

CLI Configuration Guide

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1.Foreword

Outline

This document describes the EK OLT product location and characteristics (1U) of the system equipment, the typical application scenarios, the whole structure and appearance, product characteristics, and maintenance and management of system parameters for the user to understand the use, management, and maintenance EK OLT (1U) type Device provides reference information.

To simplify the description, hereinafter EK OLT (1U) will be described as "OLT" .

Product version

Product Code	Version number
EK OLT G08	V1
EK OLT G08E	V1

Audience

This document is intended for:

- 1) Network Planning Engineer
- 2) Commissioning Engineer
- 3) Data Configuration Engineer
- 4) Site maintenance Engineer
- 5) Network Monitoring Engineer
- 6) System Maintenance Engineer

Brief introduction

This document describes the EK OLT product positioning and characteristics (1U) of the system equipment, the typical application scenarios, the whole structure and appearance, product characteristics, and maintenance and management of system parameters for the user to understand, use, administration and maintenance EK OLT (1U) Dtype Device provides reference information.

To simplify the description, hereinafter EK OLT (1U) is described as a unified OLT.

Revision History

Modify records are cumulative in boldface. The latest version of the document that contains

Author	Release date	Release Notes
	2017-04-28	First release.
	2017-06-21	Update for vlanif info

all updates made to previous versions of the document.

2.GPON properties

GPON (Gigabit Passive Optical Network) is a PON (Passive Optical Network) technology, is a series of ITU-T G.984.x&G.988 standards Gigabit PON. GPON access is used to support higher bandwidth.

2.1. Introduction

GPON Technology highlight:

»Longer transmission distances: using optical fiber transmission, the access layer coverage radius of 20km, the maximum logical distance 60km.

»Higher bandwidth: theoretical maximum downlink bit rate single user rate of 2.5Gbit / s, maximum uplink rate 1.25Gbit / s.

»QoS (Quality of Service) guarantee full service access: bearer GEM (GPON Encapsulation Mode) frames, quality of service well.

»PLC characteristics: Help to save fiber resources, reduce the number of central office optical equipment, and reduce operating and maintenance costs.

2.2. Reference Standards and Protocols

■ ITU-T G.984.1: General characteristics, mainly about the basic properties and the main GPON technology protection.

ITU-T G.984.2: Physical Media Dependent (PMD) layer specification, mainly about the GPON physical layer parameters, such as the various physical parameters of the optical module, comprising of Tx power, Rx sensitivity, overload optical power. Also it defines different levels of optical power budget, such as the most common Class B +.

ITU-T G.984.3: Transmission convergence layer specification, mainly about the GPON
 TC layer protocol, comprising of the principle frame structure of uplink and downlink of
 GPON.

 ITU-T G.984.4: ONU management and control interface specification, focuses on GPON management and maintenance protocols, including OAM, PLOAM and OMCI protocol.

- ITU-T G.984.5: Enhancement band, focuses on the wavelength planning for the next generation PON reserved for the corresponding band.
- ITU-T G.984.6: Reach extension, introduces several Long Reach PON solutions.
- ITU-T G.988: ONU management and control interface (OMCI) specification.

2.3. System Overview

GPON is a gigabit passive optical network technology, is currently the most widely used optical access mainstream technology.

- The GPON network uses a single fiber to connect the OLT, splitter and ONU, uplink and downlink data with different carrier wavelengths. Uplink in the wavelength of 1310nm, 1490nm for downlink.
- The GPON system use WDM technology to transmit the data in two directions by using different lambdas, where broadcasting in downlink and TDMA in uplink.
- All downlink data will broadcast from the OLT to all the ONUs, ONU will choose to receive data according to the ONU ID and discard the additional data.

2.4. Management Configuration

OLT supports three management ways:

1, Series port

Manage the OLT by using the series cables

2, Telenet

User can manage OLT by Telnet after configuring the in or out-band management system (please refer to the in/out band network management configuration).

3, NMS

The user can manage OLT by NMS after configuring the in/out band management system.

This user manual will introduce the configuration of CLI by using Hyper Terminal or Telnet.

2.4.1. Series Port

Please set the baud rate as 9600 for G08, while 115200 for G08E.

Please do not choose "RTS/CTS" and "XON/XOFF", see the figure below:

Figure 2-1 Series Port

COM11 Properties		? 🛛
Port Settings		
Bits per second:	9600	~
Data bits:	8	~
Parity:	None	~
Stop bits:	1	~
Flow control:	None	~
		Restore Defaults
0	K (Cancel Apply

2.4.2. Telnet

2.4.2.1. Out band Configuration

G08 has only one out-band management port, the IP is 192.168.1.32; G08E has two out-band management ports, the first (the upside one) IP address is 192.168.100.2, which can not be changed, while the second (the downside one) IP is 192.168.1.32.

In addition, OLT can be managed by Telenet after in-band IP configuration.

» In-band management system connects to the IP network by using the service channel (Uplink port), which is usually used for real network deployment.

»Out-band management system use MGMT port, the management channel will be independent from the service channels, which is usually used for local management and maintenance.

2.4.2.2. In-band management configuration

The information will be sent by service channel under in-band management mode. It is more flexible and cost-effective, but not convenient for maintenance.

Configuration Item	Data
Uplink Port	xe1/2

Table 2-1 Configuration Data

CLI Configuration Guide

In-band management VLAN	VLAN ID : 1000
In-band Management IP Address	10.1.1.1/24
Gateway	10.1.1.254/24

OLT#configure terminal

OLT(config)#

Add uplink port to in-band management VLAN:

OLT(config)#interface xe1/2

OLT(config-xe1/2)#no shutdown

OLT(config-xe1/2)#speed 1000

OLT(config-xe1/2)#switchport mode trunk

OLT(config-xe1/2)#switchport trunk tag 1000

Configure in-band management IP address:

OLT(config)#ip address 10.1.1.1/24 vlan 1000

Notes:

Out-band and In-band management IP address can not be in one network segment.

We suggest configure only one in-band management IP. If more IP are configured, other will not be able to connect to the network, but can connect to PC by configuring PVID.

Configure in-band Gateway:

OLT(config)#gateway 10.1.1.254

Note: can only configure one gateway, the previous configuration should be deleted if you want to change.

Change in-band IP and Gateway:

Note: If you want to delete IP, please delete the gateway before deleting IP, and add new

address again.

OLT(config)#no ip address vlan 1000

OLT(config)#no gateway

Save Configuration Data:

OLT(config)#exit

OLT#write

Check in-band management:

OLT(config)# show managment vlan

management vlan 10 ip address 192.168.1.32/24 management vlan 18 ip address 192.168.18.188/24

2.5. Configure NTP system time synchronization

NTP (Network Time Protocol) network time protocol is at application layer, which is used to synchronize time between distributed time server and clients, and is based on IP and UDP. NTP protocol is evolved from time protocol (Time Protocol) and ICMP timestamp message, with special design for better accuracy and robustness.

Sets access control rights for the local device NTP service. To protect the local NTP service, you can use this command to set access rights to the local NTP service. When the command is configured successfully, after the NTP synchronization message is received, the local device will determine whether the message needs to be processed according to the authority of the configuration and the content of the message, and whether to allowed to synchronize with the device. When OLT works in the NTP client mode, it will keep time synchronization with the NTP server.

Enable NTP functionality in global configuration mode:

OLT(config)#sntp enable

Configure NTP Server:

OLT(config)#sntp unicast-server 192.168.17.117

The source address used when sending synchronization request for connecting NTP:

OLT(config)#sntp connect 192.168.17.117

Configure the NTP synchronization interval, the time unit is seconds:

OLT(config)#sntp auto-sync timer 10

(Optional) Check the running status of NTP:

OLT G08# show sntp Simple ntp client: Status: Enable Auto sync timer: 10s Last sync time: Fri Nov 11 02:33:48 UTC 2016 Current time: Fri Nov 11 02:33:51 UTC 2016 Ntp server list:

CLI Configuration Guide

Address Service

192.168.17.117 Support

Total: 1

After configuring the system time, the user can view the corresponding time in the command line log and the alarm record in order to locate the fault.

Note: The server re-connect after interruption in SNTP server, and the OLT state is unsupport, OLT will not automatically synchronize the system time.

2.6. System time configuration

This command is used to set system time. Use this command when you need to set system time. When the command succeeds, the system time becomes the set time.

Configure the timezone under global configuration mode:

OLT(config)#timezone gmt + 08:00

OLT(config)#exit

Configure the system time under administrator mode:

OLT#clock set 2016.05.31-11:02:30

(Optional) View the system time:

OLT(config)# show timezone

System timezone: gmt + 08:00

OLT# show clock

2016-05-31 11:02:40 [gmt +08:00]

2.7. System Configuration Operation

2.7.1. Save

This command is used to save the system's current database files and configuration files. Use this command when the user needs to save the current data or configuration file. When the database file or configuration file of the system is modified, you can use this command to save it.

OLT# write

Note: system configuration automatically save time is 1800 seconds, i.e. 30 minutes.

2.7.2. Restart

This command is used to reset the system. If the system fails or the software version needs to be upgraded, this command is used when the package file and the supporting database file are loaded and when the system is reset. After successfully resetting the system, the system can resume services and run the newly loaded programs and database files.

OLT# reboot Are you sure reboot [y/n] y Unsaved configuration will be lost. Save now? [y/n]

2.7.3. Resotre Default Configuration

This command is used to restore the detault configuration.

OLT# default configure OLT# reboot Are you sure reboot [y/n] y Unsaved configuration will be lost. Save now? [y/n] **n**

2.7.4. System diagnostic information upload

OLT supports the upload function of the system log, saves the LOG information of the system in file mode, records the file as unos.log, and uploads it to the local computer through TFTP. When the system fails, you can collect the system's diagnostic information through that command and submit it to technical support personnel.

Upload Steps:

1. Turn on the TFTP server on your computer and make sure the computer is connected to the OLT in-band / out-band management port.

2, On the computer using the ping command, you can reach corresponding management IP address.

3, In the administrator mode, enter the following command, upload the system diagnostic information to the computer, TFTP specified folder, IP address, you need to specify the address to connect to the OLT management network card.

OLT# zlog upload tftp 192.168.1.111

4, When the command execution succeed, in the TFTP server folder, you can see diag.tar.gz compressed package files, including unos.log and other diagnostic information.

2.7.5. Configuration Saving and Restore

OLT supports the saving and restore of system configuration, saves the configuration of the system in the main.conf folder, and saves it to the local computer and restore through TFTP. When the equipment is deployed or the system is upgraded, it is recommended that the configuration file be saved to the computer for emergency recovery.

Upload Steps:

1. Open the TFTP server locally, set up the corresponding work folder, and ensure that the local computer can access the OLT device via the IP address with the inside / outside management;

2, When you implement backup of configuration commands, you need to enter the following command in administrator mode. The configuration file will be uploaded to the working folder of the TFTP software settings, and the file name is main.conf;

OLT, G08#, TFTP, config, put, 192.168.1.111

Note: 192.168.1.111 is the IP address of the network card used to connect the OLT management port on the computer.

3, When you need to restore the configuration command, change the original configuration file to main.conf and save it in the download folder of the TFTP server settings. The following command restores the configuration file from the computer to the OLT.

OLT G08# tftp config get 192.168.1.111

2.7.6. View current configuration

OLT supports to view the the configuration on the current equipment under any node.

OLT# show running-config

Note: the ONU sequence of all configurations is shown as the order of ONU authentication registration.

2.8. OLT Software Upgrade

Upgrade the OLT software in two ways, FTP and TFTP.

The update steps are as follows:

1. Connect the computer to the in-band / out-band management port of the OLT.

2, On the computer by using the ping command, you can reach the corresponding management IP address.

3, open the TFTP server or FTP server locally, and upgrade the software to the file path specified by TFTP or FTP.

4, run in administrator mode:

```
OLT# upgrade TFTP 192.168.17.117 GPON3116.tar.gz
```

or

OLT G08# upgrade FTP 192.168.17.117 GPON3116.tar.gz username password

IP is the local computer IP, requiring to be able to Ping the OLT in-band / out-band management IP.

Note: recommend using an out-band management port for upgrading. When you upgrade in the above ways, make sure that the windows firewall is off, otherwise it may cause the upgrade to fail.

2.9. Operation User Management

Operation user means the configuration and maintenance staff that use CLI terminals, including series and telnet.

User management divides the operation user's permissions into 15 levels at 1~15

2.9.1. Operation user rights description

User Level	Rights Description
Level 1	Operator mode, no administrator right;
Level 2	Administrator mode, can not enter global configuration mode Can execute 1~2 orders
Level 3 ~ 15	Can enter global configuration mode, and execute 1~15 orders. Also can maintain and manage the equipments and user accounts.

Table 2-2 Operation user rights description

Level 1 user can only operate on level 1 orders.

Level 2 user can only operate on level 1~2 orders

Level 15 user can only operate on level 1~15 orders

2.9.2. Create Operation User

When you create a user, you need to configure the user's attributes, including the user's

account number, password, and permissions.

Note: Only level 3~15 user can create other operation users.

Operation user attributes are defined in the following table:

User Attributes	Description
Account	User name consists of 1~31 printable characters (no spaces). The user name must be unique and cannot be duplicated. User name letter is case sensitive.
Password	Password consists of 1~31 characters, and case sensitive.
Rights	Totally 15 levels, 1~15.

Table 2-3	User	Attributes	Description
-----------	------	------------	-------------

OLT supports 100 operating users.

The default operation user name is admin, with the default password is admin, and the default right level is 15.

Example: create a user name and password for abc, level 10:

```
OLT(config)#username abc password abc privilege 10
```

(Optional) View operating user configuration.

OLT# show user

User	Passwd	Privilege
abc	admin	10
admin	admin	15

2.9.3. Modify user attributes

Modify the user password and rights to ensure the security of the device.

In global configuration mode, change the password of user name abc to 123, and the level is 15.

```
OLT(config)#username abc password 123 privilege 15
```

2.9.4. Delete User

OLT G08(config)# no username 111

2.10. Trap Configuration

Set the IP address of the destination host for the Trap message. When the IP address of the host of the Trap message destination is successfully set, the Trap message of the device will be sent to the host corresponding to the IP address when the Trap message is enabled. Enable:

OLT(config)# snmp-server trap enable

Rights:

OLT(config)# snmp-server community rw trap

OLT(config)# snmp-server syscontact contact

OLT(config)# snmp-server syslocation location

OLT(config)# snmp-server sysname sysname

SNMP Version:

OLT(config)# snmp-server trapsink 192.168.17.117 //v1

OLT(config)# snmp-server trap2sink 192.168.17.117 //v2

SNMP encryption:

OLT(config)# snmp-server user rw username v3 md5 password aes privacy

Note:

The SNMP version of the OLT network element configuration is permanent, and cannot be deleted. The SNMP version of the network element configuration cannot be deleted and modified by the network administrator. Please configure the SNMP related content by using the NMS network management.

OLT network management (NMS) does not need to configure trap again at the network element interface when using the trap configuration.

2.11. CPU&Memory View

OLT can view the current CPU user status and the kernel, memory user status and the occupancy rate of the kernel.

OLT# show processor

```
Total %CPU(user/kernel): 10.5/2.8
```

Total %Mem(user/kernel): 33.9/0.488

2.12. View the current system CPU|PON Optics| switching chip |PON chip temperature

OLT(config)# show environment temperature

Cpu Chip Temperture: 36 CPon Optics Temperture: 33 CSwitch Chip Temperture: 38 CPon Chip Temperture: 35 C

Note:

The OLT G08E can view the device temperature; G08 does not support this command.

2.13. CTC-enable

When this feature is enabled, OLT will follow the CTC standard, which defaults to "ITU" rules.

2.14. Broadcast storm suppression

In order to prevent the broadcast storm, unknown unicast and multicast storm, by default the OLT uplink port message suppression PPS value will be 100.

OLT(config)# interface xe1/1

OLT(config-xe1/1)# storm-control broadcast pps 100

OLT(config-xe1/1)# storm-control multicast pps 100

OLT(config-xe1/1)# storm-control unicast pps 100

2.15. OLT Default Route Configuration

OLT(config)# ip route OLT(config-ip-route)# ip route 0.0.0.0/0 10.1.1.1

OLT(config-ip-route)# exit

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OLT(config)# show ip static-route

static ip route

•

0.0.0.0/0 via 10.1.1.1

3.Basic service configuration

The GPON configuration includes configuration of GPON profile, GPON, ONU, GPON ports, GPON traffic, and so on

3.1. GPON Profile

3.1.1. ONU Type Profile Configuration

The GPON ONU profile combines the parameters needed by the GPON access service to be assembled. Among them, the GPON ONU capability profile contains the physical port type and quantity configuration of ONU, the number of Cardholder and the number of uplink and downlink queues.

