GPON OLT Products User Manual

P1201-08
---EMS Configuration Guide

Version：V1.0

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About This Manual

This manual is applicable to TP-Link P1201-08 GPON OLT
EMS network management graphical configuration guide, Is the user want to use EMS software manage GPON OLT equipment should read the information before guidelines.

The related documents for GPON OLT device are:
《P1201-08 OLT User Manual-Device Install Guide》
《P1201-08 OLT User Manual-Command Line Operation》
《P1201-08 OLT User Manual-Configuration Guide》

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1 Instruction

Revision History

Date	Version	Description
2018-08-15	V1.0	New Version GPON OLT First Edition Configuration Guide

Proper Noun

Acronym	Full name	Instructions
GPON	Gigabit-Capable Passive Optical Network	Gigabit Capable Passive Optical Network
OLT	Optical Line Terminal	Optical Line Terminal
ONT	Optical Network Terminal	Optical Network Terminal
OMCI	ONT Management and Control Interface	GPON OLT&ONT Management and Control Interface(protocol)
OAM	Operation Administration and Maintenance	EPON OLT&ONU Operation Administration and Maintenance Protocol
DBA	Dynamic Bandwidth Allocation	Dynamic Bandwidth Allocation
VLAN	Virtual Local Area Network	Virtual Local Area Network
VoIP	Voice over IP	Voice over IP
WLAN	Wireless Local Area Networks	Wireless Local Area Networks
FTTH	Fiber To The Home	Fiber To The Home
FTTB	Fiber To The Building	Fiber To The Building

2 EMS Software Introduction

2.1 Software Information

EMS (Element Management System) software is a C/S architecture integrated device management platform, which is designed based on SNMP protocol. Now, it is mainly used for managing EPON and GPON series products.

EMS need following operational environment：

OS: Windows2000, Windows XP, Windows NT

Hardware: CPU 2.4GHz, 512M memory

2.2 Functional Features

EMS software has following main features:

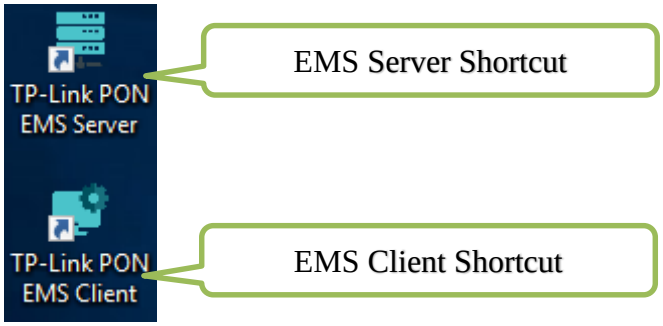
- Based on standard SNMP protocol
- Support multi-user access, C/S structure
- Support centralization management of our company all EPON and GPON serial products
- Support discovering topology automatically, TreeView, modifying topology manually
- Support all functional configuration operations of EPON and GPON
- Support division of management rights
- Support real-time alarm and historic alarm log query
- Support perfect log management
- Support database backup and import functions
- Support ram-time performance collection and port traffic statistics.

3 EMS Software Installation

After the release of EMS_V3.0.7_180615, EMS support new GPON OLT, EMS software has been able to integrate the database software into a single file by default, so as long as the EMS is installed, the corresponding database software is also installed simultaneously. if your computer have installed the database software, you doesn't need to uninstall, it doesn't matter to the EMS software installation.

It's easy to install EMS, Click **'Next Step'**,and you will finish it.

Finish the installation of EMS, you will find two Shortcuts in the installation directory or desktop for server and client, typical Shortcuts as follows:



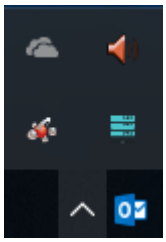
Note: Finish the installation of EMS, you can start it directly, don't need reboot PC.

4 EMS Start-Up

The architecture of EMS is C/S (Server and Client), Server and Client. You should start Server program before start Client program.

4.1 EMS Server Start-Up

Run the EMS Server program, we will find icon after the Server runs successfully, icon as follows:



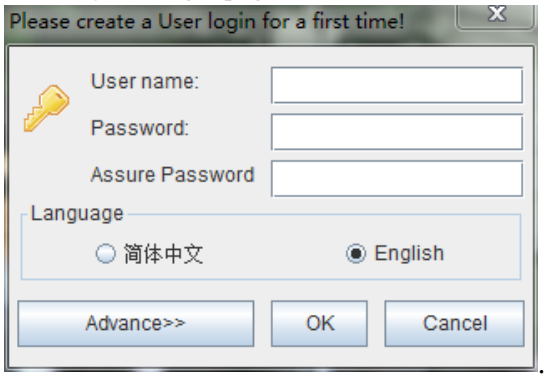
Note: EMS Server start-up time is no longer than 30 seconds. If the program runs more than 30 seconds means the program doesn't start properly.

4.2 EMS Client Start-Up

Run the EMS Client program after the EMS Server program starts. We can run EMS Client and EMS Server on the same computer, also can run on two independent computers, as long as two computer's network intercommunication.

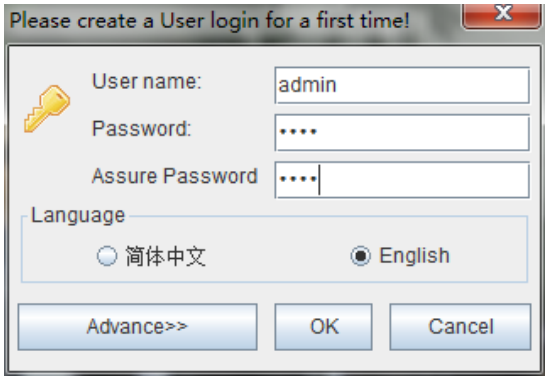
Note: To ensure operational performance of software, it is recommended that the Server and Client be installed on the computer in the same LAN or the same computer.

After the Client starts successfully, the login page as follows:

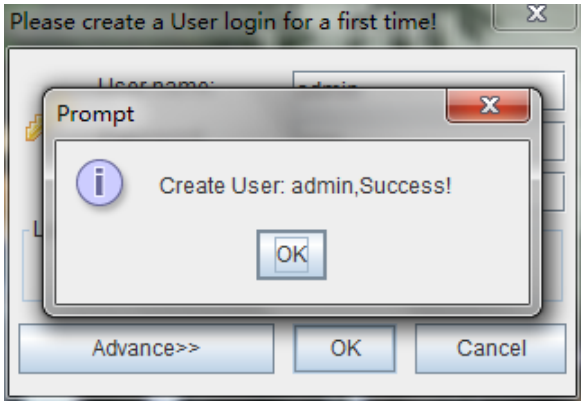


4.3 Register User For EMS

After installing EMS, we need to create a new user for the first login, enter your own customized username after **"User Name"**, and enter a custom password after **"Password"** and **"Assure Password"**.



Then click **"OK"**, display: "Create user: xxx successful", complete the creation of EMS users



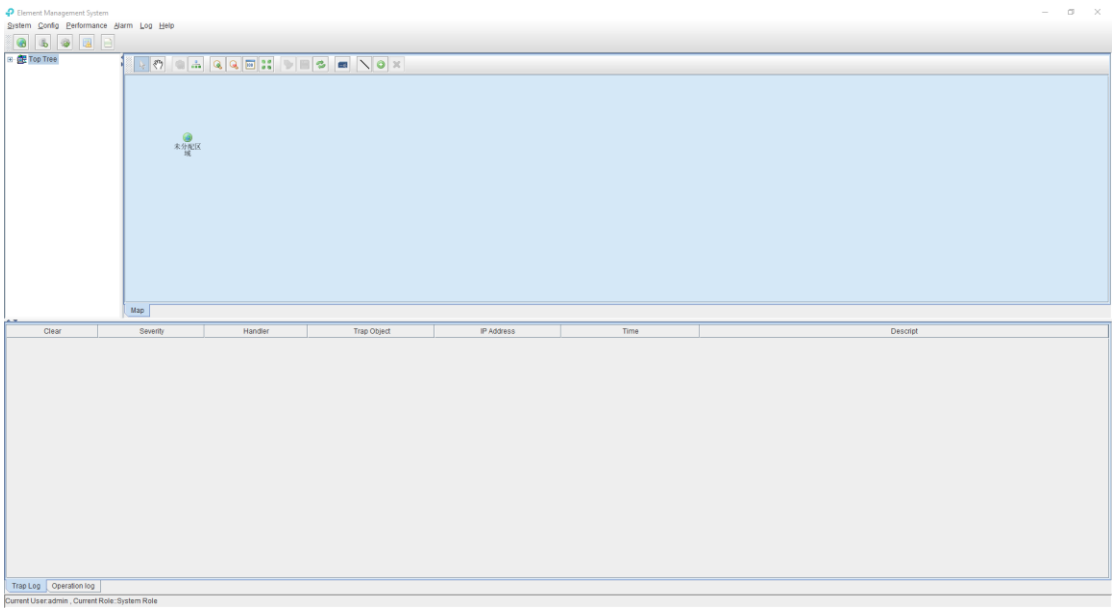
4.4 Login EMS

If the Server and Client are installed on the same computer, enter the user name and password and login directly. If the Server and Client are installed on different computers, we must click the **'Advance'** and configure, page as follows:

Configuration as follows:change Poll server's ip same to the server's ip which start EMS server, port and Timeout Keep the default.

Note: The login user and password is same to the user and password which set in **#4.3**.

After login the Client successfully,you will see the main page. The typical page follows:

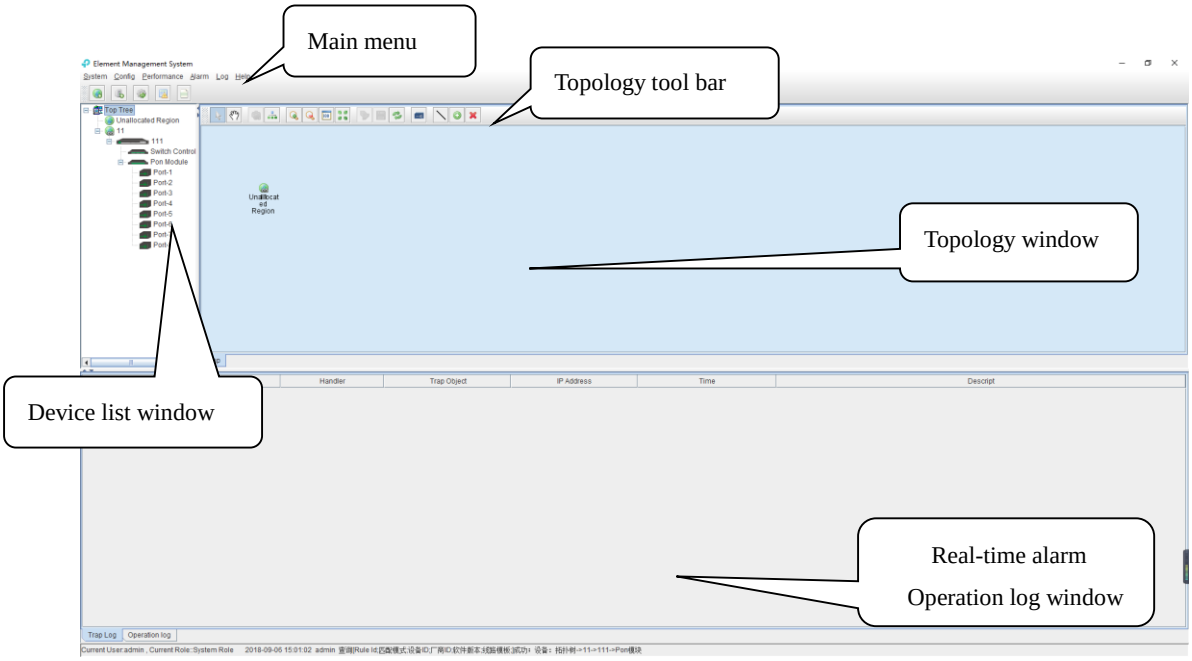


At this point, both the EMS software server and the client program have started normally.

5 EMS Software Framework Introduction

5.1 Main Window Introduction

After login successfully, system will enter main window management page. The typical page follows:



As shown above, the EMS client main window is divided into the following sections:

Main menu:

Main menu contain System, Config, Performance, Alarm, Log, and Help parts. Their main features are as follow:

- System Menu

Including System Config, backup And Recovery, User Manage, Role Management, Report, Device Upgrade etc.

- Config Menu

Including Add, Delete and Property modify function

- Performance Memu

Including Monitor Config and Performance Monitor function

- Alarm Menu

Alarm Threshold, Config Trap Rule and Alarm Query are within this menu.

- Log Menu

Including System Log and Operation Log

- Help menu

Includes features such as changing the software language, viewing the software version, checking for version updates, and downloading the latest version.

Device list window

The device list window shows all the devices under management currently. The device list can directly observe whether the device is online, whether there is an alarm, and double click device can enter into the management window of the device.
The EPON/GPON OLT device has 5 level management object in the device list window, the machine box, exchange control module, PON module, PON port and ONU level.

Topology window

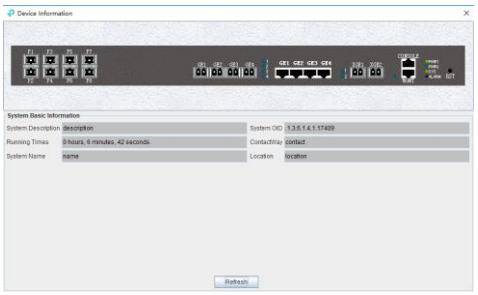
Windows of topology is the main display area of the EMS software, according to the management device, user can move device to right position on regional background map for visual management. Double click the device object on the topology diagram, you can enter the device management window to perform various operations on the device.
The administrator can add or modify the passive network part of the topology diagram manually, such as the optical shunt in EPON/GPON network, to make the topology same to the actual network layout.

Real-time alarm and Operational log

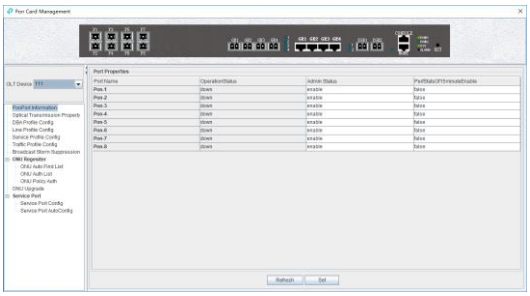
The real-time alarm window shows the abnormal alarm information of the current management device, such as alarm object, alarm time, alarm content, etc.
The operation log window records all the operations of the EMS, so it’s convenient to trace who has operated it.

5.2 Device Management Window

For device management, EMS is mainly through the corresponding device management window to operate. Through the Configuration menu or double click the device icons located on Top-tree or topology map, manager can open the device management windows. Following are several typical examples:

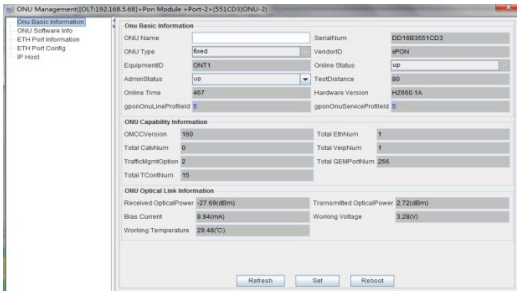


System Management Window



PON Cards Management

Switch and Control Card Window



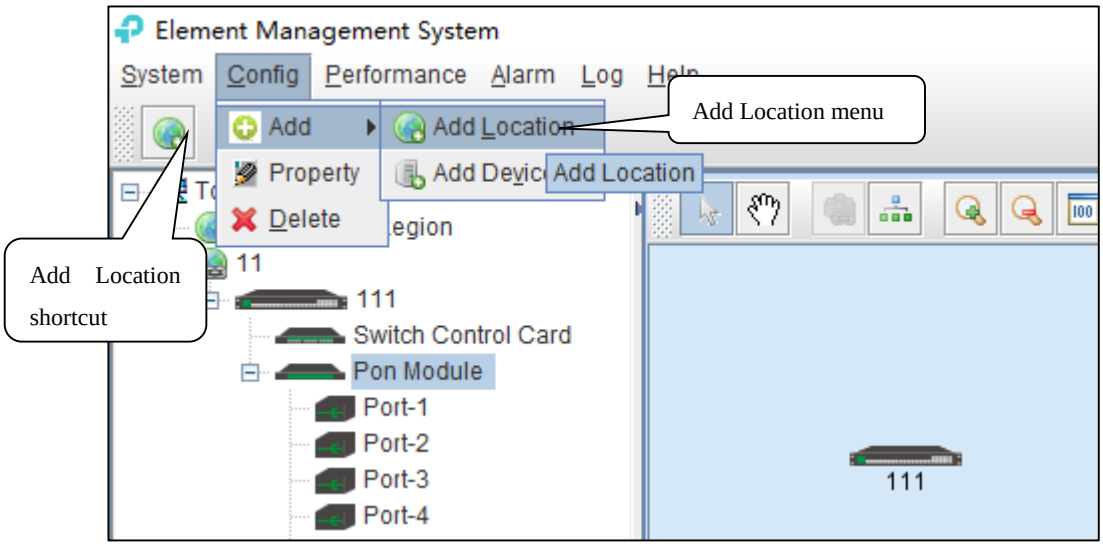
ONU management window

6 Add and Delete Management Object

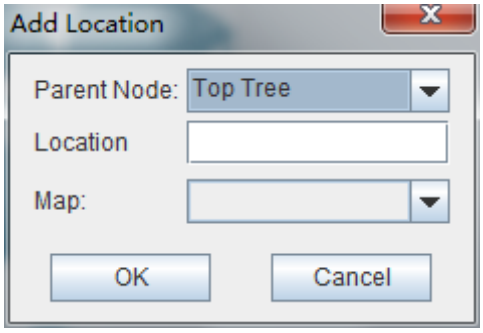
6.1 Add and Delete Location

For convenience of managing numerous devices, divide them in different regions according to their deployed locations is normally needed. According to following steps to divide management regions:

1) Add a Location node on the Top-tree list. Showing as follows:



As above figure, through **'Add Location'** menu or its shortcut, open add location operate window, as following:



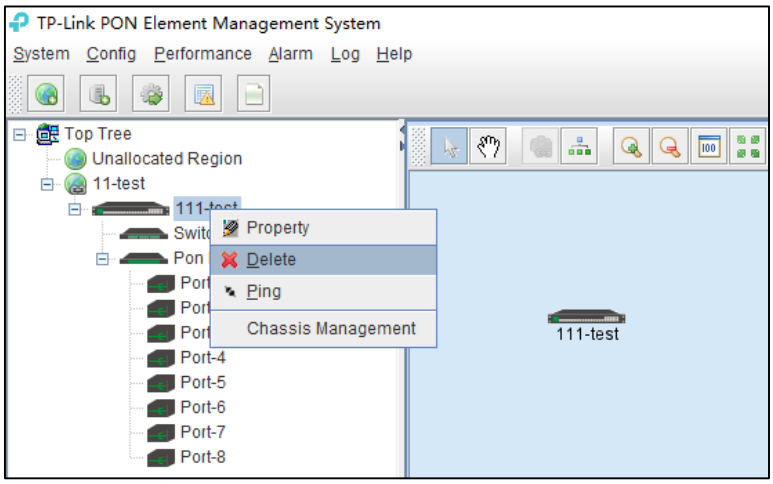
Operation steps:

i. Select the parent node for new added node;

ii. Input the name of new node;

iii. Select map for the new location node (The map should be upload first), when select this node on top-tree, the topology area will apply this map;

2) Location node delete



As above figure, right click the selected location node and delete it.

6.2 Add and Delete Device

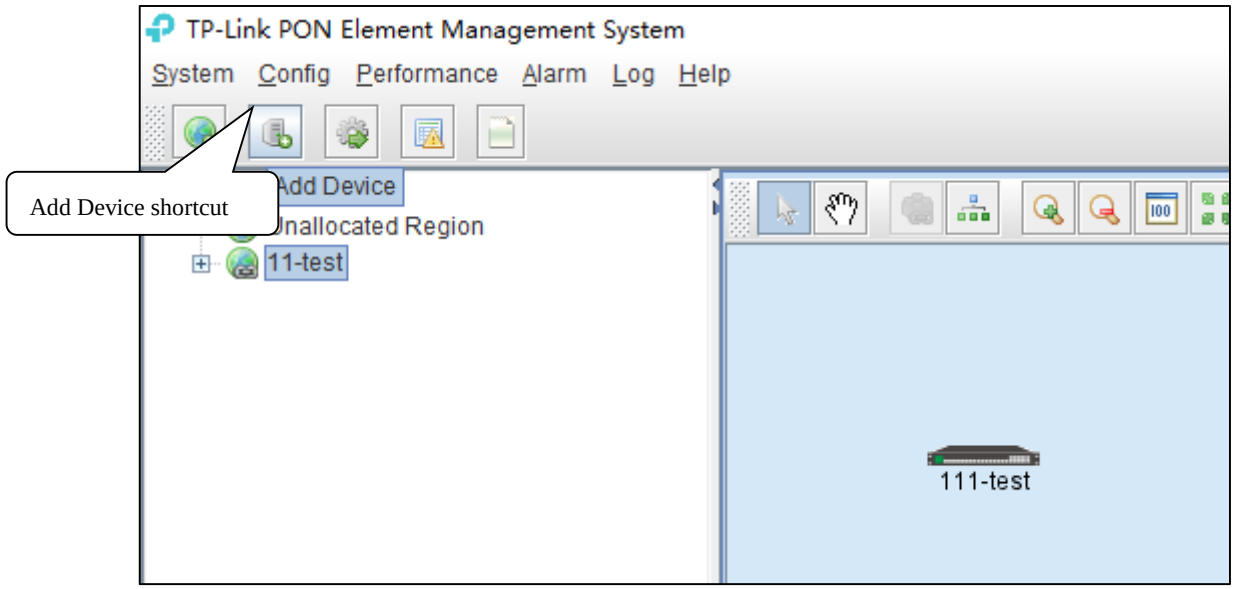
Note: Before using EMS to manage an EPON device, you need to login OLT system to enable SNMP functions and to configure the read-write community, read the community is public, and write community is private.

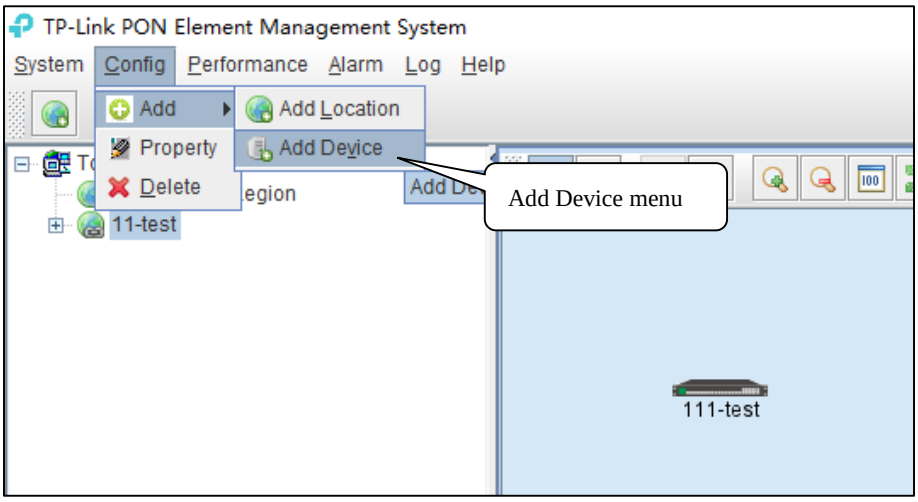
Configuration and view commands are as follows (see user Manual- CLI Operation User Manual for more relevant configuration view commands):

```
OLT(config)# snmp-agent enable

OLT(config)# snmp-agent community read public

OLT(config)# snmp-agent community write private

OLT(config)# show snmp-agent status
  Snmp agent status: Enable

OLT(config)# show snmp-agent community
-------------------------------------------------------------------------------
  Community-Name                  VACM-Name        View-Name
 ------------------------------------------------------------------------------
  public                          default          all
  private                         default          all
-------------------------------------------------------------------------------

OLT(config)#
```

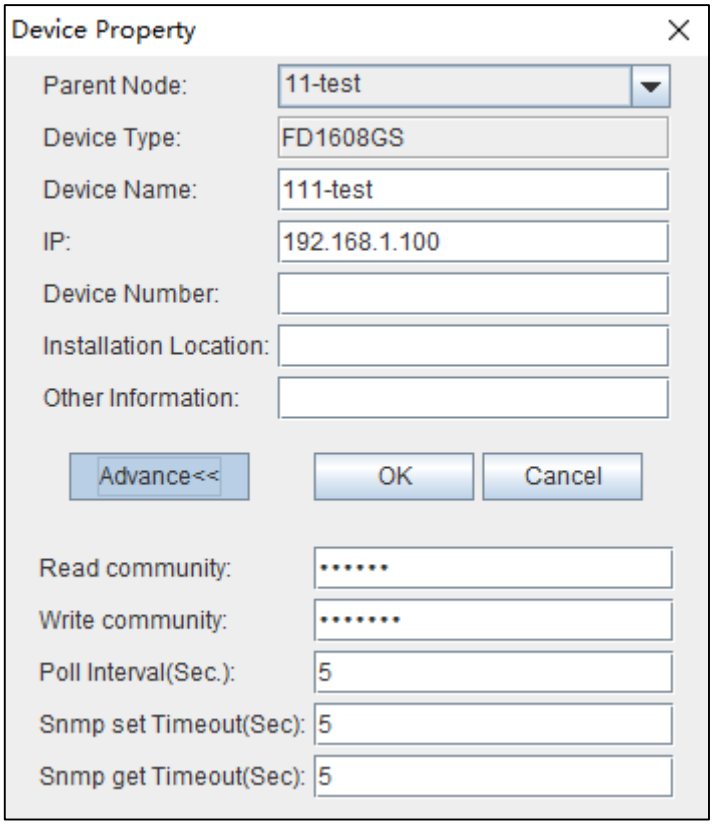
Next, you need to add the device on the EMS manually, and the operation of adding a new GPON device is as follows.

1) Add OLT





As above figure, through **'Add Device'** sub-menu or its shortcut to open the device add window and add device. As shown in the figure below:



As above figure, the new added device need configure following parameters:

- Device Name

  In order to recognize the managed device easily, a suitable alias is normally needed instead of IP Address or MAC Address. This device alias will be displayed on top-tree list.

- IP

  Input the management IP Address of the new added element device, which can be in-band or out-band IP Address.

- Read and Write Community

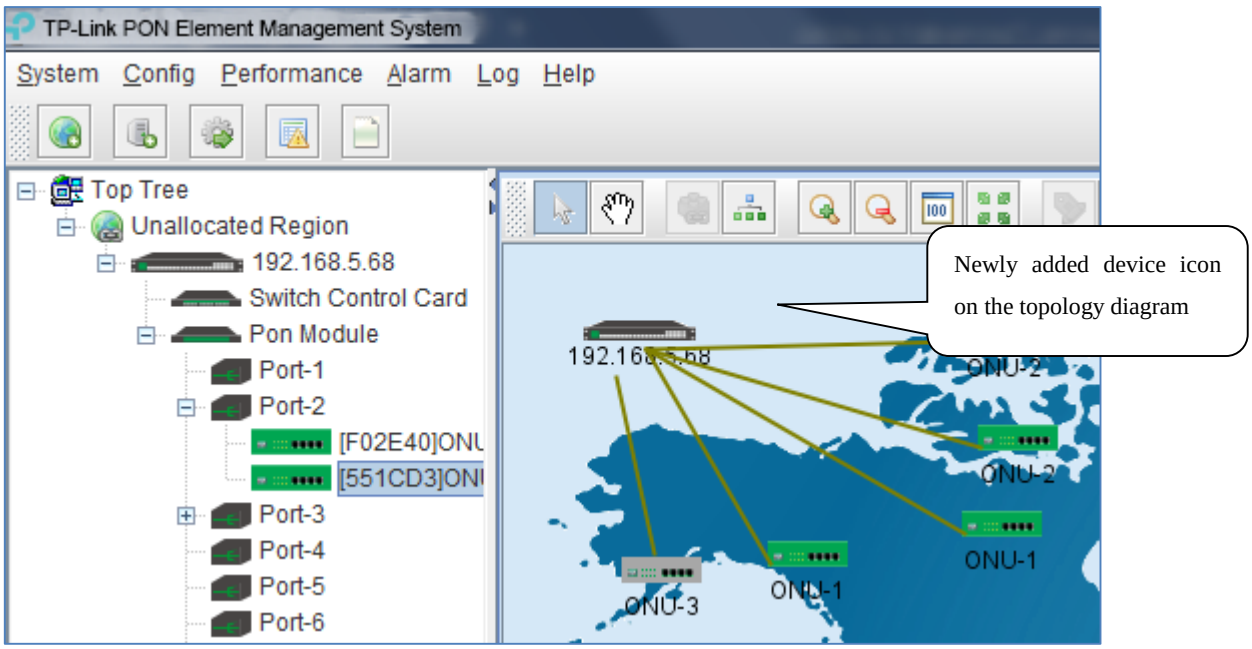
  EMS software is designed based on SNMP protocol to communicate with managed devices. Read and write community is used by SNMP protocol as access password. Community value input here should be the same with which configured in managed device, such EMS can communicate with the managed device successfully.

- Poll Interval, SNMP set Timeout and Snmp get Timeout

  EMS software will poll the managed device periodically with a configured time interval. Normally, the poll interval can use the default value. SNMP read and write timeout values are the longest wait time for EMS to wait response from managed device. Usually, the default value is suitable. Manager can also revise these values according to the real network performance situation.

  When the above parameters are configured, click OK button to finish the device add

operation. When success, the new added device's icon will appear on top-tree list and topology area. Showing as following figure:



Note: For GPON OLT device, only the OLT node need to be added manually, other part such as equipped card and accessed ONU device don't need to be added. These devices will be detected automatically.

2) Delete OLT

Obsolete or unwanted device on top-tree list can be deleted from EMS. Right click on the selected device icon and select Delete option to delete a device.

Note:

i. Deleted device can't be restored and need to be added when need.

ii. All the information of the deleted device will also be removed from EMS.

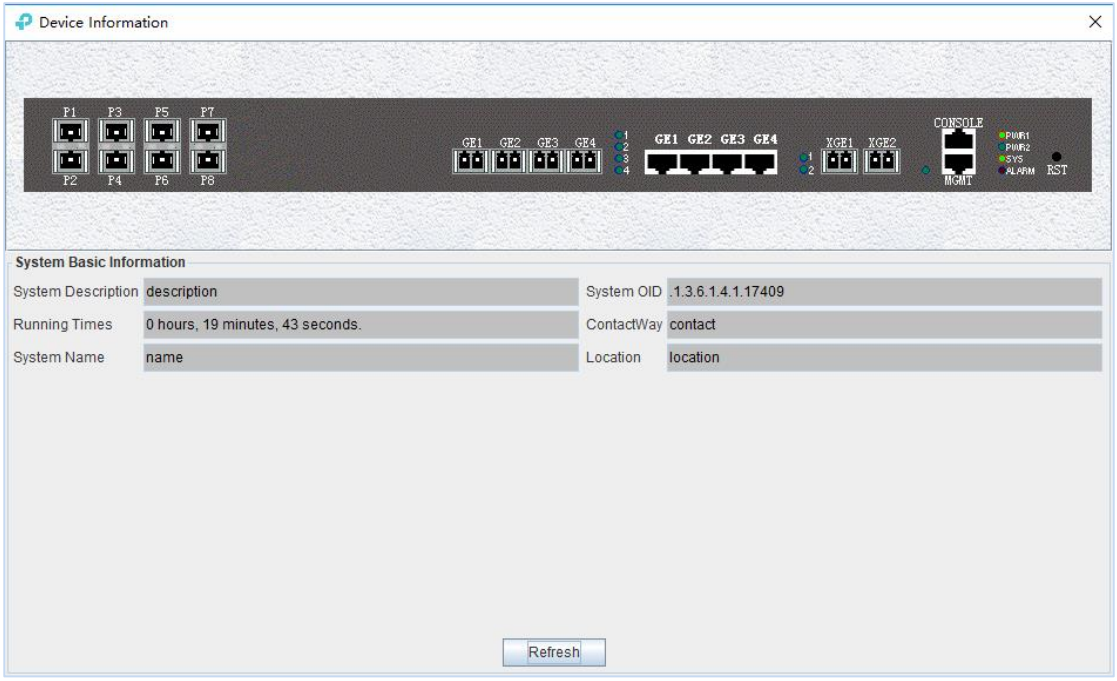
iii. The device icon deleted from the topology map is not deleted from the EMS software. After the deletion, the icon is no longer displayed on the topology map, not deleted from the device list.

7 GPON OLT Management

OLT device mainly consists of OLT chassis, Switch and Control module, PON Card module and ONU Device management module. The following sections describe the management of EMS software for these parts.

7.1 OLT Chassis Management

Double click the OLT chassis icon to open the chassis management window. Typically as following figure：



OLT chassis management includes following several parts.

Front Panel

The equipment panel parts display the power supply of the machine box in real time and the status of each port indicator light. The meaning of the indicator is subject to the panel label.

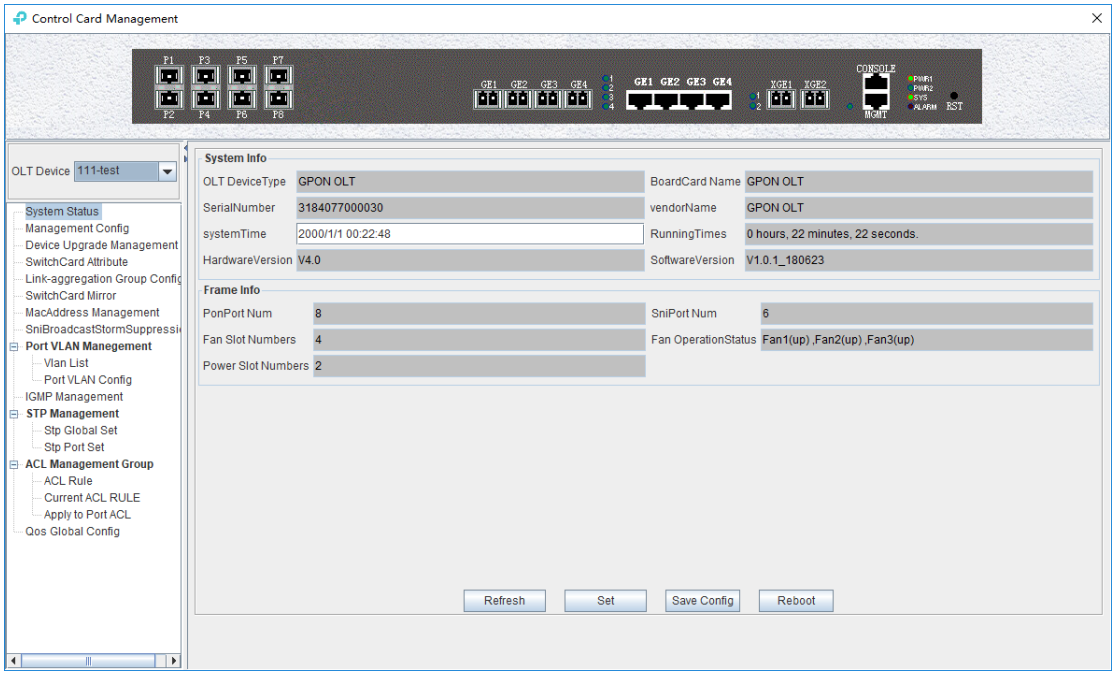
When EMS can’t connect with the OLT the windows will change to gray color.

System Basic Information

This section shows the system description, system OID, running time, ContactWay, system name, location information. Click ‘Refresh’ button can refresh the above information.

7.2 Switch and Control Management

Double click '**Switch Control Card**' icon on top-tree list to open the '**Control Card Management**' window. Typical as following figure:：



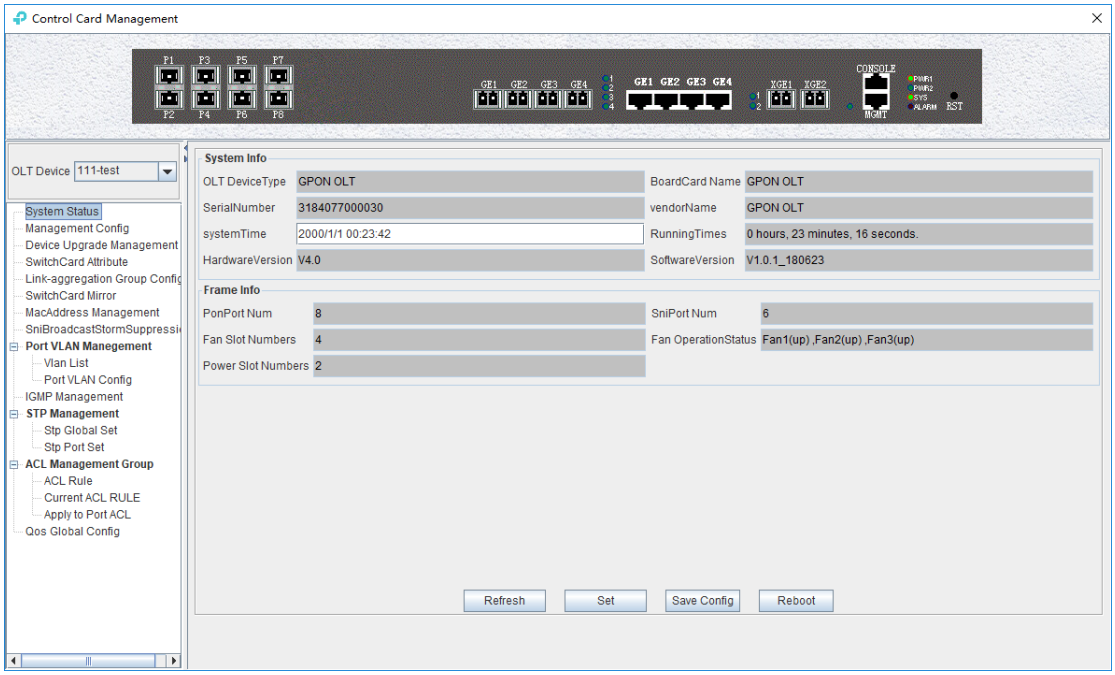
Following management features are contained on this window:

- ✓ View or set device basic information;
- ✓ View or set the IP address, the trap address, SNMP management parameters and etc;
- ✓ Upgrade OLT and ONU device;
- ✓ View and set the upper connection port, such as the admin status of port, and the port rate;
- ✓ Link aggregation group config;
- ✓ MAC address table management;
- ✓ Upper port storm suppression management;
- ✓ OLT port VLAN configuration management;
- ✓ OLT igmp configuration;
- ✓ OLT STP configuration;
- ✓ ACL management configuration;
- ✓ QoS configuration;

Following sections in this part introduce the management features contained on the switch and control card management window.

7.2.1 View OLT System Status

Double click the **'Switch Control Card'** icon on the left side of the main page to open the **'Control Card Management'** window and enter the **'System Status'** to view the page.



System info

Display OLT Device Type, BoardCard, Serial Number, Vendor Name, System Time, Software and Hardware version number, Running time and other information.

Frame info

Display pon port number, ge port number, fan slot numbers, and fan operation status.

Save config

The button of '**Save Config**' is mainly for saving all configuration of OLT.

