The corresponding levels in the system logs are Alert, Critical, critical, and Warning. Alarm types include equipment alarm, communication alarm and disposal alarm.

- Device alerts include low temperature, high temperature, CPU usage, memory usage, fans, PON, optical power, and more.
- Communications alarms include port on/down, loopback, PON deregistration, PON registration failure, PON-LOS, ONU deregistration, illegal ONU registration, ONU authorization failure, ONU MAC merge, ONU LOID merge, ONU-link-LOS, ONU dying alarm, ONU link failure, and ONU-link events, ONU extended OAM notifications, etc.
- Clearing an alarm includes upgrade failure, configuration file upload failure, and configuration file download failure.

27.2.1 System Alarm

System alerts show the performance and security of the system. The following table shows a list of system alerts.

System alarm	Reason	Default
temp-high	The device temperature is higher than the threshold	disable

temp-low	The device temperature is lower than the threshold	disable
cpu-usage-high	The CPU usage exceeds the threshold	disable
mem-usage-high	The memory usage exceeds the threshold	disable
fan	Fan switch	disable
download-file-failed	Failed to download file	enable
upload-file-failed	Failed to upload file	enable
upgrade-file-failed	Failed to upgrade firmware	enable
port-updown	Port opening and closing	enable
port-loopback	Port loop	disable

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2a	**alarm** <temp-high|temp-low|cpu-usage-high|mem-usage-high|....> **disable** <all|print|record|remote|trap>	Disable system alarm reporting
Step 2b	**alarm** <temp-high|temp-low|cpu-usage-high|mem-usage-high|....> **enable** <all|print|record|remote|trap>	Enable system alarm reporting
Step 3	**show alarm configuration**	Displays system alarm configuration

27.2.2 PON Alarm

By monitoring PON alarms, you can eliminate problems caused by PON ports or optical fibers and ensure that the PON works properly. The following table shows a list of PON alerts.

PON alarm	Reason	Default
pon-txpower-high	The send power of the PON port exceeds the threshold	enable
pon-txpower-low	The sending power of the PON port is lower than the threshold	enable

pon-txbias-high	The PON port bias current is higher than the threshold	enable
pon-txbias-low	The bias current of the PON port is lower than the threshold	enable
pon-vcc-high	The PON port voltage is higher than the threshold	enable
pon-vcc-low	The PON port voltage is lower than the threshold	enable
pon-temp-high	The temperature of the PON port exceeds the threshold	enable
pon-temp-low	The PON port temperature is lower than the threshold	enable
pon-los	The optical fiber is not connected or the link is faulty	enable
deregister	PON cancellation	disable
register-failed	PON registration failed	enable

Configure global PON alarms, as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2a	**alarm** <pon-register-failed|pon-deregister> <enable|disable>	Enable or disable PON alarm reporting
Step 2b	**alarm** <pon-txpower-high| pon-txpower-low|pon-txbias-high| pon-txbias-low|pon-vcc-high| pon-vcc-low|pon-temp-high| pon-temp-low| pon-los> <enable|disable>	Enable or disable PON port alarm reporting
Step 3	**show alarm configuration**	Display alarm configuration

27.2.3 ONU Alarm

ONU alarms can also help administrators troubleshoot ONU faults. The following table shows the list of ONU alarms.

ONU alarm	Reason	Default
onu-deregister	ONU cancellation	enable
onu-link-lost	The ONU optical fiber is not connected or the link is faulty	disable
onu-illegal-register	illegal ONU registration	enable
onu-auth-failed	ONU LOID Authorization Failed in automatic authorization mode or failed due to packet loss.	enable
onu-mac-conflict	The current PON port conflicts with the authorized ONU in the system.	enable
onu-loid-conflict	The current PON port conflicts with the authorized ONU in the system.	enable
onu-critical-event	ONU critical link event	enable
onu-dying-gasp	ONU power failure	enable
onu-link-fault	The ONU link is faulty	enable
onu-link-event	ONU link event	disable
onu-event-notific	ONU extends OAM notifications	enable

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**alarm** <onu-deregister|onu-link-lost| onu-illegal-register|onu-auth-failed| onu-mac-conflict|onu-loid-conflict| onu-critical-event|onu-dying-gasp| onu-link-fault|onu-link-event| onu-event-notific> <enable|disable>	Enable or disable ONU alarm reporting
Step 3	**show alarm configuration**	Displays system alarm configuration

27.3 Event Management

Severity levels include major, major, minor, and warning. The corresponding levels in the system logs are Alert, Critical, critical, and Warning. Event types include device

events, communication events, and dipole events.

- Device events include device restart events and PON events.
- Communication events include PON registration, PON los recovery, ONU registration, ONU search, ONU authorization success, and ONU deregistration success.
- Handle events include configuration events that are saved, erased, downloaded, uploaded, and unencoded.

27.3.1 System Event

System events are used to monitor system performance and security to ensure the normal running of the system.

System event	Reason	Default
reset	Equipment reset	disable
config-save	Save configuration	enable
config-erase	Erase configuration	enable
download-file-success	Download file successfully	enable
upload-file-success	File uploaded successfully	enable
upgrade-file-success	Firmware upgrade successful	enable

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**alarm-event config_all** <all|print|record|remote|trap><enable|disable>	Firmware upgrade successful
Step 3	**show <alarm|event> configuration**	Displays the system event configuration

27.3.2 PON Event

By monitoring PON events, eliminate problems caused by PON ports or optical fibers, and ensure that PON is working properly. The following table shows a list of PON events.