Configuration:

GPON (config) # gpon

GPON (config-gpon) # profile onutype onu-4fe eth 4 pots 0 card 4 down-queue 8 up-queue 8

View onutype configuration:

GPON (config) # show profile onutype

*****	*******
Profile Name	:onu-4fe
IS Default	:NO
Tcont Number	:8
GemPort Number	:32
Up Queue Number	:8
Down Queue Number	:8
Host Number	:2
Uni Eth Number	:4
Uni Pots Number	:0
*****	***********

Figure 3-1 View onutype Configuration

Delete onutype:

SAN3700 (config-gpon) # no profile onutype onu-4fe

Note:

:STG-402
:Yes
:4
:32
:4
:4
:2
:4
:2

» All the above configuration contains ONU 4 Ethernet ports, 4 cardholders, both up and down que are 8.

» The number of card is 1 by default.

» The number of Uplink/Downlin queue is 4 by default.

» By the query of distal ONU capability set, we can confirm whether the corresponding ONU type profile can be supported. The configuration will fail when the binding onutype number by distal ONU does not match with the actual ONU number. Please refer to "ONU Capability Set Query" for details.

» Sino-Telecom OLT has the onutype profile by default, the profile is the onutype used when ONU automatic detection function is enabled in PON port, the uplink/downlink queue is 4. Please find more details in "ONU automatic Detection Feature"

3.1.2. Configure a DBA profile

GPON (config) # gpon

GPON (config-gpon) # profile bandwidth dba-type1 fixed 20000

GPON (config-gpon) # profile bandwidth dba-type2 assured 100000

GPON (config-gpon) # profile bandwidth dba-type3 assured 100000 maximum 200000

GPON (config-gpon) # profile bandwidth dba-type4 maximum 200000

GPON (config-gpon) # profile bandwidth dba-type5 fixed 20000 assured 100000 maximum 200000

View DBA Profile configuration:

GPON (config) # show profile bandwidth

GPON(config)# show prof	ile bandwidth	*******	******
ProfileName	FixBw	AssuredBw	MaxBw
dba-type1	20000	0	0
dba-type2	0	100000	0
dba-type3	0	100000	200000
dba-type4	0	0	200000
dba-type5	20000	100000	200000
default	0	0	100000
*******	**************	*************	***********

Delete DBA profile:

SAN3700 (config-gpon) # no profile bandwidth dba-typex

Description:

» Sino telecom OLT DBA has a default profile, using the maximum bandwidth of 100M configuration, this profile can be used when there is a customized automatic service.

» The default profile can not be deleted,

» The binded ONU should be unbinded firstly before deleting the DBA profile.

» When adding a DBA template, the bandwidth value must be an integer multiple of 250. If the input bandwidth value is not an integer multiple of 250, it will be reduced to a multiple of 250.(unit:kbps)

3.1.3. The ONU Configuration

Step 1. No shutdown PON port:

SAN3700G08E (config) # interface gpon-olt 1/1

SAN3700G08E (config-gpon-olt1 / 1) # no shutdown

View PON port status:

SAN3700G08E (config) # show interface gpon-olt1 / 1

SAN3700)G08E(config)# show	v -	interfac	e	gpon-olt1/1
gpon-c	olt1/1	2	up		-
Hardwa	are address	:	60e6-bo	:00)-645a
Media	type	:	MEDIUM	F1	IBER
loopba	ack'	:	NONE		
Autone	egotiation	:	enable		
Flow o	control transmit	:	on	re	ecieve: on
Speed		1	2500	Du	uplex-full
Max fr	ame size	1	12284		
Ifinde	2X	:	0x90100	001	L
Port 1	ink-type	:	access		
PVID	31	:	1		
RxPack	cets	:	0		
RXByte	25	:	0		
RxBcas	st	:	0		
RxMcas	st	:	0		
RxPaus	ie in the second se	:	0		
RxInja	abber	2	0		
RXErro	ors	2	0		
RXCRCE	innons	:	0		
RxDrop)S	:	0		
TXPack	(ets	:	0		
TXByte	25	:	0		
TxBcas	st	:	0		
TxMcas	st	:	0		
TxPaus	e	:	0		
TxColl	lision	:	0		
TXErro	ors	2	0		
TxDrop)S	1	0		

Step 2, when ONU automatic discovery function is disable, check unauthenticated ONU:

SAN3700G08E (config) # show onu unconfig

Step 3, add the corresponding ONU:

SAN3700G08 (config) # interface gpon-olt 1/1

SAN3700G08 (config-gpon-olt1 / 1) # onu 2 type onu-4fe sn HWTCbc0028ca

Step 4, add ONU status:

SAN3700G08 (config-gpon-olt1 / 1) # show onu status

GPON(config)# show onu status					
gpon-onu	auth-type	auth-info	state		
1/1:1 1/1:2	sn sn	sn:STGUbc0036c5 sn:STGUbc003709	operational operational		

ONU status Description:

»Added	ONU has been added but is offline.
»Authpass	ONU has been authenticated.
»Operational	ONU operable.

Description:

When the PW authentication is the same as the PW part of SN+PW authentication, SN can

not be shown normally, please ensure that the ONU do not have the same SN and PW before

delivery.

4.Remote ONU function configuration

4.1. ONU automatic discovery

In the corresponding PON port, open ONU automatic discovery function, and ONU can be in operational state automatically if the optical power is normal, unnecessary to be manually added.

Enable:

OLT (config) interface gpon-olt1 / 1

OLT (config-gpon-olt1 / 1) # onu auto-learn enable

Disable:

OLT (config-gpon-olt1 / 1) # onu auto-learn enable

View:

GPON (config) # show running-config interface gpon-olt1 / 1

GPON(contig)# show running-contig intertace gpon-olt1/1 interface gpon-olt1/1 no shutdown qos-queue-scheduler model hierarchy onu auto-learn enable

Description:

»Automatic discovery onutype will use the default profile STG-402, and get online with sn authentication method. » Using automatic discovery of on-line ONU, it will not be offline when the auto-discovery function is canceled.

» The default state of auto discovery function is disable.

4.2. ONU Activation and deactivation

The command is used to activate ONU in a deactivated state. Use Deactivate command to deactivate the ONU, then the ONU will not be able to work properly, use this command to activate the ONU, and restore its normal state.

Activate:

```
OLT (config) interface gpon-onu1 / 1: 1
```

```
OLT (config-gpon-onu1 / 1: 1) # active
```

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Deactivate:

OLT (config-gpon-onu1 / 1: 1) # deactive *Description: By default, ONU is active.*

4.3. ONU Information View

SAN3700 (config-gpon-olt7 / 6) # show onu remote info

4.4. ONU uni Port Enable/Disable

This command is used to control the uni port management status of the remote ONU, and configure the Ethernet type user port to "enable" or "disable".

Enable:

OLT (config) interface gpon-onu1 / 1: 1

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 1 enable

Disable:

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 1 disable

Description:

By default, all uni ONU ports are "enable" state.

4.5. ONU capability set query

This command is used to query ONU actual ability. After the query to the actual capability of the ONT, it can create the appropriate profile of ONT capability set based on it.

SAN3700 (config-gpon-onu7 / 6: 3) # show onu remote capability



Table 4-1 ONU hardware capabilities parameter

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Parameter	Explanation
TCONT number	The T-CONT number supported by the ONU
GEMPort number	GEM Port number can be provided by ONU
Total priority queue number	Total uplink/downlink queue number supported by ONU
Up priority queue number	Uplink queue number supported by ONU
Down priority queue number	Downlink queue number supported by ONU
Traffic-scheduler number	
	The number of traffic scheduler supported by ONU
Total Card number	
	The card number supported by ONU
Total Ethuni number	
	UNI Port number supported by ONU
Card1 Ethuni number	
	Card1 Ethuni number supported by ONU
Operation Id	ID for operator configured in ONU.
CTC Spec Version	The ONU version for operator
OnuType	ONU types
Tx power supply control	Power supply specification defined in G.988

4.6. Optical Module and ONU current, voltage, temperature, Tx & Rx optical power reading

SFP Tx power, temperature, current and voltage:

SAN3700 (config) # interface gpon-olt 1/2

SAN3700G08E (config-gpon-olt1 / 2) # show optical module info

SAN3700G08E(config-gpon-olt1/2)# show optical module info optical module tx power : 5.49 dbm optical module temperature : 37.00 C optical module voltage : 3.23 V optical module bias current : 12.72 mA

ONU reads the PON port Tx/Rx and ONU Tx/Rx power

OLT (config-gpon-onu1 / 2: 1) # show onu power sAN3700G08E(config-gpon-onu1/2:1)# show onu power olt x power : 5.49 dbm olt rx power : -19.69 dbm onu rx power : 1.89 dbm onu rx power : -30.96 dbm

.

ONU reads the Tx/Rx power and voltage, current and temperature.

SAN3700G08E (config-gpon-onu1 / 2: 1) # show onu remote optical info

SAN3700G08E(config-gpon-onu1/2:1)# show onu remote optical info onu tx power : 2.26 dbm onu rx power : -30.96 dbm onu voltage : 3.32 v onu bias current : 14.25 mA onu temperture : 66.69 C

Query ONU Rx Power at PON Port:

GPON (config-gpon-olt1 / 8) # show optical module rxpower onuid 1

OLT rx power: -19.02 dbm

4.7. Optical module and ONU threshold configuration for Tx / Rx

optical power

View and configuration of ONU Tx/Rx optical power threshold

SAN3700G08E (config-gpon-onu1 / 2: 1) # show onu remote optical threshold SAN3700G08E (config-gpon-onu1/2:1)# show onu remote optical threshold

SAN37000	308F(C(onrig-gpo	on-onul/2:1)#	SHOW	onu	remote optical	thresho
optical	lower	rxpower	threshold:			onu_internal	
optical	upper	rxpower	threshold:			onu_internal	
optical	lower	txpower	threshold:			onu_internal	
optical	upper	txpower	threshold:			onu_internal	
-				_			

Modify ONU Tx/Rx optical power threshold

SAN3700G08E (config-gpon-onu1 / 2: 1) # remote onu optical threshold

lowerrxpower lowerrxpower

upperrxpower upperrxpower

lowertxpower lowertxpower

uppertxpower uppertxpower

PON SFP Module threshold view:

SAN3700G08E (config-gpon-olt1 / 2) # show optical module threshold

5AN3700G08E(config-gpon-olt1/2)# show optical	module threshold
optical module threshold tx power low	: 1.83 dbm
optical module threshold tx power high	: 7.33 dbm
optical module threshold rx power low	: -33.08 dbm
optical module threshold rx power high	: -11.00 dbm
optical module threshold temperature low	: -13.00 C
optical module threshold temperature high	: 80.00 C
optical module threshold voltage low	: 3.00 V
optical module threshold voltage high	: 3.60 V
optical module threshold bias current low	: 0.00 mA
optical module threshold bias current high	: 90.00 mA

Note:

» ONU internal the threshold is reported by ONU.

» When ONU can not report the alarm that the optical power is too low or too high, OLT will not get the corresponding alarm.

» The threshold for the PON port optical module can not be modified, and the threshold reported is from the SFP module. Different manufacturers or types of SFP modules have different threshold phenomena.

4.8. Remote ONU restart and restore

Remote ONU restore: OLT (config) #interface gpon-onu1 / 5: 1 OLT (config-gpon-onu1 / 5: 1) # remote onu restore Remote ONU reboot: OLT (config-gpon-onu1 / 5: 1) # remote onu reboot

4.9. Uplink and downlink packet encryption configuration

4.9.1. Downlink packet key interaction enabling and interactive interval

configuration

Enable encryption:

OLT (config-gpon-olt1 / 4) # aes encryption key_exchange enable

Encryption disable:

OLT (config-gpon-olt1 / 4) # aes encryption key_exchange disable

Configuration Key Update interval (ms):

OLT (config-gpon-olt1 / 4) # aes encryption key_exchange interval 10000

4.9.2. Uplink packet GEM port service flow encryption enable

Enable encryption:

OLT (config-gpon-onu1 / 4: 1) # gemport 1 encryption enable

Encryption disable:

OLT (config-gpon-onu1 / 4: 1) # gemport 1 encryption disable

4.10. Logical distance configuration and query

Configuration:

OLT (config-gpon-olt1 / 4) # onu max_distance

20 onu range 0 ~ 20km

40 onu range 20 ~ 40km

60 onu range 40 ~ 60km

Query:

OLT (config) # show distance gpon-olt1 / 4 onu 1

SAN3700G08E(confiğ)# show distance gpon-olt1/2 onu 1 onu 1 physical distance:45

4.11. Uplink and downlink FEC configuration

Downstream enable:

OLT (config-gpon-olt1 / 4) # fec downstream enable Upstream enable: OLT (config-gpon-onu1 / 4: 1) # fec upstream enable Description: By default, the FEC state is not enabled. To enable this function, you need to use the C++ SFP module.

4.12. ONU side MAC address filtering

Sino-Telecom OLT supports remote service dynamic MAC address quantitative restrictions,

or statically fixed MAC address restriction for remote ONUs.

Configure the ONU remote service MAC address restriction mode (dynamic and static)

remote mac_filter service 1 mode dynamic | static

Description:

When static constraint is used, learn and forward according to the configured static MAC address;

For Dynamic constraints, use MAC learning.

Uplink Dynamic MAC limits:

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 1 mac-limit 1

When the mode is statically limited, you can configure data that allows only fixed (source / destination) MAC addresses, or discard only the data stream of the fixed (source / destination) MAC address

OLT (config-gpon-onu1 / 1: 1) # remote mac_filter service 1 rule 1 forward da 0000-0001-0001

Only the the data flow can be through with the destination MAC address 0000-0001-0001, and the rest will be discarded.

OLT (config-gpon-onu1 / 1: 1) # remote mac_filter service 1 rule 2 forward sa 0000-0001-0002

Only the the data flow can be through with the destination MAC address 0000-0001-0002, and the rest will be discarded.

OLT (config-gpon-onu1 / 1: 1) # remote mac_filter service 1 rule 1 discard da 0000-0002-0001

Only the the data flow will be discarded with the destination MAC address 0000-0002-0001, and the rest will be through.

OLT (config-gpon-onu1 / 1: 1) # remote mac_filter service 1 rule 2 discard sa 0000-0002-0002

Only the the data flow will be discarded with the destination MAC address 0000-0002-0002, and the rest will be through.

Note:

The MAC address restriction configured by a single remote service can only be "all through", or "all discarding".

4.13. ONU remote upgrade

Upload the ONU Version to OLT:

OLT # tftp onuversion 192.168.17.117 VERSION

View the ONU version file stored in OLT, at most 5 different ONU versions can be stored at OLT.

OLT # show onu versions

ONU version delete:

OLT # delete onuversion VERSION

Update the ONU version, manual upgrade can only update the current working status of operational ONU, the upgrade process to ensure that the ONU state is normal:

OLT # cpe update tclinux.bin gpon-olt1 / 4 onuid 1

View ONU version:

OLT # show cpe information gpon-olt1 / 5 onuid 2

View the upgrade status. There are three update states of downloading, ONU, writing, disk

and update success during the upgrade process :

OLT # show cpe update-status gpon-olt1 / 5 onuid 2

Send commit, ONU will switch to partition version:

OLT # cpe commit gpon-olt1 / 5 onuid 1

Version activate the ONU, ONU Will automatically restart:

ONU will automatically restart if configuring ONU version as "activate" :

cpe activate gpon-olt1 / 5 onuid 1

When the upgrade is complete, the ONU re-authenticate and becomes operational, and you can see that the version of ONU has been updated:

OLT # show cpe information gpon-olt1 / 5 onuid 2

4.14. ONU manage-ip

If there is an EOC (Ethernet Over Cable) device, need to configure and manage the IP sending from the OLT, jumping to the EOC equipment and configure the service of ONU under it.

OLT # config terminal

VLAN Configuration management and VLAN interface address management:

OLT (config) #vlan 101

OLT (config-vlan101) # exit

OLT (config) # interface vlanif101

OLT (config-vlanif101) # ip address 11.0.0.1/24

The ONU management IP configuration:

OLT (config) # interface gpon-onu 12/4: 1

OLT (config-gpon-onu12 / 4: 1) #tcont 1 profile 1200

OLT (config-gpon-onu12 / 4: 1) #gemport 1 tcont 1

OLT (config-gpon-onu12 / 4: 1) # service-port 1 gemport 1 user-vlan 101 vlan-add 101

OLT (config-gpon-onu12 / 4: 1) #remote service 1 gem 1 vlan 101

OLT (config-gpon-onu12 / 4: 1) #remote uni eth_1 / 1 vlan-mode transparent

OLT (config-gpon-onu12 / 4: 1) #remote onu mgmt-ip 11.0.0.2 255.255.255.0 11.0.0.1 vlan 101

Ping the ONU IP from OLT:

OLT # ping 11.0.0.2

!!!!!

VLAN 101 configured in uplink port can be forwarded to PC, thus switching to the EOC configuration management.

4.15. PON Port Isolation function Disabling

This function closes the isolation function so that interworking between the same VLAN of the PON port ONU can be achieved.

When ONUs under different PON ports need service interworking, each of the corresponding PON port needs to disable this function.

OLT(config-gpon-olt1/1)# switch-port protected disable
5.Unicast service configuration

5.1. MAC address management

MAC address management is a basic function of two-layer network management, including setting MAC address aging time, limiting dynamic MAC address learning number and static MAC address.

5.1.1. Dynamic MAC aging time

The aging dynamic MAC address can update the MAC address table in time, so that the system can avoid not learning new MAC addresses, because of which the user data can not be forwarded.