Reboot

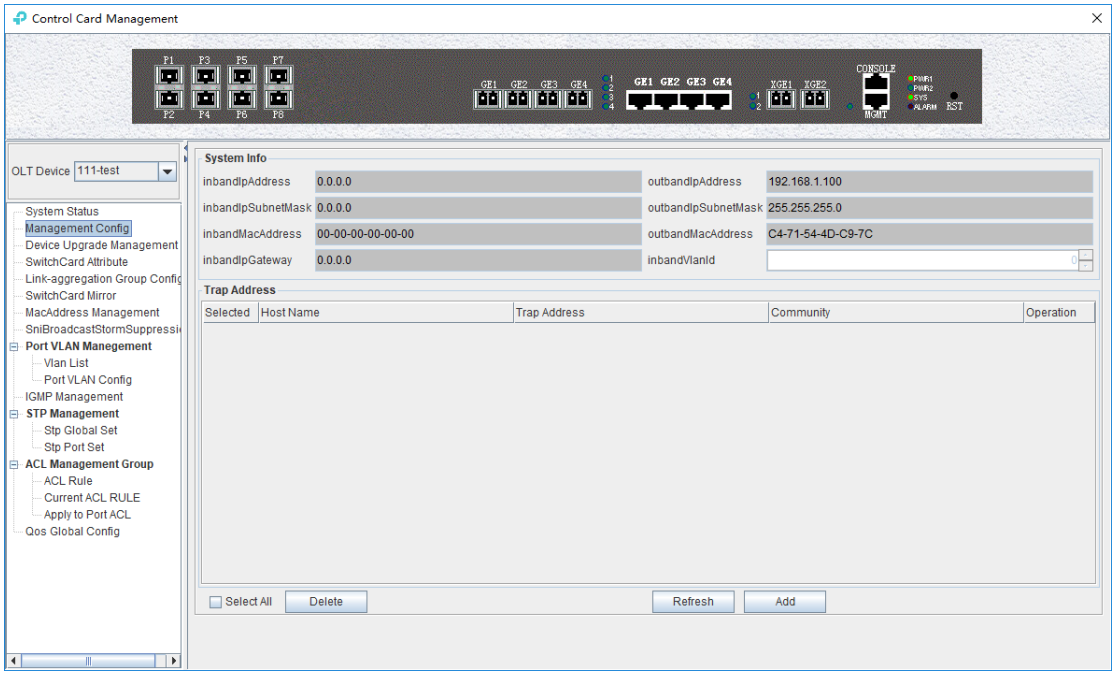
Click **'Reboot**' button, and OLT will reboot.

Set

The button of **'Set'** is used for setting system time.

7.2.2 OLT Manage Method ConfigurationDouble

Click the 'Switch Control Card' icon on the left side of the main page to open the 'Control Card Management' window and enter the 'Management Config' page:



System info

View inband ip address, outband ip address, subnet mask, getway , inband VLAN.

Instructions:

1)Inband management comes from ge port and needs to add management VLAN for upper port.

2)Outband management comes from MGMT port and needs to add ip for MGMT port.

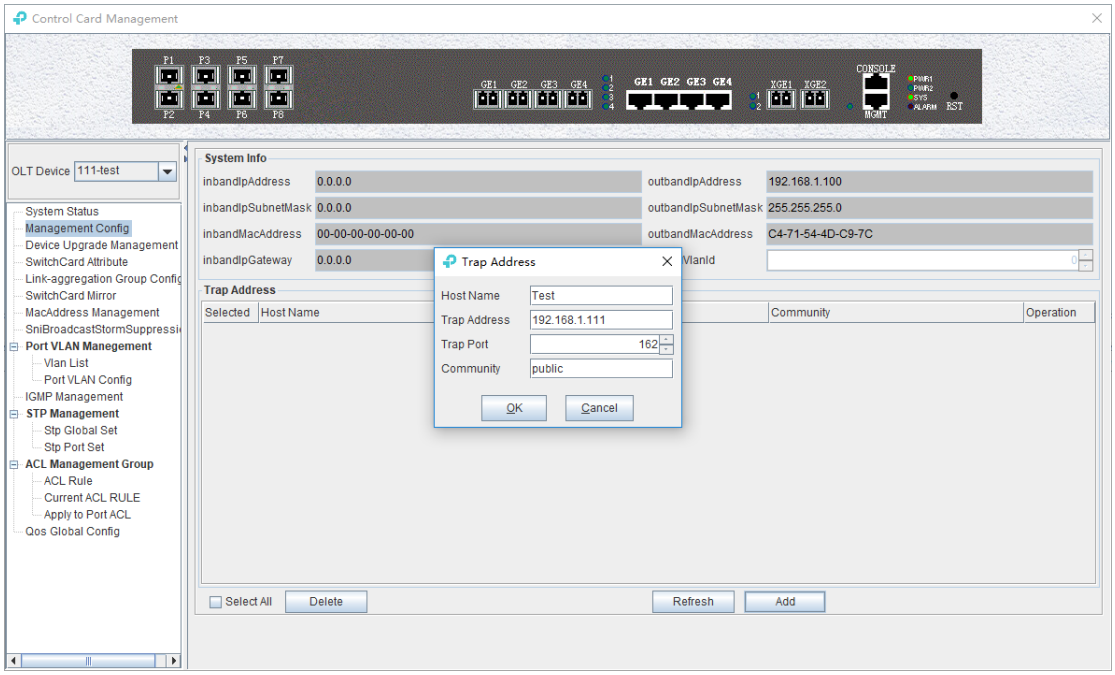
3)Normally, modify the IP of management and device parameters, EMS will lose connection with device, user need to modify management ip of device in EMS, only in this way, can we connect device again.

Trap address

Alarm receiving address is the destination IP address which alarm information sent to, when the alarm occur, New GPON OLT will sent data packet of 'SNMP TRAP' to the management PC, usually, trap address is same to the PC's ip which start EMS, Users can set four trap addresses mostly.

【Example of trap address configuration】

Example: Configure trap information as follows: host name is test, Alarm reception address is 192.168.5.196， The alarm port is 162, community is public.



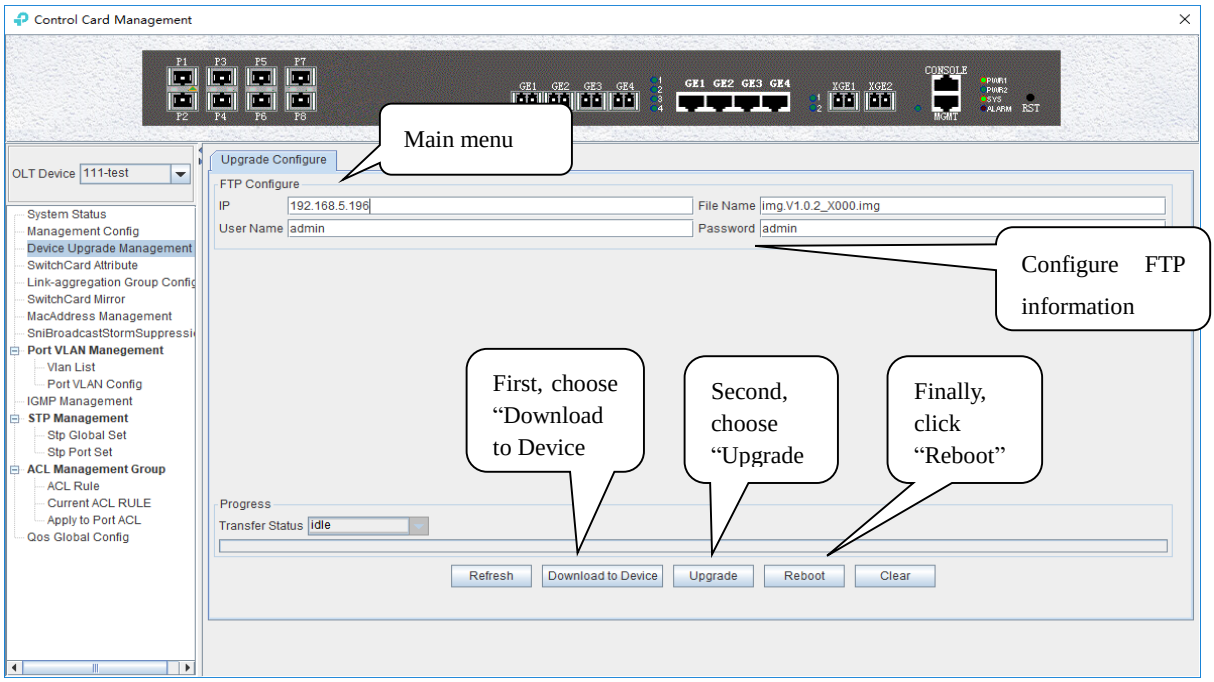
7.2.3 OLT Upgrade Management

Double click the **'Switch Control Card'** icon on the left side of the main page to open the **'Control Card Management'** window and enter the **'Device Upgrade Management'** page.
The configuration management interface can upgrade the software of OLT .

Note: before upgrading, you need to ensure that there is an upgrade file. The FTP server can connect with OLT.

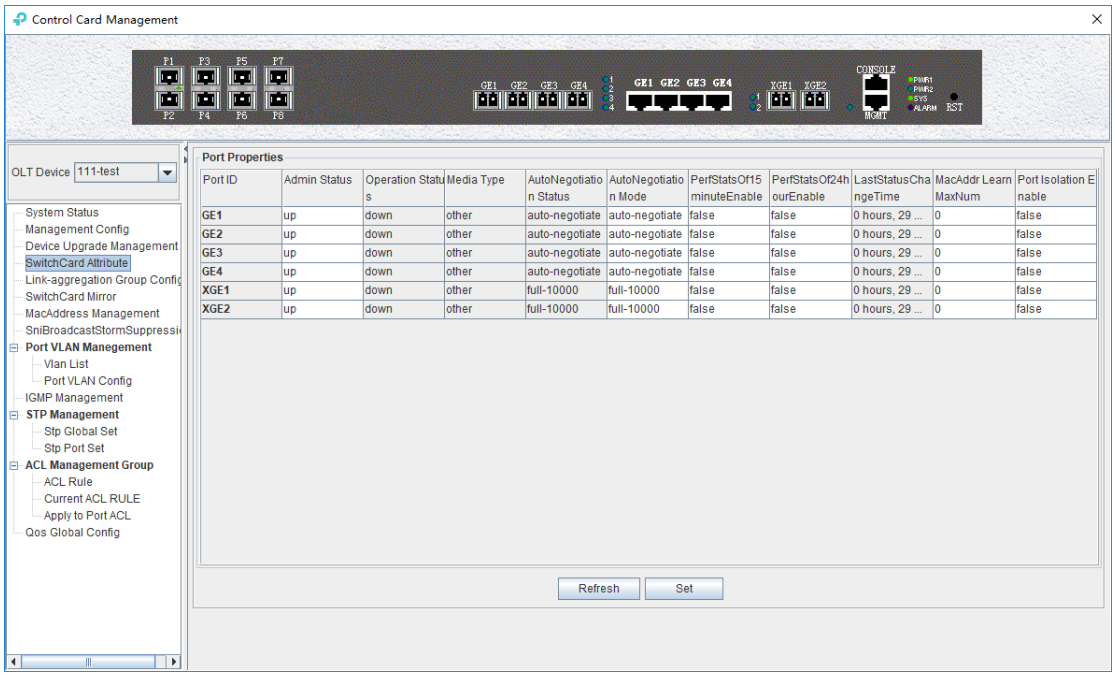
【Example of device upgrade configuration 】

Example: Upgrade firmware via FTP server, which ip is 192.168.5.196



7.2.4 OLT Uplink Port Attribute Configuration

Double click the '**Switch Control Card**' icon on the left side of the main page to open the '**Control Card Management**' window and enter the '**SwitchCard Attribute**' page.



The '**SwitchCard Attribute'** management page is mainly used to configure and view the attribute parameters of OLT 's uplink port (GE photoelectric port and 10GE uplink port). The parameters are described as follows:

- Admin Status

  Set up the uplink port state to enable or disable. When the port is set to '**Up**', the port is opened and when the port is set to '**Down**', the port is closed, 'testing' status is not available currently.

- Operation Status

Displays the current link state of the uplink port, when the uplink port connect with the end devices, the operation state is displayed as '**Up** '; when the uplink port disconnect with the end devices, the operation state is displayed as '**Down** ', and the running state only shows but can't be configured.

- Media Type

Show the media type of the uplink port, the default interface of ge1-ge4 is the optical interface, and the media type is shown as '**other**'. The default interface of ge1-ge4 is the COMBO port, XGE1 and XGE2 are 10GE uplink port.

- Auto Negotiation Status

Display the uplink port rate of duplex mode, 1000M full duplex, 100M full duplex, 10M full duplex and auto negotiation status.

- Auto Negotiation Mode

Configure the uplink port rate of duplex mode, 1000M full duplex, 100M full duplex, 10M full duplex and auto negotiation status.

- PerfStats Of 15 minute Enable

Configure PerfStats Of 15 minute Enable of uplink port,'**False**' means stop properties statistics of every fifteen minutes on uplink port.'**True**' means start properties statistics of Every fifteen minutes on uplink port.

- PerfStats Of 24 hours Enable

Configure PerfStats Of 24 hours Enable of uplink port, '**False**' means stop properties statistics of every 24 hours on uplink port. **'True'** means start properties statistics of every 24 hours on uplink port.

- Last Status Change time

Show the change time of properties statistics time, and the time of properties statistics change every 300ms.

- Mac Addr Learn Max Num

Limit the number of MAC addresses (0-8092) that are permitted to pass by the uplink port, set to '**0**' means no limit, set to '**1-8092**' to limit the number of MAC addresses which permitted to pass by the uplink port.

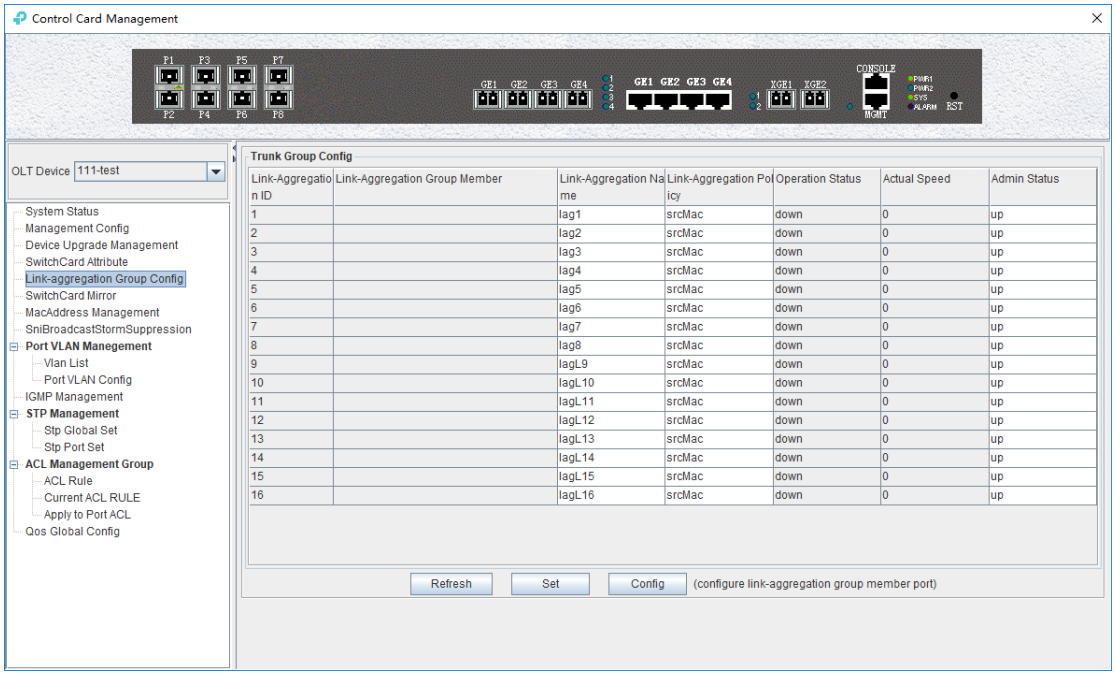
- SNI Port Isolation Enable

Set up data isolation or not between one uplink port and others. '**False**' means uplink port can access to each other. '**True**' means uplink port can access to each other.

7.2.5 OLT trunk(LACP) Configuration

The device supports the link aggregation protocol, lacp for short, which conforms to the IEEE802.3 ad standard. The lacp protocol is used to bundle multiple uplink ports together to form a single logical connection to increase the bandwidth of the link and realize backup functions of uplink port, which means when a port is broken, other ports can still communicate.

Double click the '**Switch Control Card**' icon on the left side of the main interface to open the '**Control Card Management**' window and enter the '**SwitchCardTrunkGroupConfig**' page.



Link-Aggregation ID	Link-Aggregation Group Member	Link-Aggregation Name	Link-Aggregation Policy	Operation Status	Actual Speed	Admin Status
1		lag1	srcMac	down	0	up
2		lag2	srcMac	down	0	up
3		lag3	srcMac	down	0	up
4		lag4	srcMac	down	0	up
5		lag5	srcMac	down	0	up
6		lag6	srcMac	down	0	up
7		lag7	srcMac	down	0	up
8		lag8	srcMac	down	0	up
9		lagL9	srcMac	down	0	up
10		lagL10	srcMac	down	0	up
11		lagL11	srcMac	down	0	up
12		lagL12	srcMac	down	0	up
13		lagL13	srcMac	down	0	up
14		lagL14	srcMac	down	0	up
15		lagL15	srcMac	down	0	up
16		lagL16	srcMac	down	0	up

The features of new GPON OLT lacp are as follows:

- Link aggregation function is mainly applied to all uplink port;
- The default aggregation group is 16;
- All port can be added to a aggregation group ;
- Support several equalization algorithms based on the source and destination MAC address, source and destination IP address;
- Each port can be assigned to only one aggregation group and cannot be assigned to multiple aggregation groups at the same time.

Lacp Function parameter on EMS are as follows:

Trunk Group ID

Show number of link aggregation groups available by default on OLT, default number is 1-16,link aggregation groups can't be added, only can modified and configured on the default link aggregation group.

Trunk Group Member

Show which uplink port members are already in the link aggregation group.

Trunk Group Name

Name and set the link aggregation group.

Trunk Group Policy

Select a strategy of link aggregation negotiation, which can be negotiated in several ways, such as the source and destination MAC address, source, and destination IP address.

Operation Status

Show the configuration state of the link aggregation group , the **'Up'** indicates that the configured link aggregation group is successful and has take effect, **'Down'** indicates that the configured link aggregation group is unsuccessful and hasn't take effect.

Actual Speed

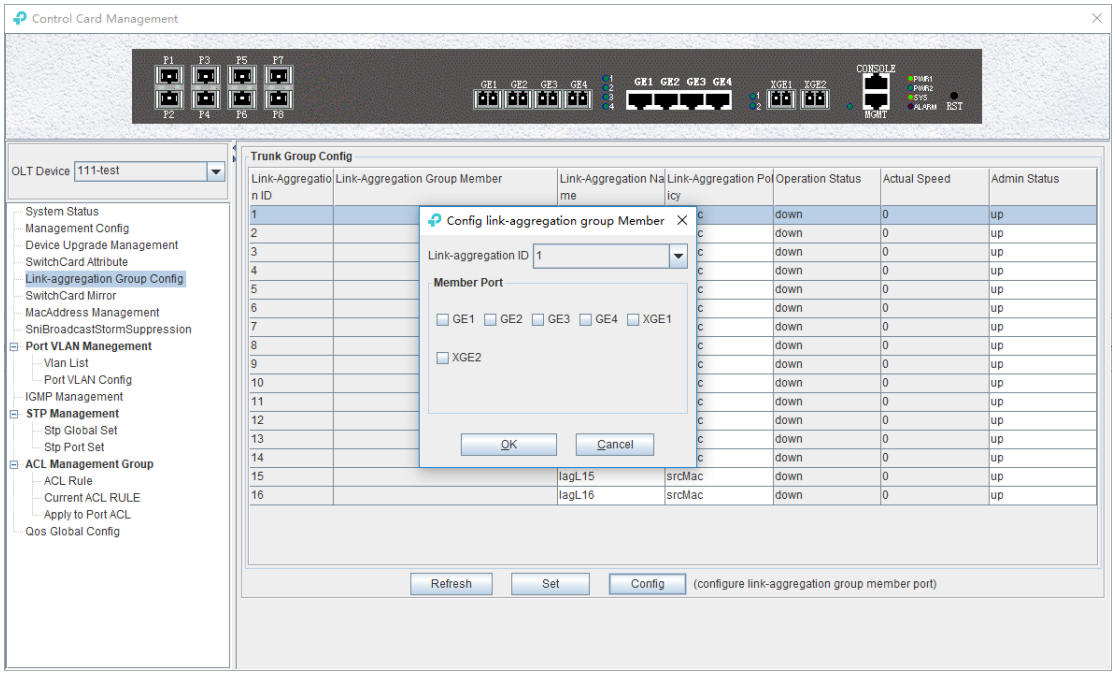
Shows the current negotiation rate of the link aggregation group.

Admin Status

Configure the management status of the link aggregation group and configure **'Up'** to run the link aggregation group; Configure **'Down'** to not run the link aggregation group.

【Example of link aggregation configuration】

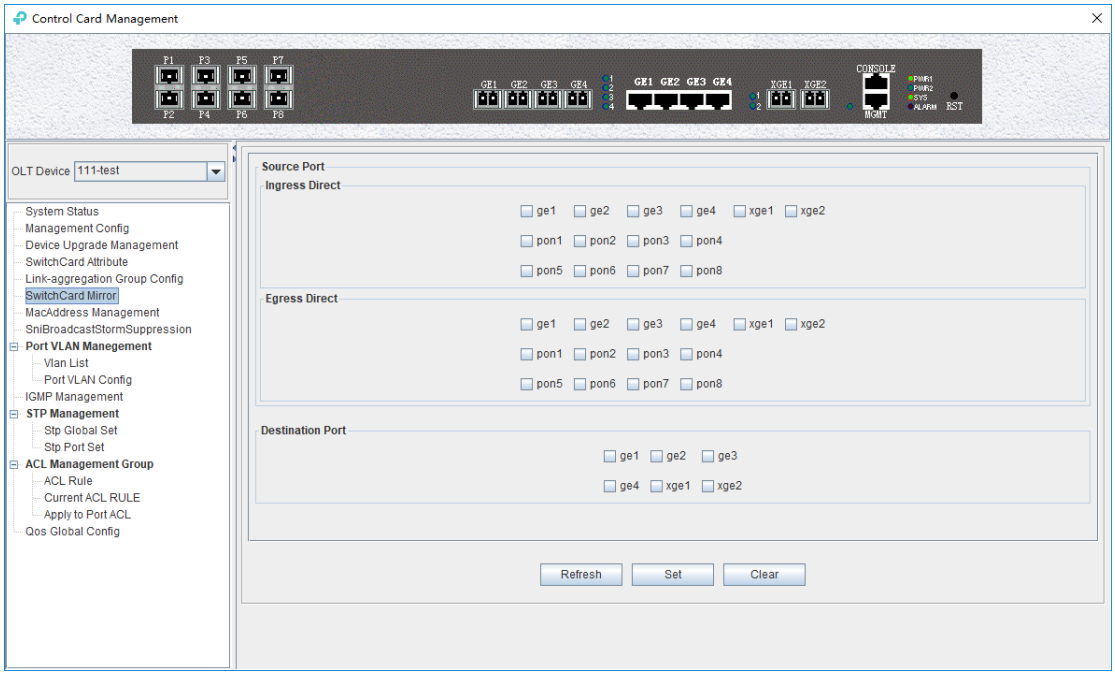
Example: Add ge1 and ge3 to link aggregation group 1, named 1234, with source MAC and destination MAC negotiation.



7.2.6 OLT Port Mirror Configuration

Port mirror function is that copy the message of Source port to other port (destination port), the user can monitor the message which copy to the destination port to monitor network and debug. All uplink port and PON port can be set to source or destination ports.

Double click the **'Switch Control Card'** icon on the left side of the main page to open the **'Control Card Management'** window and enter the **'SwitchCardMirror'** page.



Source port

Specify the source port that needs to be captured and analyzed. User should know the concepts of '**Ingress Direct**' and '**Egress Direct**' first :

'**Egress Direct**' means the direction of the message leaving the port; **'Ingress Direct'** means the direction which the message enters the port.

When only one direction is checked, OLT will copy message of one direction to the destination port. When both directions are selected, all message are mirrored to the destination port.

Destination port

The port that receives message from the source port.

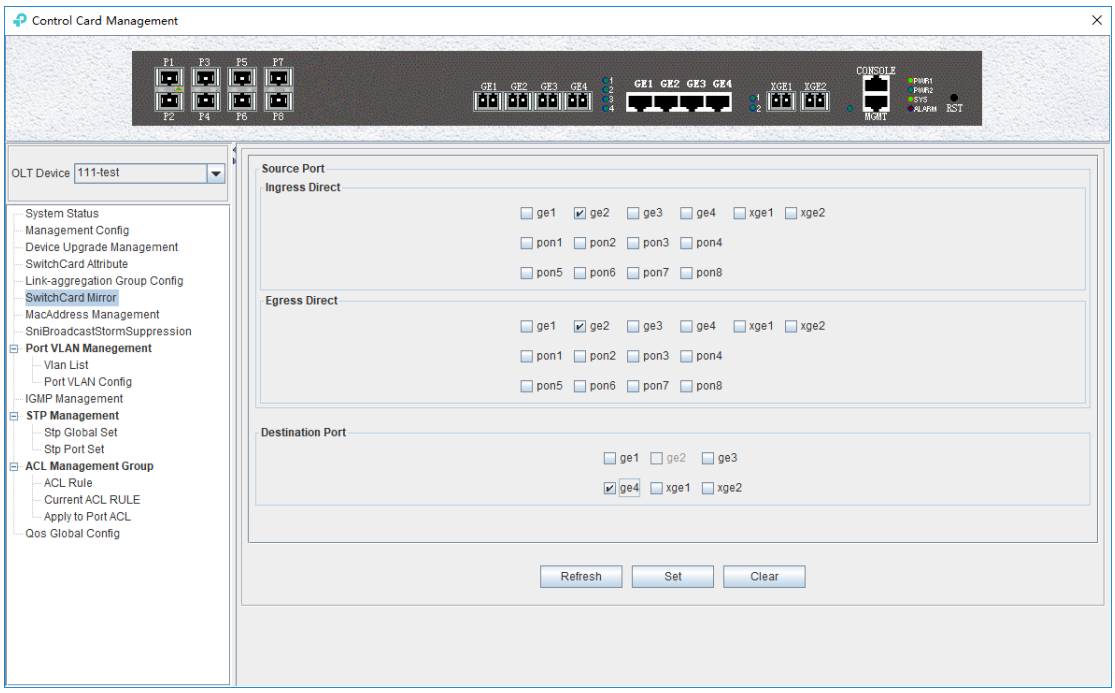
The configuration of the port image is as follows:

1) Select the source port. Port1-Port16, ge1-ge4, xge1-xge2 can be selected as the source port, each port has **'Ingress Direct'** and '**Egress Direct**'. The former refers to the port which receive message, the latter refers to the port which sent message.

2) Specify the destination port. You can specify one of the ge1-ge4,xge1-xge2 ports as the destination port, and all source port data will be forwarded to the specified destination port.

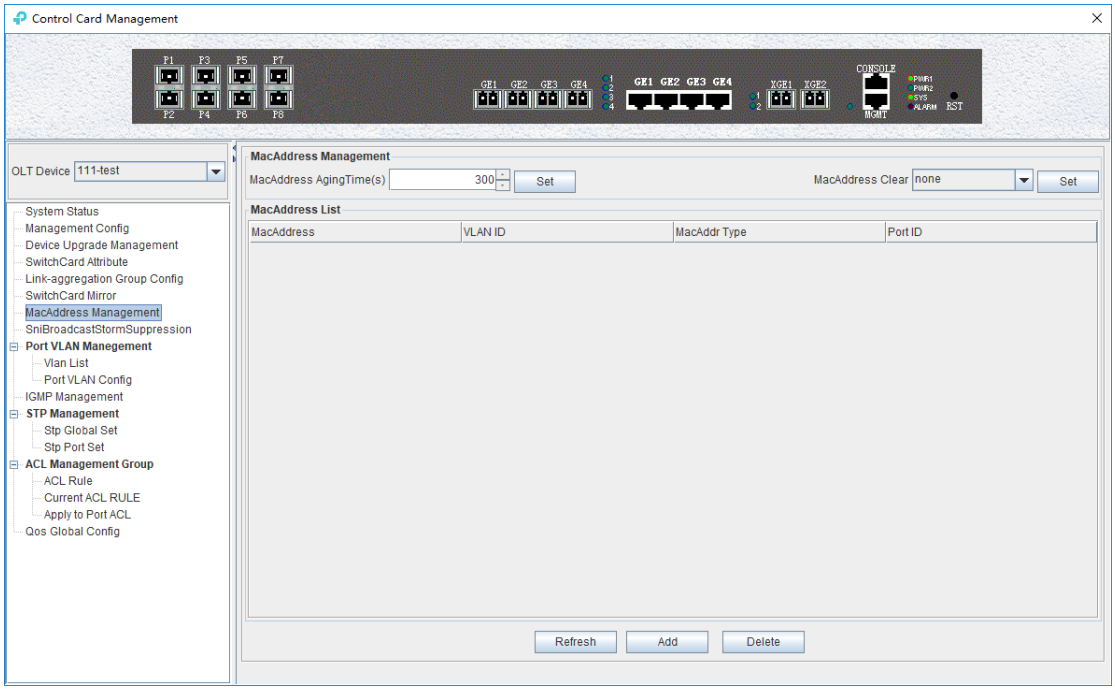
【Example of port mirror configuration】

Example: check ge2 in the '**Ingress Direct**' and '**Egress Direc**t' and select ge4 in '**Destination port**' then click '**Set**' button. All traffic of ge2 are mirrored to ge4 port.



7.2.7 OLT Mac Address Management

Double click the '**Switch Control Card**' icon on the left side of the main page to open the '**Control Card Management**' window and enter the '**MacAddress Management**' page.



MAC Address Management

MAC management interface can configure OLT's mac address aging time and clear MAC address, view the MAC address information which OLT has learned, including MAC address, VLAN ID, MAC address type, port ID, parameters are as follows:

- Mac address aging time

  Set OLT's MAC address aging time. The MAC address that OLT learned will be cleaned

automatically after this time.

- Mac address clear

  Choose a type of mac address in '**Mac Address Clear**' then click the the **'Set'** button, the MAC address of the specified type will be clear.

- Mac Address List

  The MAC address list mainly displays the MAC address that have learned by OLT, including the VLAN of the MAC address, the type and the port where the MAC address is learned.

  Click the '**Add**' button to bring up a window of '**Add MAC**'. We can add static MAC address, the parameters we can view or configure in the MAC address listare as follows:

- Port ID

  Config the MAC address learned port.

- Vlan ID

  Config the mac address vlan ID, the range is 1-4094 .

- MacAddr Type

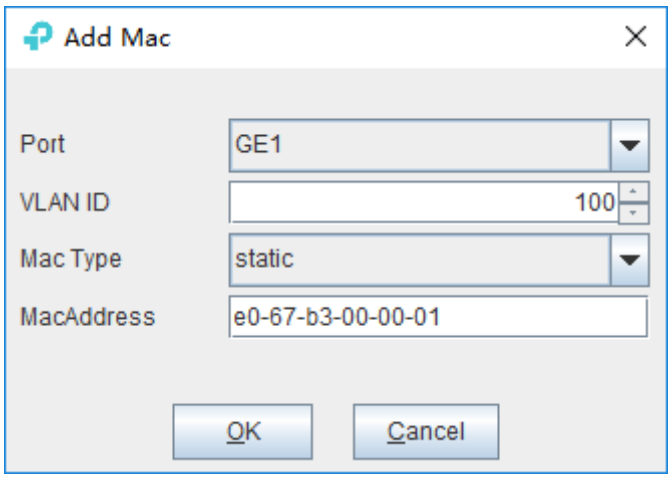
  There are two options, static, blackhole.

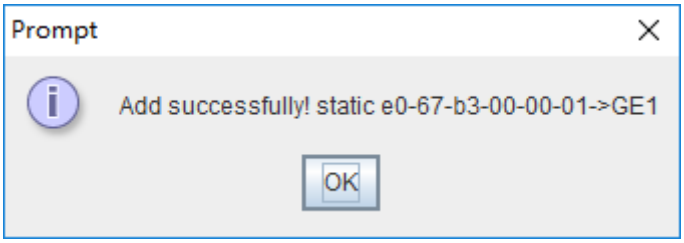
  Static represents a static MAC address. As long as the source MAC address of the message matches this static MAC address, the traffic can pass this port.

  Blackhole represents the black hole of the MAC address. If the source MAC address of the message is matched with this MAC address, the traffic will be discarded and not allowed to be circulated.

- Mac Address

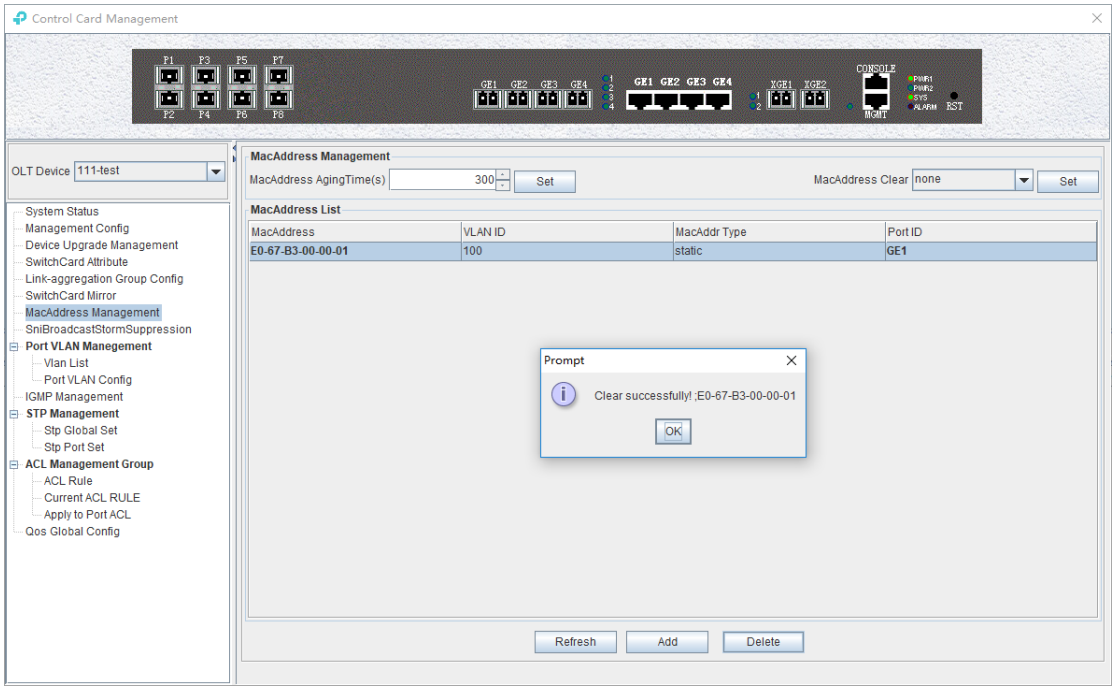
  Specified mac address, format as : xx-xx-xx-xx-xx-xx or xx:xx:xx:xx:xx:xx。





After finishing configuration, click '**OK**' button, at the same time, mac-address-table will show added a new mac-address entry.

'**Delete**' button: Choose specified a mac-address entry in mac-address-table, clicking '**Delete**' button can delete the entry.

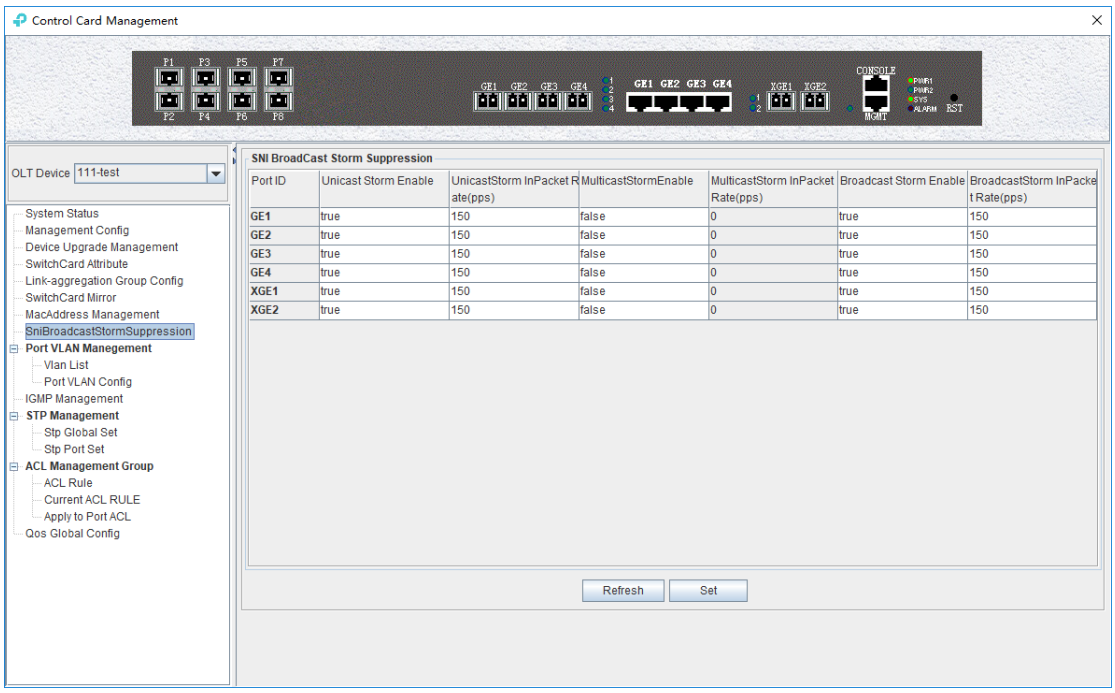


Click '**Refresh**' button to update mac-address-table.

7.2.8 Uplink Port Broadcast Storm Suppression Configuration

Exchange storm suppression is mainly to enable the uplink port to suppress unicast storms, multicast storms and broadcast storms to prevent these storms from adversely affecting the current network environment.

Double click the **'Switch Control Card'** icon on the left side of the main page, open the **'Control Card Management'** window, enter the **'SNIBroadcastStormSuppression'** management page configuration.



Exchange broadcast storm suppression support '**Unicast Storm Enable**', '**Multicast Storm Enable**' and '**Broadcast Storm Enable**' three functions. There are several checkbox above.

✓ Unicast / multicast / broadcast storm suppression enabled

When **'True'** is selected, the unicast / multicast / broadcast storm suppression function of the port is enabled.

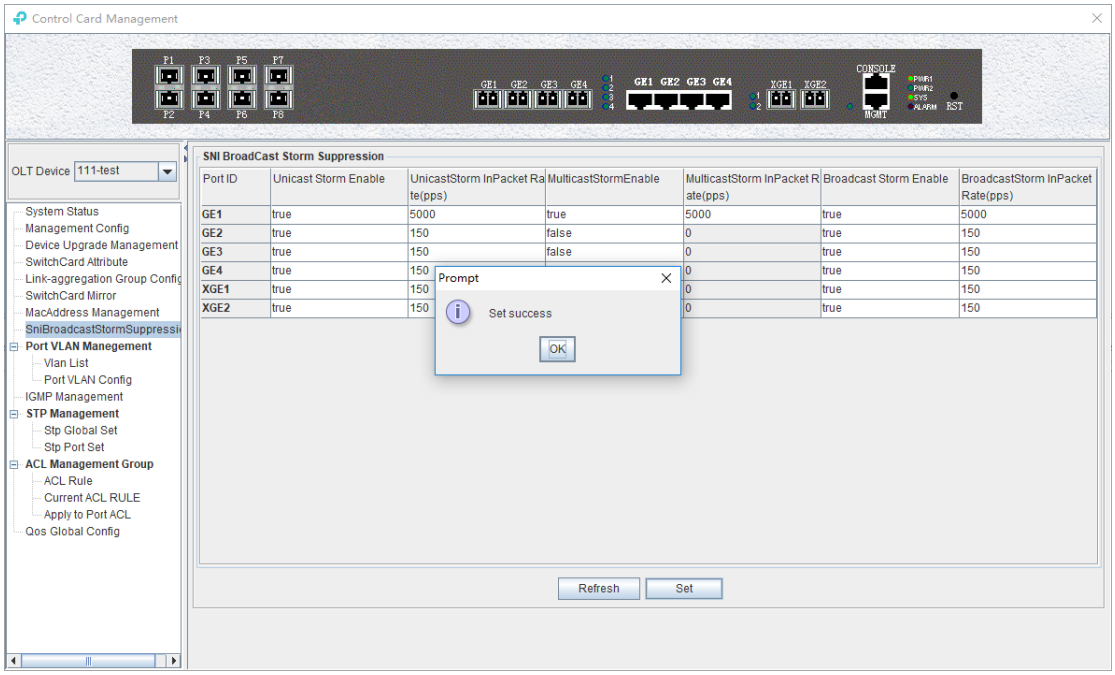
When **'False'** is selected, the unicast / multicast / broadcast storm suppression function of the port is disabled.