PON event	Reason	Default
pon-register	PON registration	disable

pon-los-recovery	PON LOS recovery	enable

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**event** <pon-enable|pon-psg-switch|pon-register|pon-los-recovery> <all|print|record|remote|trap> <enable|disable>	Enable or disable PON event reporting
Step 3	**show event configuration**	Displays the system event configuration

27.3.3 ONU Event

ONU events can also help administrators troubleshoot some ONU failures. The following table shows the list of ONU events.

ONU event	Reason	Default
onu-register	ONU Registration	enable
onu-link-discover	ONU discovery	disable
onu-auth-success	OLT authorizes ONU to succeed	enable
onu-deauth-success	OLT successfully deauthorized ONU	disable

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**event** <onu-register|onu-link-discover| onu-auth-success|onu-deauth-success|onu-finish|onu-vlan-pool|onu-upgrade-over> <enable|disable> <all|print|record|remote|trap>	Enable or disable ONU event reporting
Step 3	**show event configuration**	Displays the system event configuration

28. System Log

28.1 Introduction

System logs record the operating status of the entire system and user operations. It helps administrators understand and monitor the working status of the system and record abnormal information. System logs come from all running modules of the system. The log system collects, manages, saves, and displays information. When you need to debug or check the status of the system, it can be displayed in the design, or it can be sent to the server for long-term running status and operation tracking.

28.1.1 Log Type

System log has five types:

- Abnormal information log
  Abnormal information log mainly records the abnormal phenomenon of each module, such as abnormal response, inside state machine error, key process execute error and so on.
- Alarm log
  Alarm log mainly records the information from alarm module. Critical alarm, major alarm, minor alarm and warning are corresponding with alerts, critical, major, warnings log level respectively.
- Event log
  Event log mainly records the information from event module. Critical event, major event, minor event and warning are corresponding with alerts, critical, major, warnings log level respectively.
- Operation log
  Operation log mainly records the information from CLI and SNMP.
- Debug log
  Debug log mainly records the information from networking debugging, such as received IGMP messages, RSTP BPDU messages, state machine skip and so on.

28.1.2 System Log Level

Syslog information level reference:

Log level	Log contrast
7:emergencies	Abnormal log
6:alerts	Alarm/event log(urgent) Abnormal log

5:critical	Alarm/event log(major) Abnormal log
4:major	Alarm/event log(minor) Abnormal log
3:warnings	Alarm/event log(warning) Abnormal log
2:notifications	Operation log
1:informational	Operation log
0:debugging	Debug log

28.2 Configure System Log

28.2.1 Display System Log

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**show syslog level** <debug|info|notice|warning|major|critical|alert|emerg>	Displays all system logs or logs of a specific level

28.2.2 Clear System Log

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**clear syslog level** <debug|info|notice|warning|major|critical|alert|emerg>	Clear all system logs or logs of a specific level

28.2.3 Configure System Log Server

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2a	**remote server** <address|ip *A.B.C.D*|ipv6 *X:X::X:X*> **[secondary-server|username]**username *username* password *password*	Configure the IP address and port number of the system log server.
Step 2b	**no remote server** <ipv4|ipv6>	Delete system log server configuration.

28.2.4 Configure Storage Level

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**syslog flash level** <debug|info|notice| warning|major|critical|alert|emerg>	System log will be saved to flash if it is higher than you set.
Step 3	**show syslog flash level**	Show system log level in flash.

28.2.5 Save System Logs To The Flash

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**save syslog flash**	Save system log to flash.

28.2.6 Clear System Logs In The Flash

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**clear syslog flash**	Clear system log in flash.

28.2.7 Upload System Log

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**upload tftp syslog** *filename* <*A.B.C.D*|*X:X::X:X*> format <txt|csv>	Upload system log to local host byTFTP.

29. SSH Function

You can use SSH to remotely connect to the system via either an out-of-band or in-band management IP address.

29.1 SSH Configuration

29.1.1 Enable The SSH Server

begin at the privileged configuration mode, enable the SSH server of the device, as shown in the following table.

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**ssh**	The SSH configuration node is displayed
Step 3	**sshd** <disable|enable|reload|status>	Shut down, start, and reload the server,and show status

29.1.2 Configure Maximum Authentication Times of SSH

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**ssh**	The SSH configuration node is displayed
Step 3	**ip ssh authentication-retries** <(0-6)|default>	Specifies the number of authentication retries

29.1.3 Configure SSH Authentication Timeout Period

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode

Step 2	**ssh**	The SSH configuration node is displayed
Step 3	**ip ssh time-out** <(1-120)|default>	Authentication timeout times

29.1.4 Configure Maximum Number Of SSH Connections

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**ssh**	The SSH configuration node is displayed
Step 3	**ip ssh max-startups** <(1-5)|default>	Maximum connection number

29.1.5 Configure Maximum Number Of SSH Sessions

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**ssh**	The SSH configuration node is displayed
Step 3	**ip ssh max-sessions** <(1-12)|default>	Maximum sessions

29.2 Display SSH

29.2.1 Display the SSH Key

	Command	**Function**
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**ssh**	The SSH configuration node is displayed
Step 3	**show crypto key mypubkey** <rsa|ecdsa|ed25519|all>	The SSH key is displayed

29.2.2 Display SSH Configuration

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**ssh**	The SSH configuration node is displayed
Step 3	**show ip ssh**	Show SSH configuration

30. Diagnose Function

30.1 Diagnose Configuration

30.1.1 Network Connection Test

Run the ping command to check the network connection.

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**ping** <ip|ipv6|*WORD*> -i vlan (1-4094) -s (56-65535)	Network test -s: indicates a port -i: The vlan is used

30.1.2 Network Tracking Test

Use the traceroute command to check the network connection.

	Command	Function
Step 1	**configure terminal**	Enter the global configuration mode
Step 2	**traceroute** <ip|ipv6|*WORD*>	Network tracking

Thank you!