After successfully configured MAC address aging time, the system will check the aging dynamic MAC address. If at 1-2 times the aging time long range, there is no packet with the source MAC address, the corresponding MAC address will be deleted from the MAC address table.

View the MAC address table entry:

```
OLT (config) # show mac-address

GPON(config) # show mac-address

Mac Vid Interface Type

507b-9d13-7362 100 xe1/1 dynamic

f48e-38e9-73ea 100 gpon-onu1/1:11 dynamic
```

```
total: 2
```

Note :

The MAC address learning function is only for unicast MAC addresses and does not learn multicast and broadcast MAC addresses.

MAC address table: the MAC address table saves in the system cache, whose table entries contain the MAC address of the equipment connected to the system, the VLAN ID and the interface. When forwarding data, query MAC address table according to the destination MAC address in the data frame and the VLAN ID, the system can quickly locate the interface and thus to reduce the broadcast.

5.1.2. Dynamic MAC Learn Number Limitation

Dynamic MAC address learning number of user ports or services can be set manually. When the MAC address learned by the system reaches the configured maximum dynamic MAC address learning number, the user port or service will not learn any other new MAC address. Restricting the number of dynamic MAC address learning can limit the number of MAC addresses entering the network and reduce the burden of network equipments. A dynamic MAC address can be aged, i.e., the system will remove the MAC address table entries, if it does not send or receive messages within a specified period of time from the equipment. Configuration command:

GPON (config-xe1 / 1) # mac-address limit *

Description:

The current maximum number of MAC that can be configured by OLT is 8000;

5.1.3. Static MAC

When you need to access a device with a specified MAC address on the port, configure the VLAN + static MAC address on the port, or configure the static MAC address for the service stream. The system forwards the data directly according to the static MAC GPON (config) # mac-address static 0001-0003-0005 vlan 10 interface xe1 / 1

5.2. VLAN configuration

Creating VLAN is the basis for configuring VLAN and service, and to make sure that VLAN has been created in accordance with the actual plan before proceeding with the VLAN configuration.

Note:

>>The VLAN is 1 by default, and can not be deleted. >>Multicast downlink VLAN 4095

5.2.1. Configure the uplink port and VLAN planning

5.2.1.1. The uplinkmode configuration

OLTG08E (config) # uplink-mode

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ge uplink 8 ge port

xe uplink 2 xe port

Note:

SAN3700-G08E supports 2*10GE or 8*GE, OLT needs to be restarted if you want to change the uplink mode. The default is 8*GE mode.

5.2.1.2. The uplink port VLAN attributes configuration

In the uplink interface configuration mode, configuration port supports two modes: trunk (hybrid) and access.

Trunk mode:

OLT (config) #interface xe1 / 1

OLT (config-xe1 / 1) #switchport mode trunk

OLT (config-xe1 / 1) #switchport trunk tag 100-200

OLT (config-xe1 / 1) # switchport trunk untag 300

Access mode:

OLT (config-xe1 / 1) #switchport mode access

OLT (config-xe1 / 1) #switchport access 100

Note:

When the uplink interface VLAN is configured, the system will automatically create the corresponding VLAN

5.2.1.3. The uplink port rate configuration

The OLT has two 10G uplink ports, which can be configured as a 1G. The uplink ports stay in "shutdown" state by default, which need to be enabled and configured with corresponding rate manually. The configuration is as follow:

OLT (config) #interface xe1 / 2

OLT (config-xe1 / 2) #no shutdown

OLT (config-xe1 / 2) #speed 1000

Note:

OLT supports GE/10GE optical module, does not support the 10/100/1000 adaptive transceiver.

5.2.1.4. Uplink portrate Limiting

OLT support uplink rate limiting to set the port service rate and flow. Use this command when you need to set the specified port packet at a specified rate.

OLT (config-xe1 / 1) # rate-limit 1000 2000 egress // speed up

OLT (config-xe1 / 1) # rate-limit 1000 2000 ingress // speed downlink

Note:

The first value is the limited rate in kbps; the second is peak Burst value in kbit. When the two value is configured as 0, there will be no rate limit. The concept of Burst is different from RFC2697, 2698, 4116 in the token bucket. When the rate limit is <10Mbps, burst size is configured as a 10~1000; when the rate limit is >10Mbps, the burst size configuration is 2000, otherwise there will be a problem of rate limiting accuracy.

5.2.1.5. MAC address learning limit

This command is to configure the largest dynamic MAC address entry on the port. Use this command when necessary to restrict the number of user access for a virtual port service. When the maximum dynamic MAC address entry of the port is configured successfully, the port will no longer learn the new MAC address after the learned MAC address reaches this value.

OLT supports MAC address learning limit, up to 8K MAC addresses.

OLT (config-xe1 / 1) # mac-address limit 8000

(Optional) MAC address View command:

OLT (config) # show mac-address

Mac Vid Interface Type

0018-7d9d-2ffb 17 xe1 / 2 dynamic

00e0-4c60-7348 17 xe1 / 2 dynamic

28a0-2b2b-821e 17 xe1 / 2 dynamic

3891-d5ad-9678 17 xe1 / 2 dynamic

c4ca-d930-de0d 17 xe1 / 2 dynamic

0000-0400-0001 100 gpon-onu1 / 5: 5 dynamic

0000-0500-0001 100 xe1 / 1 dynamic

c4c9-ec10-cfd1 100 gpon-onu1 / 5: 5 dynamic 60e6-bc00-3554 200 gpon-onu1 / 5: 2 dynamic

total: 9

5.2.1.6. The uplink port broadcast storm-control

OLT supports the rate limit for broadcast, multicast, and unknown unicast packet. There are two rate limit ways: Kbps and PPS of packets, which are effective for incoming packets.

OLT (config-xe1 / 1) # storm-control broadcast pps 10000

OLT (config-xe1 / 1) # storm-control multicast pps 10000

OLT (config-xe1 / 1) # storm-control unicast pps 10000

OLT (config-xe1 / 1) # storm-control broadcast kbps 10000

OLT (config-xe1 / 1) # storm-control multicast kbps 10000

OLT (config-xe1 / 1) # storm-control unicast kbps 10000

Note:

When configured as Kbps, the rate limit is more accurate when the configuration value is 200kbps~100Mbps;

When the rate limit PPS is between 1~4, there will be some fluctuation

5.2.1.7. Monitor session

The feature copies the packet of the designated port to the port connected to the data monitoring device so that the user can monitor and analyze the copied messages for network monitoring and troubleshooting.

The source port xe1/2 is mirrored into the destination port xe1/1:

OLTG08 (config) # monitor session 1 ingress destination xe1 / 1 source xe1 / 2

OLTG08 (config) # show monitor

Session Source port Destination port Type Vlan

1 xe1 / 2 xe1 / 1 ingress –

5.2.1.8. VLAN Layer 3 sub-interface Configuration

This command is used to create the VLAN interface from the global configuration mode and the VLANIF mode. Use this command when you need to configure a virtual layer three interface in VLANIF mode. OLT (config)# interface vlanif102 OLT (config-vlanif102)# ip address 12.0.0.1/24 OLT (config-vlanif102)#exit

5.3. PON port VLAN

PON port VLAN is unnecessary to configure, after configuring VLAN in uplink interface and ONU, OLT will automatically add PON port into the corresponding VLAN.

5.4. Configure different service types

5.4.1. Passthrough service

Sino-Telecom OLT supports full Passthrough and VLAN passthrough mode, the full passthrough includes all the packets, while VLAN passthrough refers to specific VLAN packets.

5.4.1.1. Full pass-through configuration

Configure uplink port:

OLT (config) #interface xe1 / 1

OLT (config-xe1 / 1) #switchport mode trunk

OLT (config-xe1 / 1) #switchport trunk tag 2-4094

Add T-CONT and bind GEM Port:

OLT (config) #interface gpon-onu1 / 1: 1

OLT (config-gpon-onu1 / 1: 1) # tcont 1 profile 100

OLT (config-gpon-onu1 / 1: 1) # gemport 1 tcont 1

Configure Full passthrough service:

OLT (config-gpon-onu1 / 1: 1) # service-port 1 gemport 1

Configure the remoteONU passthrough mode:

OLT (config-gpon-onu1 / 1: 1) # remote service 1 gem 1

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 1 vlan-mode transparent

5.4.1.2. VLAN passthrough configuration

Configure uplink port:

OLT (config) #interface xe1 / 1

OLT (config-xe1 / 1) #switchport mode trunk

OLT (config-xe1 / 1) #switchport trunk tag 100

Add t-tcont and bind gemport:

OLT (config) #interface gpon-onu1 / 1: 1

OLT (config-gpon-onu1 / 1: 1) # tcont 1 profile 100

OLT (config-gpon-onu1 / 1: 1) # gemport 1 tcont 1

Configue service:

OLT (config-gpon-onu1 / 1: 1) # service-port 1 gemport 1 user-vlan 100 vlan 100

Configure the remote ONU to passthrough mode:

OLT (config-gpon-onu1 / 1: 1) # remote service 1 gem 1 vlan 100

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 1 vlan-mode trunk tag 100

Note:

When using VLAN passthrough, all VLAN should have the same GEM.

5.4.2. VLAN Switch service

Sino-Telecom OLT support 1:1 and N:1 VLAN Switch, and the COS value modification for the switched VLAN.

5.4.2.1. VLAN 1: 1 Switch configuration

Configure uplink port: OLT (config) #interface xe1 / 1 OLT (config-xe1 / 1) #switchport mode trunk OLT (config-xe1 / 1) #switchport trunk tag 300-400 Add t-tcont and bind gem port: OLT (config) #interface gpon-onu1 / 1: 1

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OLT (config-gpon-onu1 / 1: 1) # tcont 1 profile 100

OLT (config-gpon-onu1 / 1: 1) # gemport 1 tcont 1

OLT (config-gpon-onu1 / 1: 1) # tcont 2 profile 100

OLT (config-gpon-onu1 / 1: 1) # gemport 2 tcont 2

Configure 1: 1 service:

OLT (config-gpon-onu1 / 1: 1) # service-port 1 gemport 1 user-vlan 100 vlan 300 priority 2

OLT (config-gpon-onu1 / 1: 1) # service-port 2 gemport 2 user-vlan 200 vlan 400 priority 2

Configure remote ONU:

OLT (config-gpon-onu1 / 1: 1) # remote service 1 gem 1 vlan 100

OLT (config-gpon-onu1 / 1: 1) # remote service 2 gem 2 vlan 200

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 1 vlan-mode trunk tag 100

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 2 vlan-mode trunk tag 200

5.4.2.2. VLAN N: 1 Switch configuration

Configure uplink port:

OLT (config) #interface xe1 / 1

OLT (config-xe1 / 1) #switchport mode trunk

OLT (config-xe1 / 1) #switchport trunk tag 300

Add t-tcont and bind gem port:

OLT (config) #interface gpon-onu1 / 1: 1

OLT (config-gpon-onu1 / 1: 1) # tcont 1 profile 100

OLT (config-gpon-onu1 / 1: 1) # gemport 1 tcont 1

OLT (config-gpon-onu1 / 1: 1) # tcont 2 profile 100

OLT (config-gpon-onu1 / 1: 1) # gemport 2 tcont 2

Configure N: 1 service:

OLT (config-gpon-onu1 / 1: 1) # service-port 1 gemport 1 user-vlan 100 vlan 300 priority 2

OLT (config-gpon-onu1 / 1: 1) # service-port 2 gemport 2 user-vlan 200 vlan 300 priority 2

Configure remote ONU:

OLT (config-gpon-onu1 / 1: 1) # remote service 1 gem 1 vlan 100

OLT (config-gpon-onu1 / 1: 1) # remote service 2 gem 2 vlan 200

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 1 vlan-mode trunk tag 100

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 2 vlan-mode trunk tag 200

5.4.3. Add SVLAN service

Sino-Telecom OLT support to add SVLAN for VLAN packet, UNTAG packet, all tag packet and all packets.

The added SVLAN can modify the priority cos value or directly copy the cos value of the user VLAN.

5.4.3.1. Add SVLAN for VLAN Packet

Configure uplink port:

OLT (config) #interface xe1 / 1

OLT (config-xe1 / 1) #switchport mode trunk

OLT (config-xe1 / 1) #switchport trunk tag 200

Add t-cont and bind gem port:

OLT (config) #interface gpon-onu1 / 1: 1

OLT (config-gpon-onu1 / 1: 1) # tcont 1 profile 100

OLT (config-gpon-onu1 / 1: 1) # gemport 1 tcont 1

Configure service:

OLT (config-gpon-onu1 / 1: 1) # service-port 1 gemport 1 user-vlan 2002 vlan 2002 svlan 202 priority copy

Configure the remote ONU:

OLT (config-gpon-onu1 / 1: 1) # remote service 1 gem 1

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 1 vlan-mode transparent

5.4.3.2. Add SVLAN for untag packet

Configure uplink port: OLT (config) #interface xe1 / 1 OLT (config-xe1 / 1) #switchport mode trunk OLT (config-xe1 / 1) #switchport trunk tag 200 Add t-cont and bind gem port: OLT (config) #interface gpon-onu1 / 1: 1 OLT (config-gpon-onu1 / 1: 1) # tcont 1 profile 100 OLT (config-gpon-onu1 / 1: 1) # gemport 1 tcont 1

Configure service:

OLT (config-gpon-onu1 / 1: 1) # service-port 1 gemport 1 user-vlan untagged vlan-add 200 priority 2

Configure the remote ONU:

OLT (config-gpon-onu1 / 1: 1) # remote service 1 gem 1

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 1 vlan-mode transparent

5.4.3.3. Add SVLAN for All tag packet

Configure uplink port:

OLT (config) #interface xe1 / 1

OLT (config-xe1 / 1) #switchport mode trunk

OLT (config-xe1 / 1) #switchport trunk tag 100

Add t-cont and bind gem port:

OLT (config) #interface gpon-onu1 / 1: 1

OLT (config-gpon-onu1 / 1: 1) # tcont 1 profile 100

OLT (config-gpon-onu1 / 1: 1) # gemport 1 tcont 1

Configue service:

OLT (config-gpon-onu1 / 1: 1) # service-port 1 gemport 1 user-vlan tagged vlan-add 100 priority 2

Configure the remote ONU:

OLT (config-gpon-onu1 / 1: 1) # remote service 1 gem 1

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 1 vlan-mode transparent

5.4.3.4. Add SVLAN for All Packet

Configure uplink port:

OLT (config) #interface xe1 / 1

OLT (config-xe1 / 1) #switchport mode trunk

OLT (config-xe1 / 1) #switchport trunk tag 100

Add t-cont and bind gem port:

OLT (config) #interface gpon-onu1 / 1: 1

OLT (config-gpon-onu1 / 1: 1) # tcont 1 profile 100

OLT (config-gpon-onu1 / 1: 1) # gemport 1 tcont 1

Configure service:

OLT (config-gpon-onu1 / 1: 1) # service-port 1 gemport 1 user-vlan all vlan-add 100 priority2

Configure the remote ONU:

OLT (config-gpon-onu1 / 1: 1) # remote service 1 gem 1

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 1 vlan-mode transparent

Note:

» When the the service configuration model is untag-add | tagged-add, the default priority is 0 if adding the outer VLAN.

» The service-port VLAN configuration is not strictly on service filtering, VLAN without service configuration can also be forwarded, and controlled by uplink and ONU_ETH.

» When there are multi-layer tags in the downlink packets, only the inner tag priority will be copied.

» OLT currently supports up to 32 GEM, 32 stream configuration.

5.5. VLAN Filter and Mapple Mode configuration for remote ONU

5.5.1. Remote service configuration

The remote ONU service is based on the ONU configuration and is related to the service VLAN. OLT supports service-port passthrough for remote ONU, VLAN, VLAN+priority, VLAN+port, VLAN+port+priority services.

Port passthrough (all messages):

OLT (config-gpon-onu1 / 1: 1) # remote service 1 gem 1

Designated VLAN service:

OLT (config-gpon-onu1 / 1: 1) # remote service 1 gem 1 vlan 100

Designated VLAN+COS (enter GEM according the cos)

OLT (config-gpon-onu1 / 1: 1) # remote service 1 gem 1 vlan 100 cos 0

OLT (config-gpon-onu1 / 1: 1) # remote service 2 gem 2 vlan 100 cos 1

OLT (config-gpon-onu1 / 1: 1) # remote service 3 gem 3 vlan 100 cos 2

OLT (config-gpon-onu1 / 1: 1) # remote service 4 gem 4 vlan 100 cos 3

OLT (config-gpon-onu1 / 1: 1) # remote service 5 gem 5 vlan 100 cos 4

vlan bind ONU ports:

OLT (config-gpon-onu1 / 1: 1) # remote service 1 gem 1 vlan 100 eth_1 / 1

Service binding port:

OLT (config-gpon-onu1 / 1: 1) # remote service 1 gem 1 eth_1 / 1

Note:

Sino-Telecom OLT supports up to 32 remote service configurations. The Remote service configuration is strictly filtered and requires all the same service when configuring it, that is, which means VLAN and VLAN+COS service can't be mixed.