✓ Unicast / multicast / broadcast inpacket rate

This option can be configured with traffic limit values, which can be between 1-1488100 pps.

【Example of storm suppression configuration】

Example: The unicast storm suppression function is set to **True** and the unicast inpacket rate is 5000 pps. The multicast storm suppression function is set to **True** and the multicast inpacket rate to 5000 pps. The broadcast storm suppression function is set to **True** and the broadcast inpacket rate to 5000 pps. Click **'Set'** button after the configuration, a prompt window will pop up and click the **'OK'** button to complete the configuration.



7.2.9 OLT Port VLAN Management

VLAN (Virtual Local Area Network), is a kind of based on user demand (functions, departments or applications, etc.) logically divided the LAN into multiple segments without considering the physical location of the virtual network technology. VLAN technology allows a network administrator to divide a physical network into different logical segments (VLAN), each containing a set of devices with the same requirements.

The advantage of VLAN technology is that the broadcast and unicast traffic within VLAN will not be forwarded to other VLAN, thus helping to control network traffic, simplify network management and improve network security.

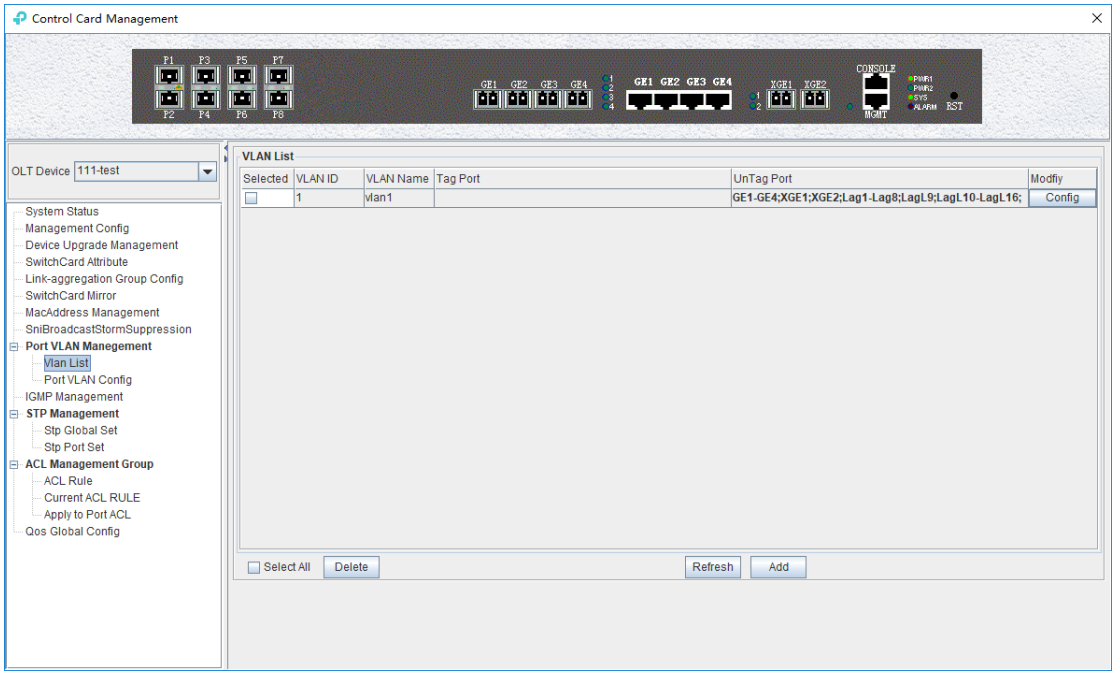
The VLAN configuration of the OLT EPON system is divided into the VLAN configuration of the OLT and the VLAN configuration of the ONU part. The VLAN management of the **'Switch Control Card'** section refers to the VLAN configuration and management of the OLT part.

The VLAN function of the OLT part of the GPON device is as follows:

- ✓ Support Port-based VLAN and IEEE802.1Q VLAN.
- ✓ Support full 4K VLAN group, VID range 1~4094.
- ✓ VLAN 1 is the system reserved VLAN, it includes all switch ports, all ports is UNTAG mode.
- ✓ All switch ports, including four ge uplink ports, two xge uplink ports and sixteen PON ports support VLAN Partition.

7.2.9.1 View OLT VLAN

Double click the **'Switch Control Card'** icon on the left side of the main page, open the **'Control Card Management'** window, and enter the **'VLAN List'** page. Typical page is as follows:



The VLAN list has **'Selected', 'VLAN ID', 'VLAN Name', 'Tag Port', 'Untag Port', 'Modify'** and other items. Here's a brief introduction to these projects:

Selected

This is mainly to delete the specified VLAN. We can select the VLAN ID we want to delete, and then click on '**Delete**' button on the left corner of the page to delete the VLAN. In addition, select the '**Select All**' button next to the '**Delete**' can select all the VLAN entries to delete all the VLAN.

VLAN ID / VLAN Name

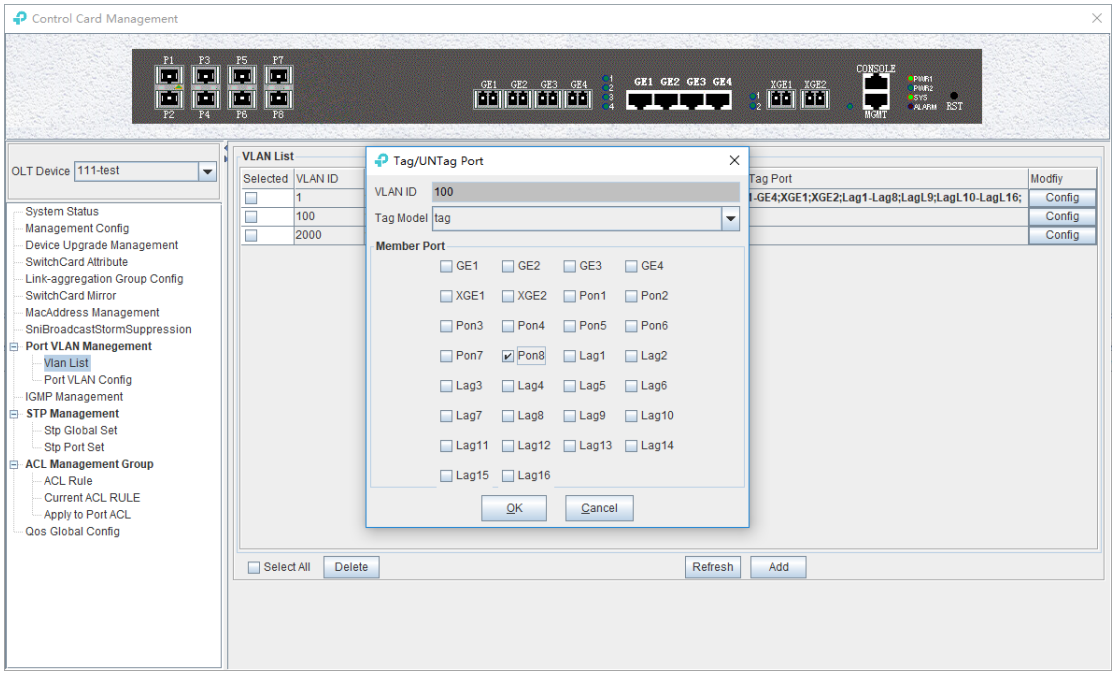
VLAN ID displays all the VLAN ID that are available on the current OLT. VLAN Name Displays the name of the current existing VLAN.

Tag Port / Untag Port

In the Port of Tag Port, the forwarded message will be tagged with a VLAN Tag. In the Port of Untag Port, the message that is forwarded will be stripped of the corresponding VLAN tag (no VLAN tag).

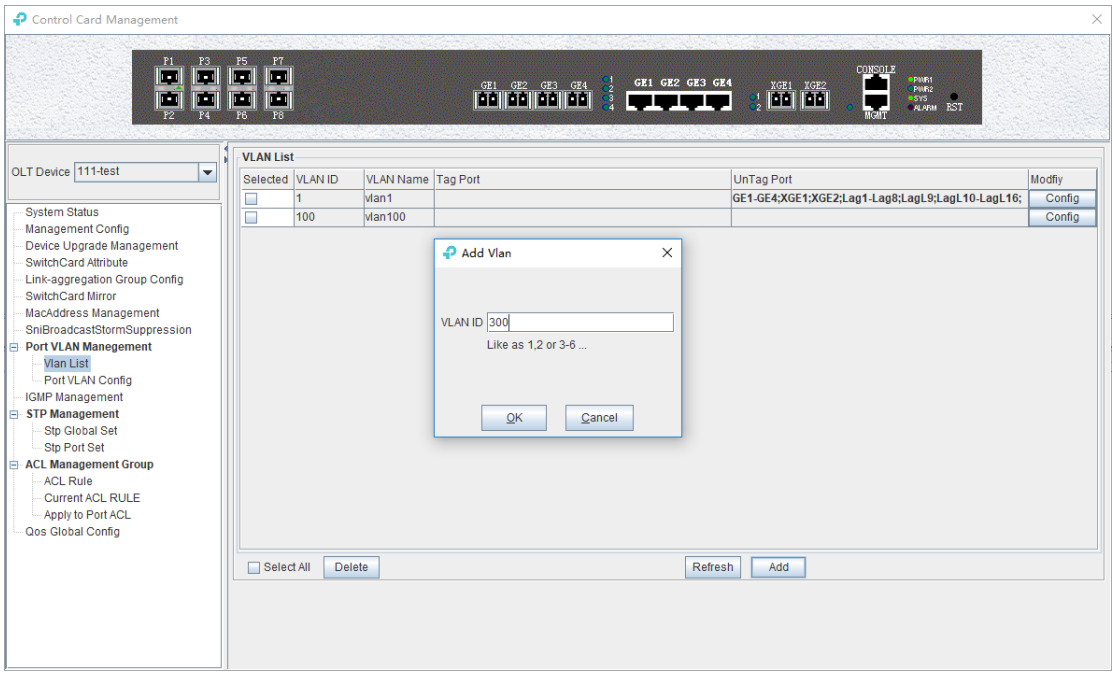
7.2.9.2 Modify OLT VLAN

Each VLAN has a '**Config**' button, which can be double-clicked to modify the VLAN 's '**Tag Model**' and '**Member Port**' as shown below, click '**OK**' button to complete the configuration after setting up.



7.2.9.3 Add OLT VLAN

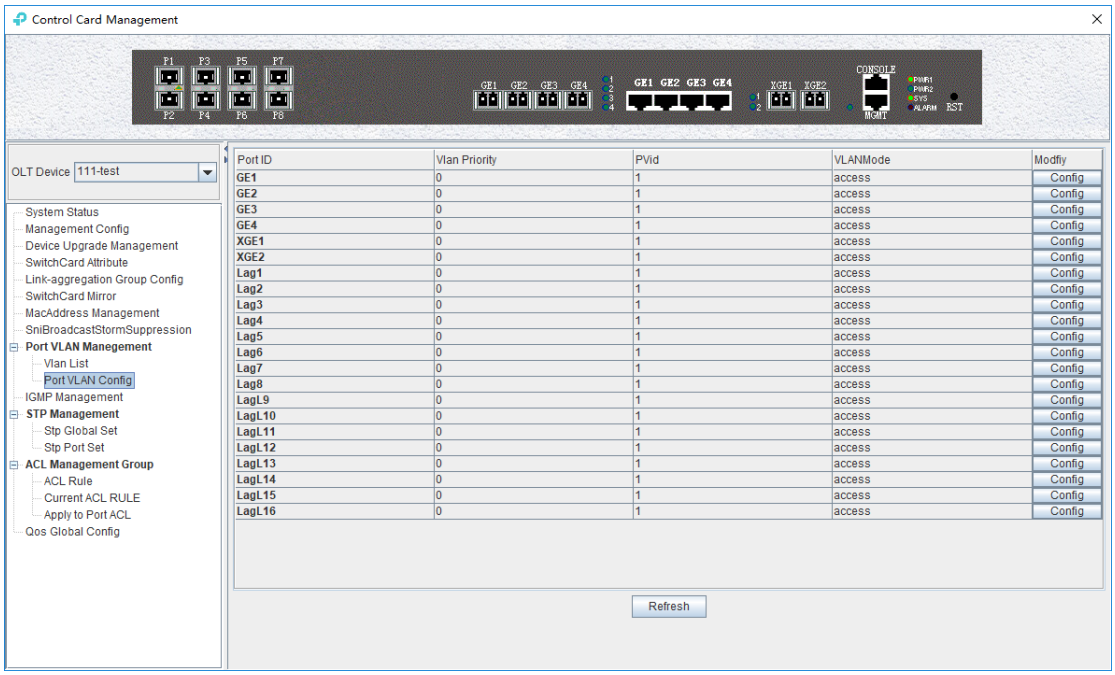
In the **‘VLAN List’** page has a **‘Add’** button. Click the button to add a VLAN ID to the OLT, and click **'Ok'** button to finish configure.



7.2.9.4 OLT Port VLAN Configuration

Double click the **‘Switch Control Card’** icon on the left side of the main page, open the **‘Control**

Card Management' window, and enter the port **'VLAN Config'** page. Typical page is as follows.



The port VLAN configuration can primarily view and configure Port ID, VLAN Priority, Port VLAN (PVID), and VLAN Mode. The following will be a brief introduction.

Port ID

Display the corresponding port number, GE represents the uplink port, XGE represents the 10 Gigabit port, PON represents the PON interface, the serial number represents the number of ports behind.

VLAN Priority

Displays the priority of the current port VLAN, which shows the value of 0-7, the minimum priority of 0, and the highest priority of 7.

Port VLAN（PVID）

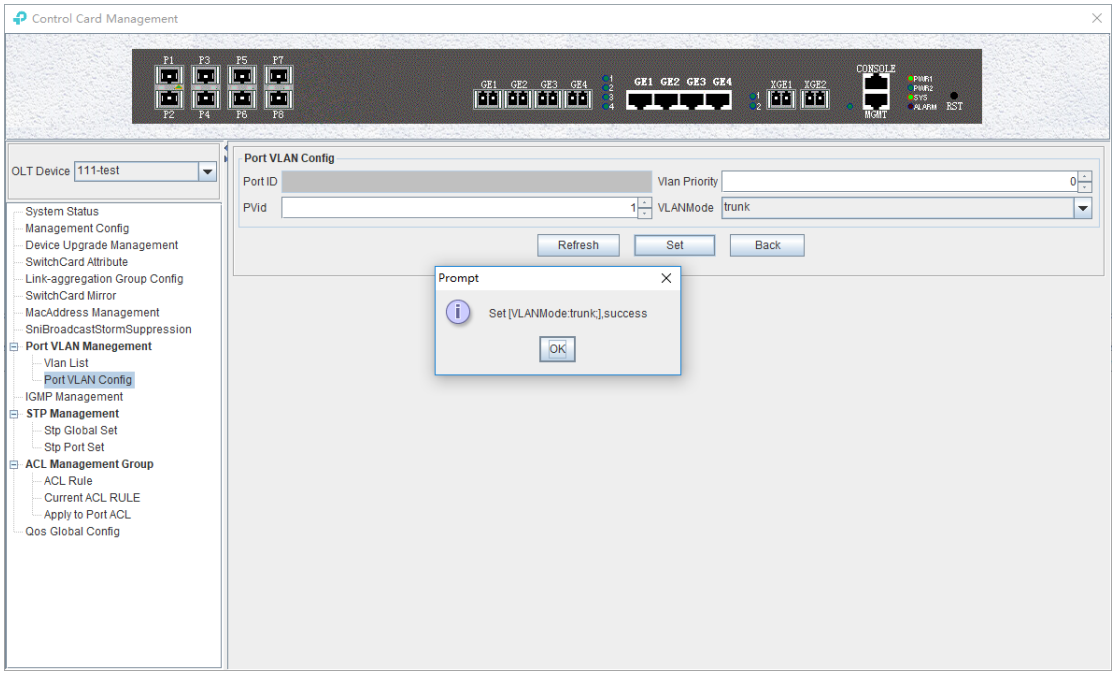
Displays the default VLAN for the current port, which shows the value of 1-4094. Default valn is 1.

VLAN Mode

Displays the VLAN mode of the current port, where the modes that can be displayed are: access, hybrid, trunk.

Modify

Double click the **'Config'** button to configure the VLAN priority, port VLAN (PVID), and VLAN mode of the corresponding port. Click the **'Set'** button to complete the configuration. As shown in the following figure.



The packets in different VLAN modes are handled as follows:

VLAN mode	Actions(in the inbound direction)		Actions(in the outbound direction)
	Untagged frame	Tagged frame	
Access	Tag the frame with the native VLAN tag.	• Receive the frame if its VLAN id is the same as the native VLAN id. • Drop the frame if its VLAN id is different from the native VLAN id	Remove the native VLAN tag and send the frame
Trunk	Tag the frame with native VLAN tag.	• Receive the frame if its VLAN is carried on the port • Drop the frame if its VLAN is not carried on the port.	• Send the frame and removing the tag if the frame is the same as native VLAN id. • Send the frame without removing the tag if its VLAN is carried on the port but is different from the native VLAN.
Hybrid			Send the frame if its VLAN is carried on the port. The frame is sent with the VLAN tag

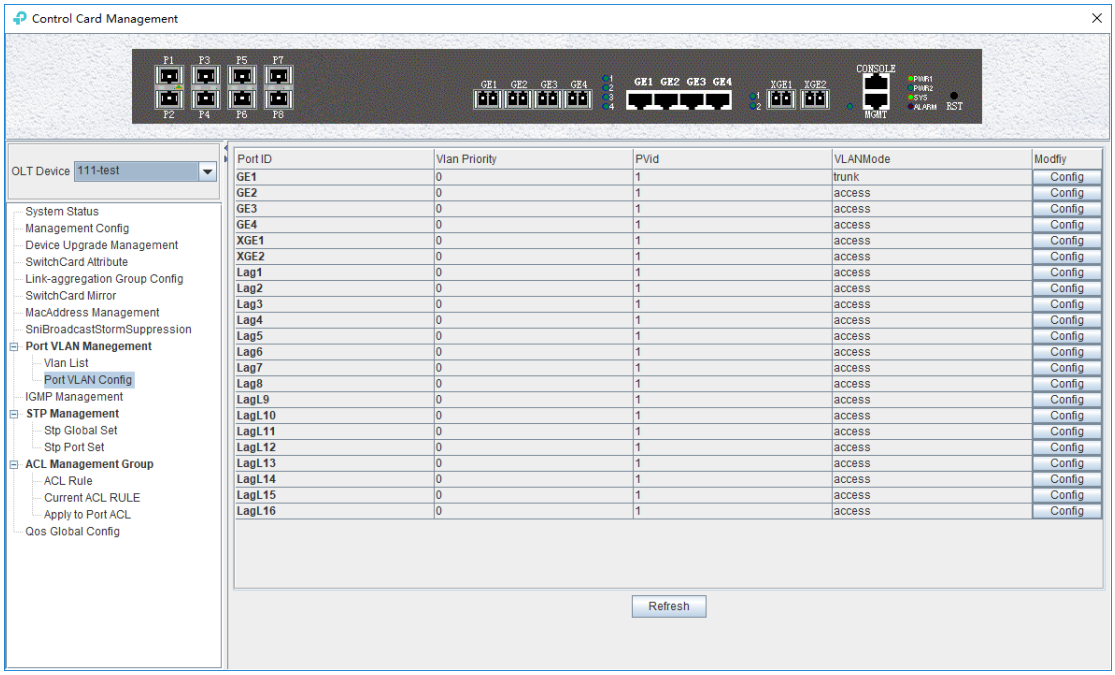
			removed or intact depending on your configuration with the VLAN hybrid command.

7.2.9.4.1 OLT Port Access Mode VLAN Configuration

Example: Configure GE1 port as access mode, priority is 2, PVID is 100. The steps are as follows: (PON port configuration is the same)

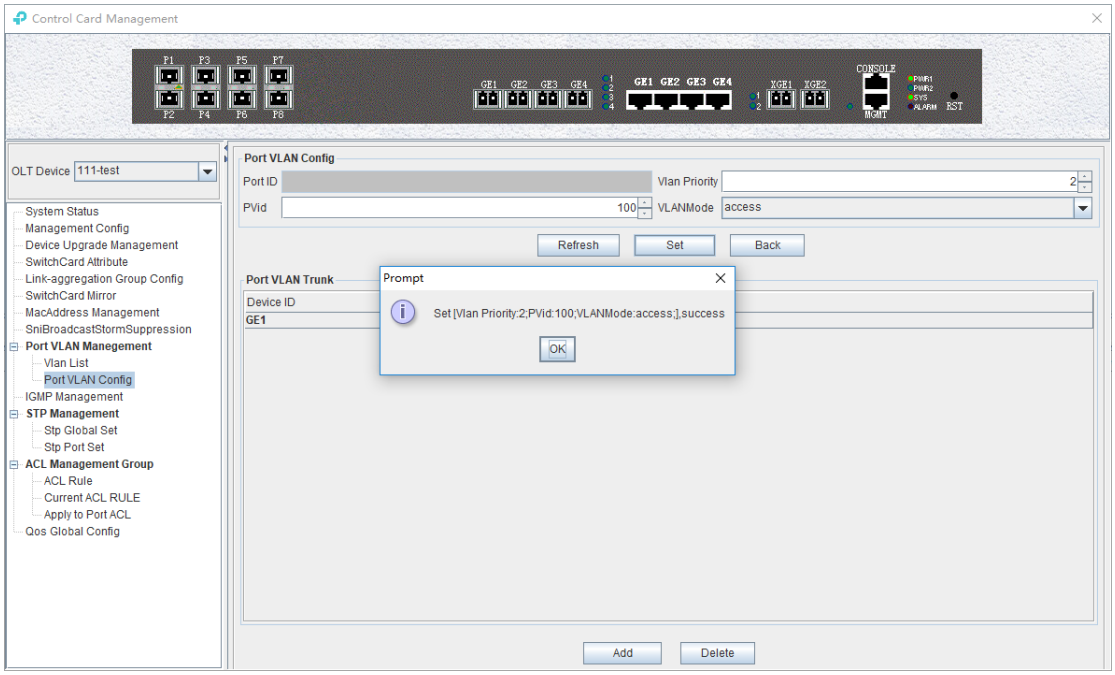
Step 1：

Double click the **'Config'** button at the back of this column of GE1 in the port VLAN configuration page.



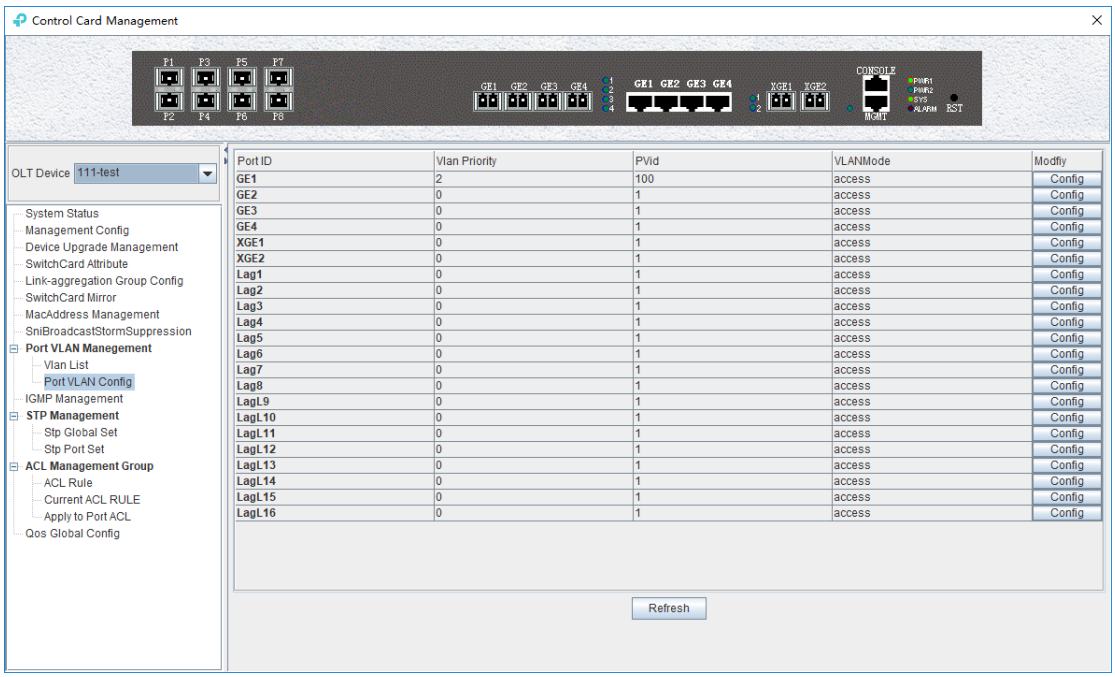
Step 2：

At this point, the following page will appear. Under this page, set the VLAN priority to 2, the PVID to 100, and the VLAN mode select to access. Click the **'Config'** button and click the **'OK'** button to complete the configuration.



Step 3:

Click the '**Back**' button to view the modified configuration.

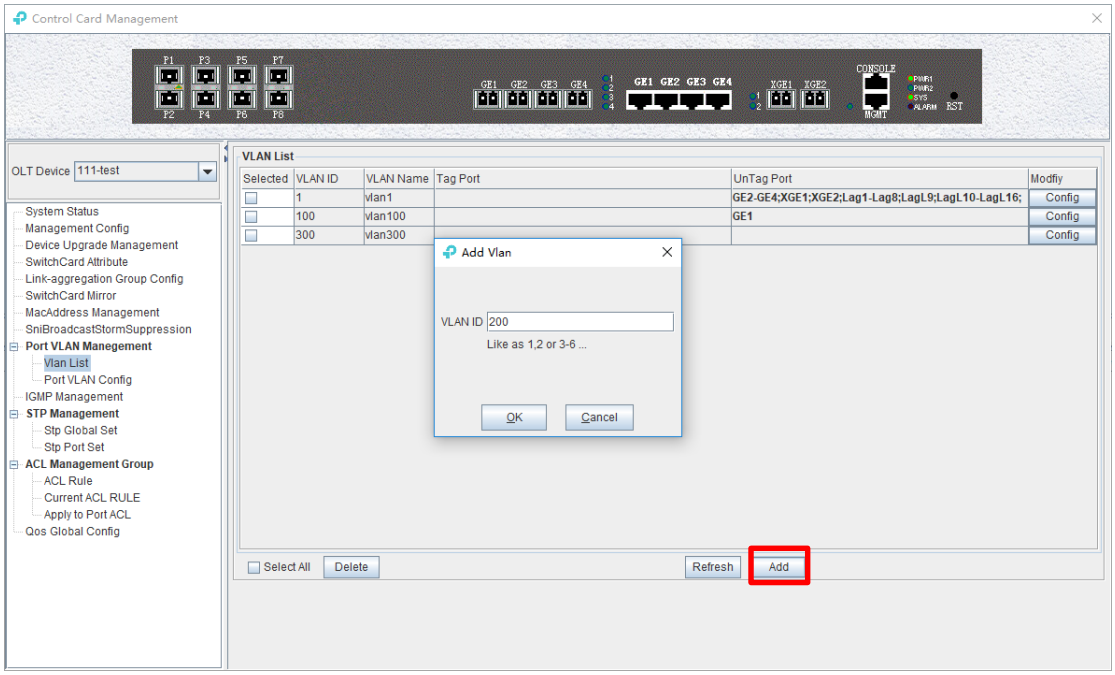


7.2.9.4.2 OLT Port Trunk Mode VLAN Configuration

Example: Configure GE3 port as trunk mode, priority is 3, PVID is 200, trunk VLAN is 101-103. The steps are as follows:

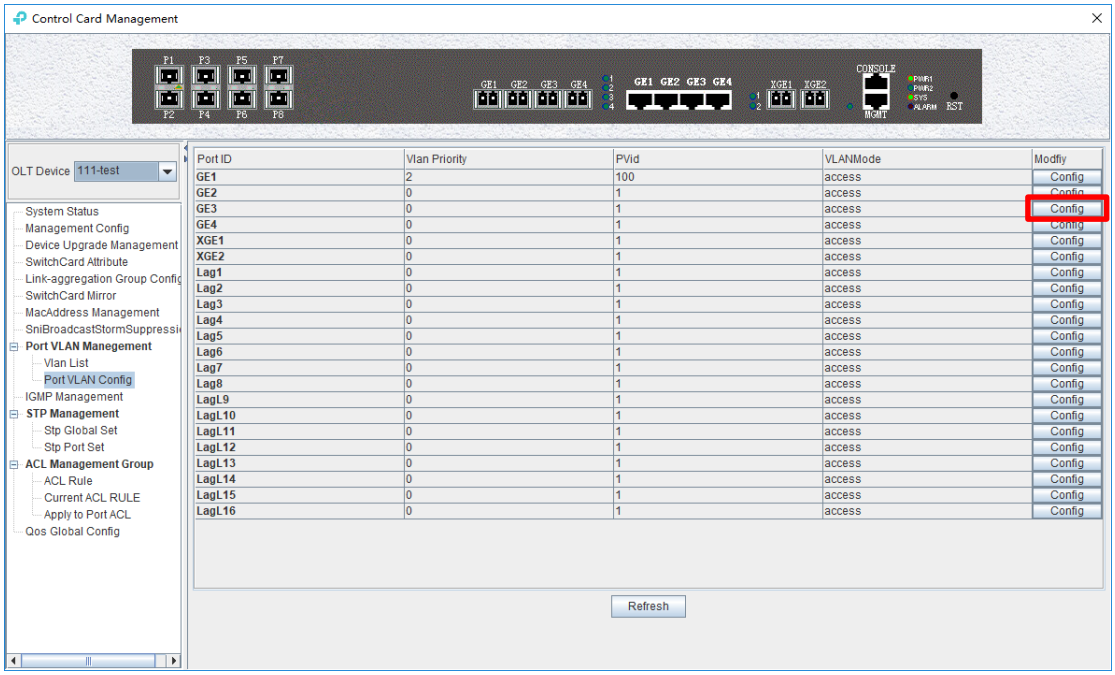
Step 1:

Add vlan 200,101-103 in the '**VLAN list'** interface



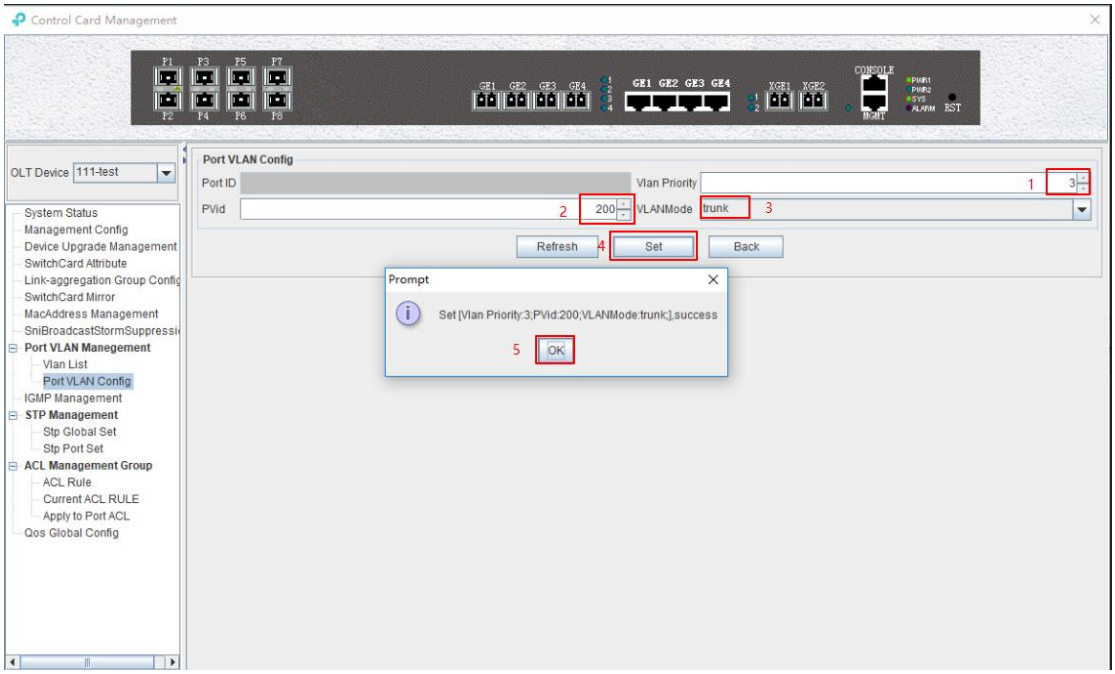
Step 2:

Double click the **'Config'** button at the back of this column of GE3 in the port VLAN configuration page.



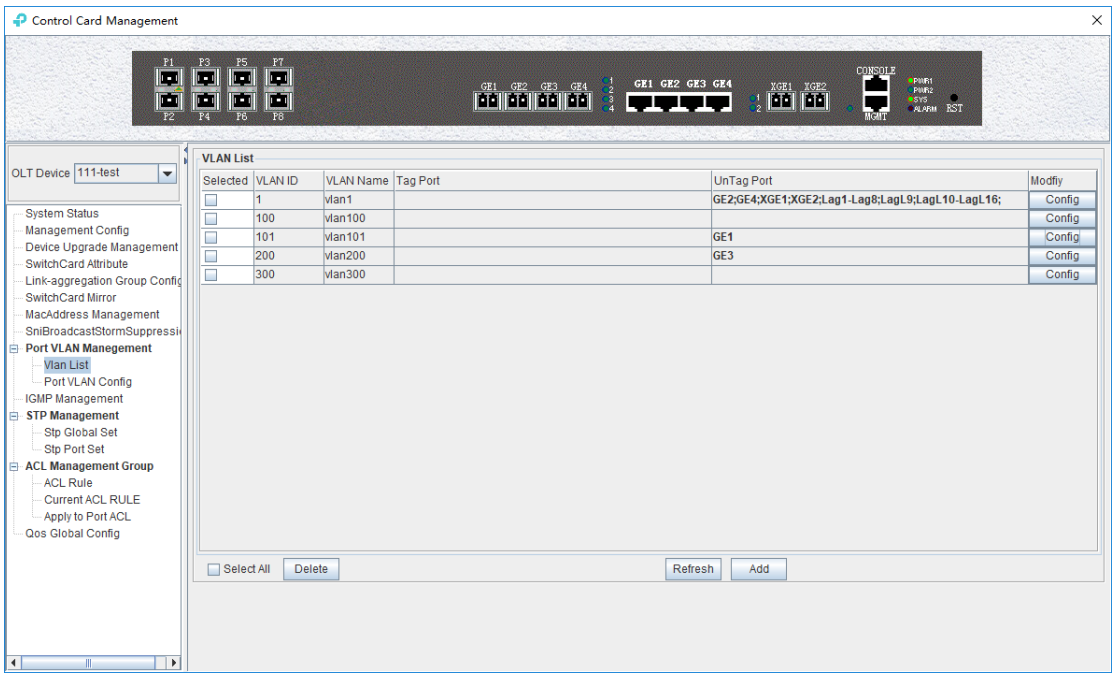
Step 3:

Then, set the VLAN priority to 3, the PVID to 200, Click the **'Set'** button to complete the pvid configuration.



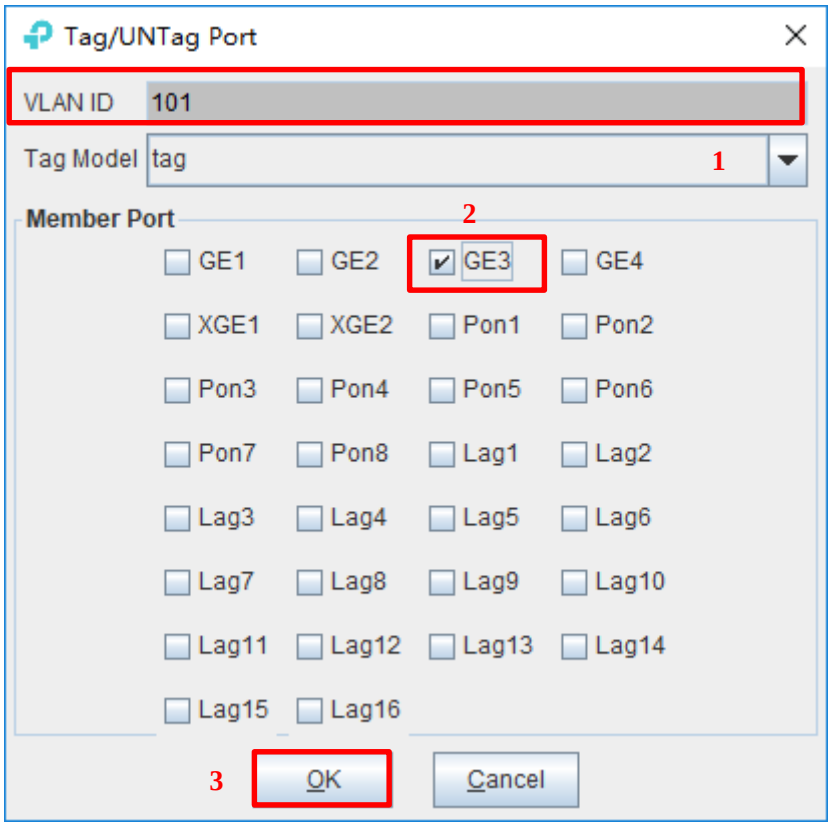
Step 4:

Add GE3 to vlan101-103 Tag port in the vlan list: Take vlan101 as an example: double-click the "**Config**" button.



Step 5:

In the fallowing interface after double-clicking **'Config'**, the Tag mode select **'tag'**, the member port select '**GE3'**, and then click '**OK'** to complete the configuration.