5.5.2. Remote UNI Configuration

OLT support 5 modes: access / hybrid / transparent / trunk / xlate.

Access mode:

OLT (config-gpon-onu1 / 1: 1) #remote uni eth_1 / 1 vlan-mode access pvlan 100

Hybrid mode:

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 1 vlan-mode hybrid pvlan 100 tag 200

Transparent mode:

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 1 vlan-mode transparent

Trunk mode:

OLT (config-gpon-onu1 / 1: 1) # remote uni eth_1 / 1 vlan-mode trunk tag 100 200

Xlate mode:

OLT (config-gpon-onu1 / 1: 1) #remote uni eth_1 / 1 vlan-mode xlate 100-200

6. Multicast service configuration

Multicast is the form of communication from point to multi-point where the source sends information to a subset of all nodes in the network. The core of multicast technology is to make the message replication work as far as possible from the nearest recipient to reduce the multicast data traffic on the network.

The controllable multicast, by identifying the user access or message request, the network equipment will have the corresponding authority management to determine whether the applicant have the appropriate permission to watch the program, thus to have the multi-cast service controlling and forwarding in the access equipment. OLT can help provide IPTV services for carriers with unicast and multicast. With the introduction of controllable multicast, the multicast users will be able to be managed and controlled on the network equipment, which can meet the requirements of broadband video services provided by operators, and enable multicast services to be "operational and manageable". OLT supports IGMP messages, V1, V2, V3 versions, and V1 versions of MLD messages, where IGMP V4 supports partial functionality of type1-4 when the run version is v3.

OLT supports two working modes, snooping and proxy. In Snooping mode, OLT listens only to the protocol message, extracts the key information, and establishes two-layer transfer table. In proxy mode, OLT will be used as a node and send query messages to the user side as a proxy of network equipment, at the same time, the multicast message flow can be reduced as it shields the user joining/leaving messages.

The two-layer multicast transfer table set up by OLT consists of MVLAN, GROUP, INTERFACE and so on. The downlink multicast stream transfer the multicast data stream to the corresponding PON port according to the multicast transfer table



6.1. Multicast IGMP configuration

6.1.1. General Multicast Configuration

Configuration Item	data
Multicast service VLAN ID	510
Service priority	0
Uplink port	XE1 / 2
Service port	ONU Interface: gpon-onu1 / 4: 3
	Service-port ID: 1

Table 6-1 General Multicast Configuration

T-CONT	Index: 1
	Name: T1
	T-CONT Profile: 20M
GEM Port	Index: 1
	Name: gemport1
	T-CONT Index: 1
Service Channel	Service type: internet
	GEM Port Index: 1
	Priority: 0
	VLAN ID: 510
User port VLAN	Port: eth_1 / 1
	VLAN modes: transparent
	VLAN ID: 510

OLT configuration:

The Mandatory configuration:

OLT (config) # igmp enable

- OLT (config) # igmp mvlan 510
- OLT (config) # igmp mvlan 510 group 224.1.1.1
- OLT (config) # igmp mvlan 510 source-port xe1 / 2
- OLT (config) # igmp mvlan 510 receive-port gpon-onu1 / 4: 3
- OLT (config) # igmp interface gpon-onu1 / 4: 3 version 3

Optional configuration:

- OLT (config) # igmp gen-query-intvl 200 // general query interval
- OLT (config) # igmp last-memb-query-count 3 // the number of specific query packet
- OLT (config) # igmp last-memb-query-intvl 20 // specific query packet interval
- OLT (config) # igmp max-resp-time 300 // maximum response time (0.1s)
- OLT (config) # igmp robustness 3 // robustness parameters
- OLT (config) # igmp snooping-aging-time 200 // snooping aging time
- OLT (config) # igmp unsolicited-report-interval 2 // active reporting interval

Note:

*Proxy Member Aging Time = robustness * gen-query-intvl + max-resp-time.*

When the HGU type is not configured with ONU multicast, it can also add to the multicast group, and the multicast packet forwarding behavior is controlled by the ONU.

ONU configurations:

OLT (config-gpon-onu1 / 4: 3) # tcont 1 profile T4-200M

OLT (config-gpon-onu1 / 4: 3) # gemport 1 tcont 1

OLT (config-gpon-onu1 / 4: 3) # service-port 1 gemport 1 user-vlan 510 vlan 510

OLT (config-gpon-onu1 / 4: 3) # remote service 1 gem 1 vlan 510

OLT (config-gpon-onu1 / 4: 3) # remote uni eth_1 / 1 vlan-mode trunk tag 510

OLT (config-gpon-onu1 / 4: 3) # remote multicast eth_1 / 1 enable

OLT (config-gpon-onu1 / 4: 3) # remote multicast eth_1 / 1 igmp version 3

OLT (config-gpon-onu1 / 4: 3) # remote multicast eth_1 / 1 up vlan 510 tag-action transparent

OLT (config-gpon-onu1 / 4: 3) # remote multicast eth_1 / 1 down vlan 510 tag-action transparent

VLAN configuration:

OLT (config-vlan510) # unknown-multicast drop // default unknown multicast is Hong Fan

6.1.2. IGMP Span-vlan multicast

Configuration Item	data
Multicast service VLAN ID	510
Service priority	0
Uplink port	Xe1 / 2
Business port	ONU Interface: gpon-onu1 / 4: 3
	Service-port ID: 1
T-CONT	Index: 1
	Name: T1
	T-CONT Profile: T4-20M
GEM Port	Index: 1
	Name: gemport1
	T-CONT Index: 1

Table 6-2 IGMP Span-vlan multicast

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6. Multicast service configuration

Service Channel	Service type: internet
	GEM Port Index: 1
	Priority: 0
	VLAN ID: 510
User port VLAN	Port: eth_1 / 1
	VLAN mode: translate
	VLAN ID: 500

OLT configuration:

- OLT (config) # igmp enable
- OLT (config) # igmp span-vlan enable
- OLT (config) # igmp mvlan 510
- OLT (config) # igmp mvlan 510 group 224.1.1.1
- OLT (config) # igmp mvlan 510 source-port xe1 / 2
- OLT (config) # igmp mvlan 510 receive-port gpon-onu1 / 4: 3

OLT (config) # igmp interface gpon-onu1 / 4: 3 version 3

ONU configurations:

OLT (config-gpon-onu1 / 4: 3) # tcont 1 profile T4-200M

OLT (config-gpon-onu1 / 4: 3) # gemport 1 tcont 1

OLT (config-gpon-onu1 / 4: 3) # service-port 1 gemport 1 user-vlan 500 vlan 510

OLT (config-gpon-onu1 / 4: 3) # remote uni eth_1 / 1 vlan-mode trunk tag 500

OLT (config-gpon-onu1 / 4: 3) # remote multicast eth_1 / 1 enable

OLT (config-gpon-onu1 / 4: 3) # remote multicast eth_1 / 1 igmp version 3

OLT (config-gpon-onu1 / 4: 3) # remote multicast eth_1 / 1 up vlan 500 tag-action transparent

OLT (config-gpon-onu1 / 4: 3) # remote multicast eth_1 / 1 down vlan 510 tag-action xlate 500

Note:

Do not configure the MVLAN before conversion, otherwise there will be possibility of failure to access multicast group.

6.1.3. IGMP Controllable Multicast

Controllable multicast can control the user access to channels, including permit, deny and preview. Under preview permissions, you can control the number, duration, and interval of

the user's preview. When the preview number reaches the maximum setting number, the OLT will force the user to leave the appropriate multicast group and will not be allowed to join again for a certain period of time.

Cac mode is controllable multicast, in a multicast group, the period, blackout and maxnbr of the joining group can be limited:

OLT (config) # igmp work-mode proxy

OLT (config) # igmp cdr enable

OLT (config) # igmp interface gpon-onu1 / 4: 3 cac eth_1 / 1 group 224.1.1.1 preview

OLT (config) # igmp interface gpon-onu1 / 4: 3 cac eth_1 / 1 group 224.1.1.1 preview period 30

OLT (config) # igmp interface gpon-onu1 / 4: 3 cac eth_1 / 1 group 224.1.1.1 preview maxnbr 3

OLT (config) # igmp interface gpon-onu1 / 4: 3 cac eth_1 / 1 group 224.1.1.1 preview blackout 30

6.1.4. Show command

OLT (config) # show igmp dynamic-group

MVLAN SOURCE GROUP TYPE INTERFACE

510 0.0.0.0 224.1.1.1 Dynamic gpon-onu1 / 4: 3

GPON (config) # show igmp

IGMP Global Configuration

Global: Enable

WorkMode: Proxy

Span-Vlan: Enable

CDR: Enable

Robustness: 10

Snooping Aging Time: 3600

Proxy Member Aging Time: 310

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Query Max Resp Time: 100

General Query Interval: 30

Startup Query Interval: 31

Startup Query Number: 2

Last Member Query Interval: 10

Last Member Query Number: 2

Unsolicited Report Interval: 10

Interpretation of the relevant parameters:

»CDR:

This parameter is only valid under proxy mode;

»Robustness:

Robustness parameters:

»Snooping Aging Time:

The aging time under snooping mode will be reset when report packet is received.

»Proxy Member Aging Time:

The aging time of the proxy model, is calculated [General Query Interval] * [Robustness] + [Query Max Resp Time], resets the received packet report time;

The aging time under proxy mode will be reset when report packet is received, the calculation formula is: [General Query Interval] * [Robustness] + [Query Max Resp Time]

»Query Max Resp Time:

Query packet maximum response time, the value is sent to ONU by inserting into the query package, if there is multicast group table entry in ONU, one report message should be responded in random in [1, Query, Max, Time], the unit is 0.1s.

»General Query Interval:

General query interval, in proxy mode, OLT sends query packets to all dynamic members in every [General, Query, Interval] seconds to maintain multicast group table entry.

»Startup Query Interval:

Start the interval query, under proxy mode, in order to quickly restore the service, after the system successfully started, OLT immediately will send to all receiving ports general query package, the interval is [Startup, Query, Interval] seconds;

»Startup Query Number:

Start the number query, under proxy mode, in order to quickly restore the service, after the system successfully started, OLT will immediately send to all the receiving ports general query message, the number is [Startup, Query, Number].

»Last Member Query Interval:

The last member interval query, in proxy mode, when the OLT receives the "leave" packet, it will send a specific set of queries to the specified port if the fast-leave function on the port is disabled. The interval is [Last, Member, Query, Interval] seconds;

»Last Member Query Number:

The last member interval query, in proxy mode, when the OLT receives the "leave" packet, it will send a specific set of queries to the specified port if the fast-leave function on the port is disabled. The number is [Last Member Query Number];

»Unsolicited Report Interval:

Active interval report, under proxy mode, in order to prevent the reported message to be lost, when joining the group for the first time, OLT will take the initiative to report [Robustness] report message, the interval is [1, Unsolicited Report Interval] random value.

OLT(config)# show igmp interface gpon-onu1/4:2

When this port receives v3 type protocol packet, the port running version will automatically adjust to V3 which defaults to v2.

IGMP Interface Configuration Fast-Leave: Enable IGMP Version: V3 IGMP Run Version: V3 Max Group Number: 512 Interpretation of the relevant parameters:

»Fast-Leave:

Fast-leave enabling, mainly reflected in the behavior of OLT after the user left the message.

When configured as enable, OLT will immediately stop forwarding multicast streams to the user.

When configured as disable, if work-mode is snooping, after [snooping-aging-time] OLT will stop forwarding multicast flows.

If work-mode is proxy, OLT will not stop forwarding multicast stream until it sent to the user [Last Member Query Number] special query packets.

»IGMP Version:

Maximum supported version number of IGMP message. If the IGMP message received by OLT is larger than the version number specified by this parameter, OLT will discard the message.

»IGMP Run Version:

The current IGMP version number running on the port. After the OLT receives the IGMP message, the version number of the message is recorded in the parameter, and in the subsequent interaction, the OLT sends the corresponding version of the IGMP message according to the parameter.

»Max Group Number:

The maximum number of groups can be added to the port

OLT (config) # show igmp interface gpon-onu1 / 4: 3 cac-info

IGMP CAC Configuration

Group Address: 224.1.1.1

Authorization: PREVIEW

Current State: IDLE

Preview Max-Count: 3

Preview Period (s): 30

Preview Blackout (s): 30

Interpretation of the relevant parameters:

»Group Address:

Multicast group address. Channel address to be controlled.

»Authorization:

Authorization mode. Permit; Deny; Preview.

»Current State:

The current control state. Only valid under PREVIEW mode. PLAY; STOP; IDLE;

»Preview Max-Count:

The maximum preview number. Only valid under PREVIEW mode.

»Preview Period (s):

Preview period. Valid only in PREVIEW mode.

»Preview Blackout (s):

Preview blackout. Valid only in PREVIEW mode

6.2. Multicast MLD Configuration

Different from the IGMP multicast protocol, the address format of multicast group is controlled as IP V6, and the key IGMP is changed to MLD when configured. The format of multicast group is in IP V6 format. And now we support V1 version for MLD message.

6.2.1. General Multicast Configuration

Configuration Item	data
Multicast service VLAN ID	410
Service priority	0
Uplink port	XE1 / 2
Service port	ONU Interface: gpon-onu1 / 4: 1
	Service-port ID: 1
T-CONT	Index: 1
	Name: T1
	T-CONT Profile: 20M
GEM Port	Index: 1
	Name: gemport1
	T-CONT Index: 1

Table 6-3 General Multicast Configuration

CLI Configuration Guide

Service Channel	Service type: internet
	GEM Port Index: 1
	Priority: 0
	VLAN ID: 410
User port VLAN	Port: eth_1 / 1
	VLAN mode: transparent
	VLAN ID: 410

OLT configuration:

OLT (config) # mld enable

OLT (config) # mld mvlan 410

OLT (config) # mld mvlan 410 group ff1e :: 101: 101

OLT (config) # mld mvlan 410 source-port xe1 / 2

OLT (config) # mld mvlan 410 receive-port gpon-onu1 / 4: 1

OLT (config) # mld interface gpon-onu1 / 4: 1 version v1

ONU configuration:

OLT (config-gpon-onu1 / 4: 1) # tcont 1 profile 20M

OLT (config-gpon-onu1 / 4: 1) # gemport 1 tcont 1

OLT (config-gpon-onu1 / 4: 1) # service-port 1 gemport 1 user-vlan 410 vlan 410

OLT (config-gpon-onu1 / 4: 1) # remote service 1 gem 1 vlan 410

OLT (config-gpon-onu1 / 4: 1) # remote uni eth_1 / 1 vlan-mode trunk tag 410

OLT (config-gpon-onu1 / 4: 1) # remote multicast eth_1 / 1 enable

OLT (config-gpon-onu1 / 4: 1) # remote multicast eth_1 / 1 igmp version 4

OLT (config-gpon-onu1 / 4: 1) # remote multicast eth_1 / 1 up vlan 410 tag-action transparent

OLT (config-gpon-onu1 / 4: 1) # remote multicast eth_1 / 1 down vlan 410 tag-action transparent

View MLD entry:

OLT (config) # show mld dynamic-group

MVLAN SOURCE GROUP TYPE INTERFACE

CLI Configuration Guide

410 0.0.0.0 ff1e :: 101: 101 Dynamic gpon-onu1 / 4: 1

View MLD current configuration:

GPON (config) # show mld

MLD Global Configuration

Global: Enable

WorkMode: Proxy

Span-Vlan: Disable

CDR: Disable

Robustness: 2

Snooping Aging Time: 300

Proxy Member Aging Time: 260

Query Max Resp Time: 100

General Query Interval: 125

Startup Query Interval: 31

Startup Query Number: 2

Last Member Query Interval: 10

Last Member Query Number: 2

Unsolicited Report Interval: 10

ViewMLD interface configuration:

GPON (config) # show mld interface gpon-onu1 / 4: 1

MLD Interface Configuration

Fast-Leave: Disable

Version: MLDv1

Max Group Number: 2

6.2.2. MLD SPAN-VLAN multicast

Configuration Item	data
Multicast service VLAN ID	410
Business priorities	0
Uplink port	Xe1 / 2
Service port	ONU Interface: gpon-onu1 / 4: 1
	Service-port ID: 1
	Index: 1
T-CONT	Name: T1
	T-CONT Profile: 20M
GEM Port	Index: 1
	Name: gemport1
	T-CONT Index: 1
Service Channel	Service type: internet
	GEM Port Index: 1
	Priority: 0
	VLAN ID: 410
User port VLAN	Port: eth_1 / 1
	VLAN mode: translate
	VLAN ID: 400

OLT configuration:

OLT (config) # mld enable

OLT (config) # mld span-vlan enable

OLT (config) # mld mvlan 410

OLT (config) # mld mvlan 410 group FF1E :: 0101: 0101

OLT (config) # mld mvlan 410 source-port xe1 / 2

OLT (config) # mld mvlan 410 receive-port gpon-onu1 / 4: 1

OLT (config) # mld interface gpon-onu1 / 4: 1 version 1

Remote ONU configurations:

OLT (config-gpon-onu1 / 4: 1) # tcont 1 profile 20M
OLT (config-gpon-onu1 / 4: 1) # gemport 1 tcont 1
OLT (config-gpon-onu1 / 4: 1) # service-port 1 gemport 1 user-vlan 400 vlan 410
OLT (config-gpon-onu1 / 4: 1) # remote uni eth_1 / 1 vlan-mode trunk tag 400
OLT (config-gpon-onu1 / 4: 1) # remote multicast eth_1 / 1 enable
OLT (config-gpon-onu1 / 4: 1) # remote multicast eth_1 / 1 up vlan 400 tag-action transparent
OLT (config-gpon-onu1 / 4: 1) # remote multicast eth_1 / 1 down vlan 410 tag-action xlate 400
Do not configure the MVLAN before conversion, otherwise there will be possibility of failure to access multicast group.

6.2.3. MLD Controllable Multicast

Cac mode is controllable multicast, in a multicast group, the period, blackout and maxnbr can be limited:

OLT (config) # mld work-mode proxy

OLT (config) # mld cdr enable

OLT (config) # mld interface gpon-onu1 / 4: 1 cac eth_1 / 1 group FF1E :: 0101: 0101 preview

OLT (config) # mld interface gpon-onu1 / 4: 1 cac eth_1 / 1 group FF1E :: 0101: 0101 preview period 30

OLT (config) # mld interface gpon-onu1 / 4: 1 cac eth_1 / 1 group FF1E :: 0101: 0101 preview maxnbr 3

OLT (config) # mld interface gpon-onu1 / 4: 1 cac eth_1 / 1 group FF1E :: 0101: 0101 preview blackout 30

View command:

OLT (config) # show mld interface gpon-onu1 / 4: 1 cac-info

MLD CAC Configuration

Group Address: ff1e :: 101: 101

Authorization: PREVIEW

Current State: IDLE

Preview Max-Count: 3

Preview Period (s): 30

Preview Blackout (s): 10

6.3. Multicast bandwidth downlink rate limit

OLT (config-gpon-olt1 / 4) # scb max-bandwidth 200000

It must be configured in "qos-queue-scheduler mode hierarchy" mode, if it is in switch mode you need to manually shutdown PON port before switching.

OLT (config-xe1 / 2) # storm-control multicast kbps 5000

Configuration will be valid in "qos-queue-scheduler mode simple" and "qos-queue-scheduler mode hierarch".

When the PON port SCB multicast flow rate and uplink port of storm-control are both configured, the lower data rate will be effective.

IGMPv3 Snooping Description:

(1) For IGMPv3, the snooping that supports type1.2.3.4 only follows the following rules.

Type1 - is include: It is "include" with source, and "exclude" without source.

Type2 - is exclude: It is "include" without source, and "exclude" with source.

Type3 - change to include: It is "include" with source, and "exclude" without source.

Type4 - change to exclude: t is "include" without source, and "exclude" with source. (2) Maximumly 16 table entries is supported at present.

(3) IGMP Run version will be automatically adjusted at uplink port, so if you need to receive V3 report, the query should be sent.

(4) MLD only supports version v1.

IGMP v3 Proxy Description:

(1) This function send the source IP which didn't join the group, there are two scenarios:

A) When the uplink port didn't issue v3-query, the default version is V2, so the V2 report will be transferred;

B) When the uplink port issue v3-query, then V3 report will be transferred, where type is the fixed type4 (change to exclude).

(2) When the packet carries type 5 or type 6, the OLT discards the corresponding source group information.

.

Span-VLAN configuration tips:

(1) When configuring Span-VLAN multicast, need to pay attention to the order of configuration, firstly to configure the converted MVLAN, or don't configure the user-vlan MVLAN related parameters, otherwise it could be unable to join the group.

(2) The planned IGMP VLAN, and MLD VLAN cannot be the same VLAN.

7.QoS service configuration

QoS:Quality of Service, which means during the network communication process, to allow users to achieve the desired level of service in terms of bandwidth, delay, jitter and packet loss rate. The indicators for measuring QoS are as follows:

» Bandwidth, theoritical transmission capacity.

» Delay, refers to the duration for information sent from one node to another. A big delay will affect the quality of real-time services such as IP telephony.

» Jitter, refer to time-lag variation. Jitter can seriously affect the quality of multimedia services such as video on demand (VOD).

» Packet Loss Rate, the percentage of packet loss during transmission.

QoS implement the function to have packet into the queue and queue scheduling, and the scheduling mode supports two ways:

Simple scheduling, support uplink/downlink packet scheduling, according to the principle: queue the incoming message, schedule the outgoing message;





For uplink traffic, packets will enter PON port,

» According to the outer-VLAN cos value after the configuration of business transferring rules conversion (single VLAN is the VLAN cos, two-layer VLAN is SVLAN cos) to determine the packet Local Priority (internal priority, default mapping 0-0, ACL rule can be used to modify the packet Local Priority);

» At the entrance of PON, configure the mapping relationship between internal priorities and uplink out-going queue;

» Configure the sheduling policy at the export of uplink port (including: SP strict priority scheduling strategy, WRR weighted round robin scheduling strategy, and SP+WRR hybrid scheduling strategy);

» At uplink port, it's optional to configure the maximum/minimum bandwidth for each queue, and the limiting rate.

The downlink data stream, Sino-Telecom OLT provides two scheduling modes: simple scheduling and hierarchical scheduling mode.

Simple scheduling mode

» In simple scheduling mode, for incoming packets, according to the conversion of the outer VLAN cos value (VLAN is the single VLAN cos, VLAN SVLAN double cos value) the uplink port will determine the packet Local Priority (internal use priority with 0-0 mapping by default, the ACL rule can be used to modify the message Local Priority);

» At the entrance of uplink port, configure the mapping relationship between internal priorities and PON out-going queue, and configure the sheduling policy at the export of PON (including: SP strict priority scheduling strategy, WRR weighted round robin scheduling strategy, and SP+WRR hybrid scheduling strategy)

» At PON port, it's optional to configure the maximum/minimum bandwidth for each queue, and the limiting rate.

Hierarchical scheduling

There are three levels of scheduling:

» The first level is scheduling between each ONU (this level scheduling mode can be changed, the default is SP);

» The second level is scheduling between each ONU under each PON port (this level of scheduling is fixed to WRR, the default weight can be changed with is 1 by default);

» The third layer scheduling is between ONU and the multicast channel (this level can not be changed, fixed as SP, and the multicast channel has higher priority).



Figure 7-2 Hierarchical scheduling model

When the PON port is configured as a hierarchical scheduling model,

» According to the converted outer VLAN 802.1Q cos (single-layer VLAN is the VLAN cos, dual-layer VLAN is SVLAN cos) to determine the packet Local Priority (internal priority, 0-0 mapping by default, ACL rule can be used to modify the the Local Priority of the message);
 » The mapping relationship for entering ONU downlink queue according to the internal priority;

» Configure the service-port for a specified queue. Optionally configure the

maximum/minimum bandwidth of each ONU queue, and the maximum/minimum bandwidth of the ONU.

» Under the PON port, WRR weighted round robin scheduling strategy will be used between each ONU, with configurable ONU weight. The SP strict priority scheduling policy will be used beween all unicast and mulcast services, which guarantees the multicast service, also can configure the multicast bandwidth and the PON export rate limit.

7.1. Profile configuration

7.1.1. CoS-Queue-Map

The cos-queue-map command is used to configure the mapping between the internal priority and the queue used for message scheduling. Use this command when you need to modify the mapping between the internal priority and the queue. When the mapping relation is successful, the user message will be transferred to the corresponding queue according to the mapping relation.

Description:

The internal priority of message scheduling is determined by message VLAN cos priority.
 ACL traffic-priority modification of message 802.1p will not affect the mapping relation, ACL local-precedence can be configured to modify the internal priority message scheduling.
 The command cos-queue-map is to restore default mapping between internal priority and queue for message scheduling recovery. The default mapping is queue 0 for all priorities.
 Only when the service model configuration is untag-add | tagged-add, the added outer VLAN default priority is 0.

Configuration:

OLT (config) # gpon

OLT (config-gpon) # profile cos-queue-map 1 name 1 cos0 0 cos1 0 cos2 0 cos3 0 cos4 0 cos5 0 cos6 0 cos7 0

OLT (config-gpon) # profile cos-queue-map 2 name 2 cos0 0 cos1 1 cos2 2 cos3 3 cos4 4 cos5 5 cos6 6 cos7 7

OLT (config-gpon) # profile cos-queue-map 3 name 3 cos0 7 cos1 6 cos2 5 cos3 4 cos4 3 cos5 2 cos6 1 cos7 0

Viewing configured Profile:

OLT (config-gpon) # show profile cos-queue-map

profile cos-queue-map 1 name 1 cos0 0 cos1 0 cos2 0 cos3 0 cos4 0 cos5 0 cos6 0 cos7 0

profile cos-queue-map 2 name 2 cos0 0 cos1 1 cos2 2 cos3 3 cos4 4 cos5 5 cos6 6 cos7 7

profile cos-queue-map 3 name 3 cos0 7 cos1 6 cos2 5 cos3 4 cos4 3 cos5 2 cos6 1 cos7 0

Description:

Cos-queue-map can be configured in the PON and uplink port, and is not supported to configure service cos-queue-map at ONU side.

Binding Profile:

>> Uplink message profile binding on PON port

OLT (config) # interface gpon-OLT 1/1

OLT (config-gpon-olt1 / 1) # cos-queue-map 1

>> Downlink message profile binding on uplink port.

OLT (config) # interface xe1 / 1

OLT (config-xe1 / 1) # cos-queue-map 1

Description:

When the PON port is a hierarchical scheduling mode, this attribution does not work.

Restore the default mapping relation between the internal priority and the queue for message scheduling:

» Uplink message profile binding in PON port, and restore to the default mapping.

OLT (config) # interface gpon-OLT 1/1

OLT (config-gpon-olt1 / 1) # cos-queue-map default

» Downlink message profile binding in uplink port, and restore to the default mapping.

OLT (config) # interface xe1 / 1

OLT (config-xe1 / 1) # cos-queue-map default

The downlink message that is configured in ONU straightly enter the queue. OLT (config) #

interface gpon-onu1 / 1: 1

OLT (config-gpon-onu1 / 1: 1) # service-port 1 queue 1

Description:

» When the PON port is simple scheduling mode, the configuration on the ONU does not take effect and cannot be modified; in hierarchical mode, ONU maps all priority to queue 0 by default. View the mapping of the port message scheduling between internal priority and the queue. »

» Uplink port binding profile
OLT (config) # show cos-queue-map interface xe1 / 1
cos-queue-map default
» PON port binding profile
OLT (config) # show cos-queue-map interface gpon-olt1 / 1
cos-queue-map default
» Straight queue entering way configured in ONU:
OLT (config) # show running-config interface gpon-onu1 / 1: 1
service-port 1 queue 1

7.1.2. QoS-Queue-Scheduler

The qos-queue-scheduler command is used to configure the queue scheduling policy for the port. This command is used when a user needs to select a different queue scheduling policy based on the importance of the service to ensure that QoS of important services when there is network congestion. After successfully configuring the queue scheduling policy, the system forwards the message in the queue in accordance with the new scheduling mode. OLT supports three QoS scheduling strategies: SP (Strict Priority), WRR (Weighted Round Robin), and SP+WRR hybrid scheduling strategy.

The qos-queue-scheduler default command is used to restore the default queue scheduling policy for the system. When this command is successfully executed, the system is restored to a strict priority queue scheduling.

Configure :

» Configure the SP profile(Strict Priority scheduling strategy)

OLT (config) # profile qos-queue-scheduler 1 name 1 policy sp

OLT (config) # profile qos-queue-scheduler 2 name sp2 policy wrr queue0 0 queue1 0 queue2 0 queue3 0 queue4 0 queue5 0 queue6 0 queue7 0

» Configure WRR scheduling policy profile

OLT (config) # profile qos-queue-scheduler 3 name wrr policy wrr queue0 1 queue1 1 queue2 1 queue3 1 queue4 1 queue5 1 queue6 1 queue7 1

» Configure SP+WRR hybrid scheduling policy profile.

OLT (config) # profile qos-queue-scheduler 4 name spwrr policy wrr queue0 1 queue1 0 queue2 2 queue3 0

queue4 3 queue5 0 queue6 4 queue7 0

Description:

When there is no que of weight is 0, the profile is WRR policy scheduling; When there is the entry with weight 0 in the queue, the profile is a SP+WRR hybrid scheduling policy scheduling.

View the configured qos-queue-scheduler profile:

OLT (config-gpon) # show profile qos-queue-scheduler

profile qos-queue-scheduler 1 name 1 policy sp

profile qos-queue-scheduler 2 name sp2 policy wrr queue0 0 queue1 0 queue2 0 queue3 0 queue4 0 queue5

0 queue6 0 queue7 0

profile qos-queue-scheduler 3 name wrr policy wrr queue0 1 queue1 1 queue2 1 queue3 1 queue4 1 queue5

1 queue6 1 queue7 1

profile qos-queue-scheduler 4 name spwrr policy wrr queue0 1 queue1 0 queue2 2 queue3 0 queue4 3

queue5 0 queue6 4 queue7 0

OLT (config-gpon-olt1 / 1) # show profile qos-queue-scheduler

profile qos-queue-scheduler 1 name 1 policy sp

profile qos-queue-scheduler 2 name sp2 policy wrr queue0 0 queue1 0 queue2 0 queue3 0 queue4 0 queue5

0 queue6 0 queue7 0

profile qos-queue-scheduler 3 name wrr policy wrr queue0 1 queue1 1 queue2 1 queue3 1 queue4 1 queue5 1 queue6 1 queue7 1

profile qos-queue-scheduler 4 name spwrr policy wrr queue0 1 queue1 0 queue2 2 queue3 0 queue4 3 queue5 0 queue6 4 queue7 0

OLT (config-gpon-onu1 / 1: 1) # show profile qos-queue-scheduler

profile qos-queue-scheduler 1 name 1 policy sp

profile qos-queue-scheduler 2 name sp2 policy wrr queue0 0 queue1 0 queue2 0 queue3 0 queue4 0 queue5 0 queue6 0 queue7 0

profile qos-queue-scheduler 3 name wrr policy wrr queue0 1 queue1 1 queue2 1 queue3 1 queue4 1 queue5

1 queue6 1 queue7 1

profile qos-queue-scheduler 4 name spwrr policy wrr queue0 1 queue1 0 queue2 2 queue3 0 queue4 3 queue5 0 queue6 4 queue7 0

Bind the qos-queue-scheduler profile, the command is to take effect of the current qos-queue-scheduler profile in uplink port and PON port.

When it is necessary to have uplink queue scheduling, the scheduling strategy should be configured at the exit, i.e., the uplink port:

OLT (config) # interface xe1 / 1

OLT (config-xe1 / 1) # qos-queue-scheduler 1

When the PON port is a simple scheduling mode, before scheduling for downlink queue, the scheduling policy should be configured at the exit, i.e. PON port (*Note: PON port is*

hierarchical scheduling mode, this attribute is not valid, and can not be modified):

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

OLT (config-gpon-olt1 / 1) # qos-queue-scheduler 1

When the PON port is hierarchical scheduling mode, the queue scheduling policy should be configured in ONU before having the downlink queue scheduling for ONU (*Note: PON port is simple scheduling mode, this attribute is not valid, and can not be modified*):

OLT (config) # interface gpon-onu1 / 1: 1

OLT (config-gpon-onu1 / 1: 1) # qos-queue-scheduler 1

Restore the default queue scheduling policy

OLT (config) # interface xe1 / 1

OLT (config-xe1 / 1) # qos-queue-scheduler default

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

OLT (config-gpon-olt1 / 1) # qos-queue-scheduler default

(Note: PON port is hierarchical scheduling mode, the property does not take effect, and can not be modified)

OLT (config) # interface gpon-onu1 / 1: 1

OLT (config-gpon-onu1 / 1: 1) # qos-queue-scheduler default
(Note: PON port is simple scheduling mode, the property does not take effect, and can not be modified)

Query the quque scheduling policy that the message uses at the port, this command is used to view the gos-gueue-scheduler profile in the uplink port, PON port and ONU:

OLT (config) # show cos-queue-map interface xe1 / 1 qos-queue-scheduler default OLT (config) # show cos-queue-map interface gpon-olt 1/1 qos-queue-scheduler default View the queue scheduling policy in ONU: OLT (config-gpon-onu1 / 1: 1) # show qos-queue-scheduler interface gpon-onu1 / 1: 1 qos-queue-scheduler default

7.1.3. QoS-Queue-Traffic

Qos-queue-traffic is to guarantee and limit the queue bandwidth, in which the minimum bandwidth is the guaranteed bandwidth of the queue, and the maximum bandwidth is the maximum bandwidth allowed by the queue.

The qos-queue-traffic default command is used to recover the default queue bandwidth limiting policy for the system. After this command is successfully executed, the system is restored to the default queue bandwidth limiting policy, and the default queue bandwidth rate limiting policy is not to have any rate limitation.