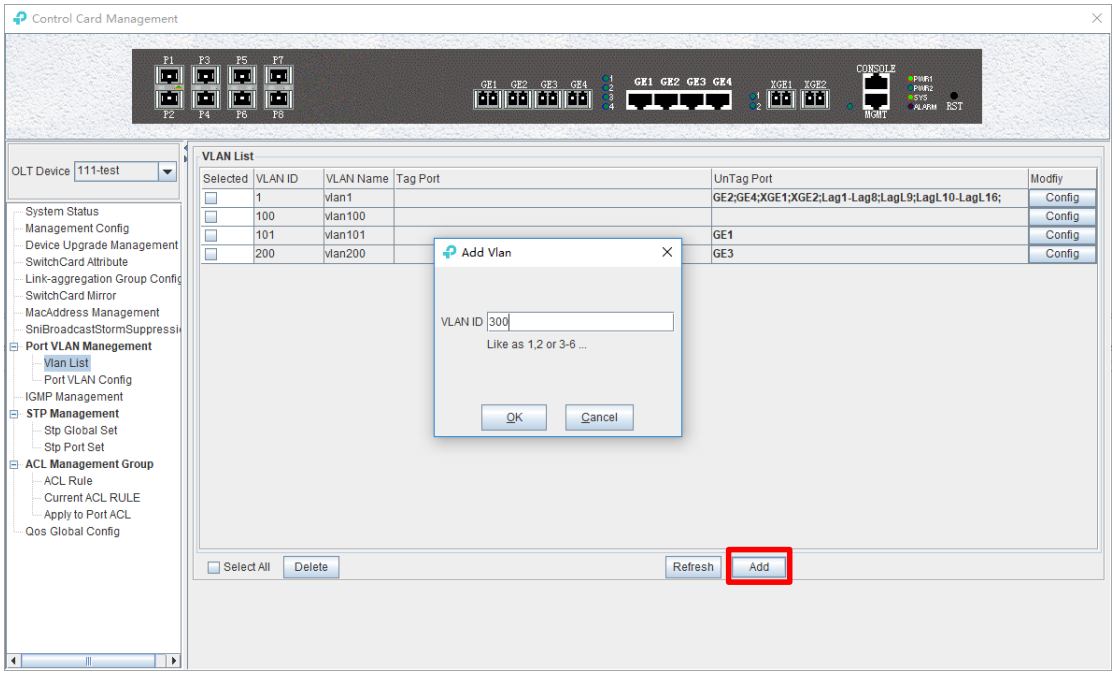


7.2.9.4.3 OLT Port Hybrid Mode VLAN Configuration

Example: Configure GE4 port as hybrid mode, priority is 4, PVID is 300, The hybrid mode allows VLAN 301 with tag, VLAN 302 without tag. The steps are as follows:

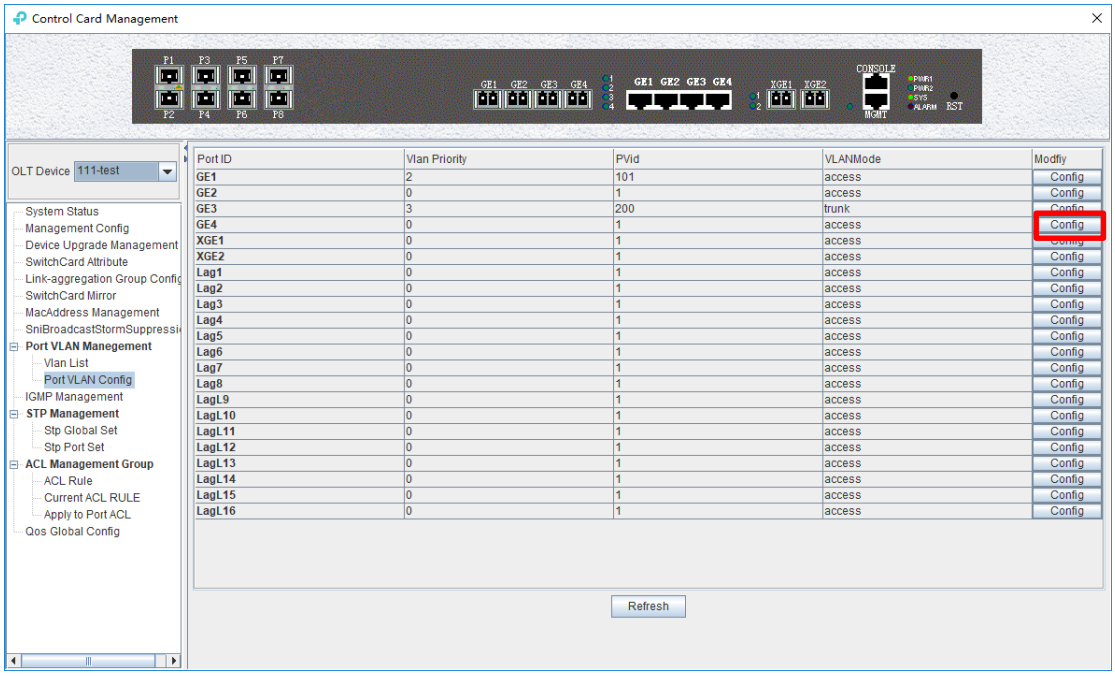
Step 1:

Add vlan 300,301,302 in the '**VLAN list**' interface.



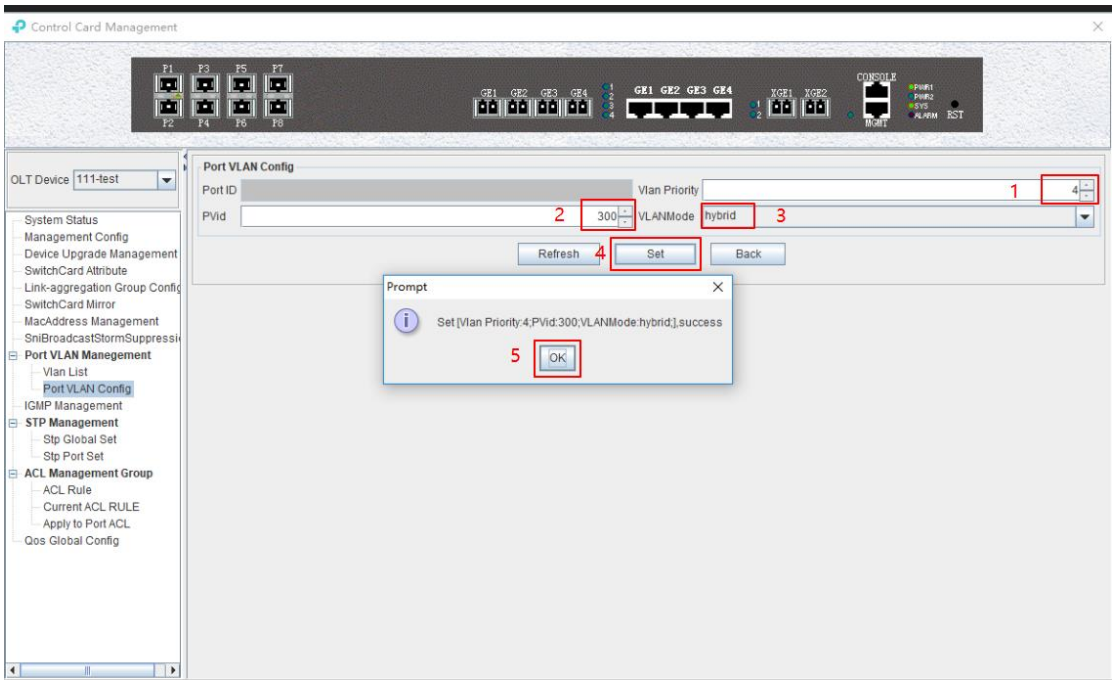
Step 2:

Double click the **'Config'** button at the back of this column of GE4 in the port VLAN configuration page.



Step 3:

Then, select the VLAN priority to 4, the PVID to 300, vlanMode is hybrid, then click the **'Set'** button to complete the pvid configuration.

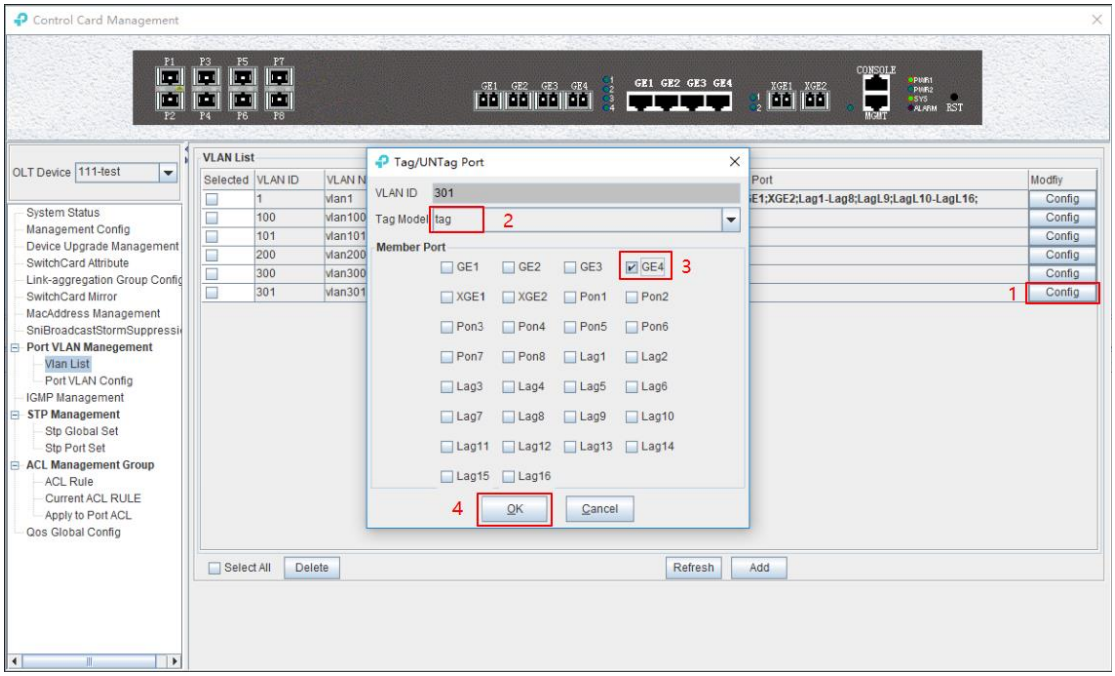


Step 4:

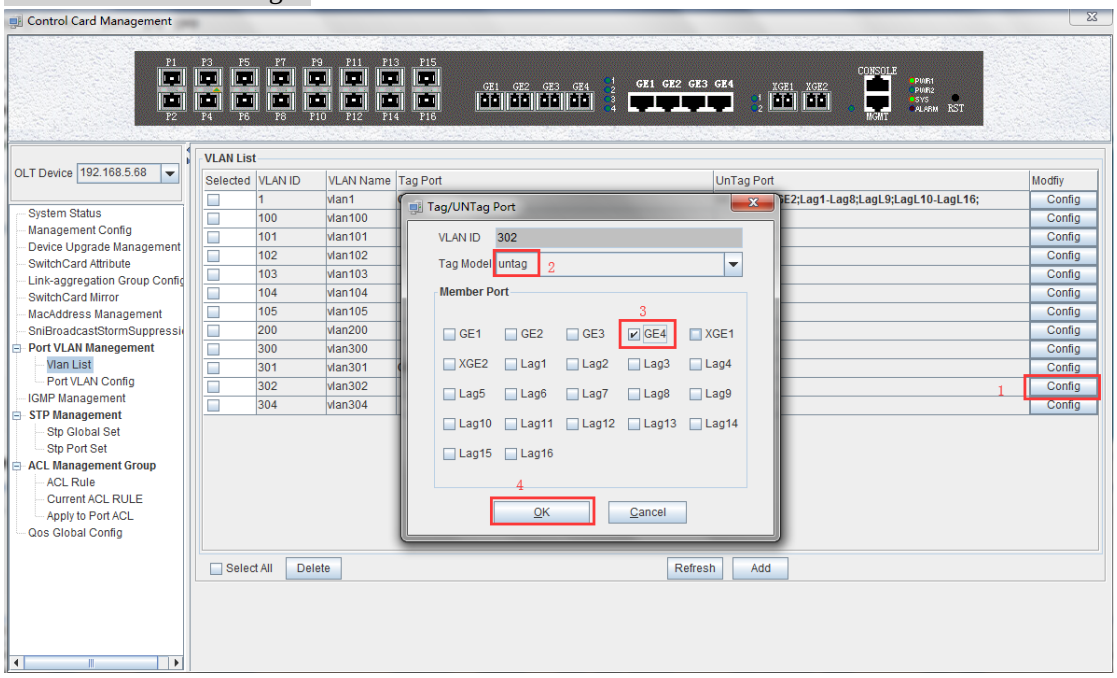
GE4's hybrid mode allows vlan301 with tags, and vlan302 without tags, we need to add vlan 301,302

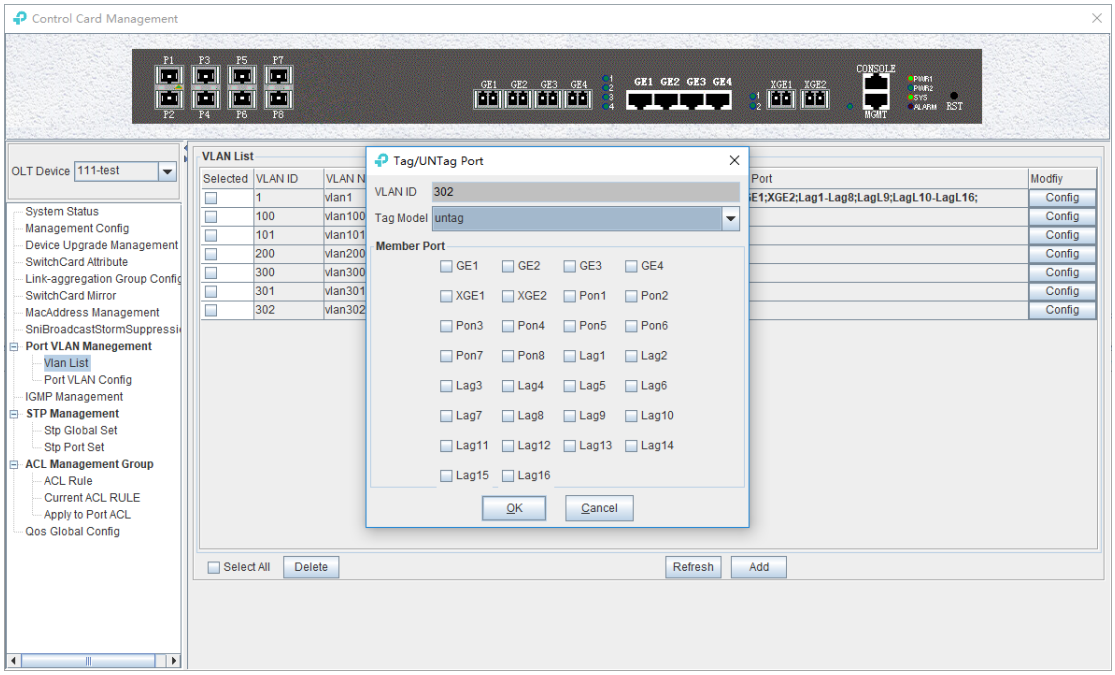
in the **'VLAN List'** as # 6.2.9.2 and # 6.2.9.3.

Add vlan 301 with tag:



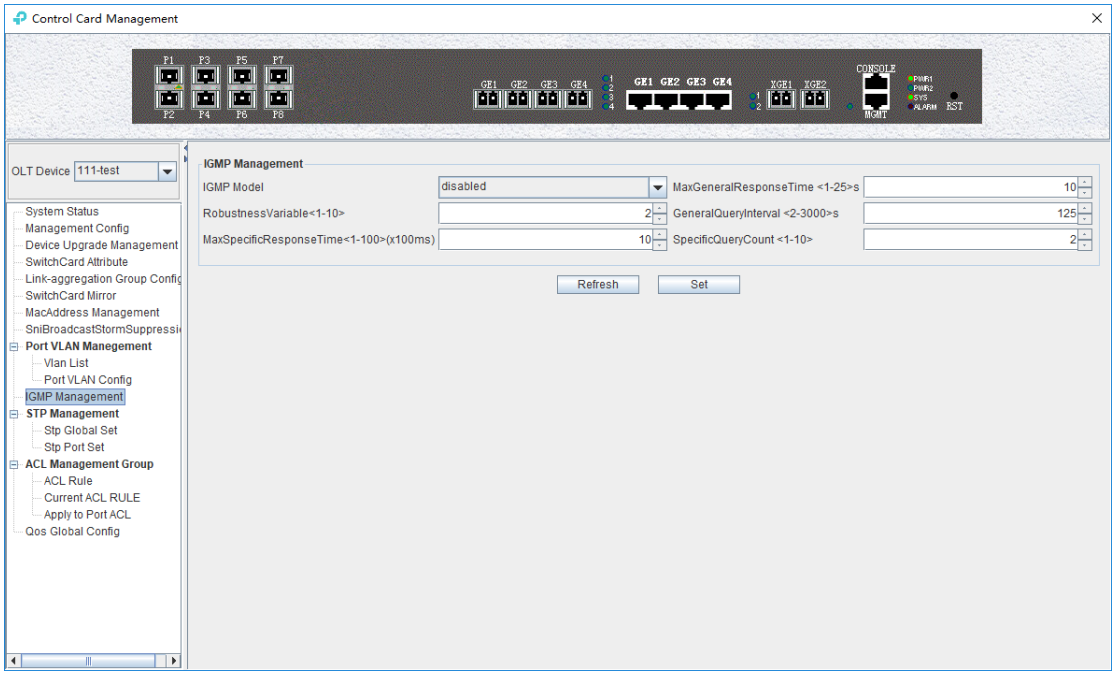
Add vlan 302 with untag：





7.2.10 OLT IGMP Management

Double click the **‘Switch Control Card’** icon on the left side of the main page, open the **‘Control Card Management’** window, and enter the **'IGMP Management'** page. Typical page is as follows:



In this interface,we can config IGMP model,max general response time,general query interval,specifi query count,rebustness variable,max speclific response information

The new 16 PON OLT support IGMP mode are snooping,proxy

(1) igmp - proxy

Set the OLT IGMP forwarding mode is proxy.

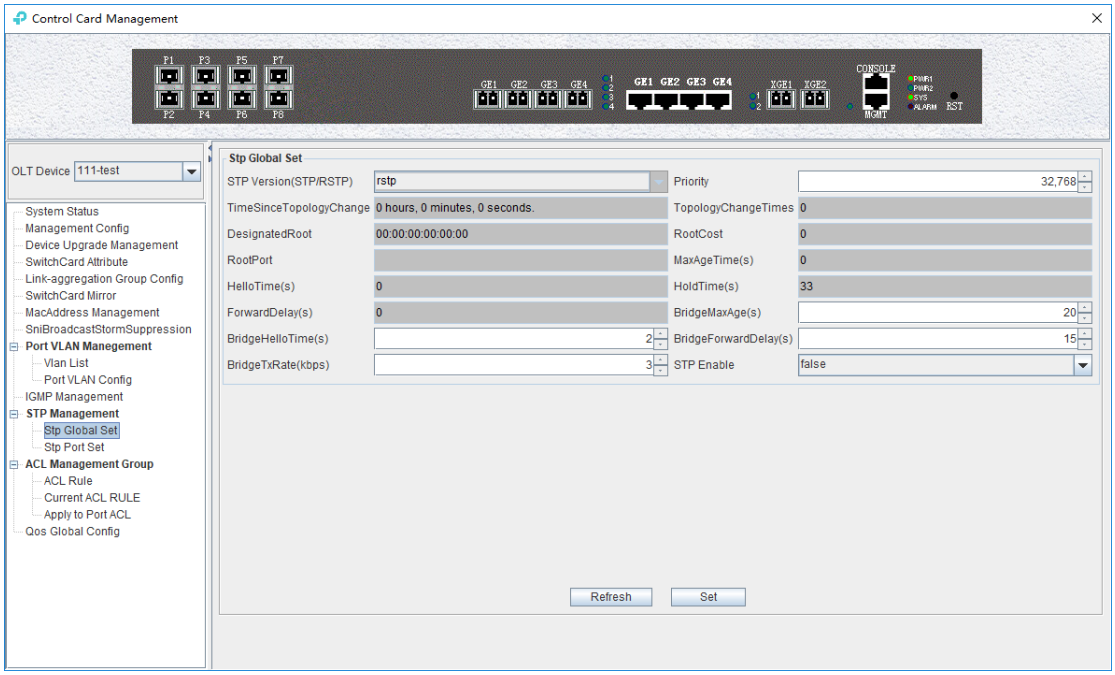
IGMP proxy is the multicast agent. The IGMP proxy intercept and handling the IGMP message between the user and the multicast router and then forwards it to the upper
multicast router. From a user perspective, the system is a multicast server equivalent; From an upper point of view, the system is a multicast user equivalent. The IGMP proxy mode reduces the multicast protocol traffic of the network side.
(2) igmp snooping
Set the OLT IGMP mode is IGMP snooping. IGMP snooping is the multicast listening. IGMP Snooping retrieves the relevant information of maintenance group by listening to the IGMP message that communicates between the user and the multicast router to maintain items. The system does not do any processing of the broadcast VLAN message

7.2.11 OLT STP Management

STP (Spanning Tree Protocol) is the abbreviation of spanning tree protocol. The protocol can be applied to the loop network, through a certain algorithm to achieve path redundancy, while the loop network is trimmed into a loopless tree network, so as to avoid the message in the loop network proliferation and infinite loop.
The main application of the spanning tree protocol is to avoid the network loopback in the LAN and solve the "broadcast storm" problem of the ring-to-ring Ethernet network. In a sense, it is a kind of network protection technology that can eliminate the loop connection caused by mistake or accident.

7.2.11.1 STP Global Config

Double click the '**Switch Control Card**' icon on the left side of the main page, open the '**Control Card Management**' window and enter the '**STP Global Set**' window of '**STP Management**' page .



As shown above, in '**STP Global Set**' page, you can view the STP Version, Priority, Time Since Topology Change, Topology Change Times, Designate Root , Root Cost, Root Port, Max Age Time(s), Hello Time(s), Hold Time(s), Forward Delay(s), Bridge Tx Rate(kbps)and STP Enable State. Among them, Priority, Max Age Time(s) ,Hello Time(s) , Forward Delay(s), Bridge Tx Rate(kbps) and STP Enable State can be modified . Specific parameters are introduced as follows:

STP Global Set

- STP Version

  The default setting of system is RSTP.

- Priority

  Bridge priority is used to select the root bridges of the network. The smaller the value, the higher the priority, the greater chance of being elected as the root bridge. You can set a bridge with a priority value of 0, 4096, 8192, 12288,16384, 20480, 24576, 28672, 32768, 36864, 40960, 45056, 49152,53248, 57344 and 61440.

- Time Since Topology Change

  The duration of switching from the previous topology state to the current state .

- Topology Change Times

  The topology changes times of port change or network topology link state.

- Designate Root

We can designate root bridge through bridge priority. If not designating priority, the smaller MAC address will has greater chance to be the root bridge.

- Root Cost

  To calculate the link cost, the port with the lowest root link cost will become the forwarding port in case of forwarding the same network bridge ID . The legal range is 1 ~ 20000000.

- Root Port

  The number of ports that are passed by the path of from non-root bridge to the root bridge.

- Max Age Time

  The lifetime of the BPDU message received from the adjacent bridge of Designated port. The legal range is 6~40, in s.

- Hello Time

  Set the bridge how often to send a BPDU message. The setting range time is 1~2, in s.

- Hold Time

  When the network bridge changes in topology, maintaining time of monitoring and learning state before sending packets.

- Forward Delay

  Used for compatibility of STP network bridge, for port of working in the STP mode, forwarding delay timer designated the port before the transition to the learning state the time of in discarding state , and before the learning state transition to the forwarding state in the time of learning state. The legal range is 4~30, in s.

- Bridge Rx Rate

  Set the number of maximum sending BPDU messages in 1 second. The setting range of 1~10, in frame/s.

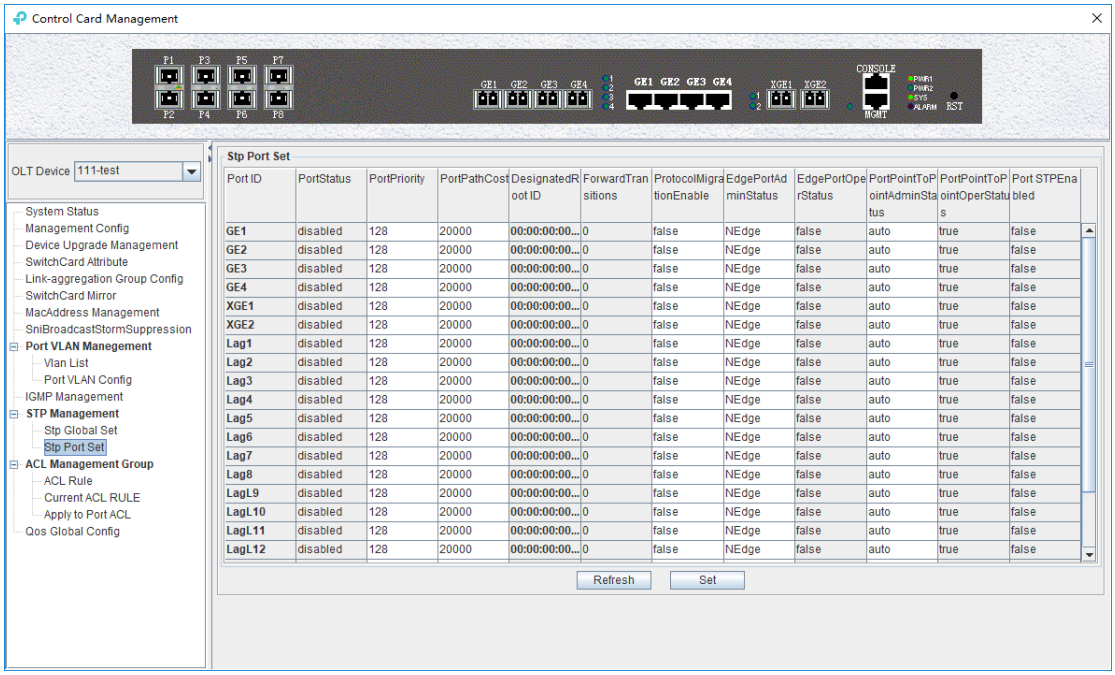
- STP Enable State Configuration

Open or close the RSTP function by setting the **'RSTP State'** to **'Enable'** or **'Disable'**.

Note: When we set Max Age Time, Hello Time, Forward Delay, first input setting value, then click **'Set'** button, to finish config.

7.2.11.2 STP Port Set

Double click the '**Switch Control Card**' icon on the left side of the main page, open the '**Control Card Management**' window and enter the '**STP Port Set**' window of '**STP Management**' page .



Port ID	PortStatus	PortPriority	PortPathCost	DesignatedRoot ID	ForwardTransitions	ProtocolMigrationEnable	EdgePortAdminStatus	EdgePortOperStatus	PortPointToPointAdminStatus	PortPointToPointOperStatus	Port STPEnabled
GE1	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
GE2	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
GE3	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
GE4	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
XGE1	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
XGE2	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
Lag1	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
Lag2	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
Lag3	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
Lag4	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
Lag5	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
Lag6	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
Lag7	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
Lag8	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
LagL9	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
LagL10	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
LagL11	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false
LagL12	disabled	128	20000	00:00:00:00:...	0	false	NEdge	false	auto	true	false

As shown above, in '**STP Port Set**' page, we can view Device ID, Port Status, Port Priority, Port Path Cost, Designated Root ID, Forward Transitions, Protocol Migration Enable, Edge Port Admin Status, Edge Port Oper Status, Port Point to Point Admin Status, Port Point to Port Oper Status and Port STP Enabled Status. In addition, we can modify Port Priority, Port Path Cost, Protocol Migration Enable, Edge Port Admin Status and Port Point to Point Admin Status. Specific parameters are introduced as follows:

- Port Status

  STP Port Status has five types, including disable, learning, listening, forwarding and blocking.

  Disable: In the invalid status, to be a valid port, first switch to the blocking port.

  Learning: In the learning state, the port is adding addresses to its forwarding database, but does not forward packets.

  Listening: In the listening state, the port is waiting to receive BPDU packet, and BPDU may tell the port to return to the blocking state.

  Forwarding: In the forwarding state, the port is forwarding the packet.

  Blocking: In the blocking state, the port is blocked and can not forward or receive packets.

- Port Priority

  When the link cost and the sending network bridge ID is the same, the lowest priority port will be the forward port. The parameter value can be set to 0 ~ 440, and the step length is 16.

- Designated Root ID

  The BID in the BPDU message consists of two parts, the bridge priority and the bridge MAC. The bridge ID is only. Switches selects the smallest BID switch as the root bridge in the network.

- Forward Transitions

  The port consists of five status. Status transitions need to go through status transition time.

- Protocol Migration Enable

  This means that the device supports RTSP, and if the port is enabled, the port will automatically migrate to STP compatible mode when the port is connected to the device running the STP

protocol. '**True**' means opening this function, and '**False**' means closing this function.

- Edge Port Admin Status
  We can use this option to set whether it is an edge port. '**Edge**' is an edge port, and **'NEdge'** is a non - edge port.
- Edge Port Oper Status
  This option indicates whether the current port is in the edge port state. **'False'** indicates that the port is not in an edge state, and **'Ture'** indicates the status of the port on the edge. The edge port does not need to go through the **'Discarding-learning-forwarding'** step and directly switch to the forwarding status.
- Port Point to Point Admin Status
  You can use this option to set whether the port is a point-to-point port, including '**Auto**', '**Ture**' and **'False'** three options. '**Ture**' is to set this port to point-to-point port, and '**False**' is to set this port to non point-to-point port. **'Auto'** is dependent on the STP protocol itself. Point-to-point ports allow fast switching to forwarding status, and non point-to-point ports need to go through discarding-learning-forwarding step to switch to forwarding status.
- Port Point to Port Oper Status
  This option is to specify the port actually point-to- point port state.

Prompt: Some of the parameter explanations are described in the previous section, which are not repeated here. we can go to the previous section to inquire.

7.2.12 ACL Management

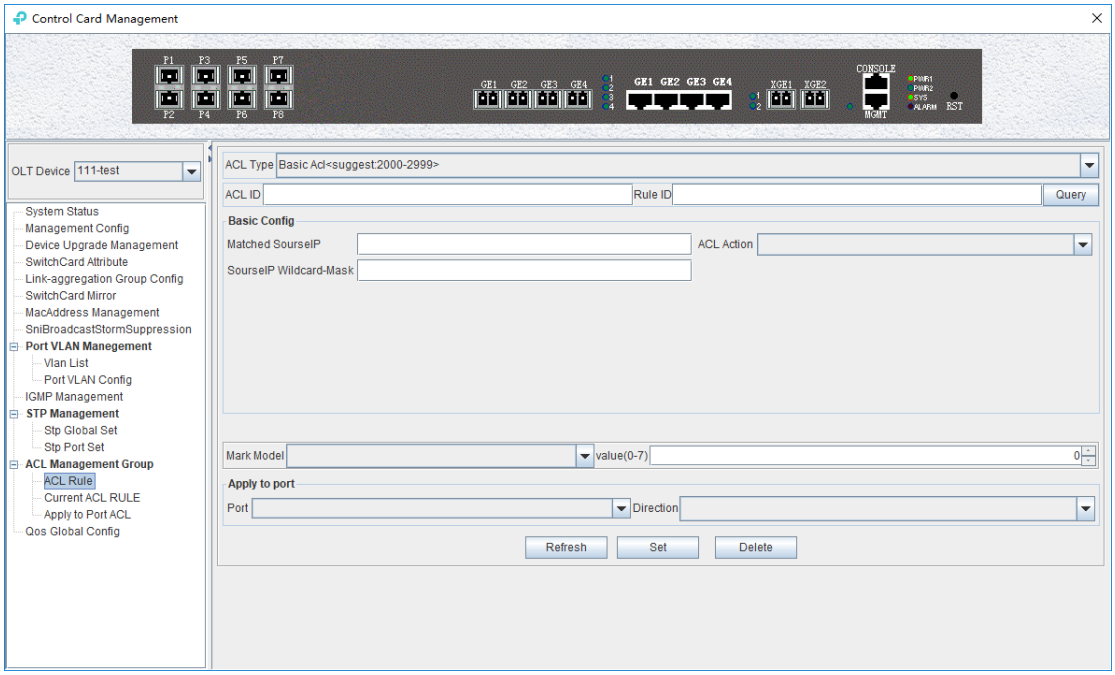
ACL is **'Access Control List'** . Through configuring a serial of matching rules to filter specific data packets, thus identifying objects that needs to be filtered. After identifying specific objects, according to preset policy permitting or denying the corresponding data packets pass. The process of ACL filter message flow prepares for Qos.

7.2.12.1 Configuration ACL Rule

ACL has three types, including basic ACL, its Id range from 2000 to 2999,only matching source IP address; advanced ACL, its Id range from 3000 to 4999, being able to matching source IP address, destination IP address, source port, destination port, DSCP and IP massage type; link ACL, its Id range from 5000 to 5999, being able to match source mac, destination mac, VLAN Id and Ethernet type.

7.2.12.1.1 Basic ACL Configuration

Double click the '**Switch Control Card**' icon on the left side of the main interface, open the '**Control Card Management**' window and enter the '**ACL Rule**' window of **'ACL Management'** page . Click the pull-down menu of ACL Type, and choose basic acl(2000-2999) option.



As above **'Basic ACL'** page, you can set the following configuration parameters:

ACL ID

ACL ID，the set of ACL entries, this can inquire one of ACL according to inputting ACL Id and rule id.

Rule ID

ACL Rule id, the range of value is 1-16.

Basic config

- Matched source IP

  Configure matched source IP address of ACL Rule, in this format: A.B.C.D.

- ACL Action

  ACL Action configuration, including **'permit', 'deny'** and **'mark'** three options, indicates specific parameters of permitting or denying matching.

- Source IP Wildcard-Mask

  Configure matched source IP Wildcard-Mask address of ACL Rule. IP Wildcard-Mask address is reverse address of IP sub-net mask. Example for: IP is 192.168.5.123, and its IP Wild-Mask is 0.0.0.225.

Mark Model

This is Mark Model, only applied in when ACL Action is **'mark'** , including **'null'** , **'802.1p'** , **'VLAN id'** ,' **TOS PRECEDENCE '** and **' DSCP '** .

- 802.1p

  For the traffic priority VLAN level 2 QoS/CoS protocol, the protocol header includes a 3-bit priority field with a value range of 0-7, which supports grouping packets into various traffic types.

- VLAN id

  VLAN identifier，with a value range of 0-4094.

- TOS PRECEDENCE

  TOS is a field of IP Message, with indicating type of service, a total of 8bit. PRECEDENCE

is IP priority, and it's at 0, 1, 2 three fields with a value range of 0-7.

- DSCP

  DSCP is 'Differentiated Services Code Point', Which provides the standard of differentiated service for Qos, occupied before 6 bit of TOS, with a value range of 0-63.

Apply to port

- Port

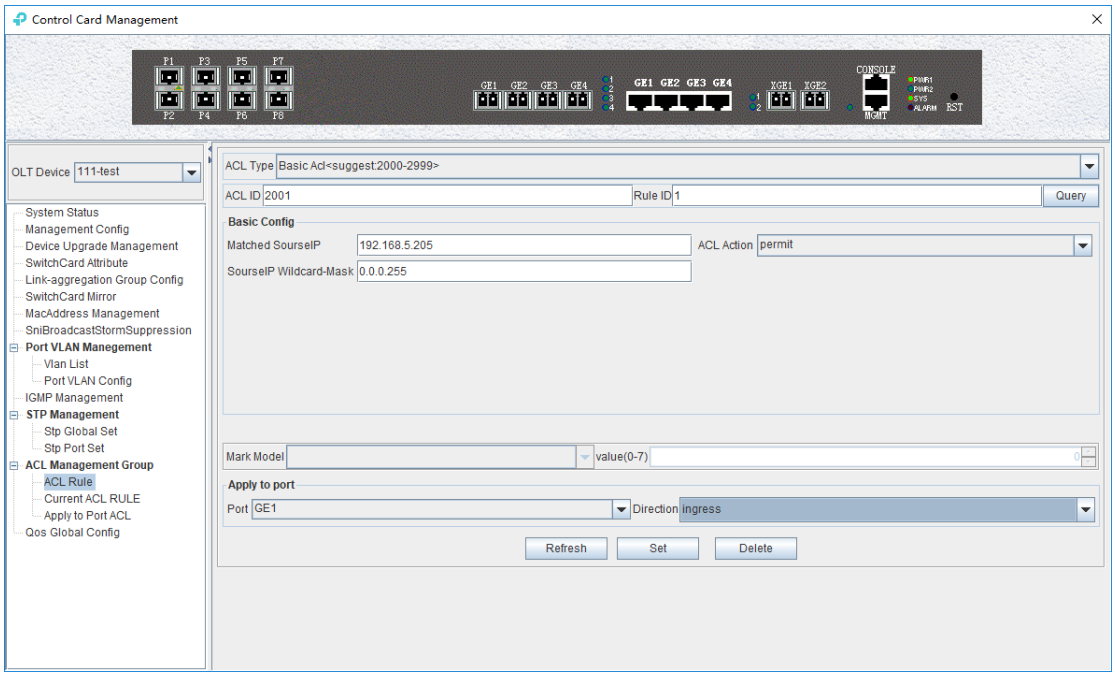
  ACL Rule applies to ports, including 4 ge port,2xge port and 16 pon port.

- Direction

  ACL Rule applies to direction of port, including **' ingress'** and **' egress'** two options.

【Example of Basic ACL configuration】

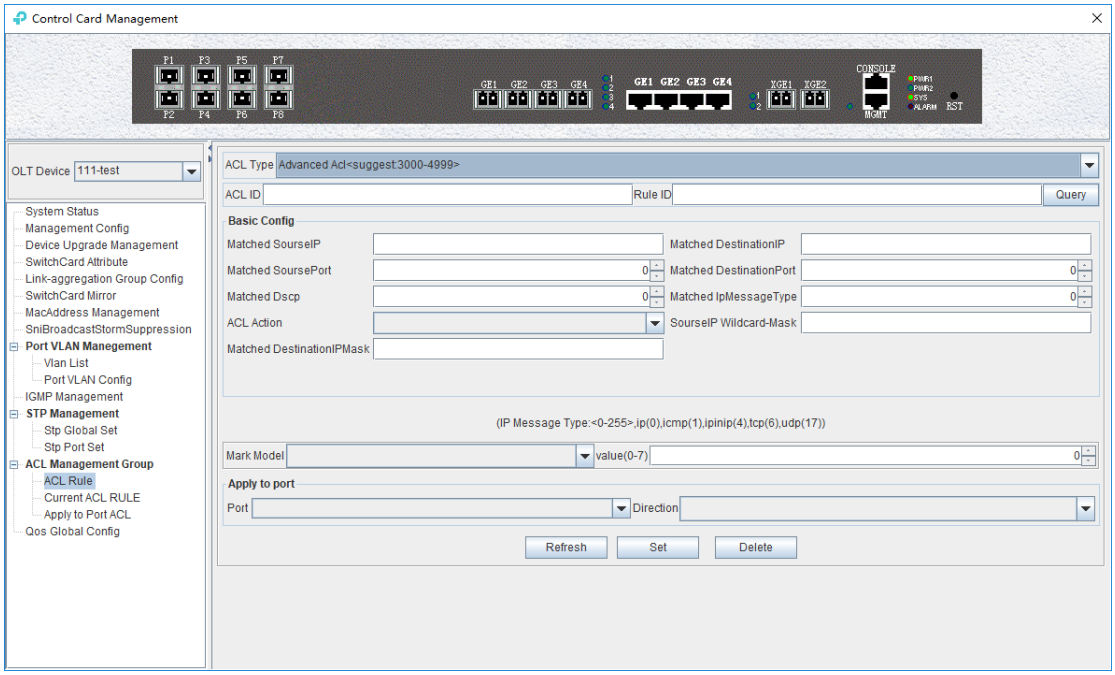
Example: Configure a basic ACL, and ID is 2001. Source IP is 192.168.5.205, and Rule Action is **'permit'** ,as show below:



After completing those configurations, click the **'Set'** button at the bottom of page to make config effect,and creating a basic ACL Rule successfully. Deleting a ACL rule through the **'Delete'** button. Updating a ACL Rule through the **'Refresh'** button.

7.2.12.1.2 Advanced ACL Configuration

Double click the **'Switch Control Card'** icon on the left side of the main interface, open the **'Control Card Management'** window and enter the **'ACL Rule'** window of **'ACL Management'** page . Click the pull-down menu of ACL Type, and choose advanced acl(3000-4999) option.



As above **'Advanced ACL Rule'** page, compared with **'Basic ACL Rule'** page, we can also set the following configuration parameters.