This command can be configured under the GPON node:

OLT (config-gpon) #profile qos-queue-traffic 1 name 1 queue0 1-1 queue1 1-1 queue2 1-1 queue3 1-1 queue4 1-1 queue5 1-1 queue6 1-1 queue7 1-1 OLT (config-gpon) #profile qos-queue-traffic 2 name 2 queue0 10-1000000 queue1 10-100000 queue2 10-10000 queue3 10-1000 queue4 10-100 queue5 10-10 queue6 10-11 queue7 10-10 OLT (config-gpon) #profile qos-queue-traffic 3 name 3 queue0 10-1000000 queue1 10-100000 queue2 10-10000 queue3 10-1000 queue4 10-500 queue5 1-250 queue6 10-200 queue7 10-100 OLT (config-gpon) #profile qos-queue-traffic 4 name 4 queue0 10-1000000 queue1 10-100000 queue2 10-100000 queue3 1-1000 queue4 10-500 queue5 10-250 queue6 10-200 queue7 10-100

Note :

The maximum bandwidth configuration of the queue must be no less than the minimum configuration. When the maximum or minimum bandwidth of the queue is configured to be 0, the maximum and minimum bandwidth limitation will not be valid, i.e. the queue will not have any rate limitation. At present the configuration of 0 is not supported.

Check the current qos-queue-traffic profile, this command is used to view on the PON port, uplink port, ONU node:

OLT (config-gpon) # show profile qos-queue-traffic

profile qos-queue-traffic 1 name 1 queue0 1-1 queue1 1-1 queue2 1-1 queue3 1-1 queue4 1-1 queue5 1-1 queue6 1-1 queue7 1-1

profile qos-queue-traffic 2 name 2 queue0 10-1000000 queue1 10-100000 queue2 10-10000 queue3

10-1000 queue4 10-100 queue5 10-10 queue6 0-1 queue7 0-0

profile qos-queue-traffic 3 name 3 queue0 0-1000000 queue1 0-100000 queue2 0-10000 queue3 0-1000

queue4 0-500 queue5 0-250 queue6 0-200 queue7 0-100

profile qos-queue-traffic 4 name 4 queue0 10-1000000 queue1 10-100000 queue2 10-10000 queue3

0-1000 queue4 0-500 queue5 10-250 queue6 10-200 queue7 10-100

OLT (config-gpon-olt1 / 1) # show profile qos-queue-traffic

profile qos-queue-traffic 1 name 1 queue0 1-1 queue1 1-1 queue2 1-1 queue3 1-1 queue4 1-1 queue5 1-1 queue6 1-1 queue7 1-1

profile qos-queue-traffic 2 name 2 queue0 10-1000000 queue1 10-100000 queue2 10-10000 queue3

10-1000 queue4 10-100 queue5 10-10 queue6 0-1 queue7 0-0

profile qos-queue-traffic 3 name 3 queue0 0-1000000 queue1 0-100000 queue2 0-10000 queue3 0-1000

queue4 0-500 queue5 0-250 queue6 0-200 queue7 0-100

profile qos-queue-traffic 4 name 4 queue0 10-1000000 queue1 10-100000 queue2 10-10000 queue3

0-1000 queue4 0-500 queue5 10-250 queue6 10-200 queue7 10-100

OLT (config-gpon-onu1 / 1: 1) # show profile qos-queue-traffic

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profile qos-queue-traffic 1 name 1 queue0 1-1 queue1 1-1 queue2 1-1 queue3 1-1 queue4 1-1 queue5 1-1 queue6 1-1 queue7 1-1

profile qos-queue-traffic 2 name 2 queue0 10-1000000 queue1 10-100000 queue2 10-10000 queue3

10-1000 queue4 10-100 queue5 10-10 queue6 0-1 queue7 0-0

profile qos-queue-traffic 3 name 3 queue0 0-1000000 queue1 0-100000 queue2 0-10000 queue3 0-1000 queue4 0-500 queue5 0-250 queue6 0-200 queue7 0-100

profile qos-queue-traffic 4 name 4 queue0 10-1000000 queue1 10-100000 queue2 10-10000 queue3

0-1000 queue4 0-500 queue5 10-250 queue6 10-200 queue7 10-100

Take effect of qos-queue-traffic profile, the command is used in uplink port, PON port current gos-queue-traffic profile.

When it is necessary to have rate limitation on the uplink queue, the queue bandwidth configuration will be at the exit, i.e. the uplink port, for example:

OLT (config) # interface xe1 / 1

OLT (config-xe1 / 1) # qos-queue-traffic 1

When the PON port is simple scheduling mode, before downlink queue scheduling the queue bandwidth should be configured at the exit, i.e. the PON port (*Note: PON port for hierarchical scheduling model, this property is not valid, and can not be modified*), for example:

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

OLT (config-gpon-olt1 / 1) # qos-queue-traffic 1

When the PON port is a hierarchical scheduling mode, before scheduling to the ONU downlink queue, configurable queue bandwidth is in ONU *(Note: PON is simple scheduling mode, this property is not valid, and can not be modified*), for example:

OLT (config) # interface gpon-onu1 / 1:1

OLT (config-gpon-onu1 / 1: 1) # qos-queue-traffic 1

Restore the default queue scheduling policy.

OLT (config) # interface xe1 / 1

OLT (config-xe1 / 1) # qos-queue-traffic default

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

OLT (config-gpon-olt1 / 1) # qos-queue-traffic default

(Note: PON port is hierarchical scheduling mode, the property is not valid and can not be modified.)

OLT (config) # interface gpon-onu1 / 1: 1

OLT (config-gpon-onu1 / 1: 1) # qos-queue-traffic default

(Note: PON port is simple scheduling mode, the property is not valid and can not be modified.)

Query the queue scheduling policy that message use at the port, this command is used to view the effective qos-queue-traffic profile at uplink port, PON port, ONU, for example:

OLT (config) # show cos-queue-map interface xe1 / 1

qos-queue-traffic default

OLT (config) # show cos-queue-map interface gpon-olt 1/1

qos-queue-traffic default

View ONU queue speed limit:

OLT (config-gpon-onu1 / 1: 1) # show qos-queue-traffic interface gpon-onu1 / 1: 1

qos-queue-traffic default

7.1.4. QoS-ONU-Bandwidth

The configuration can only be configured and effective on the ONU when the PON port is a hierarchical scheduling mode.

OLT (config-gpon-onu1 / 1: 1) # qos-onu-bandwidth min 100 max 1000

Note:

The maximum bandwidth configuration value of the ONU must be no less than its minimum configuration. If the maximum or minimum configuration is 0, there will be no rate limitation. By default here is no rate limitation on ONU downlink.

View the ONU downlink bandwidth configuration:

OLT (config) # show qos-onu-bandwidth interface gpon-onu1 / 1:1

qos-queue-bandwidth min 100 max 1000

7.1.5. QoS-ONU-Weight

The configuration can only be configured and effective on the ONU when the PON port is a hierarchical scheduling mode.

OLT (config-gpon-onu1 / 1: 1) # qos-onu-weight 1

View ONU weight value:

OLT (config) # show qos-onu-weight interface gpon-onu1 / 1:1

qos-onu-weight 1

Note :

When there is downlink traffic congestion, the WRR weighted unicast polling is carried out for each ONU unicast service under the PON port according to the weight value, and the default ONU weight is 1.

7.2. Uplink QoS configuration

7.2.1. PON port configuration

Before the uplink queue is scheduled, the operation of the data packet into the queue should be configured at the entrance, i.e. th PON port, for example:

```
OLT (config) # interface gpon-olt 1/1
OLT (config-gpon-olt1 / 1) # cos-queue-map 1
```

7.2.2. Uplink port configuration

When it is necessary for scheduling uplink queue, the policy should be configured at the exit,

i.e.the uplink port, for example:

```
OLT (config) # interface xe1 / 1
OLT (config-xe1 / 1) # qos-queue-scheduler 1
```

7.2.3. Optional Configuration

When it is necessary to have rate limitation on the uplink queue, the bandwidth configuration will be at the exit, i.e.the uplink port, for example:

```
OLT (config) # interface xe1 / 1
OLT (config-xe1 / 1) # gos-gueue-traffic 1
```

When it is necessary to have uplink QoS rate limitation, can configure the uplink port output rate limitation:

OLT (config-xe1 / 1) # rate-limit 1000 2000 egress // uplink rate limit

7.3. Simple downlink QoS Scheduling Configuration

When the QoS is simple mode, the profile is binding in the Xe port and PON port, according to the principle: in-bound to the queue, out-bound for scheduling and rate limiting; There is only simple QoS scheduling mode and can not be modified in uplink; the downlink defaults to simplified QoS scheduling mode, and can be modified.

Set the PON1 port scheduling mode for simple scheduling configuration:

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

OLT (config-gpon-olt1 / 1) # shutdown

OLT (config-gpon-olt1 / 1) # qos-queue-scheduler model simple

OLT (config-gpon-olt1 / 1) # no shutdown

Note :

Modify the PON port scheduling mode, you need to disable the PON port firstly, port rate limitation need to be reconfigured.

7.3.1. PON port configuration

When the PON port is in simple scheduling mode, the queue scheduling policy should be configured at the exit, for example:

```
OLT (config) # interface gpon-onu1 / 1: 1
```

OLT (config-gpon-olt1 / 1) # qos-queue-scheduler 1

7.3.2. Uplink port configuration

When the PON port is simple downlink scheduling model, before scheduling of downlink queue, packet into the queue should be configured at the entrance, i.e.the uplink port, for example:

```
OLT (config) # interface xe1 / 1
```

```
OLT (config-xe1 / 1) # cos-queue-map 1
```

7.3.3. Optional Configuration

When a speed limit is required for a downlink queue, the queue's bandwidth is configured at the exit, i.e. PON port, for example:

OLT (config) # interface gpon-olt1 / 1

OLT (config-gpon-olt1 / 1) # qos-queue-traffic 1

When a QoS flow limit is needed for the downlink data, the PON port speed limit can be configured.

OLT (config-gpon-olt1 / 1) # rate-limit 1000 2000 egress // downlink rate limit

7.4. Downlink hierarchical QoS scheduling configuration

The OLT three-layer QoS scheduling is only for ONU downlink service, for uplink service support only 8 queue scheduling of unicast in a single ONU, for each ONU to provide up to 8 queues used to distinguish the services (*Note: the supported queue number is related with the ONU registration profile, refer to "the ONU type profile configuration" for details*), each ONU can use different scheduling policy; OLT support WRR (weighted round robin) scheduling between the ONUs in one PON port; for all the unicast and multicast service a single PON port, OLT strictly follow the principle that multicast service has higher scheduling priority, to guarantee the multicast service.

7.4.1. PON port configuration

Set the PON1 port scheduling mode as hierarchical scheduling configuration.

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

OLT (config-gpon-olt1 / 1) # qos-queue-scheduler model hierarchy

Note :

After modifying the QoS scheduling profile, OLT needs to be restarted.

Modify the scheduling to hierarchical mode, the configuration such as rate limit, uplink port cos-queue will not take effect and need to be reconfigured, in which qos-queue-scheduler, qos-queue-traffic will not be configurable under hierarchical mode.

7.4.2. ONU Configuration

Configure ONU downlink bandwidth

OLT (config-gpon-onu1 / 1: 1) # qos-onu-bandwidth min 100 max 1000

Note :

The maximum bandwidth configuration of the ONU must be no less than its minimum value. If the maximum or minimum configuration is 0, the maximum / minimum bandwidth of the ONU will not be limited. There will be no downlink rate limit for ONU by default.

View the ONU downlink bandwidth configuration:

OLT (config) # show qos-onu-bandwidth interface gpon-onu1 / 1: 1

qos-queue-bandwidth min 100 max 1000

Configure ONU weight

OLT (config-gpon-onu1 / 1: 1) # qos-onu-weight 1

View ONU weight:

OLT (config) # show qos-onu-weight interface gpon-onu1 / 1:1

qos-onu-weight 1

Note :

When there is downlink traffic congestion, the WRR weighted unicast polling is carried out for each ONU unicast service under the PON port according to the weight value, and the default ONU weight is 1.

Configure ONU service into queue mode, OLT support service into designated queue.

Service designate the queue:

OLT (config-gpon-onu1 / 1: 1) # service-port 1 queue 0

View the ONU service incoming queue mode:

OLT (config) # show running-config interface gpon-onu1 / 1: 1

Note :

ONU use default mappings by default, that is, all GEM maps to queue 0.

The specified number of queues can not be greater than the number of downstream queues allocated by the registered ONU.

Configure the queue scheduling in ONU

OLT (config-gpon-onu1 / 1: 1) # qos-queue-scheduler 1

OLT (config-gpon-onu1 / 1: 1) # qos-queue-scheduler default

View the queue scheduling in ONU

OLT (config-gpon-onu1 / 1: 1) # show qos-queue-scheduler interface gpon-onu1 / 1: 1

qos-queue-scheduler default

Note :

ONU uses the system default queue scheduling policy by default, and the default queue scheduling policy is strictly priority queue scheduling

Configure ONU queue rate limt

OLT (config-gpon-onu1 / 1: 1) # qos-queue-traffic 1

OLT (config-gpon-onu1 / 1: 1) # qos-queue-traffic default

View ONU queue rate limit:

OLT (config-gpon-onu1 / 1: 1) # show qos-queue-traffic interface gpon-onu1 / 1: 1

qos-queue-traffic default

Note :

ONU uses the default queue bandwidth limit speed policy by default, and the default queue bandwidth policy is not to have any speed limit.

7.4.3. Optional Configuration

When the QoS stream speed limit for downlink unicast/multicast data streams is required, the PON port speed limit can be configured in kbps.

OLT (config-gpon-olt1 / 1) # rate-limit 1000 2000 egress // speed downlink

When it is necessary to limit the downlink multicast data speed, the maximum bandwidth of the PON outlet multicast can be configured in kbps.

OLT (config-gpon-olt1 / 1) # scb max-bandwidth 20000

8.ACL service configuration

ACL (Access Control List) policy is to filter a specific packet by configuring a series of matching rules, so as to identify the packets that need to be filtered. After identifying a particular object, the corresponding packets will be allowed or prohibited in accordance with a predetermined policy.

The system supports IP V4 and V6 ACL, that is, ACL V4 and ACL V6, and ACL is divided into 5 types: Standard ACL, extended ACL, mixed ACL, link layer ACL and customized ACL.



8.1. The ACL principle

Figure 8-1 The principle ACL

8.2. ACL category list

Table	8-1	ACL	category	list
-------	-----	-----	----------	------

Category	Digital ranges	Feature
Acl standard ipv4	<2000-2999>	The rules can only be made according to the source IP and the mask field of the IP V4 message, and analyze the data packet accordingly.

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8. ACL service configuration

Acl extend ipv4	<3000-3999>	Make rules according to the protocol type code (ip tcp udp gre ipinip icmp), source IP and mask, source port, destination IP and mask, and the destination port number, dscp<0-63> or precedence<0-7> and cos<0-15> field, analyze the data packets accordingly.
Acl hybrid ipv4	<5000-5999>	The Hybrid IPv4 pattern is a hybrid mode of link and extend IPv4
Acl link	<4000-4999>	According to Ethernet type code (ip ipv6 arp rarp pppoe-conurol pppoe-data, etc.), VLAN ID, cos<0-7>, source MAC and destination MAC fields, rules are formulated to analyze and process the data packets accordingly.
Acl user	<6000-6999>	According to the string content of the offset digit after PS (packet start), the packet is processed and analyzed accordingly. To configure PS more than 12, an additional 4 bytes need to be added to match the corresponding string because the length of the internal lltag results.
Acl standard ipv6	<7000-7999>	The rules can only be formulated according to the source IP and mask fields of the IP V6 message, and the packets are analyzed accordingly.
Acl extend ipv6	<8000-8999>	Make rules according to the protocol type code (ip tcp udp gre ipinip icmpv6), source IP and prefix, source port, destination IP and prefix, the destination port number, flow-label <0-1048575>, traffic-class <0-255> field, analyze the data packets accordingly.
Acl hybrid ipv6	<9000-9999>	The Hybrid IPv6 is a hybrid mode of link and extend IPv6

8.3. Acl rule configuration

	Standard	Permit	All source ip		
			Source ip		
	ipvo standard	Deny	Source ip + mask		
	Extend	Permit	Source Source ip mask Mask		
			Destination ip Destination ip mask		
	Ipv6 extend	Deny	Source port Destination port		
		Permit	Vlan Cos Destination mac		
ACL	Link		Source mac Source mac mask		
		Deny	Destination mac mask		
	Hybrid	Permit	Combination of "extend" &" link" ,notice that the Mutual exclusion option can not be		
	Ipv6 hybrid	Deny	effective		
		Permit			
	User		base Offset String mask		
		Deny			

Figure 8-2 Acl rule configuration

Description:

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Command Format

acl {standard-acl-number | extend-acl-number | link - acl-number | hybrid-acl-number}

no acl {all | standard-acl-number | extend-acl-number | link - acl-number | hybrid-acl-number}

Each ACL can create up to 128 rules.

OLT (config) # acl hybrid 5555 name iiiiiiiii

OLT (config-acl-hybrid-rule) # rule 55 permit protocol tcp source 192.168.1.11 ignore destination any ignore dscp ef type arp vlan 4000 cos any src-mac any ignore dst-mac any ignore

» ACL name can be configured with infinite length, but at MIB level only take the first 30 bits.
 » Don't configure mutually-exclusive rule like tcp\arp, otherwise it will not hit the rules, action will not be effective.

Standard typical configuration:

OLT (config) # acl standard 2222

OLT (config-acl-std-rule) # rule 22 deny source 192.168.2.22 255.255.255.255

Extend

OLT (config) # acl extend 3333

OLT (config-acl-ext-rule) #rule 33 deny protocol tcp source 192.168.1.11 ignore source-port equal 33 destination 192.168.2.22 ignore destination-port equal 33 dscp any

Link

OLT (config) # acl link 4444

OLT (config-acl-link-rule) # rule 44 permit type arp vlan 100 cos 6 src-mac any dst-mac any

For multicast MAC address (IP V4 begins with 01005e and IP V6 begins with 3333), global multicast should be disabled.

Hybrid

OLT (config) # acl hybrid 5555

OLT (config-acl-hybrid-rule) # rule 55 permit protocol tcp source any ignore source-port eq 20 destination

any ignore destination-port lt 23 dscp any type ip vlan 100 cos 6 src-mac any ignore dst-mac any ignore User

PS is Packet Start, starting to offset 0 from the message, until hitting the string of 000001000E00. Only valid for source:

OLT (config) # acl user 6666

OLT (config-acl-user-rule) #rule 10 permit base ps offset 0 string 000001000E00

Ipv6 standard

OLT (config) # acl ipv6 standard 7777

OLT (config-acl-ipv6-std-rule) # rule 1 permit source fe80 :: 200: 1ff: fe00: e00

Ipv6 extend

OLT (config) # acl ipv6 extend 8888

OLT (config-acl-ipv6-ext-rule) # rule 1 permit protocol ip source any ignore destination any ignore flow-label

any traffic-class any

Ipv6 hybrid

OLT (config) # acl ipv6 hybrid 9999

OLT (config-acl-ipv6-hyb-rule) # rule 1 permit protocol ip source any ignore destination any ignore flow-label any traffic-class any type ip vlan any cos any src-mac any ignore dst-mac any ignore

Parameter description:

» Permit: keywords that allow qualified packets to pass through. Use this parameter when you need to configure ACL rules that allow qualified packets to pass.

» Deny: Keywords that discard the eligible packets. Use this parameter when you need to configure the ACL rule to reject the packets.

» Source: Specify the source IP of the packets in the ACL rules. It is optional parameter, which can match any source IP address if it is not configured.

Packet source IP address

» Sour-addr: The source IP address of packets in ACL rule. Can be unspecified, if not specified, any source address can match. Dotted decimal representation.

» Sour-wildcard: the source IP address wildcard charater, dotted decimal format, is the source IP address wildcard mask. Use this parameter when matching a subnet.

User's guide:

» When the specified access control list number to be visited does not exist, create a new access control list, and enter the corresponding ACL configuration mode.

» When the serial number already exists, go directly to the corresponding ACL configuration mode.

» The matching rules that the system supports include basic ACL(standard), senior ACL (extend), link-layer ACL (link) and self-defined type ACL (hybrid), for ACL-matched packets and message, can support the filter, flow mirroring, traffic restrictions, priority tag, redirection and traffic statistics.

» When removing the access control list, the access control list that has been sent to the port can't be deleted, if you need to delete, please use the "ACL action" command which correspond to no to cancel the visiting of the access control list.

» The "all" in "No ACL rule all" is only used as index, can only be issued when configuring "acl rule all".

» When using "ACL user", need to add extra 4 bytes after the MAC address (offset=16). »

When a message flow match with more than two rules , and these rules are user defined/non

user defined at the same time, the matching order is as follows:

- Same level (standard\extend\link\hybrid\ipv6, standard\ipv6, extend\ipv6, hybrid\user):
- Simultaneous activation (all), larger rule-id has higher priority;
- When not activated at the same time, larger rule-id has higher priority;

Different levels:

Larger ACL ID has a higher priority.

» The ACL rule does not support multicast MAC address.

8.4. ACL Action Configuration



Figure 8-3 ACL Action Configuration

8.4.1. Packet-Filter

The packet-filter command is used to configure the ACL filtering rule for the specified port and enable it. Use this command when you need to filter the data flow at a port with ACL rules. When the filter rule is configured successfully, the system will filter the input or output packets of the specified port according to the rule. OLT (config) # packet-filter ingress acl 2222 rule 1 port gpon-olt1 / 11

The "no packet-filter" command is used to cancel the ACL filter rule for the specified port. Use this command when you need to delete the ACL filter rule for the specified port.

OLT (config) # no packet-filter ingress acl 2222 rule 1 port gpon-olt1 / 11

8.4.2. Traffic-Limit

The "traffic-limit" command is used to limit traffic where messages match the ACL filtering rules received by the specified port. Use this command when you need to have rate limitations on a port that matches the ACL rule. After the flow limit configuration is successful, if the port receives more traffic than the limit, it will directly discard the message over the restricted part or reset the DSCP priority to the message in excess of the limit.

OLT (config) # traffic-limit ingress acl 2222 rule 1 rate 640000 drop port gpon-olt1 / 11

The "no traffic-limit" command is used to cancel restrictions on the traffic received on the specified port. After the configuration is successful, the system will not have any speed limit on the port.

OLT (config) # no traffic-limit ingress acl 2222 rule 1 port gpon-olt1 / 11

8.4.3. Traffic-Mirror

The traffic-mirror command is used to mirror messages that are filtered by the ACL rule on the specified port. When a message that is received or sent at a port needs to be monitored, this command can be used to mirror the message that the port needs to monitor to the designated port. Please be noted that the destination port needs to configure the corresponding VLAN, otherwise the traffic can not be forwarded successfully.

OLT (config) # traffic-mirror ingress acl 2222 rule 1 port gpon-olt1 / 11 to-port gpon-olt1 / 2

The "no traffic-mirror" command is used to cancel messages mirroring the specified port filtered by the ACL rule. Once the configuration is successful, the system no longer mirrors the port traffic.

OLT (config) # no traffic-mirror ingress acl 2222 rule 1 port gpon-olt1 / 11

8.4.4. Traffic-Priority

The "traffic-priority" command is used to configure priority tags for messages that are filtered by the ACL rule on the specified port. Use this command when you need to configure

priority tags for traffic over a specified port. After the configuration is successful, the port will forward the message matching the ACL rules according to the priority to realize the different QoS guarantees.

Among them, cos, DSCP, ip-precedence will only modify the message content, and not affect the message into queue; modification of local-precedence will affect the message into queue; traffic-priority in the message in-bound configuration can modify the queuing-in rule.

OLT (config) # traffic-priority ingress acl 2222 rule 1 cos 1 port gpon-olt1 / 11

OLT (config) # traffic-priority ingress acl 2222 rule 1 cos 1 local-precedence 4 port gpon-olt1 / 11

OLT (config) # traffic-priority ingress acl 2222 rule 1 dscp 1 port gpon-olt1 / 11

OLT (config) # traffic-priority ingress acl 2222 rule 1 dscp 1 local-precedence 3 port gpon-olt1 / 11

OLT (config) # traffic-priority ingress acl 2222 rule 1 dscp 1 cos 2 port gpon-olt1 / 11

OLT (config) # traffic-priority ingress acl 2222 rule 1 dscp 1 cos 2 local-precedence 4 port gpon-olt1 / 11

The "no traffic-priority" command is used to cancel the configuration priority tag for the message under the specified port. Once the configuration is successful, the system no longer handles priority for specified messages.

OLT (config) # no traffic-priority ingress acl 2222 rule 1 port gpon-olt1 / 11

8.4.5. Traffic-Redirect

The "traffic-redirect" command is used to redirect messages that match the ACL rule on the specified port to other ports. Use this command when you need to redirect specific traffic to other ports. After successful configuration, the source port will not forward the redirection message, but by the redirected destination port, note that the destination port need to configure the corresponding VLAN to forward the traffic successfully.

OLT (config) # traffic-redirect ingress acl 2222 rule 1 port gpon-olt1 / 11 to-port gpon-olt1 / 2

The "no traffic-redirect" command is used to cancel forwarding the messages that match ACL rules to other ports. After canceling the redirection configuration, the message will be forwarded directly from the designated port.

OLT (config) # no traffic-redirect ingress acl 2222 rule 1 port gpon-olt1 / 11

8.4.6. Traffic-Statistic

The "traffic-statistic" command is used to have statistics of the flow that match ACL rule under specified port. Use this command when you need the statistics of a particular message through a port. After the configuration is successful, the system will have the statistics of the particular message and query the results using the "show ACL +acl ID" command.

OLT (config) # traffic-statistic ingress acl 2222 rule 1 port gpon-olt1 / 11

OLT (config) # show acl 2222

acl 2222 name acl2222

rule 1 permit source 192.168.3.33

traffic-statistic port gpon-olt1 / 11 ingress (960512 packets)

Use the following commands to clear the previous statistics:

OLT (config) # traffic-statistic ingress acl 2222 rule 1 port gpon-olt1 / 11 clear

The "no traffic-statistic" command is used to cancel traffic statistics that match the ACL rule on the specified port. When the cancellation is successful, the system no longer has the traffic statistics.

OLT (config) # no traffic-statistic ingress acl 2222 rule 1 pore 1 port gpon-olt1 / 11

9.STP service configuration

OLT supports three STP (Spanning Tree Protocol) modes: »STP (Spanning Tree Protocol) »RSTP (Rapid Spanning Tree Protocol)

»MSTP (Multiple Spanning Tree Protocol)

STP mode:

STP comply with IEEE802.1d standards.

RSTP mode:

RSTP follows IEEE802.1w standard, a faster convergence rate than STP. When the network topology changes, the original redundancy switch port in point-to-point connection port condition can quickly transfer (Discard, Forward).

MSTP mode:

MSTP follows the IEEE802.1s standard and adds the concepts of examples and VLAN mappings. Both STP and RSTP mode can be considered as a special case of MSTP mode, that is, there is only one instance of 0. The MSTP mode also provides rapid aggregation and load balancing of the VLAN environment.

In STP and RSTP mode, there is no concept of VLAN, and there is only one state for each port, that is, the port is in the same state of forwarding in different VLAN.

In MSTP mode, there can be multiple spanning-tree samples, and the forwarding status of ports under different VLAN can be different. Within the MST region, multiple independent sub-tree samples can be formed to achieve load balancing. MSTP is applied to redundant networks, which can converge quickly and distribute traffic of different VLAN along their paths, thus providing a good load sharing mechanism for redundant links.

OLT supports the MSTP protocol and is also compatible with STP and RSTP protocol. OLT default protocol type is STP. No matter which type is configured, it can be fully compatible and interoperable with the other two types. This article takes RSTP as an example to introduce the configuration of STP.

Steps:

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In global configuration mode, enable STP: OLT (config) # spanning-tree Configure spanning-tree mode type: OLT (config) # spanning-tree mode rstp Configure the bridge priority. OLT (config) # spanning-tree instance 0 priority 4096 Configure the designated VLAN to designated instance: OLT (config) # spanning-tree instance 0 vid 100

Description:

By default, all VLAN are mapped to CIST (Common And Internal Spanning Tree), that is, instance 0. A VLAN cannot be mapped to a different instance, that is, if the mapped VLAN is re-mapped to a different instance, the original mapping relationship will be automatically canceled.

Configure the specific bridge "Hello Time" in seconds:

OLT (config) # spanning-tree hello-time 2

Configure specific bridge Max Age time in seconds:

OLT (config) # spanning-tree max-age 20

Configure the maximum hops of the MST region

OLT (config) # spanning-tree max-hop 20

Configure specific bridge "Forward Delay" time in seconds:

OLT (config) # spanning-tree forward-delay 15

Configure MST Domain Name

OLT (config) # spanning-tree mstp name xxxx

Configure the MSTP revision level

OLT (config) # spanning-tree mstp revision 65535

View STP

OLT (config) # show spanning-tree

```
SAN3700G08E(config)# show spanning-tree

Spanning-tree is enable:

Format Selector: 0

Configuration Name: 60E6BC006459

Revision Level: 0

Configuration Digest: 2C060C84FA9BD1DA58E17DA1CD383586

CIST info:

bridge id 8.000.60:E6:BC:00:64:59

designated root 8.000.60:E6:BC:00:64:59

regional root 8.000.60:E6:BC:00:64:59

root port none 0

path cost 0 internal path cost 0

max age 20 bridge max age 20

forward delay 15 bridge forward delay 15

tx hold count 6 max hops 20

hello time 2 ageing time 300

force protocol version rstp

time since topology change 3

topology change port None
```

Uplink port enables STP function

OLT (config) # interface xe1 / 1

OLT (config-xe1 / 1) # spanning-tree

OLT (config) # interface xe1 / 2

OLT (config-xe1 / 2) # spanning-tree

Set path cost in spanning tree instance

OLT (config-xe1 / 1) # spanning-tree mstp 0 cost 20000

Set a specific port priority

OLT (config-xe1 / 1) # spanning-tree mstp 0 port-priority 16

Set the port is an edge port

OLT (config-xe1 / 1) # spanning-tree mstp edge auto

Set whether backward compatible with STP version

OLT (config-xe1 / 1) # spanning-tree mstp migration-check

Set the link connected with the port is point-to-point or not

OLT (config-xe1 / 1) # spanning-tree mstp point-to-point auto

10. Dhcp-relay service configuration

10.1. DHCPv4-Option60 / 82

The OLT DHCP v4 function does not do anything for the option60. After enabling the DHCP v4 relay function, the DHCP message is transparently forwarded.

After enabling DHCP (Dynamic Host Configuration Protocol) Option 82 function, DHCP v4 L2 Relay work process is as follows:

» DHCP V4 client broadcast the request message when initializing.

» DHCP v4 relay equipment will check whether there is option 82 in the message, and handle accordingly. If Option 82 is there, the equipment will handle the message according to the configuration of the strategy (Discard, Replace the option 82 with relay equipment itself or keep the one in the original message), then forward the request message to DHCP v4 server. If there is no Option 82 in the request message, the DHCP v4 relay equipment will forward the message to DHCP V4 server after the Option 82 is added. So the request message will contain the ONU information that is connected by the DHCP v4 client, the VLAN that belongs to, and the MAC address of the DHCP v4 relay equipment itself.

» When the DHCP v4 server receives DHCP v4 request message forwarded by DHCP V4 relay equipent, the message in Option 82 will be recorded, and send the message that is carried with DHCP V4 configuration and option82 information to DHCPv4 relay equipment.

» After DHCPv4 relay equipment received the return message of the DHCPv4 server, it will strip Option 82 information in the message, and then forward the message with DHCPv4 configuration information to the DHCPv4 client.

Configuration:

Enable OLT global DHCPv4 Relay Function:

OLT (config) # dhcp-relay information

Option82 configuration option to add location information field

Configure the location information adding field in the option82:

OLT (config) # dhcp-relay information access-node-id string xxxx

Configure ONU CID (circuit-id, which is used to describe line information for GPON and ONU connections) and RID (remote-id, used to describe remote DHCP server information)in option82.

OLT (config) # interface gpon-onu1 / 1:1

OLT (config-gpon-onu1 / 1: 1) # dhcp-relay infomation circuit-id string 123456789

OLT (config-gpon-onu1 / 1: 1) # dhcp-relay infomation remote-id string 123456789

Description:

Where the RID field is configured, the "access-node-id" field is covered, corresponding to the "Agent Remote ID" field in the option82 option

10.2. DHCPv6-Option18 / 37

DHCPv6, that is, DHCP protocol under IP V6 protocol. The OLT DHCPv6 function does not do anything for the option18. After the DHCPv6 relay function is enabled, the DHCP message will be transparently forwarded.

Configuration: Enable OLT global DHCPv6 relay function: OLT (config) # dhcp-relay information ipv6 Description:

After enabling, OLT adds the option37 in DHCPv6 message, including the ONU information that is connected to the DHCPv6 client, and the OLT MAC address information

Configure the ONU RID in option37:

OLT (config) # interface gpon-onu1 / 1:1

OLT (config-gpon-onu1 / 1: 1) # dhcp-relay infomation remote-id string zxcasdqwe

Description:

Where the RID field is configured, the Remote ID field is filled in the option37 option.

View the current status of DHCP enabling:

OLT (config) # show dhcp-relay

dhcp-relay is enable

dhcp-relay v4: option82 is enable

dhcp-relay v6: option18 and option37 is enable

dhcp-relay system access-node-id xxxx port information Uplink Port xe1 / 1 PVID: 1 Tag vid: 400 4000 Untag vid: Uplink Port xe1 / 2 PVID: 1 Tag vid: 400 4000 Untag vid: Onu Port gpon-onu1 / 1: 1 clients: 0

10.3. DHCPv4-relay point to dhcp ip pool

When the service VLAN in the OLT is different from the upper equipment address pool VLAN, by using "dhcp-relay" service VLAN need to jump to the VLAN interface address where DHCP address pool is at.

This command is used to set how three-layer DHCP Relay will fill in the message source IP. DHCP Relay can set the IP source address and the IP address of the unicast DHCP message when unicasting the user's broadcast message to DHCP server.