Basic configuration

- Matched destination IP

  Configure matched destination IP address of ACL Rule, in this format: A.B.C.D.
- Matched source port

  Configure matched source port Id of ACL Rule to match IP Protocol to TCP/UDP, ranging from 0 to 65535.
- Matched destination port

  Configure matched destination port Id of ACL Rule to match IP Protocol to TCP/UDP, ranging from 0 to 65535.
- Matched DSCP

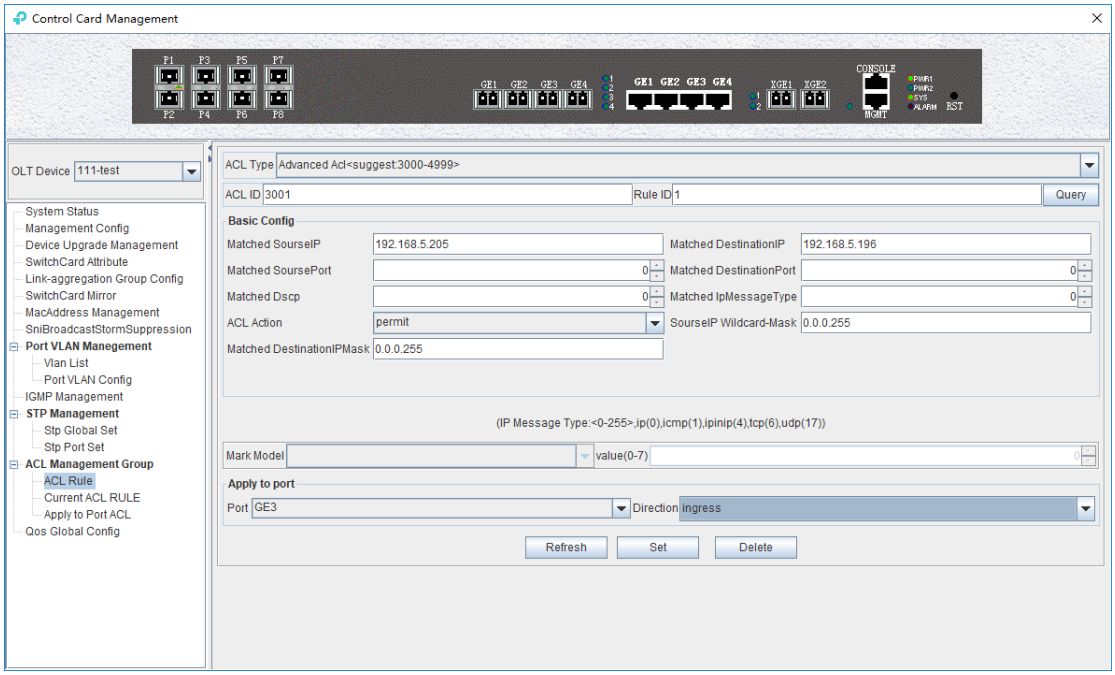
  Configure matched DSCP of ACL Rule. DSCP is 'Differentiated Services Code Point' .In the TOS identification byte of each data packet IP header, taking advantage of used 6 bit and unused 2 bit to prioritize by coding value. DSCP user 6 bit, the value range of 0-63.
- Matched IP Message Type

  Configure matched IP Message Type of ACL Rule, including IP, ICMP, IPINIP, UDP, TCP and so on, the value range of 0-255.
- Matched Destination IP Wildcard-Mask

  Configure matched destination IP Wildcard-Mask address of ACL Rule. IP Wildcard-Mask address is reverse address of IP sub-net mask. Example for: IP is 192.168.5.205, and its IP Wild-Mask is 0.0.0.255.

【Example of Advanced ACL configuration】

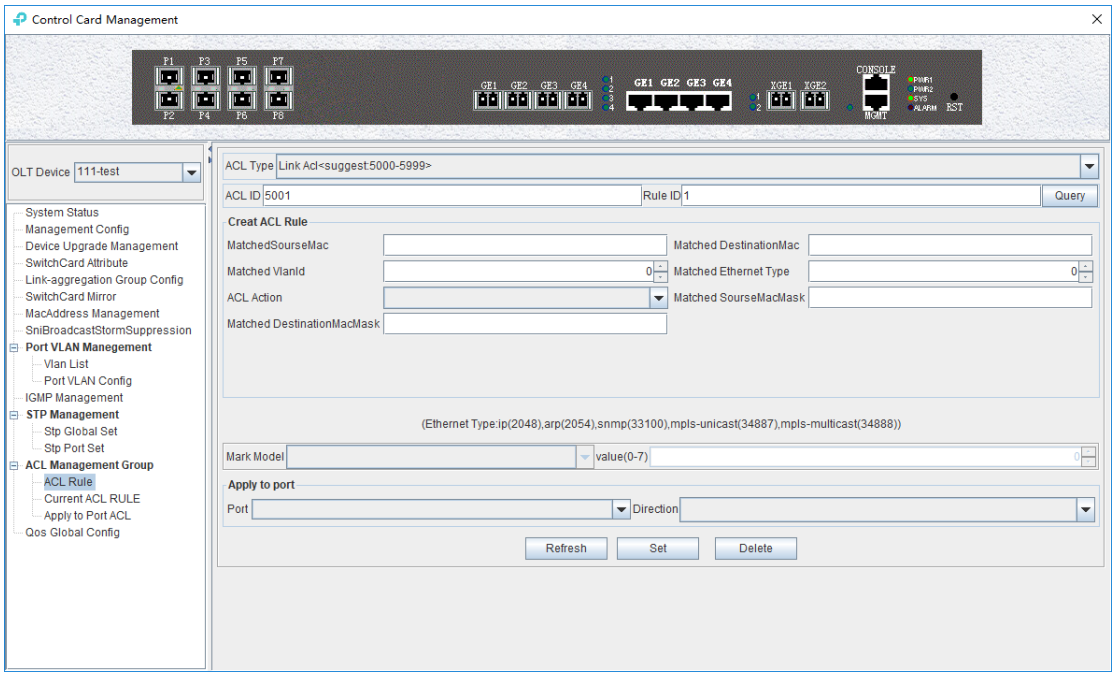
Example: Configure a advanced ACL, and ID is 3001. Rule Action is **'Permit'** ,as show below:



After completing these configurations, click the **'Set'** button at the bottom of page to takes the configuation effect, and creating a advanced ACL Rule successfully. Deleting a ACL rule through the **'Delete'** button. Updating a ACL Rule through the **'Refresh'** button.

7.2.12.1.3 Link ACL Configuration

Double click the **'Switch Control Card'** icon on the left side of the main interface, open the **'Control Card Management'** window and enter the **'ACL Rule'** window of **'ACL Management'** page . Click the pull-down menu of ACL Type, and choose link acl(5000-5999) option.



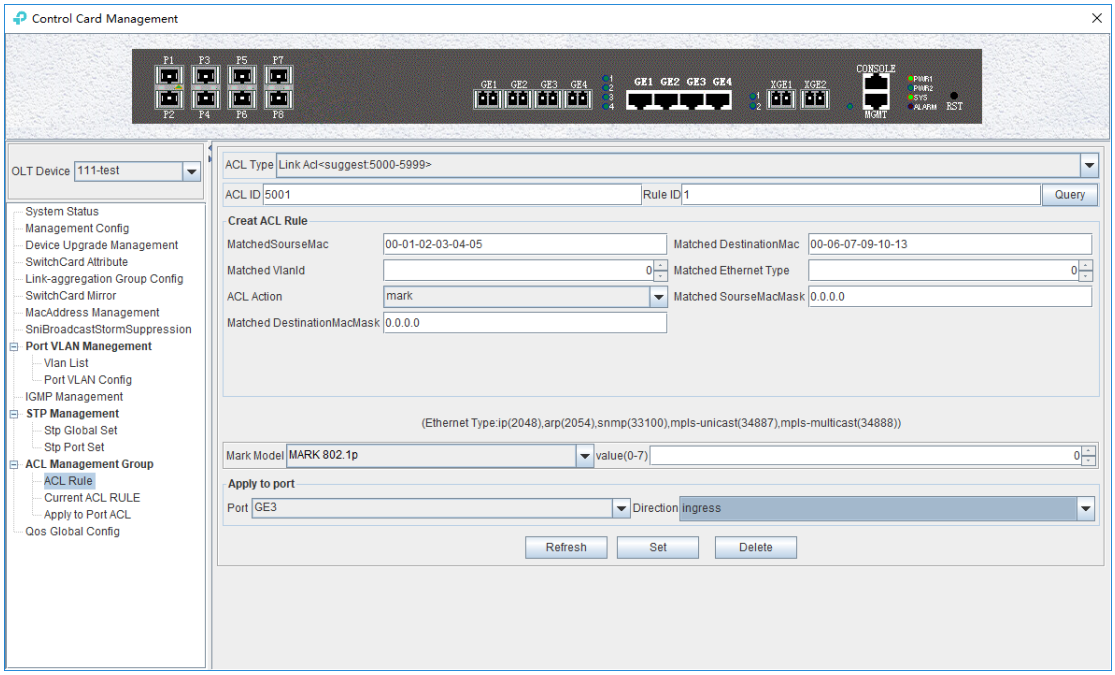
As above **'Link ACL Rule'** page, compared with **'Basic and Advanced ACL Rule'** page, we also can set the following configuration parameters.

Basic configuration

- Matched source MAC
  Configure matched source MAC address of ACL Rule, only applied in link ACL Rule, in the format: AA-BB-CC-DD-EE-FF
- Matched destination MAC
  Configure matched destination MAC address of ACL Rule, only applied in link ACL Rule, in the format: AA-BB-CC-DD-EE-FF.
- Match VLAN Id
  Configure matched VLAN of ACL Rule, only applied in link ACL Rule. The value range of Id is 1-4094.
- Match Ethernet Type
  Configure matched Ethernet data frame type of ACL Rule, only applied in link ACL Rule, including IP(2048), ARP(2054), SNMP(33100), mpls-unicast(34887), mpls-multicast(34888) and so on.
- Matched source MAC wildcard mask
  Configure matched source MAC wildcard mask of ACL Rule, only applied in link ACL Rule. MAC wildcard mask of a single host is 00-00-00-00-00-00. MAC wildcard mask of any host is FF-FF-FF-FF-FF-FF.
- Matched destination MAC wildcard mask
  Configure matched destination MAC wildcard mask of ACL Rule, only applied in link ACL Rule. MAC wildcard mask of a single host is 00-00-00-00-00-00. MAC wildcard mask of any host is FF-FF-FF-FF-FF-FF.

【Example of LINK ACL configuration】

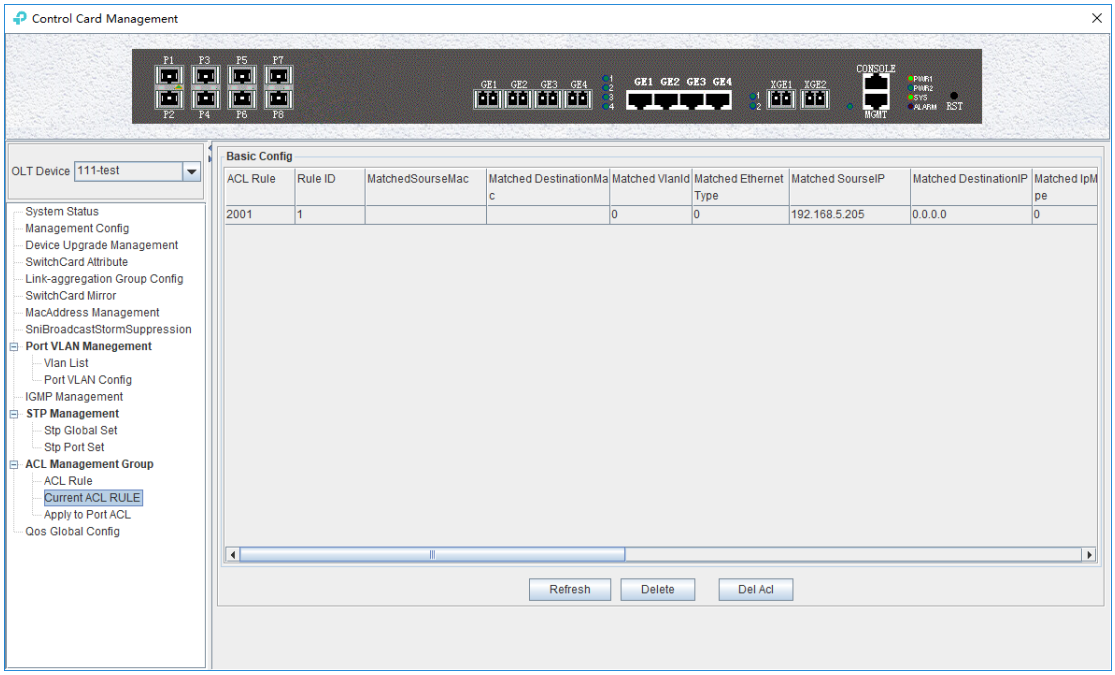
Example： Configure a link ACL, and ID is 5001. Add outer VLAN 500 to MAC address. As shown below:



After completing those configurations, click the '**Set**' button at the bottom of page to make the config effect, and creating a link ACL Rule successfully. Deleting a ACL rule through the **'Delete'** button. Updating a ACL Rule through the **'Refresh'** button.

7.2.12.2 View OLT ACL Rule

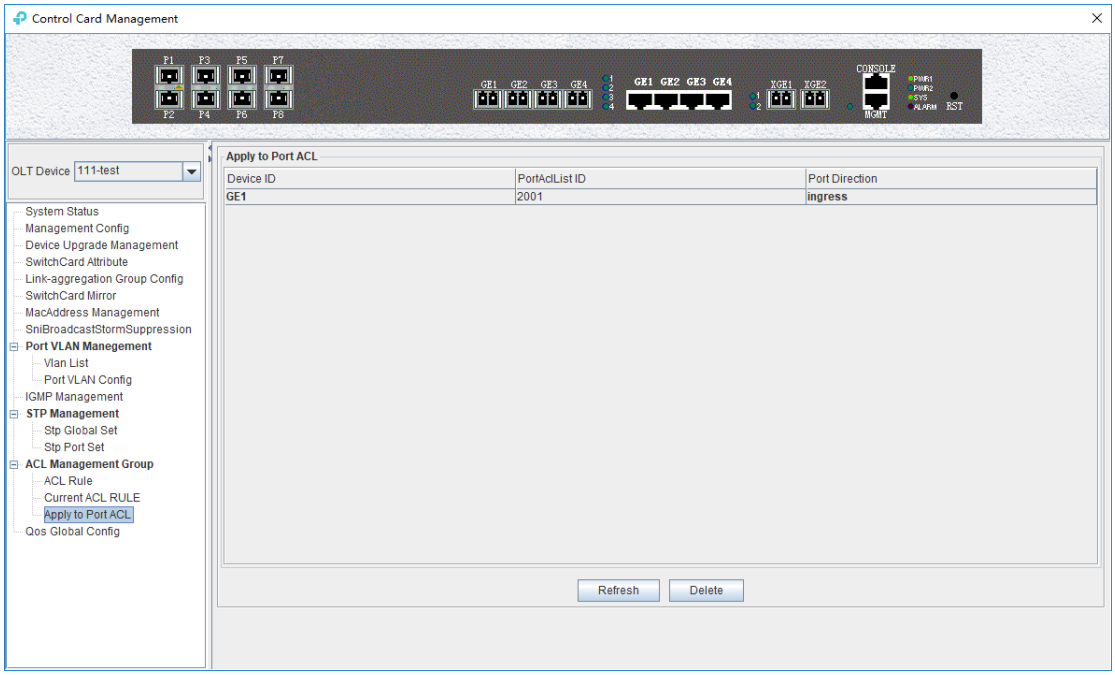
Double click the '**Switch Control Card**' icon on the left side of the main interface, open the '**Control Card Management**' window and enter the ' **Current ACL Rule**' window of **'ACL Management'** page .



As shown in the figure above, you can view the previously created ACL rule entries on the '**Basic Configuration**' page, where the contents are set on this page. On this page can also delete a ACL, first select an ACL rules, and then click **'Delete'** or **'Delete ACL'** button to delete the ACL rules which not applied directly to the port , if you want to delete the ACL which has been applied to the port, can only remove the binding with the port, and then delete. Update the configuration rules information by the '**Refresh**' button.

7.2.12.3 View OLT Port Applied ACL Rule

Double click the '**Switch Control Card**' on the left side of the main page to open the '**Control Card Management**' window and enter the '**Apply to Port ACL**' window on the '**ACL Management Group**' page.

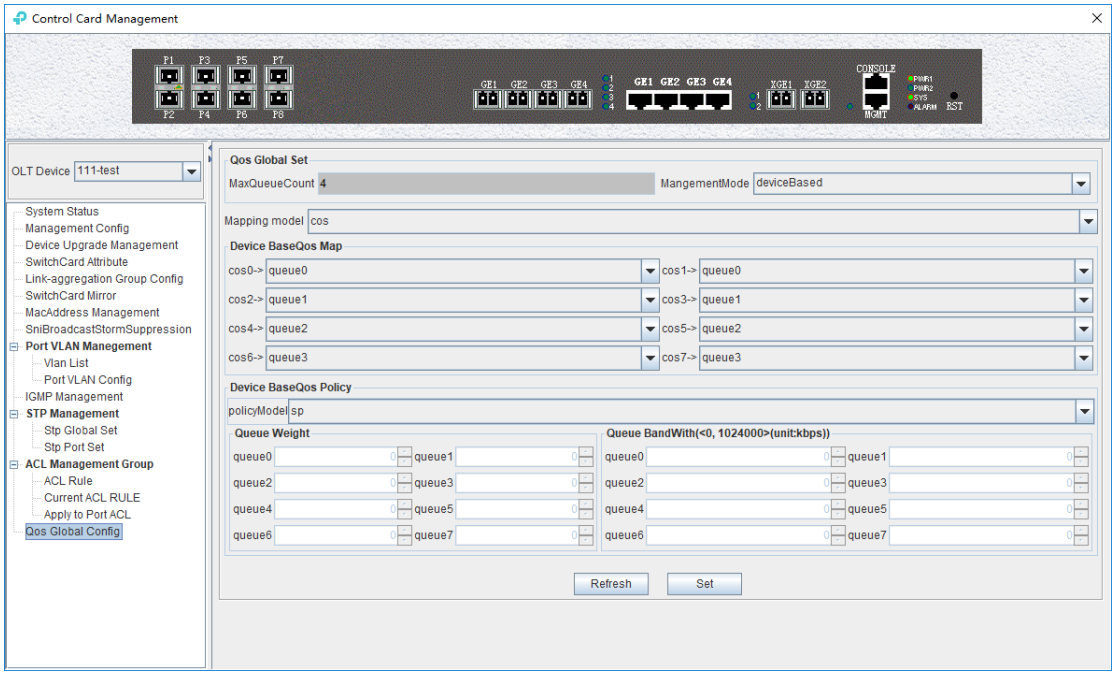


As we can see from the figure above, we can see the ACL that we created is applying to port, including the port number, ACL ID, and the direction of the application port . Through the **‘delete’** button, we can delete a ACL rule and update the rule information of the configuration through the **‘Refresh’** button.

7.2.13 OLT QoS Configuration

QoS Refers to a network can use a variety of basic technology, to provide better services for the specified network communication, is a kind of network security mechanism, is used to solve the problem of network delay and blocking.

Double click the **'Switch Control Card'** icon on the left side of the main interface, open the **'Control Card Management'** window and enter the **'Qos Global Information'** management page configuration.



'Qos Global Information' management page mainly can configure 'Device BaseQos Map' , 'Device BaseQos Policy' , 'Queue Wieght' and 'Queue Bandwidth'. The parameters are described as follows：

Qos system parameter

- Max queue count

  System sets max queue count to 4. it's range from queue 0 to queue 3.

- Qos management mode

  System set Qos management mode to deviceBased.

Device BaseQos Map

Qos mapping table is corresponding relationship between priority and port queue. This can configure queue corresponding to the priority. The fault configuration is showing in the following table:

priority	Cos 0	Cos 1	Cos 2	Cos 3	Cos 4	Cos 5	Cos 6	Cos 7
queue	Queue 0	Queue 0	Queue 1	Queue 1	Queue 2	Queue 2	Queue 3	Queue 3

Device BaseQos Policy

Queue schedule has three modes, including sp- strict priority, WRR- Weighted Round Robin and SP+WRR. The details are follows.

- SP

Applying this mode, the system is scheduled to be dispatched strictly according to the priority of queue. Only when the high-priority queue is empty, the message of the low priority queue can be dispatched.

- WRR

  Applying this mode, it needs to configure a weight for each queue, according to the weight between the queue scheduling in turn, ensure each queue can have a certain amount of services. When the priority is the same, the weight is not the same, the larger the weight of the queue, the longer the scheduling time.

- SP+WRR

  This mode combines the advantages of SP and WRR, and adopts SP mode when dealing with some critical business, and adopts WRR mode when dealing with some business with low real time requirement.

Queue weight

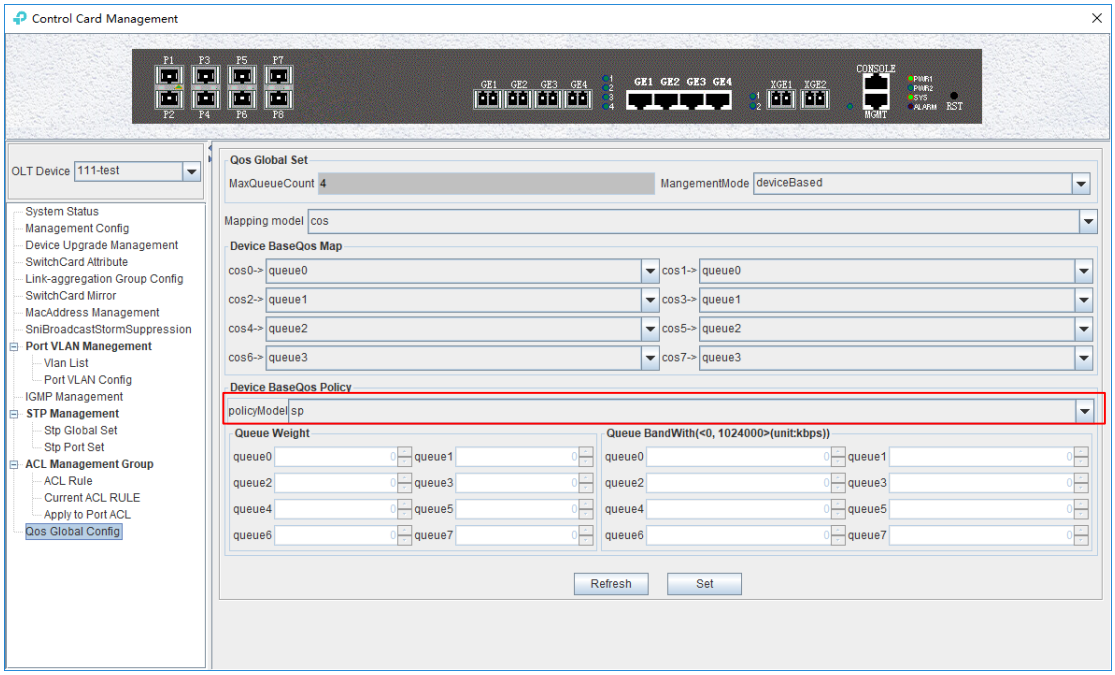
Applying in the WRR and SP+WRR two modes, the sum of four queue weight is required to be 100. And in the WRR mode, the value of weight is not be set 0.

Queue bandwidth

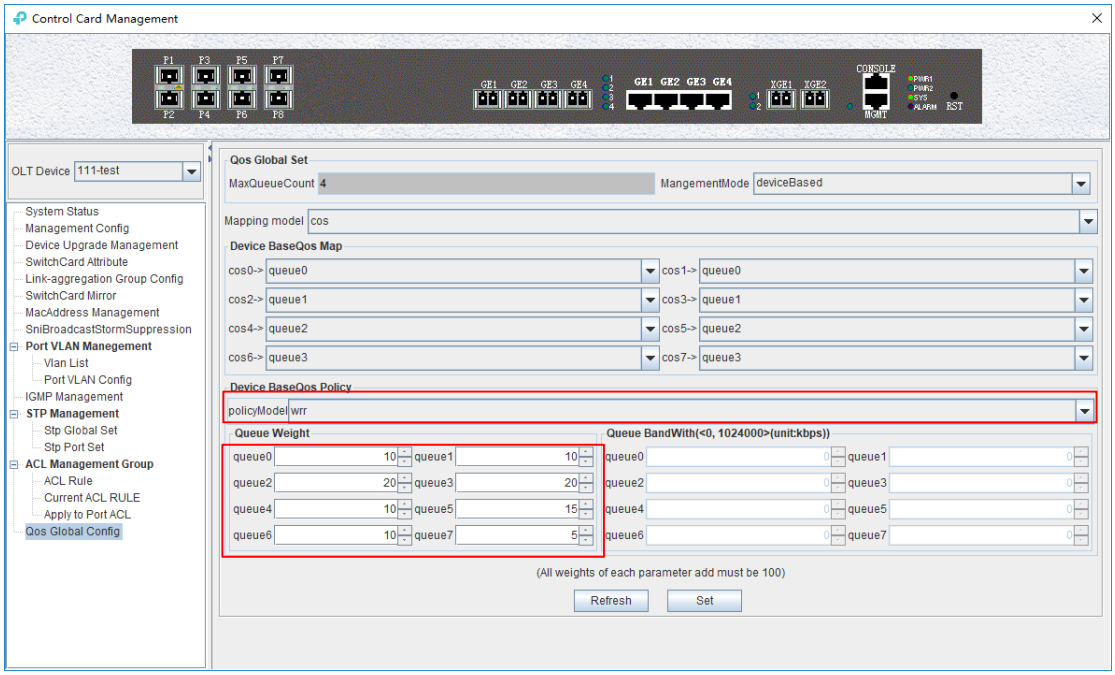
Set the size of bandwidth occupied by each queue, its range from 0kbps to 1024000kbps.

【Example of QoS configuration】

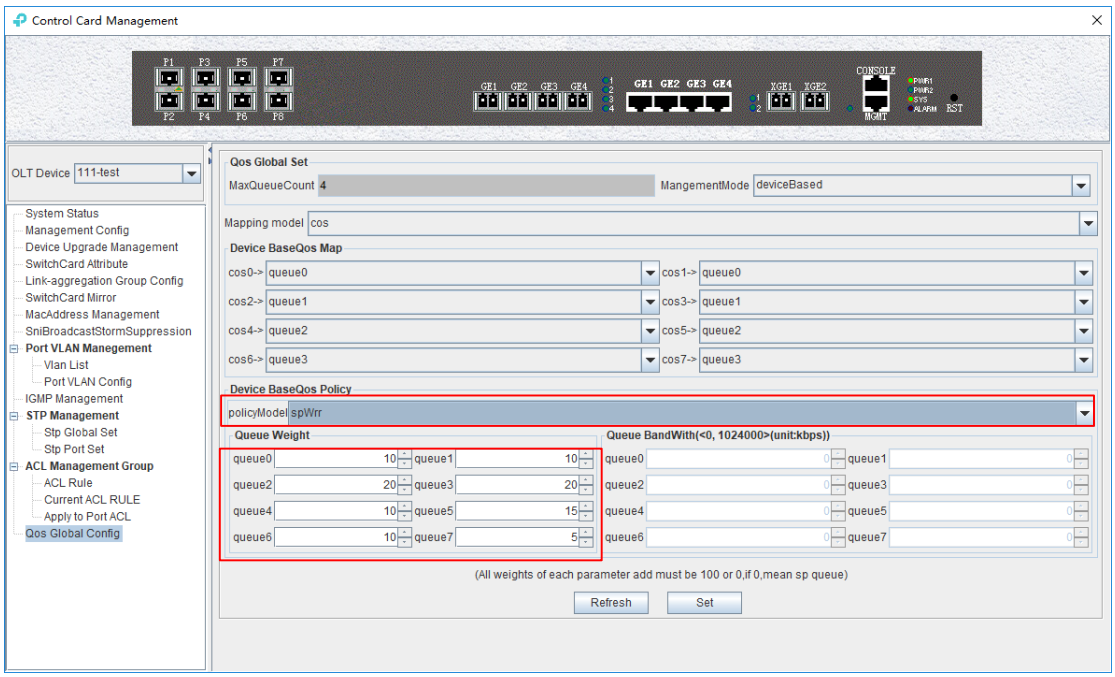
Example： Set Qos schedule mode to SP, the specific configuration is shown below:



Example 2： Set Qos schedule mode to WRR, the specific configuration is shown below:



Example 3： Set Qos schedule mode to SP+WRR, the specific configuration is shown below:

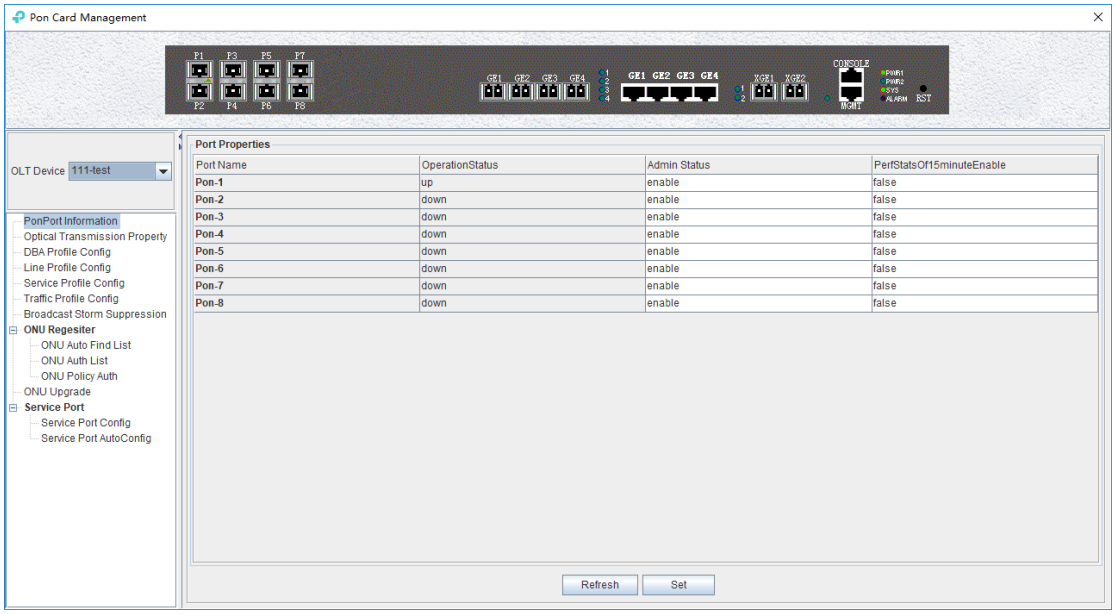


Note: In the WRR mode, the value of weight is not be set 0. If the value of weight has 0, Qos schedule mode is SP+WRR.

7.3 OLT PON Card Management

This section introduces OLT PON Card Management function.

Double click the **‘PON card’** icon on the left side of the main page and enter the **'PON Card Management'** window. The typical page is shown below:



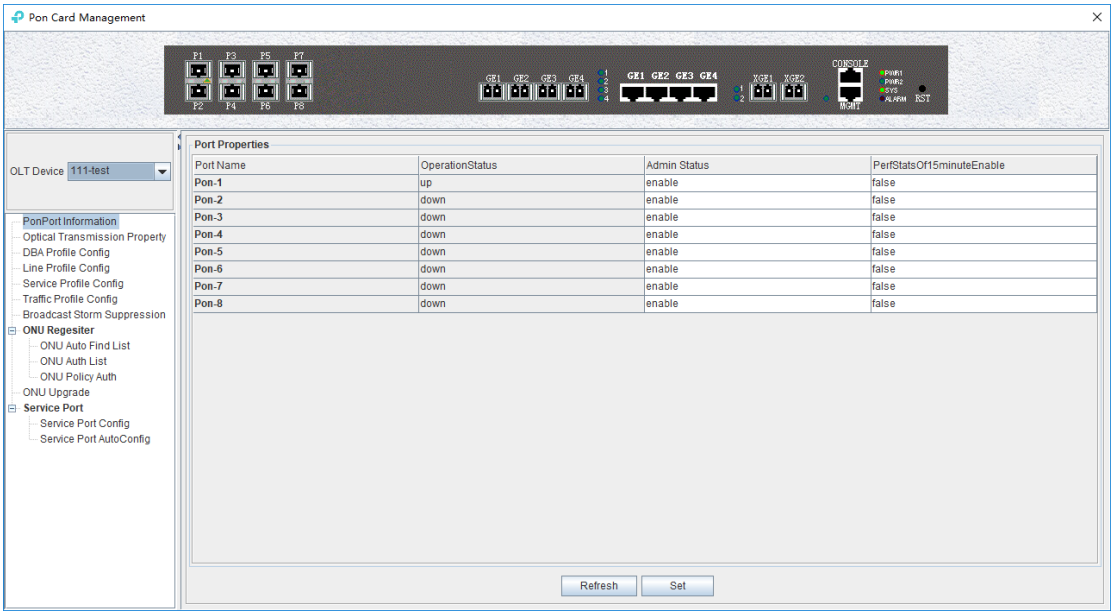
Through this window the user can do the following management:

- ✓ Some basic management of PON port of OLT;
- ✓ PON port storm suppression configuration;
- ✓ OLT profile configure(DBA profile, line profile, service profile, traffic profile);
- ✓ ONU upgrade
- ✓ Authenticate the registration of the ONU;
- ✓ View the optical power information of the PON port;

The following sections describe the functional modules involved in the PON module management window.

7.3.1 OLT PON Port Basic Configuration

Double click the **‘PON Module’** icon on the left side of the main page to enter the **'PON port information'** page of the **'PON Card Management'** window:



In the '**PON port information**' property page,we can configure and view the PON port property parameters of the OLT. The parameters are described below:

- The PON port name

Displays the PON port name on the OLT. This parameter is an unchangeable state.

- Port operation status

Display the current PON port operation state, the status displays as **'UP'** when connects to an ONU or the ONU has registered under the PON port; the state displays as **'Down'** when not connected or the ONU unregistered under the PON port.

- Port management status

We can configure the PON port of the OLT to be closed or on. Configure **'Enable'** to turn on the PON port; Configure **'Disable'** to turn off the PON port; The default status is **'Enable'** .

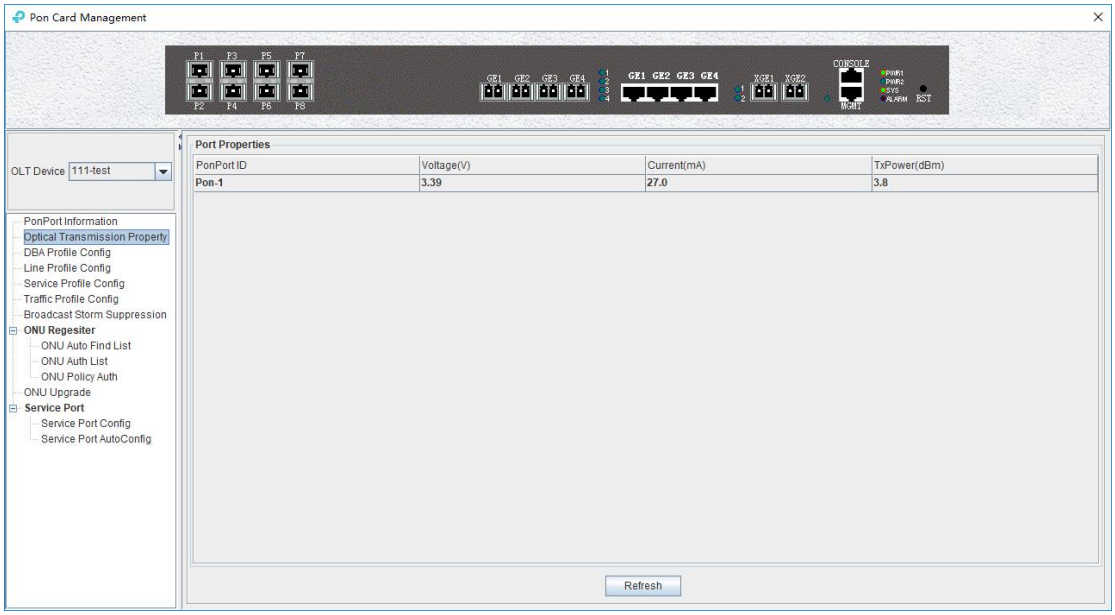
- 15 minutes performance statistics enabled

Displays the management status of the 15 minute performance statistics enabled, administrators can configure this option for two states, namely '**True**' and **'False**'.

When set to '**True**', the 15 minute performance statistics feature for the PON port is enabled; when configured as '**False**', the 15 minute performance statistics for the PON port is disabled.

7.3.2 View OLT PON Port Optical Module Information

Double click the **'PON Module'** icon on the left side of the main page to enter the '**PON port optical module information**' page of the '**PON Card Management**' window:



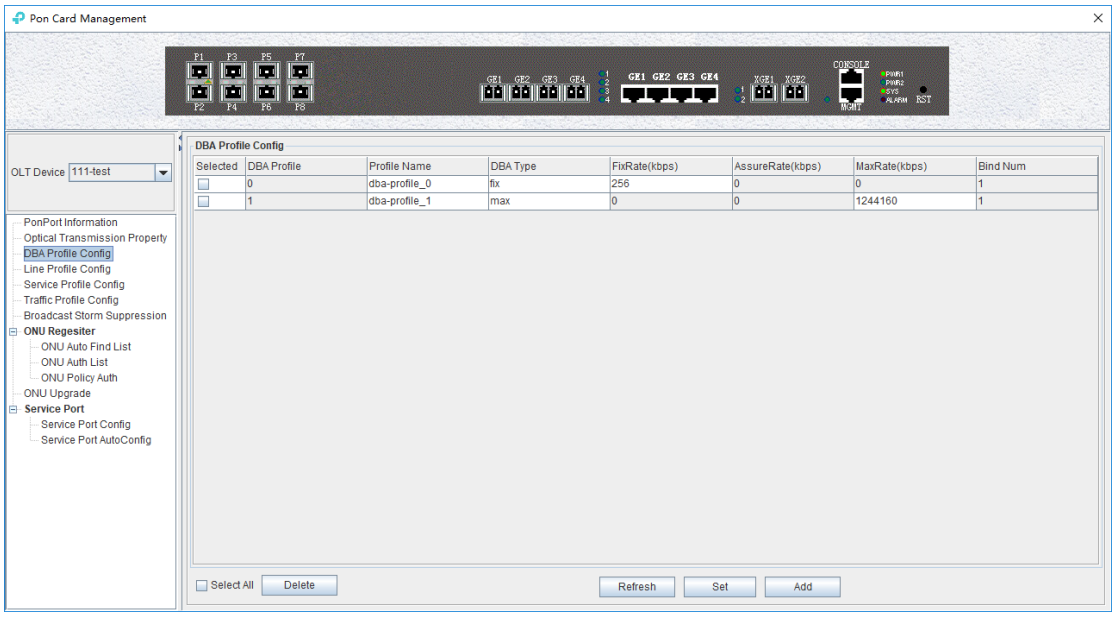
Enter this page to view and refresh the voltage, current and transmit power of each PON port module.

7.3.3 Config OLT DBA Profile

OLT profile mainly is used to limit upstream bandwidth of ONU's each service. This section mainly describes how to view, create, modify and delete DBA profile.

7.3.3.1 View DBA Profile

Double click the **'PON Module'** icon on the left side of the main page to enter the **'DBA Profile Config'** page of the **'PON card management'** window, we can view default DBA profile and created DBA profile:

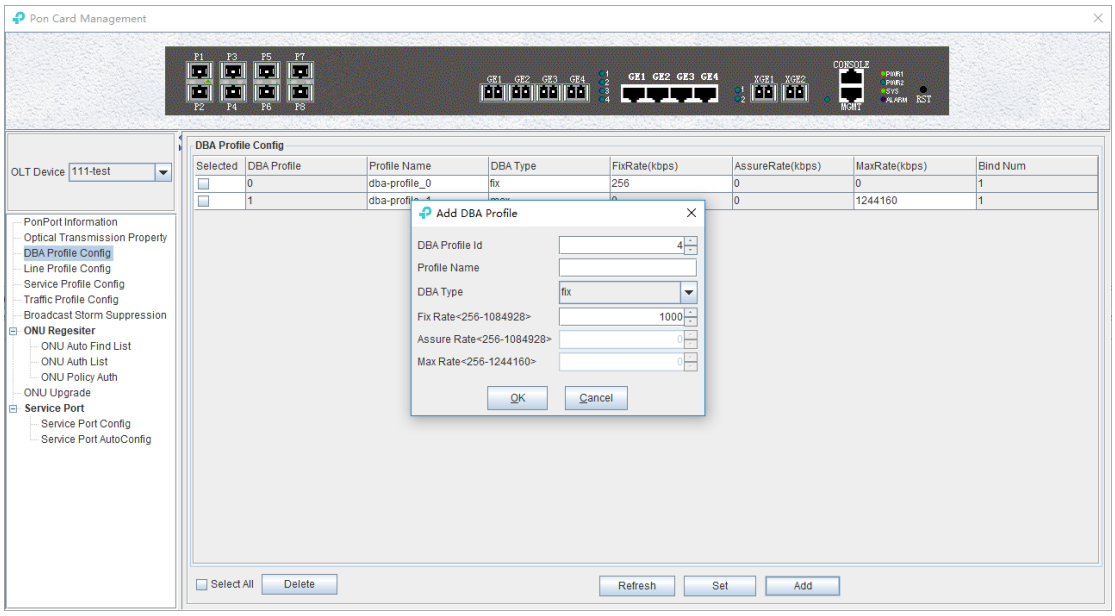


The parameters are described below:

- DBA profile
  Display configured DBA Profile ID, and DBA profile ID is the only.
- Profile name
  Display configured DBA Profile name, and if users don not understand the meaning from DBA Profile ID, users can identify the DBA Profile by DBA profile name.
- DBA type
  Display configured DBA profile type, including five types: 'fix', 'assure' , 'assure+max' , 'max' , 'fix+assure+max' .
- FixRate
  Configure and display uplink DBA fix bandwidth. The unit is kbps.
- AssureRate
  Configure and display uplink DBA assure bandwidth. The unit is kbps.
- MaxRate
  Configure and display uplink DBA max bandwidth. The unit is kbps.
- Bind Num
  Display the DBA Profile numbers of being bound.

7.3.3.2 Create DBA Profile

In the page of **'DBA Profile Config'** , click **'Add'** button to pop up **'Add DBA Profile'** window:

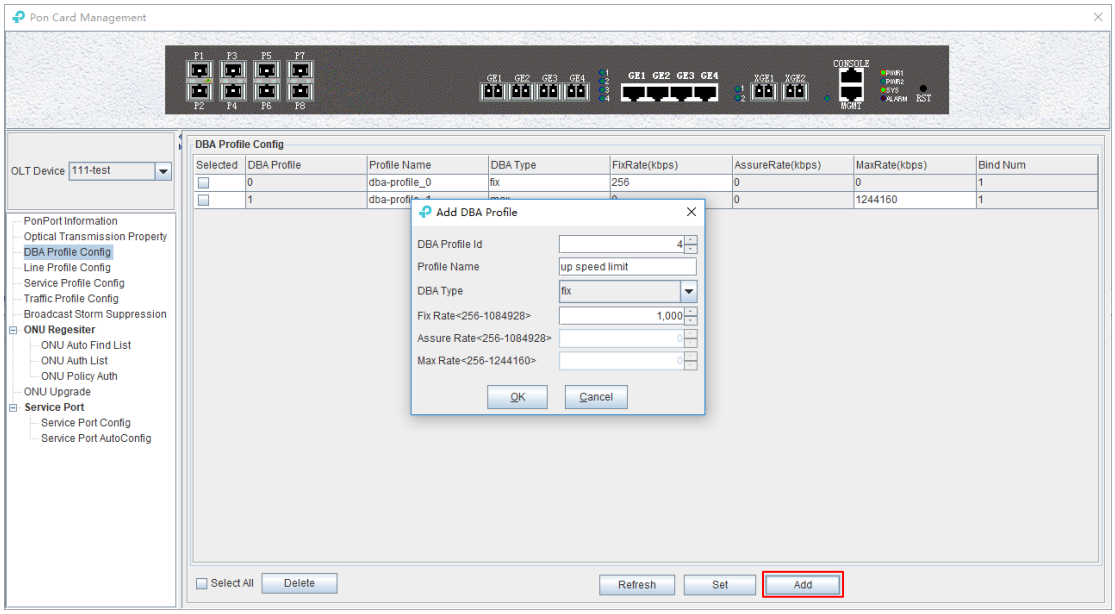


The page can create a uplink DBA profile, specified DBA profile id, DBA profile name, DBA profile type and configure uplink the corresponding bandwidth.

After input dba profile information, click 'OK' to finish the DBA Profile create.

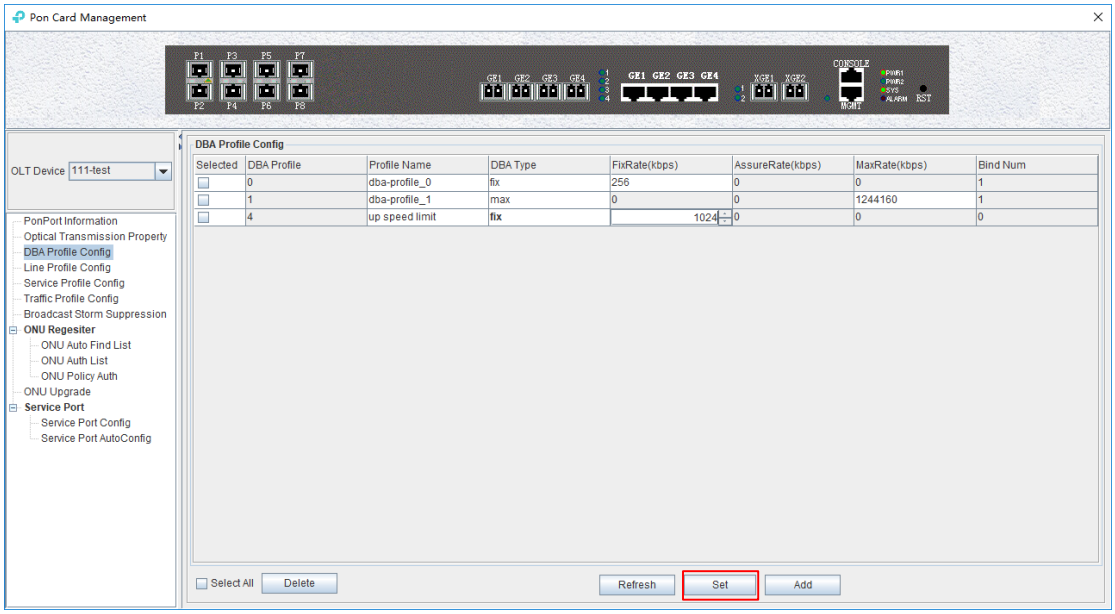
【Example of DBA Profile configuration】

Example: Create a DBA Profile that its id is 4, name is ‘up speed limit’ , and type is 1M fix bandwidth.



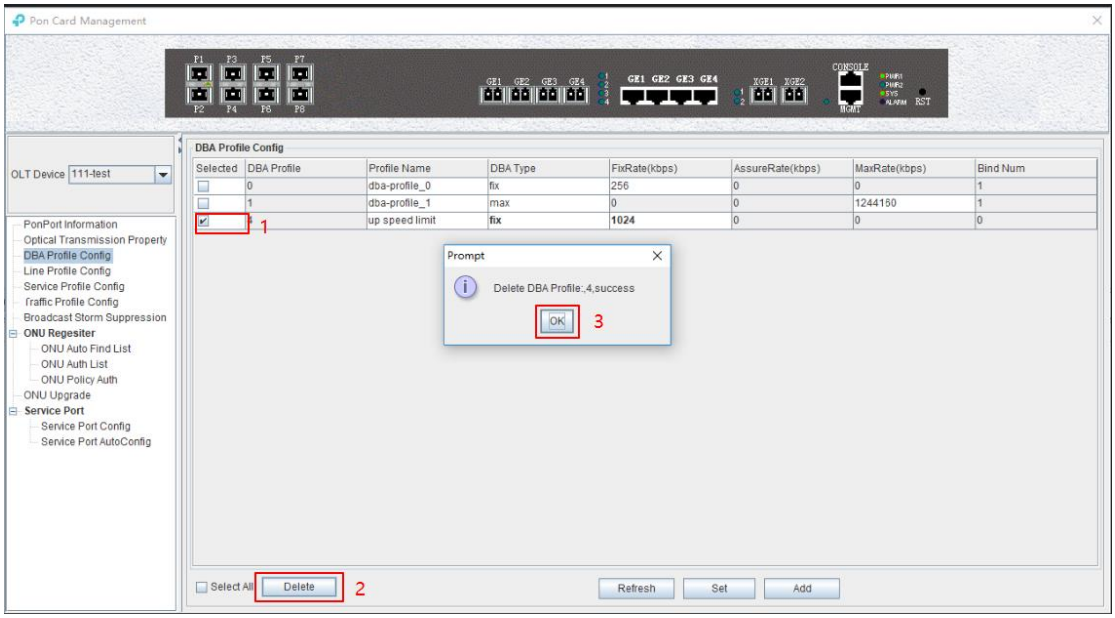
7.3.3.3 Modify DBA Profile

In the page of **‘DBA Profile Config’** , users can modify some configured DBA Profile parameters, click **‘set’** button to complete modification.



7.3.3.4 Delete DBA Profile

In the **'DBA Profile Config'** page, you can delete the configuration of some DBA profile:

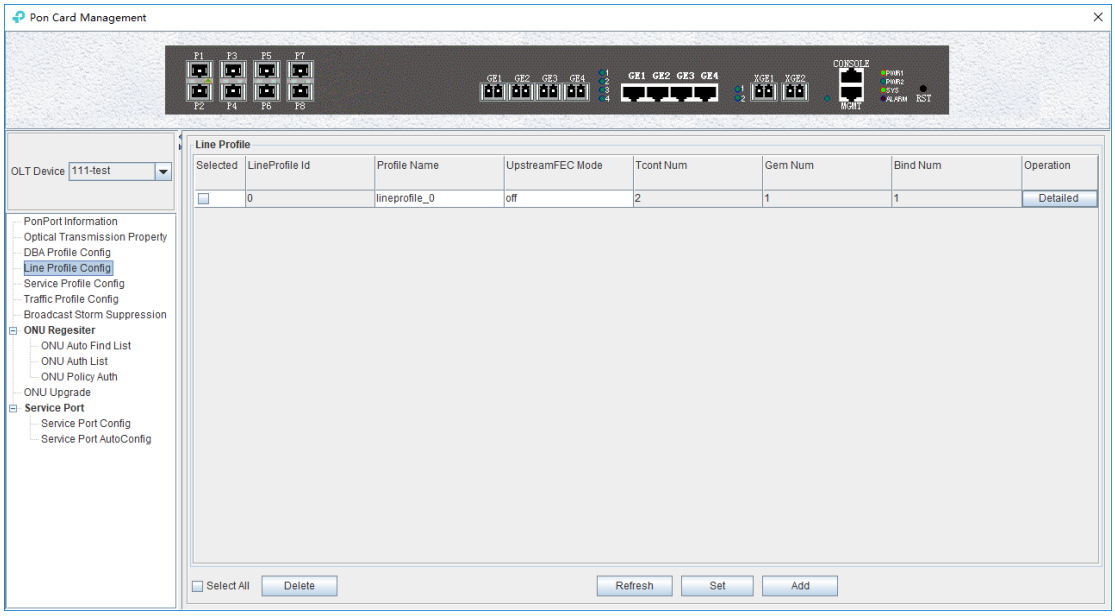


7.3.4 Config OLT Line Profile

The GPON ONU line profile describes the binding relationship between the t-cont and DBA profiles ， the QoS model of the service traffic and the mapping relationships between the GEM Port and ONT side service.it is mainly used to configure DBA, t-cont and GEM Port information, the ONU line correlation property is configured in the line profile, for the same ONU, we only need to configure once to save the configuration workload. The ONU management mode is OMCI or SNMP, we both need to bind the GPON ONU line profile when adding ONU, and if not specified, the system will automatically bind ONU to the default line profile 0. After executing command success, user will enter the corresponding GPON ONU line profile configuration mode and set the related properties of the GPON ONU line profile.

7.3.4.1 View Line Profile

Double click the "**PON Module**" on the left side of the main page and enter the "**Line Profile Config**" page of the "**PON Card Management**" window, which will show the line profile on OLT:



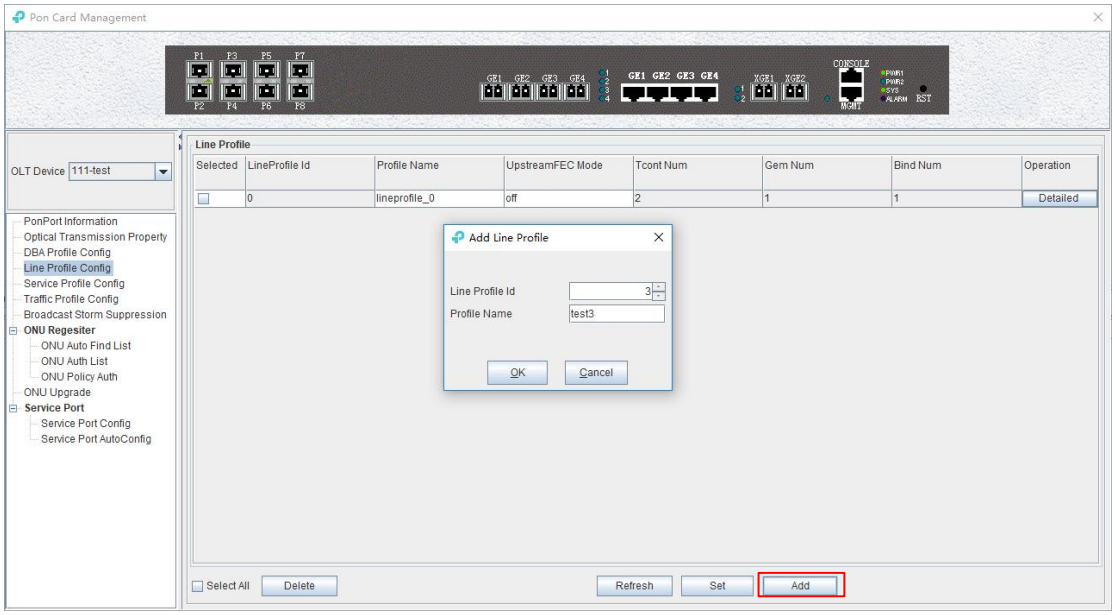
The parameters in the line profile are described in detail below:

- LineProfile id:
  Show the configured line profile id, and the profile id is unique;
- Profile Name:
  Show the name of the configured line profile, if user cannot understand the meaning of the line profile by profile ID, we can distinguish the profile by the profile name.
- UpstreamFEC Mode:
  Enable or disable FEC function, After enable this function, the damaged signal can be restored to a certain extent, and by using the FEC function, a relatively low data transmission error rate can be achieved to avoid retransmission.
- Tcont Num:
  Show the number of tcont number in the line profile, and currently support 4 tcont quantities, range: 0-3.
- Gem Port:
  Show the number of gem port in the line profile, and currently support 30 tcont quantities, range: 1-30.
- Bind Num:
  Show the number of gem mapping in the line profile, The single gem port currently supports 8 gems mapping, range: 1-8.

7.3.4.2 Create Line Profile

Because of the ralated configuration of the line profile, there are many steps to add a line frofile.create steps as follows:

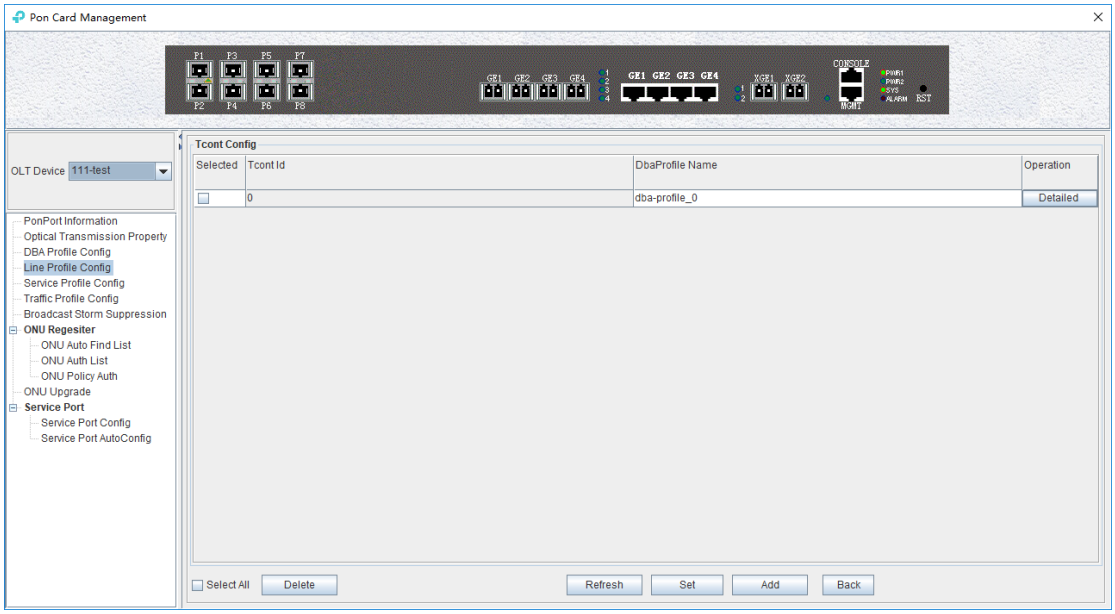
Step 1 (creat line profile ID) :
In '**Line Profile Config**' page, click "**add**" button will open a '**Add Line Profile**' window, in the window input customized Line Profile ID, Profile Name and click **'OK**':



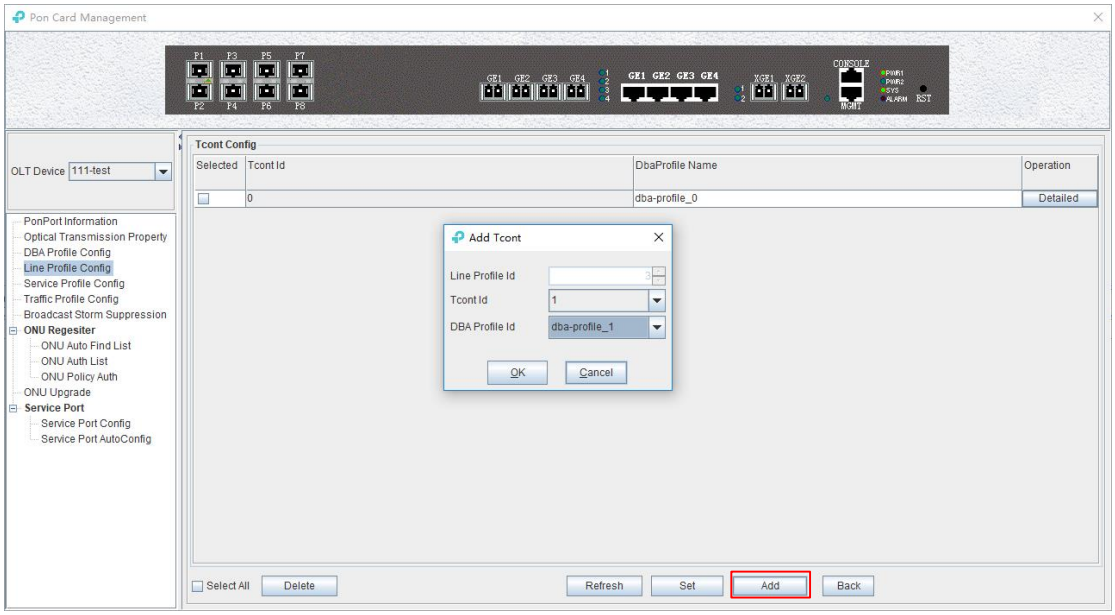
In this page, double-click the '**Detailed**' button below the '**Operation**', and we can enter the '**Tcont Config**' page;

Step 2 (creat tcont id)

In '**Line Profile Configure'** page, double-click the '**Detailed**' button below the '**Operation**', and you can enter the '**Tcont Config**' page;



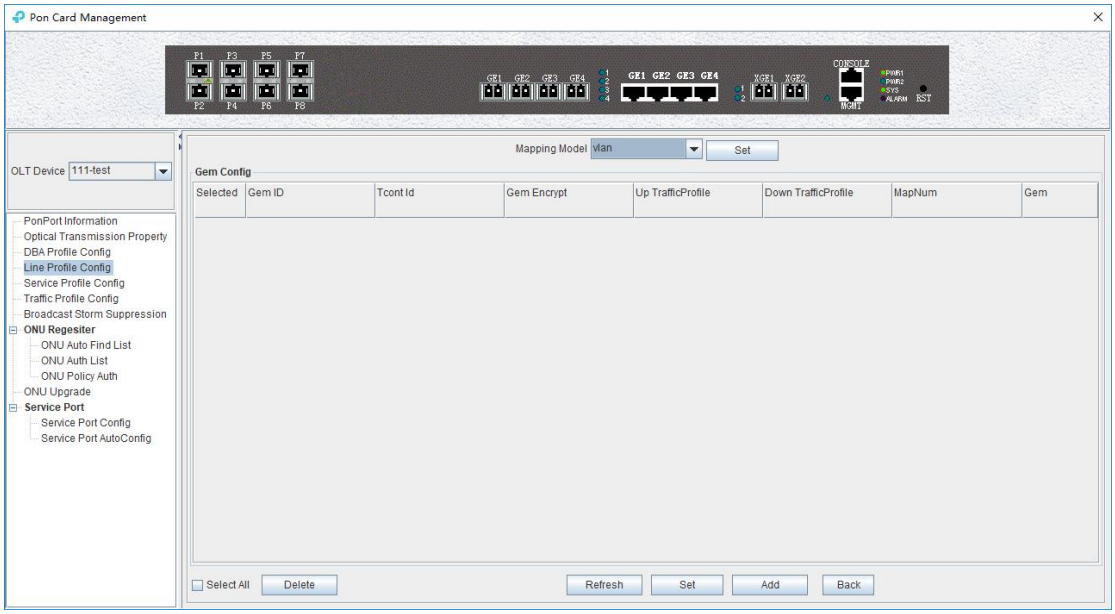
In the '**Tcont Config**' page, click '**Add**' to add a Tcont, input Tcont id, and then bind one DBA profile:



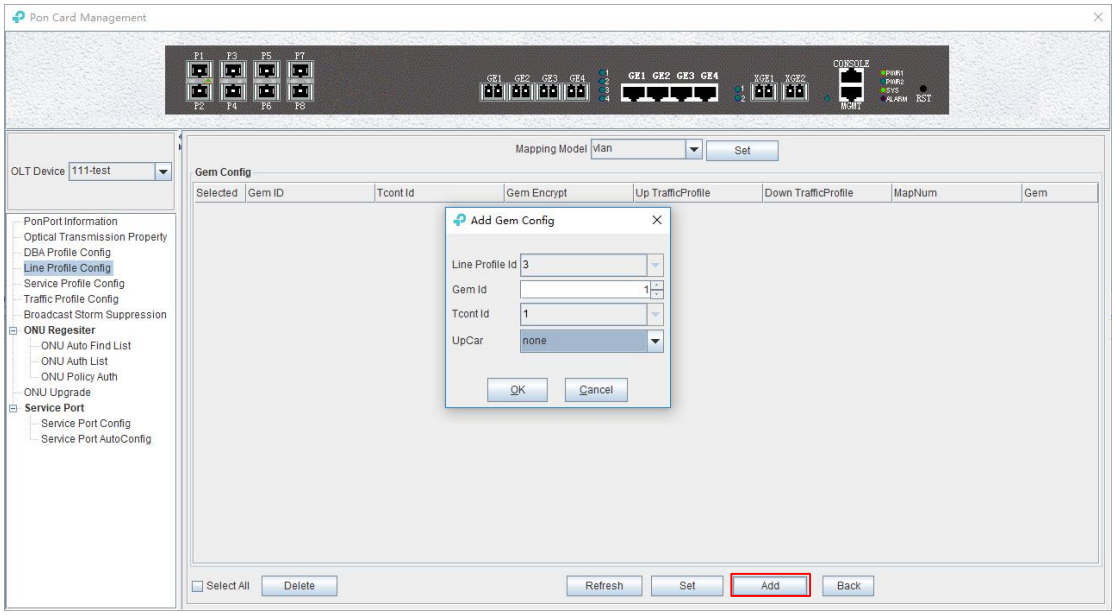
In the '**Tcont Config**' page, double-click the '**Detailed**' button below the '**Operation**', and we can enter the '**Gem Config**' page,Click the **'Add'** button to create a tcont; Select a Tcont, and then click **'Delete'** to delete a Tcont;

Step 3 (creat gem port) :

In the '**Tcont Config**' page, double-click the '**Detailed**' button below the '**Operation**', and we can enter the '**Gem Config**' page,



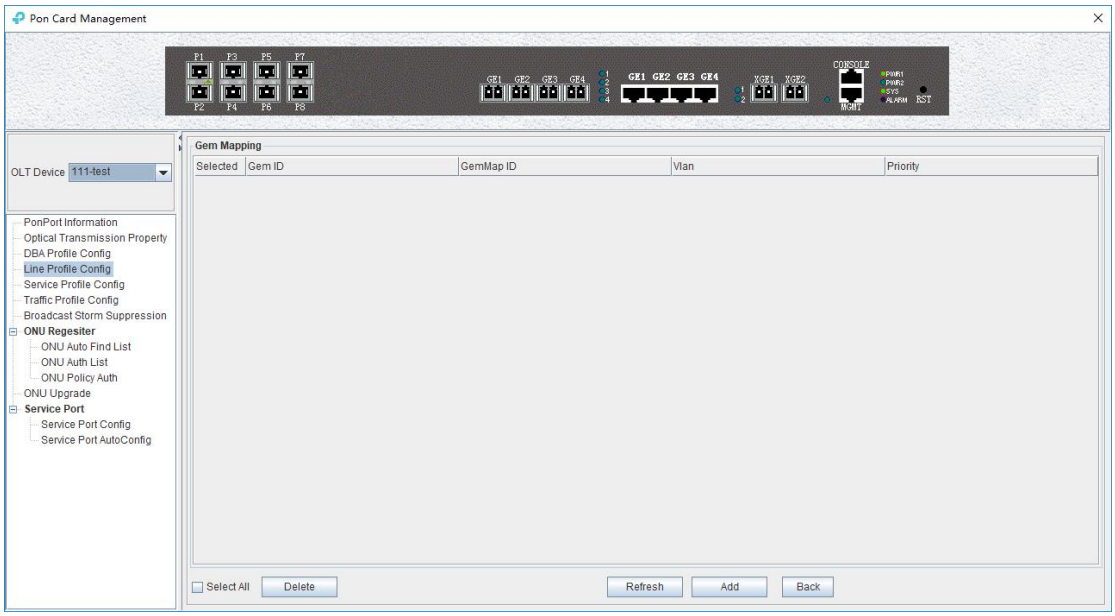
In the '**Gem Config**' page click '**Add**' to add a gem port, input the gem id, and then bind a traffic profile of up and down (the default don't have to bind the traffic profile) :



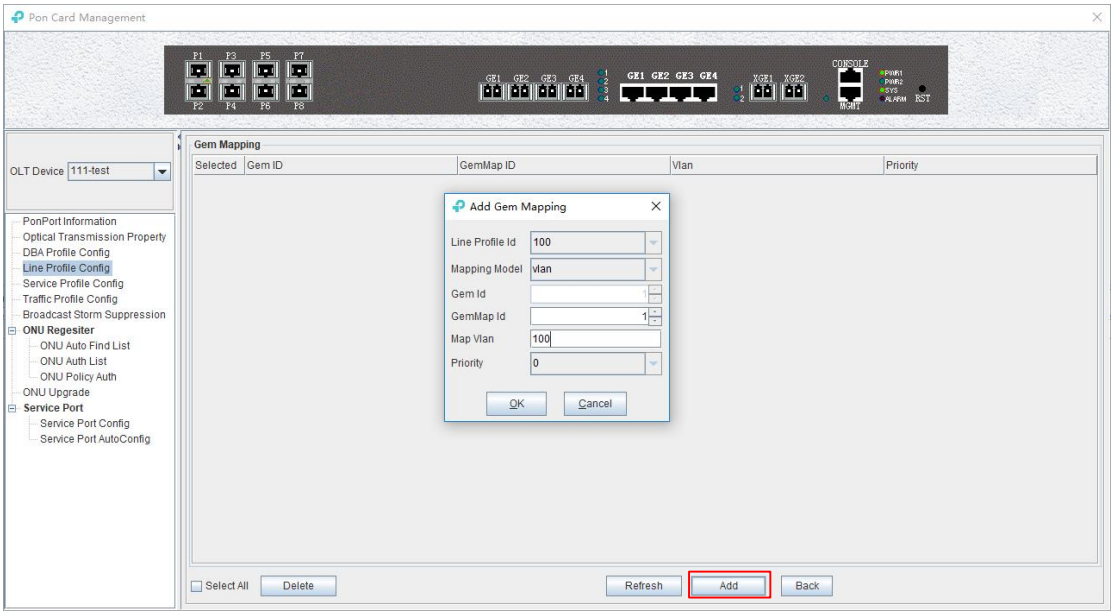
In this page, double-click the '**Detailed**' button below the '**Operation**' to enter the '**Gem Mapping**' page and create the gem mapping. Select a gem port, and then click '**Delete'** to remove a gem port; In Mapping Model we can select vlan, vlan priority and vlan + priority, and then click '**Set'**.

Step 4(create gem mapping) :

In '**Gem Config**'page, double-click the '**Detailed**' button below the '**Operation**' to enter the '**Gem Mapping**' page.



In the '**Gem mapping**' configuration page click '**Add**', to add a Gem map, input the Gem mapping id, and the Gem mapping vlan:



In this page, we can select a gem port, then click '**Delete**' to remove a gem mapping; Select the '**Add**' button to add a gem map.

Complete the creation of the line profile and we can click the '**Back**' button and use view the created line profile by #6.3.4.1.1.

7.3.4.3 Modify Line Profile

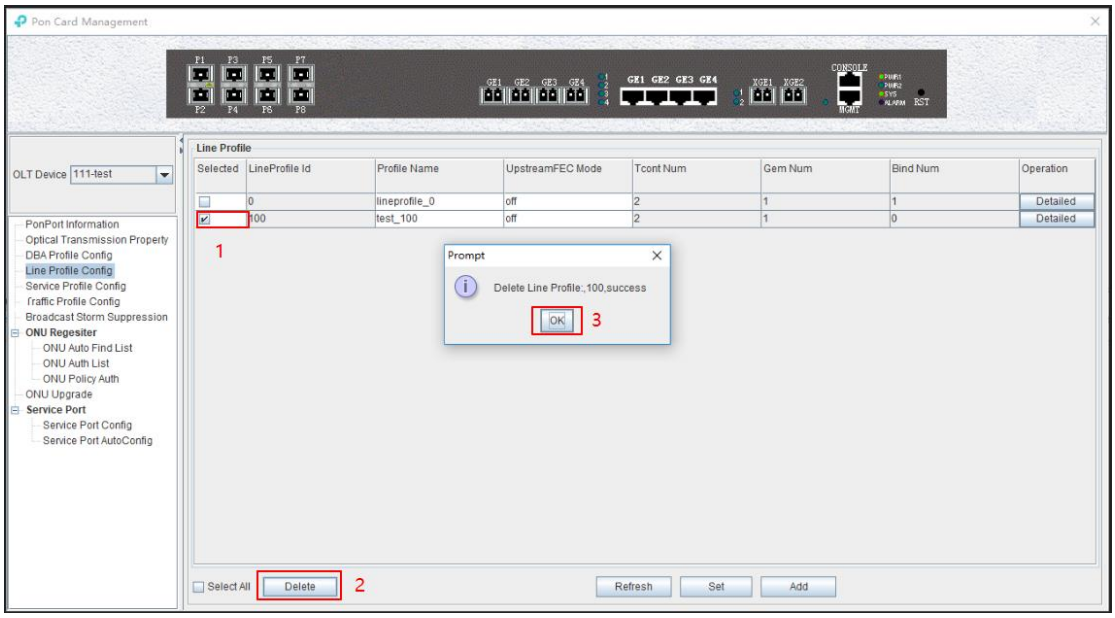
The name of the line profile can be modified in the main page of the line profile.

Double-click the '**Detailed**' button under the '**Operation**' of line profile , we can modify the '**tcont**' and '**gem**' of the line profile binding.

7.3.4.4 Delete Line Profile

In the main page of the '**Line Profile**', you can select a line profile and click the '**Delete**' button to delete the line profile.

Note: The line profile can only delete the unbind, if the line profile has been bound, delete profile operation should be done before the ONU is deleted or bound ONU to other line profile.



Double-click the '**Detailed**' button of the '**Line Profile**' main page to modify parameters such as '**tcont**' and '**gem**'.

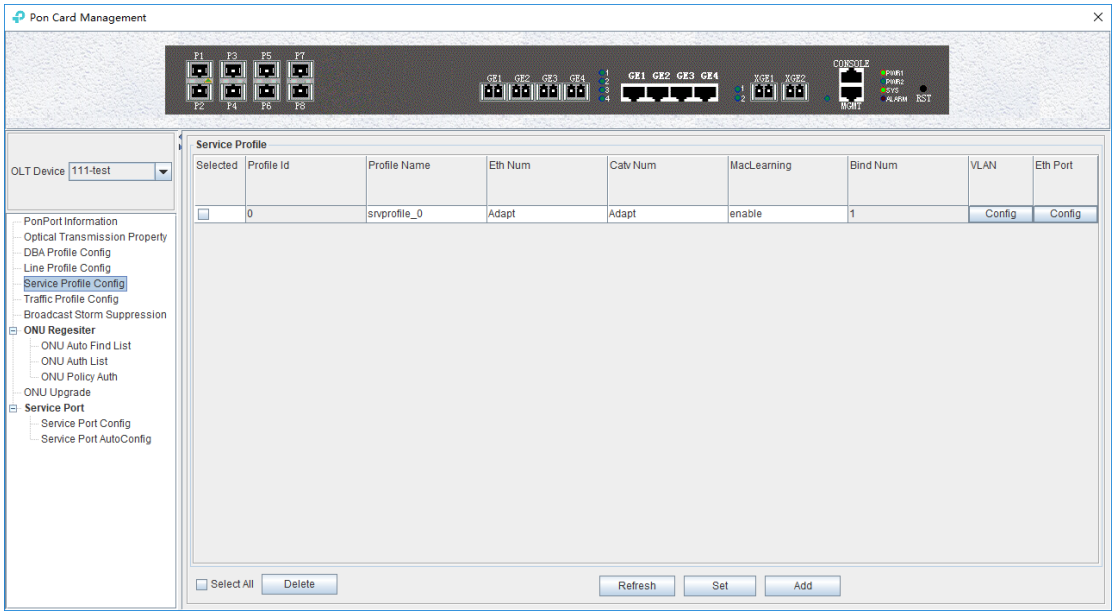
7.3.5 Config OLT Service Profile

The GPON ONU service profile provide service profile configuration channel for ONT which use the OMCI (ONT Management and Control page) method manage.

The ONU service correlation properties are concentrated in the service profile for configuration. the same service only need to be configured one time to save configure workload. If ONU management mode is OMCI, when adding ONU, we need to bind GPON ONU to service profile, if not specified service profile, ONU will bind to the default service profile 0 automatically. After the command executes successfully, we enter the corresponding GPON ONU service profile configuration Mode, we can set the associated properties of the GPON ONU service profile.

7.3.5.1 View Service Profile

Double click the '**PON Module'** icon on the left side of the main page and enter '**Service Profile Config**' page of '**PON Card Management**' window, which will show service profile on OLT:



The parameters in the service profile are described in detail below:

- Service Profile id

  Show the configured service profile id, which is unique;

- Profile Name

  Show the name of service profile, if the profile id can't show the meaning of the service profile,profile name will help distinguish the profile.

- Eth Num

  ONU Ethernet (eth) ports number to bind to the service profile, range is: 0-8; The Adapt parameter indicates that the number of Ethernet ports can be adapted to the ONU, and don't need config manually. For example, the actual eth number of ONU is four, we can select four or Adapt.

- Catv Num

  ONU Catv ports number to bind to the service profile,range is 0-8; The Adapt parameter indicates that the number of catv ports can be adapted to the ONU, and don't need config manually. For example, the actual catv number of the ONU is one, we can select 1 or Adapt.

- Mac Learning

  Enable ONU Mac address learning function, 'enable' means to enable ONU Mac address learning function, 'disable' means to disable ONU Mac address learning function

- Bind Num

  Show the times that the service profile is bound by the ONU.

- VLAN

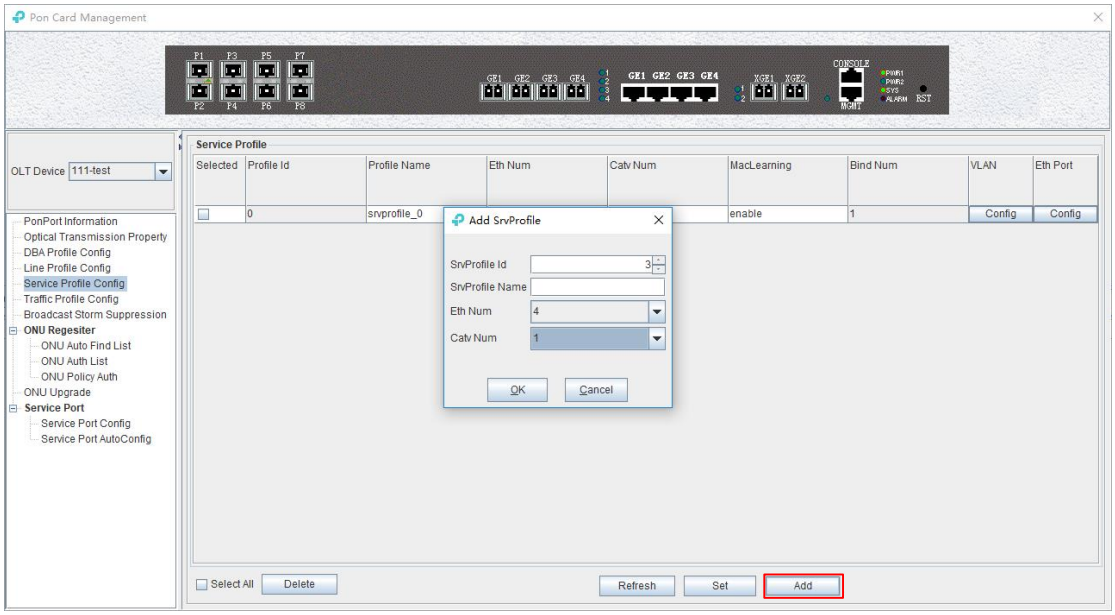
  Config the ONU port vlan in the service profile.

- Eth Port

  Config ONU port MAC address limit, Mtu, flow control,in traffic profile, and out traffic profile.