Configure global DHCP Relay: OLT(config)# ip dhcp-relay enable Configure service VLAN and allocated interface address: OLT (config) # vlan 102 OLT (config-vlan102) # exit OLT (config) # interface vlanif102 OLT (config) # interface vlanif102 OLT (config-vlanif102) # ip address 12.0.0.1/24 Configure DHCP Relay layer three function: OLT (config-vlanif102) # ip dhcp relay-agent OLT (config-vlanif102) # ip dhcp relay-server-address 22.0.0.1 OLT (config-vlanif102) # ip dhcp relay-server-address 22.0.1

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OLT (config-vlanif102) # ip dhcp relay-server-address 22.0.4.1

Configure static route:

OLT(config)# ip route

OLT(config-ip-route)# ip route 22.0.0.0/16 22.0.0.2

OLT(config-ip-route)# exit

View the current configuration

OLT (config) # show running-config interface vlanif102

i

interface vlanif102

ip address 12.0.0.1/24

ip dhcp relay-agent

ip dhcp relay-server-address 22.0.0.1

ip dhcp relay-server-address 22.0.1.1

ip dhcp relay-server-address 22.0.3.1

ip dhcp relay-server-address 22.0.4.1!

View Static route configuration:

OLT(config)# show ip static-route

static ip route

22.0.0.0/16 via 22.0.0.2

11. Uplink port LAG service Configuration

OLT uses double uplink protection mechanism to ensure the stability of the service. When the physical connection between the OLT and the upper equipment is interrupted, the equipment automatically switches to the standby line to ensure that the service can recover quickly.

OLT supports trunk protection, and achieves load sharing and protection for uplink ports by configuring trunk.

Prerequisite :

Trunk has been set up on the end equipment, and the working rate and the VLAN property are consistent with the end.

Relevant information:

OLT supports two types of link trunk modes: static trunk mode and dynamic trunk mode.

Static aggregation mode refers to adding multiple physical ports directly to the Trunk group to form a logical port. This approach is relatively simple, but it is not good for observing the state of the trunk port.

The dynamic aggregation mode dynamically trunk multiple physical ports into a Trunk group to form a logical port to realize load sharing between the out and inbound traffic in each member port. LACP automatically generates aggregations to obtain maximum bandwidth. OLT's trunk capabilities follow the following principles: the member ports must work in full duplex mode, and the working rate and the VLAN attribute must be consistent.

11.1. Dynamic trunk configuration steps

In the uplink interface configuration mode, and enable LACP mode.

OLT (config) #interface xe1 / 1 OLT (config-xe1 / 1) #lacp active (or passive) OLT (config) #interface xe1 / 2 OLT (config-xe1 / 2) #lacp active (or passive) *Description:* OLT supports 2 port trunk ways, Active and Passive. » Active:LACP active negotiation mode (default mode);

» Passive:LACP the passive mode of negotiation.

» It is recommended to set one port trunk mode to be active, another port to be passive, or both ports to be active.

Configure LACP system priority.

OLT (config) # lacp system-priority 33333

Configure dynamic trunk VLAN and negotiating rates.

OLT (config) # interface xe1 / 1

OLT (config-xe1 / 1) # no shutdown

OLT (config-xe1 / 1) # speed 1000

OLT (config-xe1 / 1) #duplex full

OLT (config-xe1 / 1) # switchport mode trunk

OLT (config-xe1 / 1) # switchport trunk tag 200

OLT (config) # interface xe1 / 2

OLT (config-xe1 / 2) # no shutdown

OLT (config-xe1 / 2) # speed 1000

OLT (config-xe1 / 2) #duplex full

OLT (config-xe1 / 2) # switchport mode trunk

OLT (config-xe1 / 2) # switchport trunk tag 200

View trunk state:

OLT (config) # show trunk verbose

Flags: A - LACP_Activity, B - LACP_timeout, C - Aggregation,

D - Synchronization, E - Collecting, F - Distributing,

G - Defaulted, H - Expired

System ID: 60e6-bc00-34f5

System priority: 32768

Trunk 17: 2 ports, Dynamic, PSC: src-mac

Local:

Port Status Priority Oper-key Flag Link-Status



xe1 / 2 32768 305 20f1-7ce9-1160

xe1 / 1 32768 305 20f1-7ce9-1160

(Optional) View BCM's internal trunk group

OLT (config) # bcm trunk show

Device supports 144 trunk groups: 128 front panel trunks (0.127), 8 ports/trunk 16 fabric trunks (128.143), 16 ports/trunk trunk 1: (front panel, 2 ports)=ge13,ge14 dlf=any mc=any ipmc=any psc=srcmac (0x1)

11.2. Static trunk configuration steps:

The default configuration is trunk 1:

OLT (config) #interface trunk 1

In the uplink interface configuration mode, add the port to trunk.

OLT (config) #interface xe1 / 1

OLT (config-xe1 / 1) # trunk 1

OLT (config) #interface xe1 / 2

OLT (config-xe1 / 2) # trunk 1

Configure trunk VLAN and rate.

OLT (config) # interface xe1 / 1

OLT (config-xe1 / 1) # no shutdown

OLT (config-xe1 / 1) # speed 1000

OLT (config-xe1 / 1) #switchport mode trunk

OLT (config-xe1 / 1) # switchport trunk tag 200

OLT (config) # interface xe1 / 2

OLT (config-xe1 / 2) # no shutdown

OLT (config-xe1 / 2) # speed 1000

OLT (config-xe1 / 2) #switchport mode trunk

OLT (config-xe1 / 2) # switchport trunk tag 200

View trunk state

OLT (config) # show trunk

SAN3700G08E(config)# show trunk System ID: 60e6-bc00-6459 System priority: 32768

Group Type Ports 1 Manual ge1/8 ge1/7

OLT (config) # show trunk verbose

11.3. Load balancing (take Static LAG as example)

OLT supports 3 traffic load balancing ways(based on source MAC, destination MAC, and both source/destination MAC). The default value is based on both source and destination MAC.

OLT configuration (take source MAC as an example):

OLT (config) # interface trunk 1

OLT (config-trunk1) # load-balance

both-mac Specify source and dst mac balance

dst-mac Specify dst mac balance

src-mac Specify source mac balance

12. Alarm Management

OLT alarm information can be viewed by NMS network management software (need to

enable trap, IP is local address). OLT support the alarm of uplink port / PON port fiber

broken, ONU power failure, UNI offline, etc.

Use the NMS network management software to view alarms.

12.1. Unplug the optical fiber (ONU_deregister)



Figure 12-1 Unplug the optical fiber (ONU_deregister)

12.2. Unplug the cable at ONU UNI port (lan_los)



Figure 12-2 Unplug the cable at ONU UNI port (lan_los)

12.3. Power Off (dying_gasp)

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Figure 12-3Power Off (dying gasp)

Description:

The low optical power alarm can also be viewed on the NMS. If the ONU cannot report its Tx and Rx optical power alarm information, the OLT will not be able to view the ONU optical power alarm. If ONU does not report an alarm with low power output, need to check whether the ONU can support it.

12.4. View alarms on the NE

The current alarm information can be viewed by following commands. History alarm information can only be viewed by NMS network management software:

OLTG08 (config) # show current-alarm xe1 / 1 OLT_ETH_LOS Thu Mar 10 14:15:09 2016 gpon-olt1 / 1 OLT_PON_LOS Thu Mar 10 13:43:55 2016 gpon-onu1 / 12: 2 onu_OFF Thu Mar 10 13:44:15 2016 gpon-onu1 / 8: 3 onu_UNI_LAN_LOS Fri Mar 11 10:30:06 2016 gpon-onu1 / 5: 5 onu_DYING_GASP Mon Jan 9 04:09:33 2017 *Description:*

On the network element, the onu_OFF in the current alarm is the onu_deregister displayed in

the NMS system, that is, ONU offline.

13. Port statistics and PM statistics

OLT currently supports port statistics for uplink ports and PON ports; Performance statistics for PON ports, ONU, and gem. The port statistics (See port statistics and PON port statistics) does not need to be enabled, and can be cleared by clear counters + corresponding ports. Performance statistics does not support manual remove currently. It will automatically report to the network management every 15 minutes when connected to NMS.

For each port statistics and PM management is as follows:



Figure 13-1 PM on statistics and management chart for each port

13.1. Port Message Statistics

This command is used to query the statistics of Ethernet ports. Use this command when you need to judge whether the device is running normally according to the statistics of the Ethernet port.

13.1.1. Message statistics of uplink-port

View port statistics:

•

SAN3700 (config) # show interface xe9 / 4

SAN3700(config)# show int	terface xe9/4
xe9/4	: up
Hardware address	: 0000-3710-0005
Media type	: MEDIUM_FIBER
loopback	: NONE
Autonegotiation	: disable
Flow control transmit	: on recieve: on
Speed	: 1000 Duplex-full
Max frame size	: 1518
Ifindex	: 0x1d218000
Port link-type	: trunk
PVID	: 1
Tag vid	: 2-998 1000-1999 2201-4094
Untag vid	:
RxPackets	: 853640
RxBytes	: 1295825520
RxBcast	: 0
RxMcast	: 0
RxPause	: 0
RxInjabber	: 0
RXErrors	: 0
RXCRCErrors	: 0
RxDrops	: 0
TxPackets	: 735047
TxBytes	: 1115801346
TxBcast	: 0
TxMcast	: 0
TxPause	: 0
TXCollision	: 0
TXErrors	: 0
TxDrops	: 0

Table 13-1 Packet statistics parameters uplink port description

parameter	Parameter Description	parameter	Parameter Description
xe9 / 4	The current port	PVID	Pvid Configuration, default is 1
Hardware address	Port MAC address	Tag vid	Configurable list of available tags
Media type	Current optical module type	Untag vid	<mark>Untag vid</mark> by hybrid type port
loopback	Loopback or not	RxPackets	The number of packets received by the port
Autonegotiation	Self-adaptiveon. Do not support currently	RxBytes	The number of bytes received by the port
Flow control transmit	Flow control switch	RxBcast	The number of broadcast packets received by the port
Speed	Rate configure, full-duplex	RxMcast	The number of multicast packets received by the port
Max frame size	The maximum transmission frame size	RxPause	The number of pause frames received by the port
lfindex	The port number.	RxInjabber	The number of frames that the port receives

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13. Port statistics and PM statistics

Port link-type	Port Type	RxErrors	The number of error frames received by the port	
RxCRCErrors	The CRC error frames received by current port	TxMcast	Number of group broadcasts sent by port	
RxDrops	Number of packets dropped by port	TxPause	Number of suspended frames sent by port	
TxPackets	Number of messages sent by port	TxCollision	Number of conflicting frames sent by port	
TxBytes	Number of bytes sent by port	TxErrors	Number of error frames sent by port	
TxBcast	Number of broadcast messages sent by port	TxDrops	Number of messages dropped by port	

Clear linked port packet statistics:

OLT (config) # clear counters xe9 / 4

13.1.2. Packet statistics of PON port

SAN3700 (config) # show interface gpon-olt7 / 6

Clear PON port packet statistics:

SAN3700 (config) # clear counters gpon-olt7 / 6

Description:

Port statistics does not need to enable

If the displayed value is 0, means that no frames received for this type or the port has no

traffic currently.

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13.2. PM Statistics

This command is used to query performance statistics of ports, ONU, and gem.

13.2.1. PM statistics of PON port

Enable data packets and protocol packets separately:

OLT (config) interface gpon-olt7 / 6 OLT (config-gpon-olt17 / 6) # pm protocol enable OLT (config-gpon-olt7 / 6) # pm data enable **View data message:** OLT (config) # show statistic gpon-olt7 / 6 data

SAN3700(config)# show statistic	gpon-olt7/6	data
the olt data statistic:	21	
Rxframes64	:0	
Rxframes65_127	:0	
Rxframe128_255	:0	
Rxframe256_511	:0	
Rxframe512_1023	:0	
Rxframe1024_1518	:0	
Rxframe1519_2047	:0	
Rxframe2048_4095	:0	
Rxframe4096_9216	:0	
Rxframe9217_16638	:0	
Rxframes	:0	
RxBytes	:0	
RxGoodframes	:0	
RxUcastframes	:0	
RxMcastframes	:0	
RxBcastframes	:0	
RxFcsError	:0	
RxCtrlframes	:0	
RxPauseFrames	:0	
RxPfcframes	:0	
RxUnsupportOpcode	:0	
RxUnsupportDa	:0	
RxAlighError	:0	
RxLenoutofrange	:0	
RxCodeErrors	:0	
RxOversizeFrame	:0	
RxJabberFrame	:0	
RxMtuCheckerror	:0	
RxPromiscuousFrame	:0	
Rxtruncatedframes	:0	
RxUndersizeframes	:0	
RxFragmentframes	:0	
RxRuntframes	:0	
TxFrame64	:0	
TxFrame65_127	:88	
TxFrame128_255	:0	
TxFrame256_511	:0	
TxFrame512_1023	:0	
TxFrame1024_1518	:0	
TxFrame1519_2047	:0	
TxFrame2048_4095	:0	
TxFrame4096_9216	:0	
TxFrame9217_16638	:0	
TxFrames	:88	
TxBytes	:11176	
TxGoodFrames	:88	
TxUcastFrames	:0	
TxMcastFrames	:88	
TxBcastFrames	:0	
TxPauseFrames	:0	
TXPTCFrames	:0	
IXJabberFrames	:0	
IXECSETTOTS	:0	
TXCTriFrames	:0	
IXOVERSIZEFRAMES	:0	
IXFragmentedFrames	:0	
IXERFORFRAMES	:0	
TXKURICER AMES	:0	
IxunderrunFrames	:0	

View protocol message:

.

OLT (config) # show statistic gpon-olt7 / 6 protocol
the olt statistic:	pon oren, o proc
FecCodeWordsUncorrect:	0
Bip8Bytes:	2574561808
Bip8Errors:	177
RxGemDropped:	168
RxGemIdle:	0
RxGemCorrtected:	458745
RxGemIllegal:	0
RxAllocationsValid:	ō
RxAllocationsInvalid:	428846
RxAllocationsDisabled:	0
RxPloams:	0
RxPloamsNonIdle:	377142
RxPloamsError:	340
RxPloamsDropped:	0
RxCpu:	0
RxOmci:	0
RxDroppedTooShort:	80
RxDroppedTooLong:	0
RxCrcErrors:	0
RxKeyErrors:	0
RxFragmentsErrors:	0
RxPacketsDropped:	0
TxGem:	0
TxPloams:	80
TxCpu:	680
TxOmci:	0
TxDroppedIllegalLength:	80
TxDroppedTpidMiss:	0
TxDroppedVidMiss:	0

SAN3700(config)# show statistic gpon-olt7/6 protocol

13.2.2. PM statistics of ONU

Enable:

SAN3700 (config-gpon-onu7 / 6: 2) # pm enable

View:

```
SAN3700 (config-gpon-onu7 / 6: 2) # show statistic gpon-olt7 / 6 onu 2
```

```
SAN3700(config-gpon-onu7/6:2)# show statistic gpon-olt7/6 onu 2
FecCodeWords: 0
FecBytesCorrected: 0
FecCodeWordsCorrected: 0
FecCodeWordsUncorrected: 0
Fin8Pertes: 1514201216
FecCodeWordsUncorrected:
Bip8Bytes:
Bip8Errors:
RxPloamsCrCError:
RxPloamsNonIdle:
PositiveDrift:
NegativeDrift:
RxOmciPacketsCrCError:
ParPeoreted:
                                                                                      1514201216
104
                                                                                       0
12
0
                                                                                      0
0
0
27
0
0
BerReported:
UnreceivedBurst:
opmLcdgErrors:
opmRdiErrors:
```

13.2.3. PM statistics of gem

Enable:

SAN3700 (config-gpon-onu7 / 6: 2) # gemport 1 pm enable

View:

```
SAN3700 (config-gpon-onu7 / 6: 2) # show statistic gpon-olt7 / 6 onu 2 gem 1
```

```
SAN3700(config-gpon-onu7/6:2)# show statistic gpon-olt7/6 onu 2 gem 1
gem statistic:
RxPackets:
                           4
492
RxBytes:
TxPackets:
TxBytes:
                           0
```

13.2.4. PM statistics of uni

Enable:

SAN3700 (config-gpon-onu7 / 6: 2) # show onu remote uni eth_1 / 1 pm

View:

SAN3700G08E (config-gpon-onu7 / 6: 2) # show onu remote uni eth_1 / 1 pm

SAN3700G08E(config-gpon-onu1/8:64)# show onu remote uni eth_1/1 pm GPON-ONU1/8:64 eth_1/1 Statistics RxByte: 0 RxPkt: 0 BCPkt: 0 MCPkt: 0 FCSErr: 0 AlignmentErr: 0 AlignmentErr: 0 RxBufoverflow: 0 TxBufoverflow: 0 TxBufoverflow: 0 PktLessThan64: 0 Pkt4: 0 Pkt65r0127: 0 Pkt128T0255: 0 Pkt256T0511: 0 Pkt1024T01518: 0 PktLargerThan1518: 0 FrmToLong: 0

Description:

.

PM statistics are based on a historical performance statistics for 15 minutes.