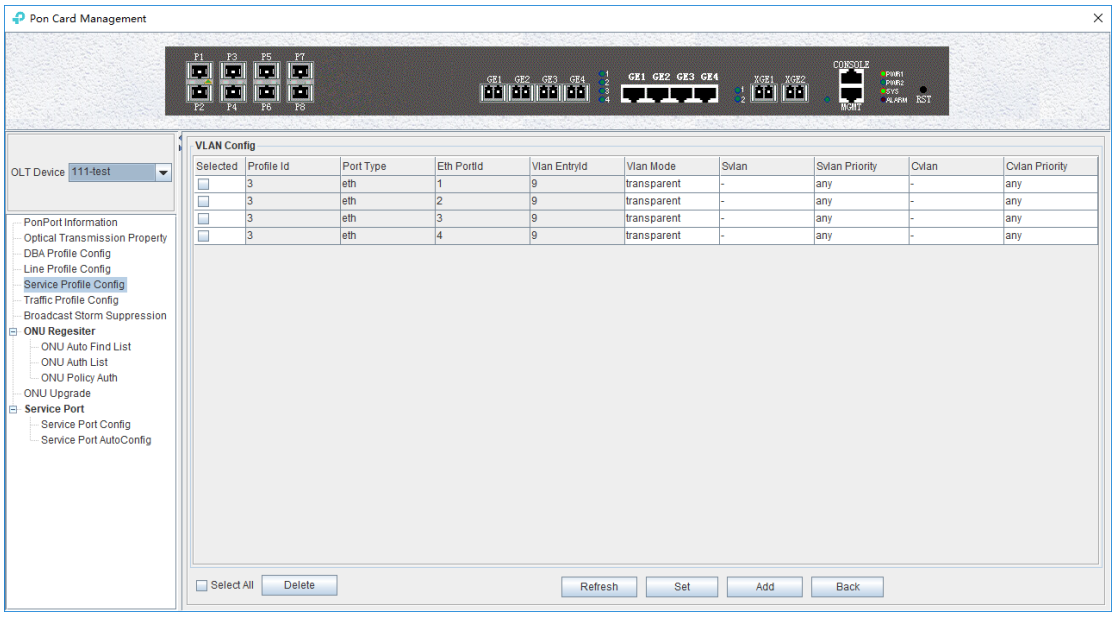
7.3.5.2 Create Service Profile

In the '**Service Profile**'main page, click "**Add"** button, specify the service profile ID, name and ONU Eth port number and Catv port number,then click '**OK**' button to complete the basic create for service profile:



7.3.5.2.1 Config Service Profile ONU Vlan

In '**Service Profile**' main page, double-click the '**Config**' button in the '**VLAN**' column behind the service profile enter '**Vlan Config**' page:



The following is a description of service profile vlan related config:

- Selected

  Select ONU eth port.

- Profile Id

  Show the service profile ID of current modified ONU vlan

- Port Type

  Show ONU port type,by default,show eth (Ethernet) in this position.

- Eth PortId

Show ONU port sequence number,if the ONU have four eth port, it will appear from top to bottom 1-4.

- Vlan EntryId

  Vlan index number, if the port is configured with multiple vlans, this position will display from 1-x.

- Vlan Mode

  Translation: the translation mode has two meanings:

  When the ONU port svlan and cvlan are same, it means ONU port vlan mode is trunk mode;

  When the ONU port svlan and cvlan are different, the ONU port vlan mode is translate mode,ONU user vlan(Cvlan) will translate to server vlan(Svlan).

  QinQ: Config ONU Eth port vlan mode is QinQ vlan mode. In QinQ mode, upstream data will add a out vlan on user vlan,then forwarded to uplink device. The downstream data will strip outer vlan tag and then forward traffic to user.

  Transparent: config onu port vlan mode is transparent,in this mode,ONU unconcern the traffic have vlan or not, onu will forward traffic directly.

- Svlan

  Configure network side vlan(Svlan) ,range is 1-4094.

- Svlan Priority

  Configure svlan priority, the range is 0-7 and any, 0 has the lowest priority, and 7 has the highest priority. Any means any priority.

- Cvlan

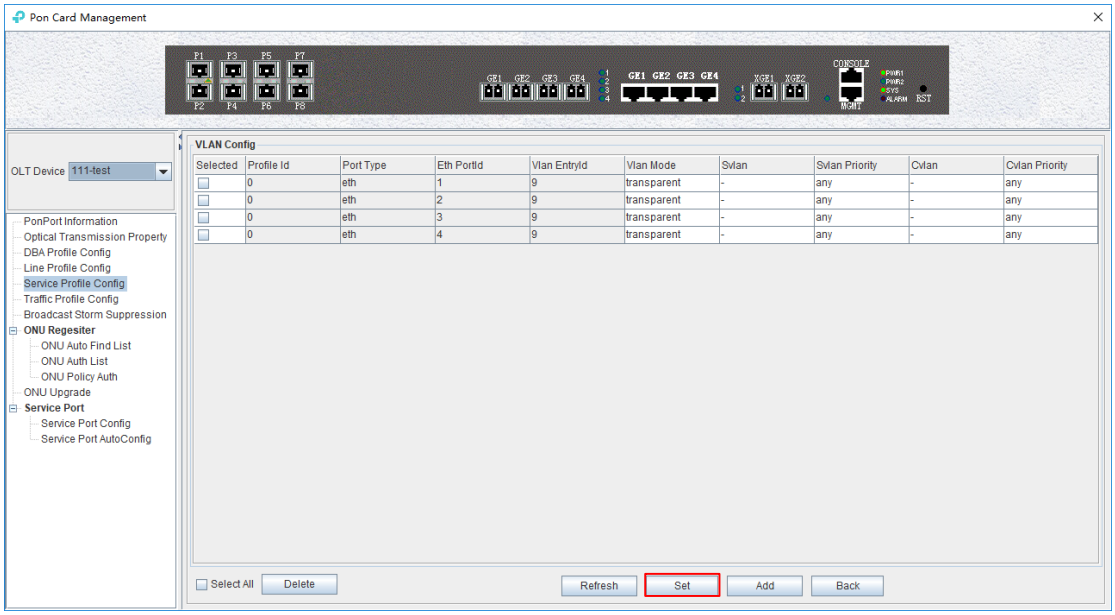
  Configure user side vlan(Cvlan) ,range is 1-4094.

- Cvlan Priority

  Configure Cvlan priority, the range is 0-7 and any, 0 has the lowest priority, and 7 has the highest priority. Any means any priority.

7.3.5.2.1.1 Config ONU transparent vlan mode

In '**Service Profile**' main page, double-click '**Config**' button under '**VLAN**', enter the '**VLAN Config**' page, in the column of '**Vlan Mode**' choose '**transparent**' then click **'Set'** button to set onu port transparent mode:



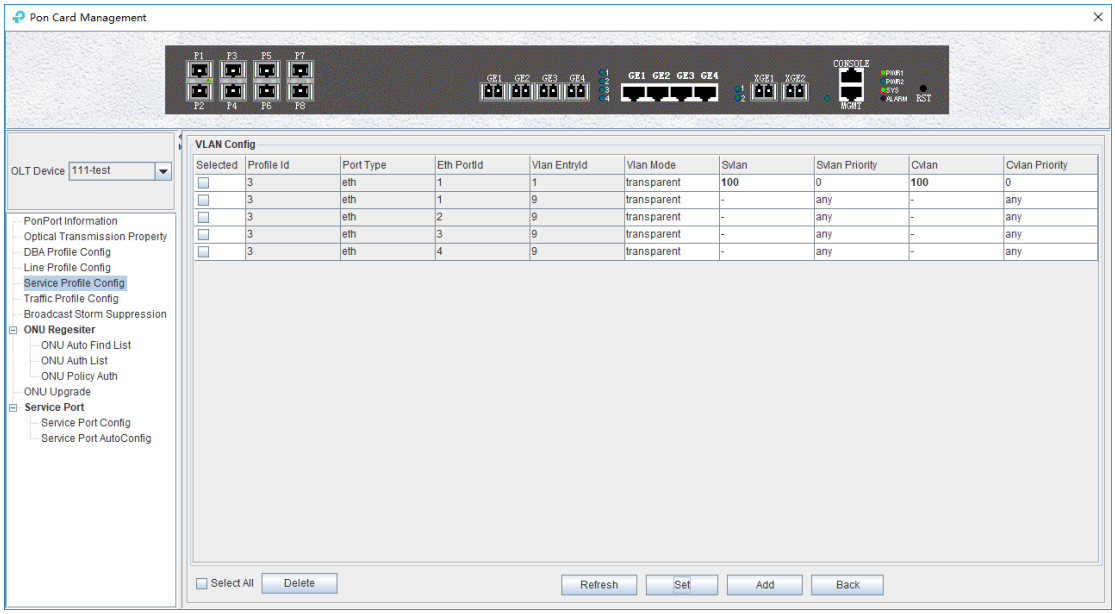
7.3.5.2.1.2 Config ONU trunk vlan mode

In the main page of the '**Service Profile**', double-click the '**Config**' button under '**VLAN**',enter '**Vlan Config**' page. The specific configuration steps are as follows:

Example: configure ONU trunk vlan 100, 200, 300, pvid is 100.

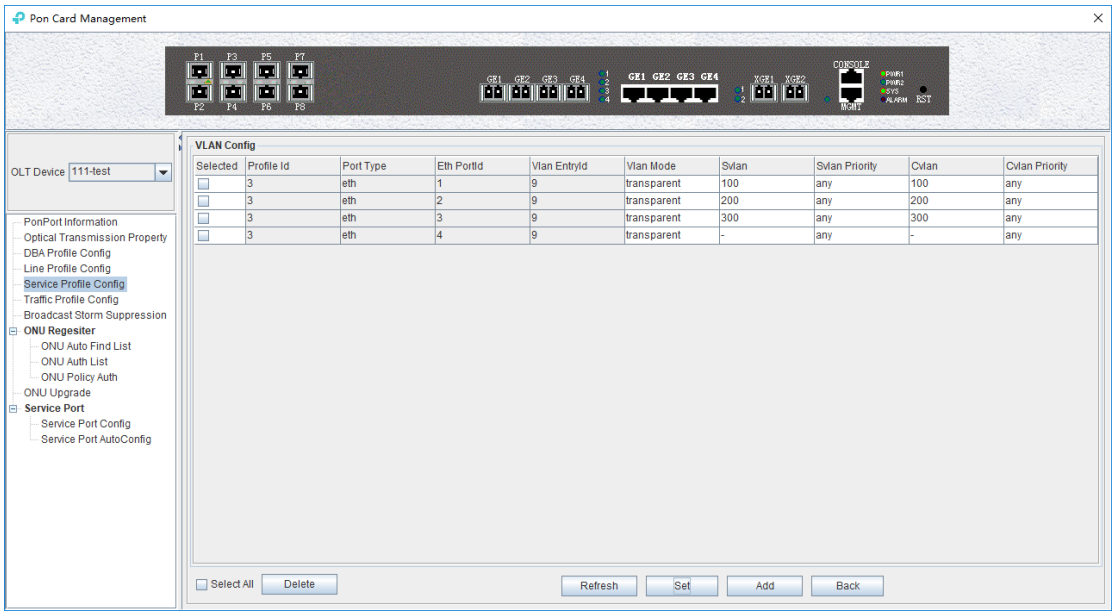
Step 1:

Click **'Add'** button, configure trunk vlan 100,200,300 to the ONU port , need three times to add three vlan, because every time can only add one vlan, the screenshot show add a trunk vlan 100,200,300 to illustrate, config SVLAN and CVLAN to same vlan means config onu vlan mode is trunk:



Step 2:

Return to the '**Vlan Config**' page to view the successful trunk vlan 100,200,300:



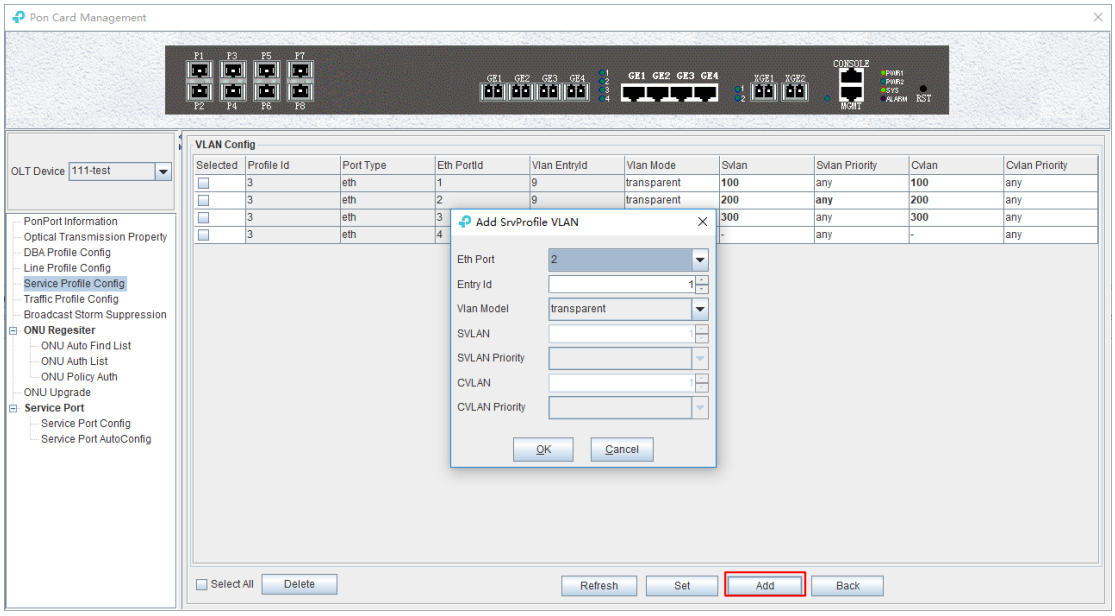
7.3.5.2.1.3 Config ONU translation vlan mode

In the main page of the '**Service Profile**', double-click the '**Config**' button under '**VLAN**',enter '**Vlan Config**' page. The specific configuration steps are as follows:

Example: config onu port vlan translation from 101 to 201,102 to 202, 103 to 203.

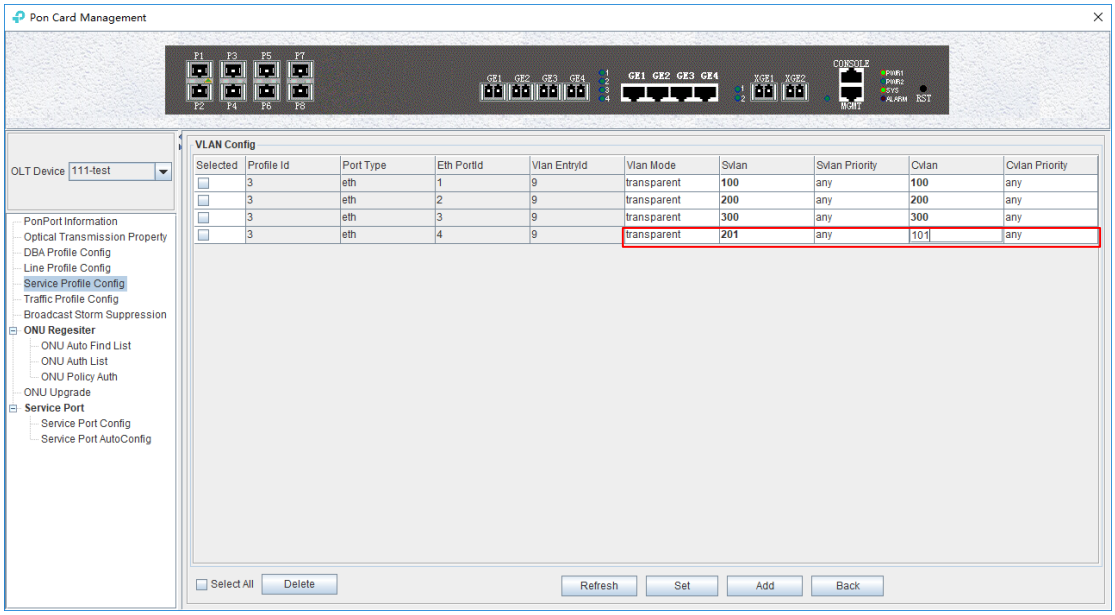
Step 1:

Click '**Add**' button, add translation vlan to the ONU port for 101 to 201,102 to 202,103 to 203, need three times to add the three translation vlan, because every time can only add one vlan to translate, the following screenshots to show translate vlan 101 to 201:



Step 3:

Return to the '**Vlan Configure**' page to view the vlan transformation that adds success 101 to 201:



7.3.5.2.1.4 ONU QinQ Mode Vlan Configuration

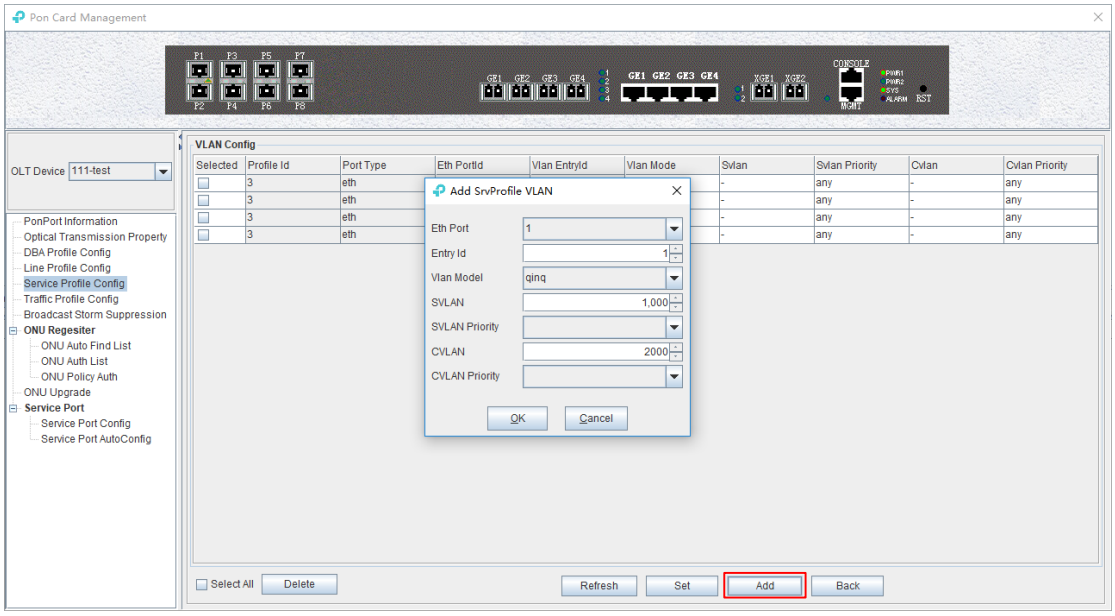
In the main page of the '**Service Profile**', double-click the '**Configure**' button in the '**VLAN**' column in the back of the vlan service profile, and enter the '**Vlan Configure**' page. The specific configuration steps are as follows:

Note: pvid in translation mode needs to be configured in port native - vlan in # 7.3.2.

Example: configure the outer vlan (SVLAN) of QinQ is 1000, the inner vlan (CVLAN) is 2000, and pvid is 3000 of ONU port.

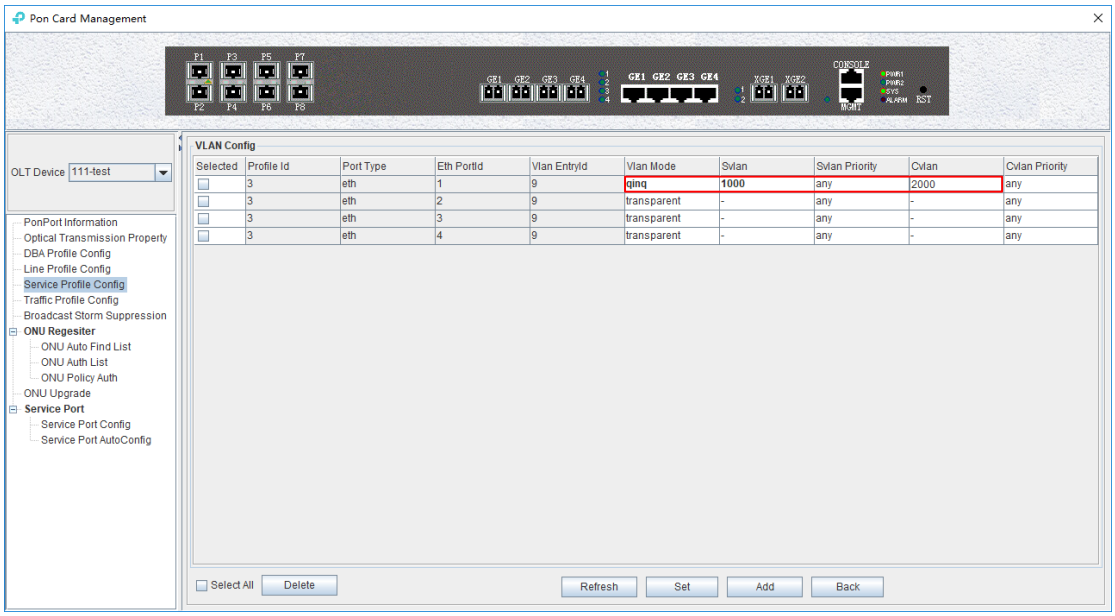
Step 1:

Click '**Add**' button, configure ONU port vlan mode for qinq, SVLAN for 1000, and CVLAN for 2000:



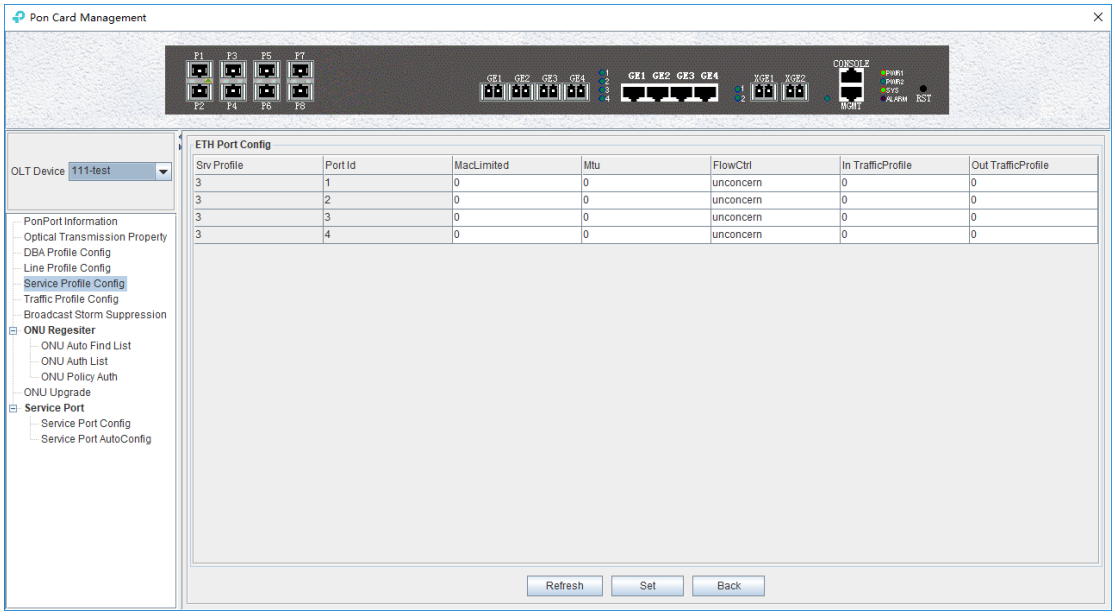
Step 2:

Return to the '**Vlan Configure**' page to view the added SVLAN as 1000, and CVLAN 2000 of QinQ vlan:



7.3.5.2.2 ONU ETH Port Config

In the main page of the '**Service Profile**', double-click the '**Configure**' button in the '**Eth Port**' column in the back of the vlan service profile, and enter the '**Eth Port Config**' page. The specific configuration steps are as follows:



The following is a description of the configuration of Eth Port Config in service profiles:

- Srv Profile
  Show the service profile id that currently needs to do the eth port configuration.
- Port id
  The ONU port id.
- Mac Limited
  Set ONU port Maximum value of the MAC address.
- Mtu
  Set the maximum transmission unit of the ONU port. Setting the appropriate MTU value can increase the network speed.
- FlowCtrl
  Set the flow control of the ONU port. Enable means to enable the flow control function of the ONU port. Disable disables the flow control function of the ONU port. After the flow control function is enabled, the port sends a flow control frame when the port is in the congestion state. The device stops sending data and determines how long to stop sending data.
- In TrafficProfile
  Binding an inbound traffic profile to the ONU port to limit the rate of data entering the ONU port.
- Out TrafficProfile
  Binding an outbound traffic profile to the ONU port to limit the rate of data flowing out of the ONU port.

7.3.5.3 Service Profile Modification

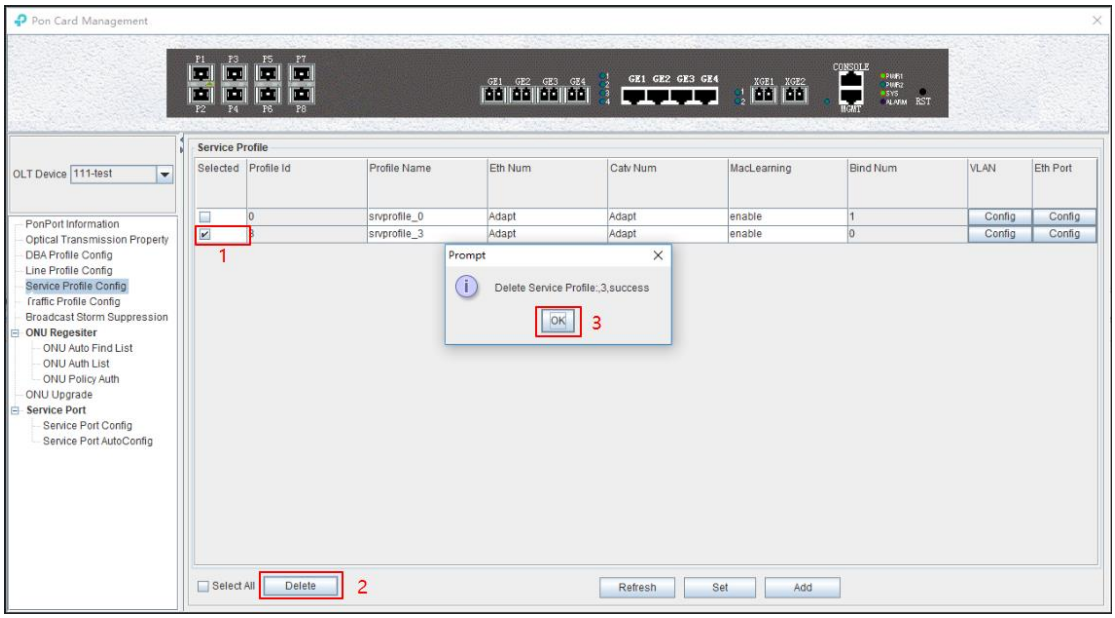
In the main page of the '**service profile**', the name and the number of ONU ports of the profile can be directly modified.

Double-click the '**Configure**' button below the vlan or igmp on the '**Service Profile**' main page to modify parameters such as vlan and igmp which the service profile binding. here no longer illustration, We can know the details by the vlan and igmp configuration instructions.

7.3.5.4 Delete Service Profile

In the main page of the service priofile, you can select a service profile and then click the '**Delete**' button to delete the entire service profile information:

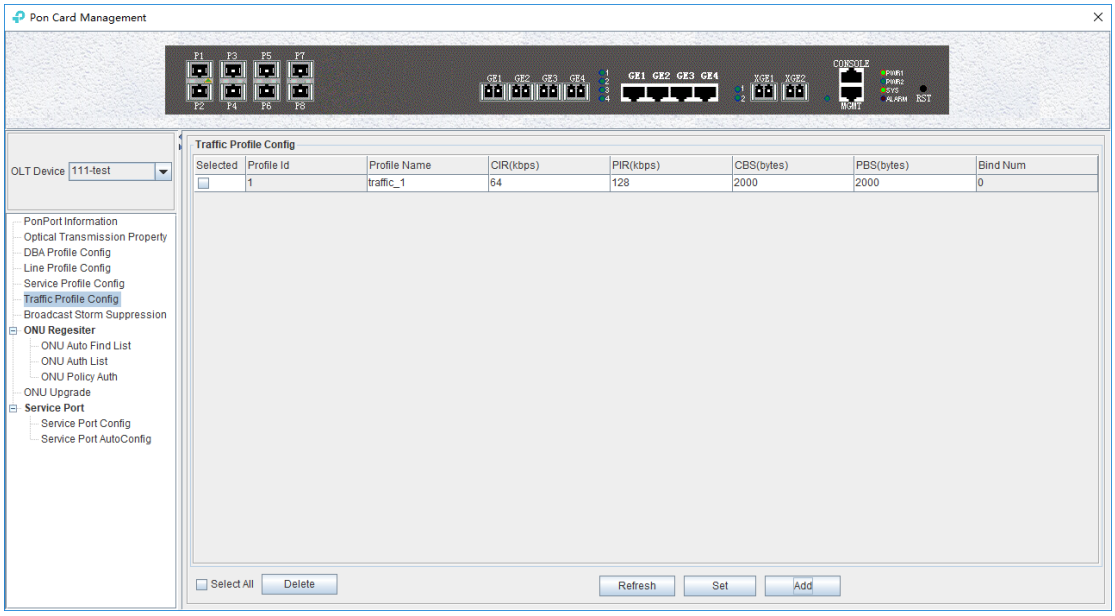
Note: Only can delete unbinded service profile, if the service profile is already bound, the delete operation of the profile will be done before the ONU is deleted or the other service profile is used.



7.3.6 OLT Traffic Profile Configuration

The traffic profile on GPON OLT is mainly applied to the ONU port for the port speed limit. Applying to an ACL for speed limits for a particular message, because we need to create it in advance when using this profile, a chapter is used to specify some configuration parameters for the profile:

Double click the "**PON Card**" on the left side of the main page and enter the "**Traffic Profile Configure**" page of the "**PON Card Management**" window. The typical page is as shown below:



Enter this page to select '**Delete**', global '**Refresh**', select '**Set**' and' **Add** 'operations.

Some parameters in the traffic profile configuration are explained below:

- traffic profile id

  Show the configured traffic profile id, which can be used later when you need to bind the traffic profile.

- profile name

  Show the configured traffic profile name, which can be modified when you need to bind the traffic profile.

- ensure information rate (CIR)

  To show and modify the guaranteed bandwidth, the effect of bandwidth is to ensure that the traffic rate can reach its guaranteed bandwidth when the traffic is congested. The default minimum configuration is 64kbps, and the unit is kpbs.

- peak information rate (PIR)

  The maximum bandwidth is shown and modified, and the maximum bandwidth is only a limited effect. The limit of the traffic can not exceed its maximum bandwidth. The default minimum configuration is 128kbps, and the unit is kpbs.

- ensure the burst length (CBS)

  Show and modify the guarantee burst length, that is the instantaneous ability to pass the promise burst traffic, the default minimum configuration is 2000bytes, the unit is byte.

- peak burst length (PBS)

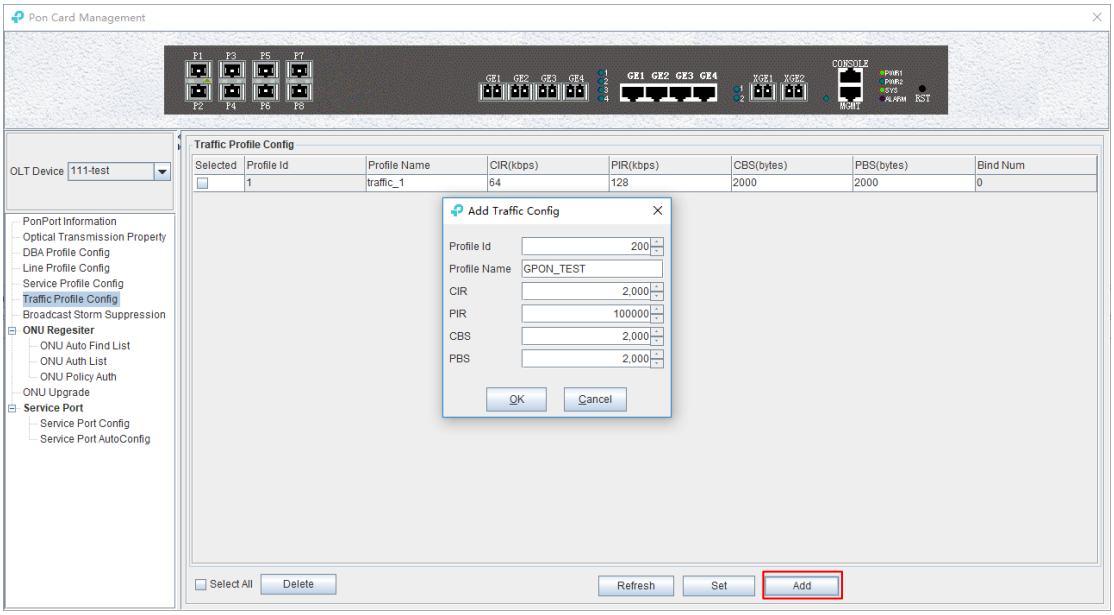
  Show and modify peak burst length, peak burst size, the default minimum configuration is 2000bytes, the unit is byte.

- mapping rule number

  Show times the traffic profile has been applied.

【Example of traffic profile configuration 】

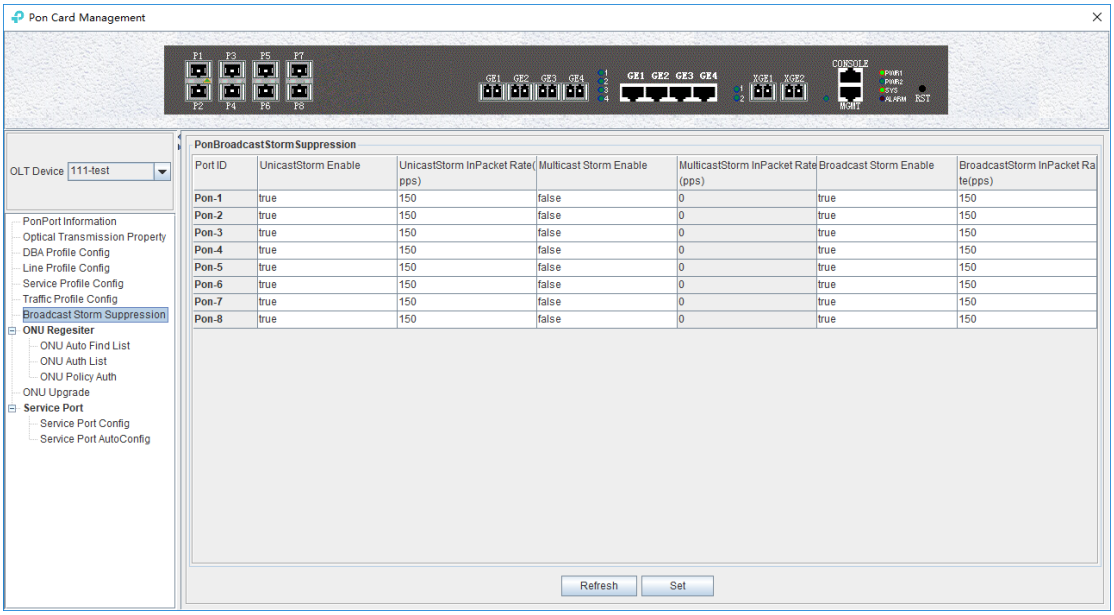
Example: add a traffic profile which id is 200, name is '**GPON_TEST**', ensure bandwidth is 20M and the maximum bandwidth is 100M.



7.3.7 PON Broadcast Storm Suppression

The number of the broadcast network frame increase sharply and affects normal network communication, broadcast storm will occupy a considerable network bandwidth, cause the entire network cannot work normally. Broadcast storm control is allowing the port to filter the broadcast storm that appears on the network. When the broadcast storm control is enabled, the port will automatically discard the broadcast frames received when the broadcast frames received from the port are accumulated to the predetermined threshold value. When the function disabled or broadcast frames don't come to limit, the broadcast frames will be broadcast to other ports of OLT.

Double click the '**PON Card**' icon on the left side of the main page and enter the '**Broadcast Storm Suppression**' page of the '**PON Card Management**' window. The typical page is as shown below:



Entering this page can set and enable the storm suppression and setting speed of various storm suppression for OLT's PON.

The following is a description of the storm control parameters of the PON port of OLT.

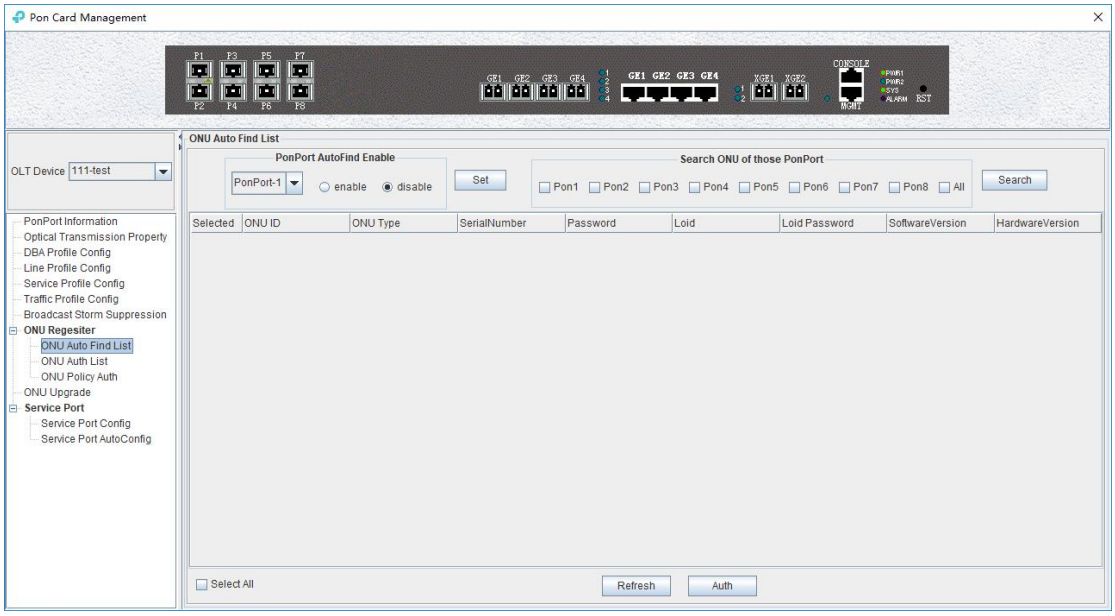
- Port ID
  Show the PON index number that needs to be configured for storm suppression.
- Unicaststorm Enabled
  Enable or disable the unknown single storm suppression function of the PON, select 'true' to enable the unknown single storm suppression function. Select 'flase' to disable the unknown single storm suppression function.
- UnicastStorm InPacket Rate
  Configure unknown single storm suppression rate for PON port, unit is PPS.
- Multicast Storm Enabled
  Enable or disable the unknown multicast storm suppression function of the PON, select 'true' to enable the multicast storm suppression function. Select 'flase' to disable the the multicast storm suppression function.
- MulticastStorm InPacket Rate
  Configure multicast storm suppression rate for PON port, unit is PPS.
- Broadcast Storm Enable
  Enable or disable the broadcast storm suppression function of the PON, select 'true' to enable the broadcast storm suppression function. Select 'flase' to disable the the broadcast storm suppression function.
- Broadcast Storm InPacket Rate
  Configure broadcast storm suppression rate for PON port, unit is PPS.

7.3.8 ONU Authentication and Register

Before GPON auth, the ONU needs to open the automatic discovery function of the PON, then find the ONU in the automatic list, and finally add the ONU to auth authentication in the automatic list. The auth step of GPON is mainly divided into the following parts.

7.3.8.1 Open ONU Auto Discovery and Auth

Double click the '**PON Card**' icon on the left side of the main page and enter the '**ONU Auto Find List**' page of the '**PON Card Management**' window:



We can do many operation in this page, we can enable the automatic find function of the ONU of PON, check the automatical but not auth ONU, and verify the ONU of automatic find.

Enables PON automatic find

Turn on the ONU auto find function of the specified PON ports, and only the ONU connected to the PON will be displayed.

Select the specified PON port, select '**enable**' (open) or '**disable**' (not open), and then click the '**Set**' button.

View the PON's ONU

When the ONU auto find function is opened, you can select a PON port to view which ONU is found under the PON.

Select the specified PON port and click the '**Search**' button.

Authentication

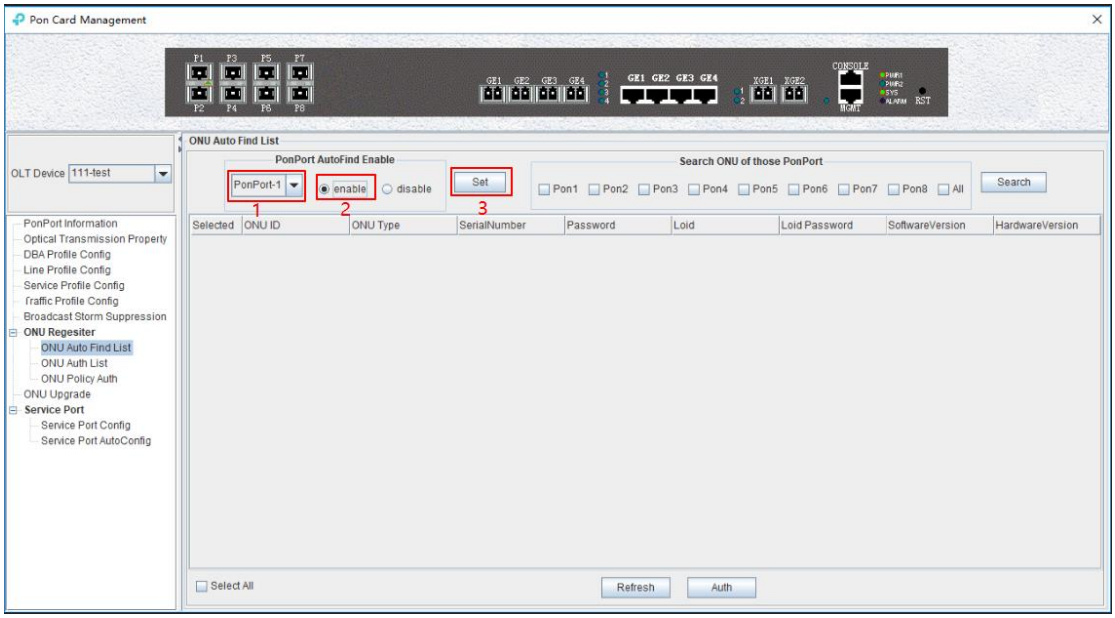
Auth the ONU which we found on this page.

【Example of enable the ONU automatic find + authentication configuration】

Example: start the ONU automatic authentication of PON1, then add the ONU of the PON1 finding and bind to the created line profile and service profile.

Step 1:

Enable the automatic find function of PON1 in the **'ONU Auto Find List**' page:

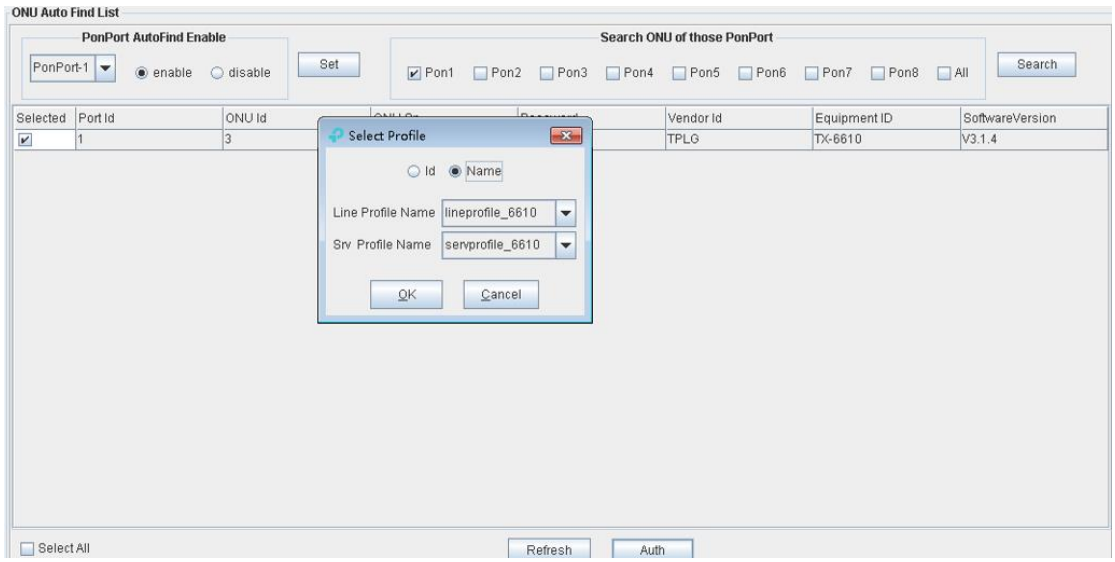


Step 2:

Find ONU at the '**Search ONU of those PonPort**':

Step 3:

Select ONU, Click the '**Auth**' button, and select the line and service profile created before:



7.3.8.2 View Registered ONU and Register ONU Independently

Double click the '**PON Card**' icon on the left side of the main page and enter the '**ONU Auth List**' page of the '**PON Card Management**' window:

In this page, you can view the ONU information that has been registered and manually add the authentication ONU, detailed description of some of the more important parameters as follows:

Check the registered ONU

You can query All (All) registered ONU of OLT or registered under specific PON port (pon1-pon8).

The relevant ONU parameter as follows:

- Auth Mode

  It shows that the registered mode of ONU. GPON is certified by SN, which is different from EPON MAC auth. The ONU authentication mode supported on OLT is: sn, sn + password and password.

- ONU Sn

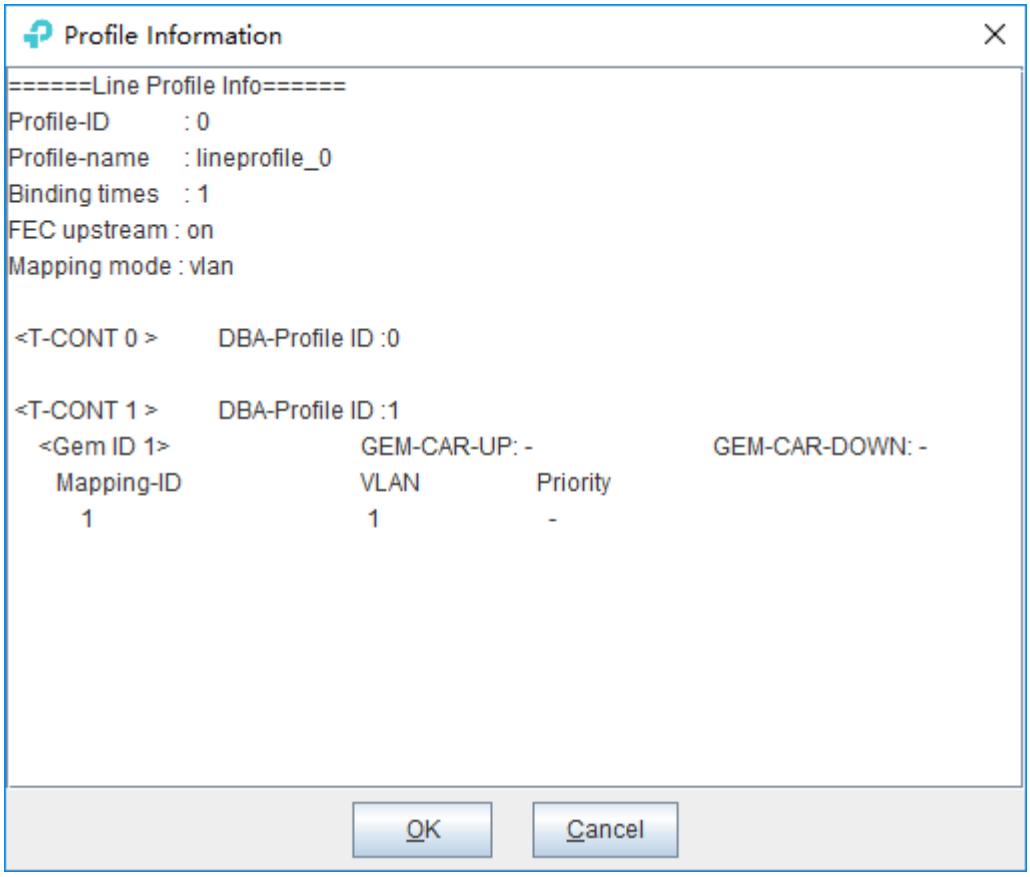
  show the registered ONU's SN in port, the SN of ONU must be the ASCII value of 12 bits.

- Password

  If ONU is registered by the SN + password or password authentication mode, the ONU authentication password will be displayed here.

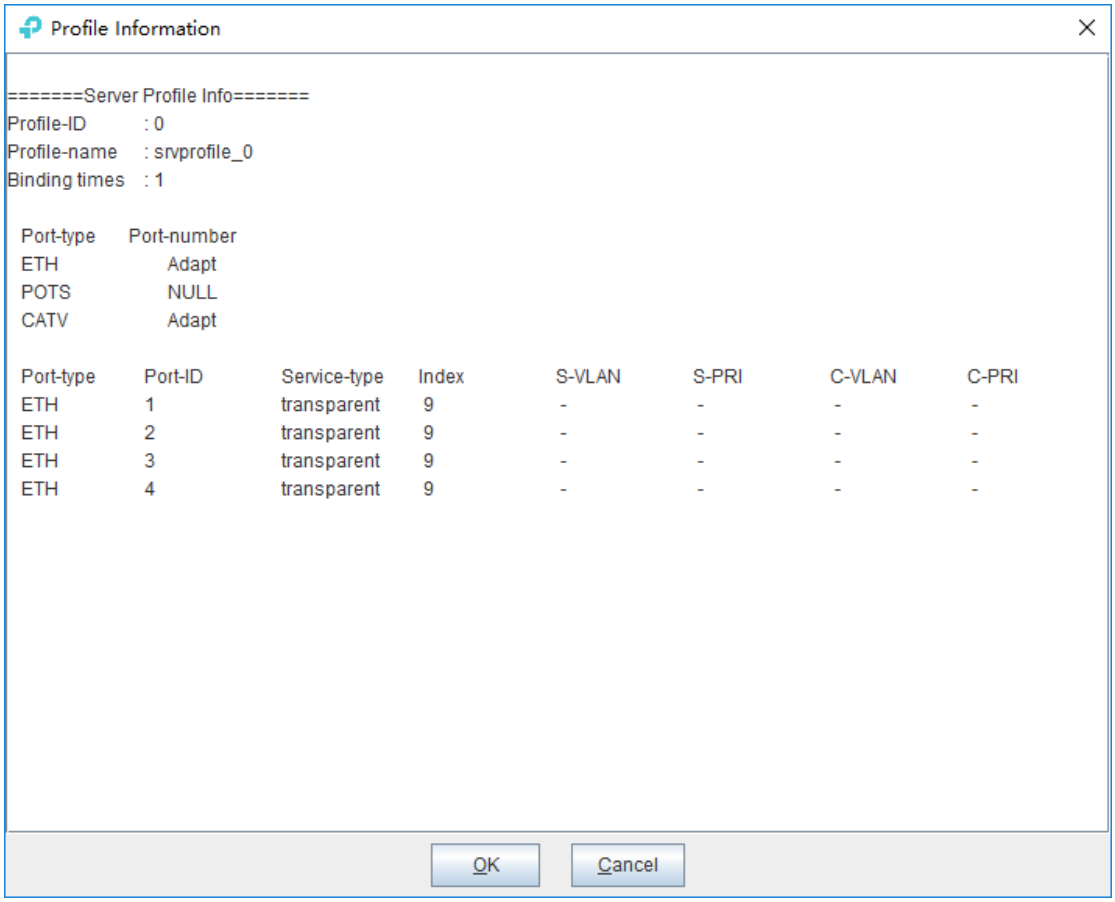
- Line Id

  Shows which line profile id is binding on the ONU, and double-clicking the id to displays detailed information about the line profile configuration.



- Service Id

  Shows which service profile id is binding on the ONU, and double-clicking the id displays the details of the service profile configuration.



- Run State

  The running state can reflect whether the ONU is online or not. The state of 'online' state indicates that ONU has been registered and launched. The 'offline' state indicates that the ONU is not registered, and it is necessary to check whether the light power of the ONU is normal.

- Config Statue

  The configuration state can reflect whether OLT send the configuration file to ONU is success. The '**failed**' status indicates that the default configuration of OLT is not recognized by the ONU, which requires the positioning analysis of the bag. '**success**' shows that the status indicates that the default configuration of OLT is recognized by the ONU.

- Match State

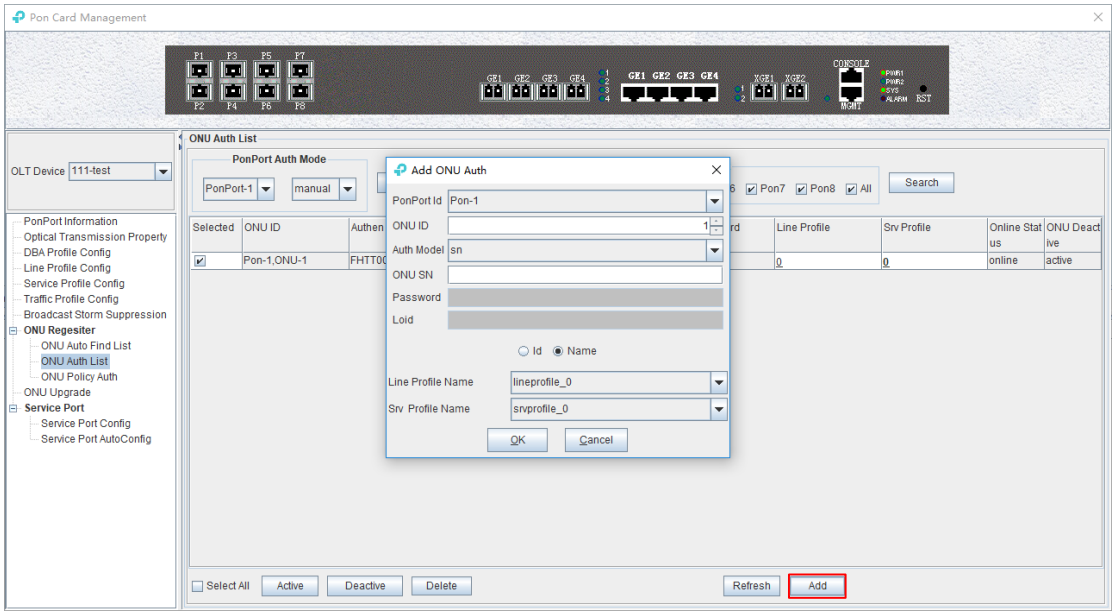
  Match state can reflect the ONU port whether actual ability and binding service profile configuration of port capacity match, '**match**' status show that port number of ONU service profile configuration is match to ONU actual report; '**mismatch**' status show that port number of ONU service profile configuration is not match to ONU actual report, need to see the actual reported ONU port number, and then configure the ONU port number in the ONU service profile.

- Active Status

  The active state indicates whether the ONU is active, and the '**active**' indicates that ONU has been activated on OLT; '**deactive**' means that ONU is not activated on OLT.

add authentication and auth ONU manually

If you know the auth SN or password of ONU in advance, you can register the ONU with the "Add" button on this page.



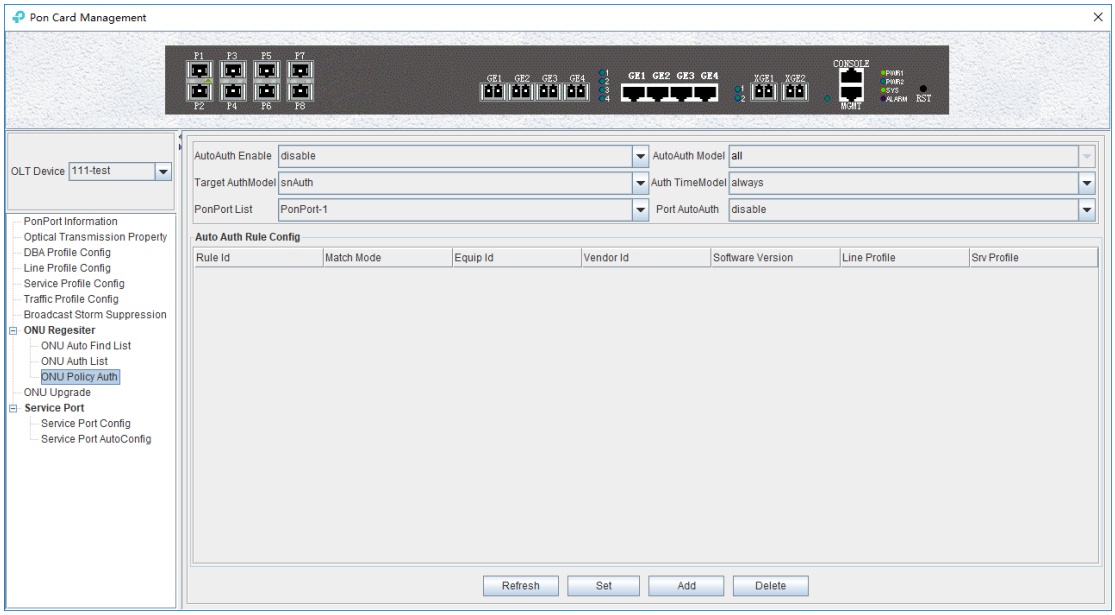
active or deactive ONU

In the '**ONU Auth List**' page, select an ONU to active or deactivate the ONU that has been registered.

7.3.8.3 Auto Register ONU

GPON OLT support automatic auth ONU function, if the OLT in advance enable the function of automatic auth and configured automatic auth rules, ONU can automatically register according to the configuration.

Double click the "**PON Card**" on the left side of the main page and enter the '**ONU Auto Auth rule**" page of the "**PON Card Management**" window:



We can configure rules of register ONU function on GPON OLT automatically in this page, and some parameters will be given to illustrate:

AutoAuth Enable

This option enables or disable the global auto auth ONU function on OLT.

AutoAuth Model

Configure auto auth rules of the ONU on the OLT, we can choose all (all) ONU adopt automatic auth certification, according to ONU model (equid) automatic auth certification, according to the ONU manufacturer (vendor) automatic auth certification, according to ONU model (equid) + ONU software version (swer) automatic auth certification.

PonPort List

Specify which PON port to open ONU automatic auth function.

Port AutoAuth

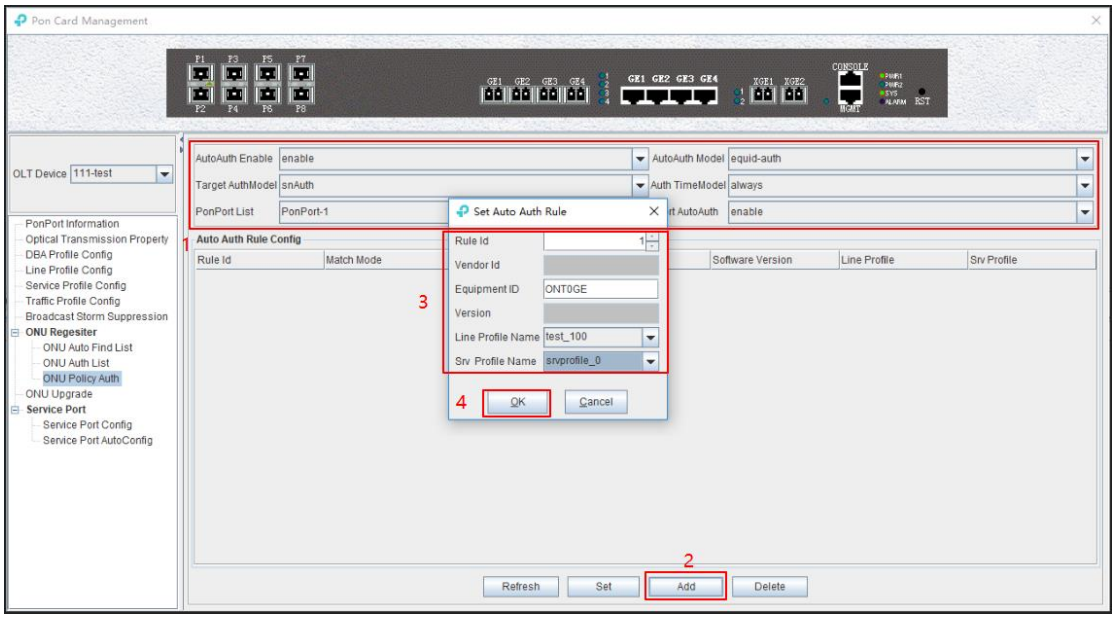
enable or disable the ONU automatic auth function of a PON.

Add rules of auto auth

The 'add' button on the page can add an auto auth rule.

【Example of ONU automatic registration configuration】

Example: enable the automatic registration function of PON1 on OLT, the automatic registration rules are based on the ONU model of ONT1GE, automatic binding line profile: ontline profile_50, service profile: ontsrvprofile_50.

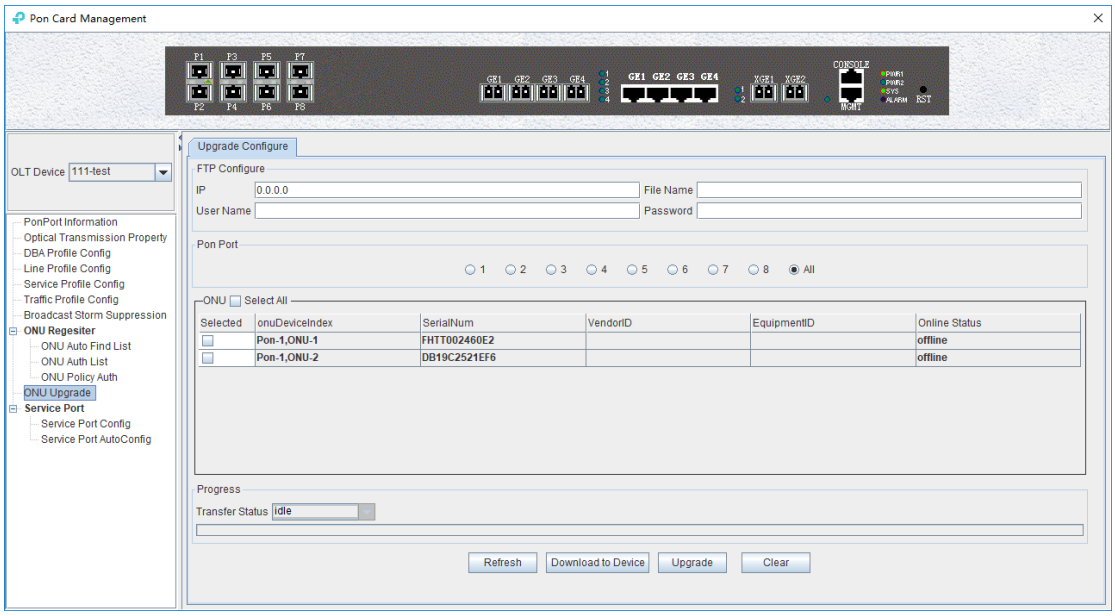


7.3.9 Upgrade ONU

The new GPON OLT now supports remote upgrade of ONUs on the OLT. The configuration management interface can upgrade ONU software in batches or individually.

Note: before upgrading, you need to ensure that there is an upgrade file. The FTP server can connect with OLT.

Double click the '**PON Card**' icon on the left side of the main page, open the '**PON Card Management**' window and enter the '**ONU upgrade**' page:



This page needs to pay attention to the configuration of the following parameters. Other parameter configurations can be used by default:

- FTP Configure

  Before upgrading, ensure that the OLT can ping the FTP server. The IP address here is generally the IP address of the PC that has opened the FTP server. The file name is the file placed in the FTP home directory. The user name and password are entered in the FTP server. Password.

- Pon Port

  Select the PON port of the ONU to be upgraded. You can select a single PON port or All to indicate all PON ports.

- ONU

  Select the ONU that needs to be upgraded. You can click the Select All button to upgrade all ONUs, or you can upgrade them with a single ONU.

【Example of the ONU device upgrade】

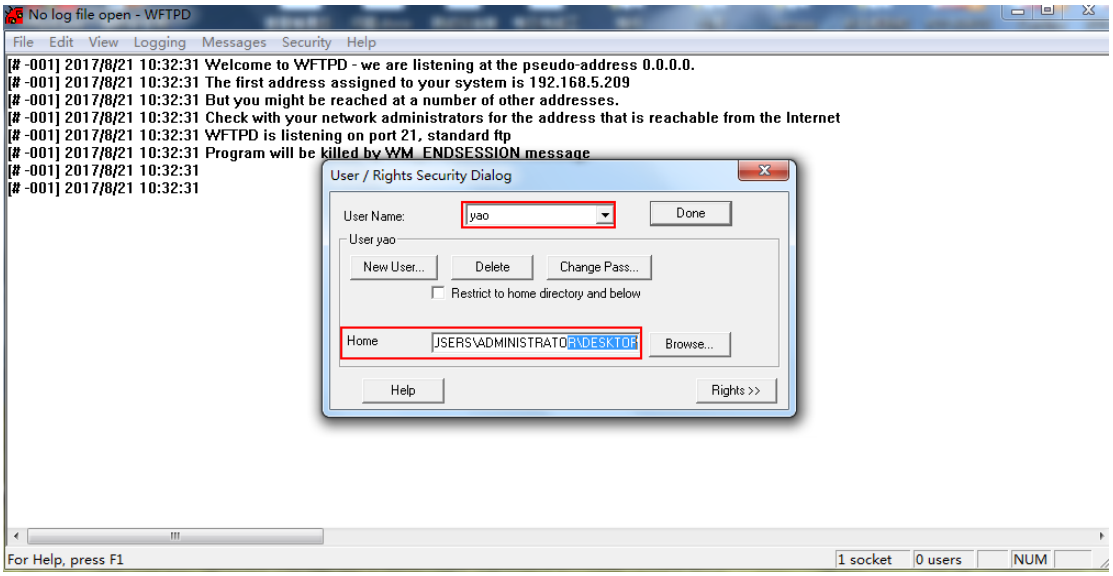
Example: upgrade the software of the ONU, through the FTP server of 192.168.5.209.

Step 1:

First, ensure that the computer is connected to an OLT inband or outband management port, and the computer can properly ping the IP of the inband or outband management port.

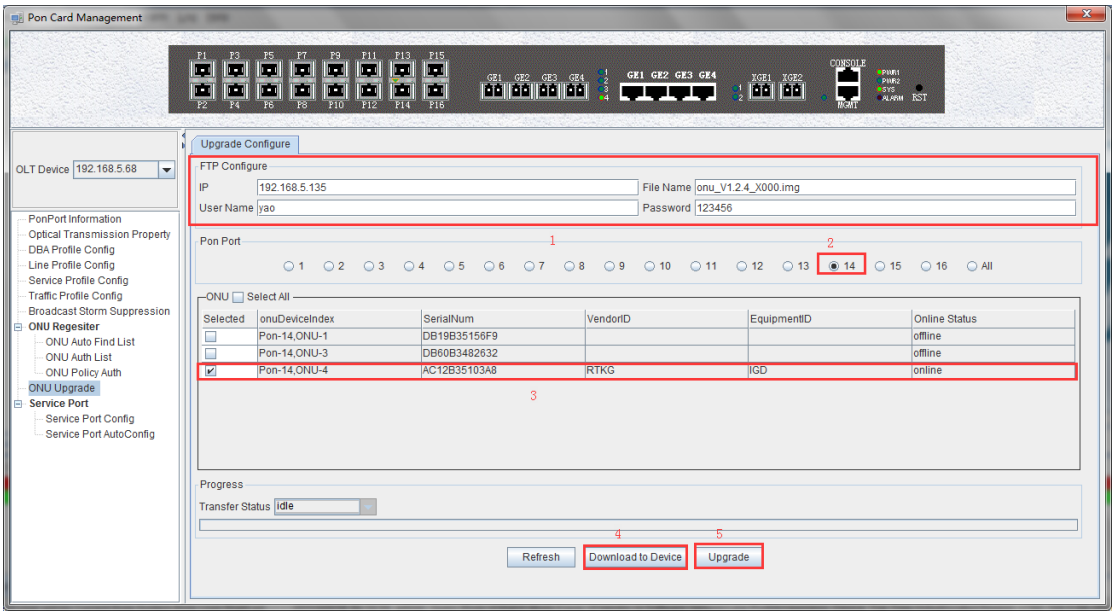
Step 2:

Configure the FTP server on your computer to access the username and password as well as the file storage path:



Step 3:

Operation of upgrade EMS on the ONU:



Step 4:

It is suggested that the upgrade operation of ONU is completed successfully.

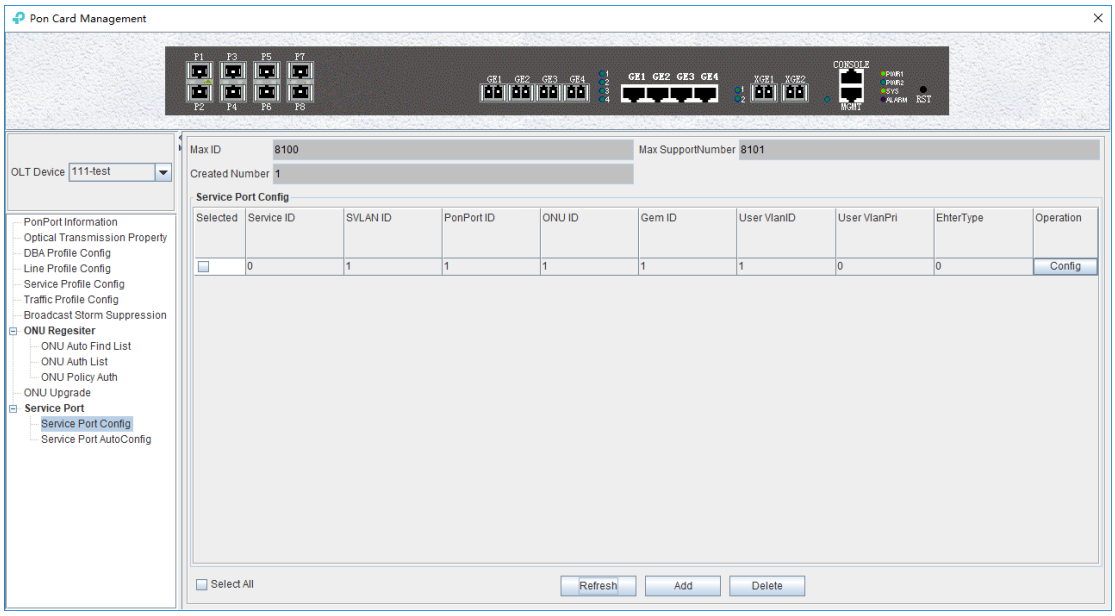
7.3.10 OLT Service Port Configuration

The service virtual port supports the ONT-based service transparent transmission and traffic management, and implements the VLAN conversion for data packets and the rate limiting function for uplink and downlink data flows.

The service virtual port (SERVICE PORT) is the smallest granularity that distinguishes the processed traffic and the finest pipe that carries the service. The basic idea is to define a data flow through the OLT-side SVLAN, GPON port, ONT ID, GEMPORT, and user VLAN, and associate the traffic profile used by the rate limit.

7.3.10.1 Service Port Config

Double click the '**PON Card**' icon on the left side of the main page, open the '**PON Card Management**' window and enter the '**Service Port Config**' page:



Enter this interface to select the '**Delete**', Global '**Refresh**', and Select '**Add**' operations for the service virtual port. The following mainly describes some parameters in the traffic template configuration:

The following mainly describes some parameters in the traffic template configuration:

- Service ID

  Displays the configured virtual port id of the service and uniquely identifies the virtual interface of the service.
- SVLAN ID

  Displays the SVLAN of the configured service virtual port.
- PonPort ID

  Displays the PON port corresponding to the configured service virtual interface.
- ONU ID

  Displays the ONU ID corresponding to the virtual port of the configuration service.
- Gem ID

  Displays the gem id corresponding to the configured service virtual port.
- User VlanID

  Displays the user-side vlan corresponding to the configured service virtual interface.
- User VlanPri

  Displays the user-side vlan priority corresponding to the configured service virtual interface.
- Ether Type

  Displays the Ethernet frame type corresponding to the configured service virtual port. Currently, the type of the configurable IP address is ipv4, ipv6, or pppoe.

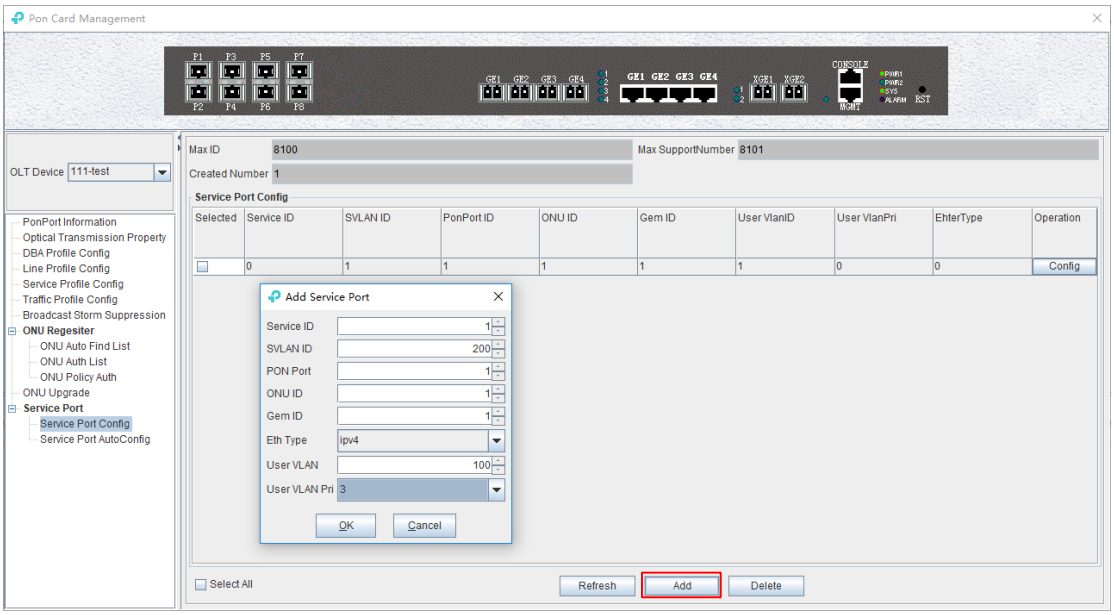
【Example of Service Port Configure】

Create a service virtual interface for the gem1 of the ONU3 on the PON2 port. The virtual interface ID is 1, the SVLAN is 200, the Ethernet type is ipv4, the user side vlan is 100, and the user side

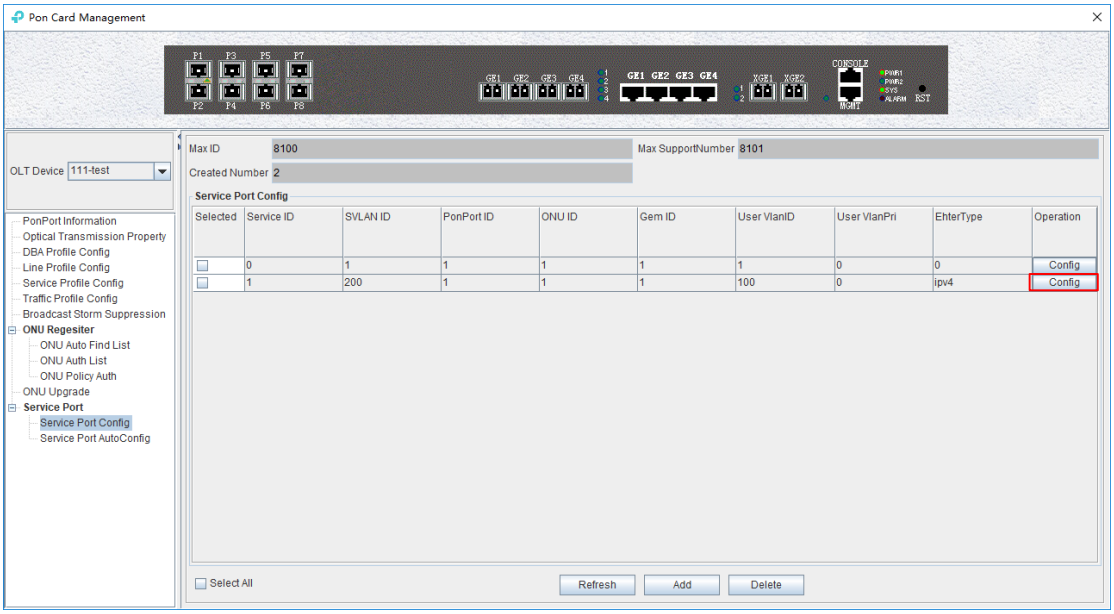
vlan priority is 3.

Double click the '**PON Card**' icon on the left side of the main page, open the '**PON Card Management**' window and enter the '**Service Port Config**' page:

Click the '**Add**' button in the pop-up Add Virtual Port dialog box. Enter the relevant parameters. And finally click OK to complete the basic configuration of the service virtual interface.



Then double-click the 'Configure' button behind the service virtual interface to configure more parameters.



On the service port configuration page, you can bind the created traffic profile, vlan tag rule, and other information. You can also view the online status of the ONU and the number of packets on the upstream and downstream packets.

Finally, click the 'Settings' button to complete the configuration of a service port.

Description of the vlan switch parameter in the service port：

Default:
In the default mode, the C-VLAN carried by the user side does not change, and a layer of S-VLAN is added. Applicable to the service flow in which the S-VLAN is a QinQ VLAN and the default mode is switched.

Translate:
The C-VLAN carried by the user side is switched to a S-VLAN. Applicable to: The S-VLAN is a common VLAN, and the C-VLAN or VLAN+802.1p or VLAN+EtherType traffic classifier is used. The C-VLAN is a service flow of 1-4094 or 0 (priority-tagged). The S-VLAN is a QinQ VLAN and is specified as the service flow switched in the translate mode.

Translate-and-add:
Switch VLANs and add a layer of tags. The C-VLAN carried by the user side is switched by one layer of VLAN, and then a layer of S-VLAN is added, and the S+C' two-layer VLAN is uplinked. Applicable to: S-VLAN is a stacking VLAN, which specifies the C-VLAN or VLAN+802.1p or VLAN+EtherType traffic classifier. The C-VLAN is a service flow of 1-4095 or 0 (priority-tagged). The S-VLAN is a QinQ VLAN and is designated as the service flow switched by the translate-and-add mode.

Add-double:
Add two layers of tags. Add the user-side packet to the two-layer VLAN (S+C). Applicable to: The S-VLAN is a stacking VLAN, and the service flows are processed by a single service or by EtherType traffic classification. The S-VLAN is a stacking VLAN and the service stream processed by the untagged service stream. The S-VLAN is a QinQ VLAN and is designated as the service flow switched by the add-double mode.

Transparent:
Transparent transmission mode, no VLAN changes are made. The C-VLAN carried by the user side is directly used as the S-VLAN. The S-VLAN of the service flow is required to be equal to the C-VLAN. Applicable to: The service flow created by the GEM port expansion port. The S-VLAN is a QinQ VLAN or a stacking VLAN and is specified as a service flow that is switched in the transparent mode.

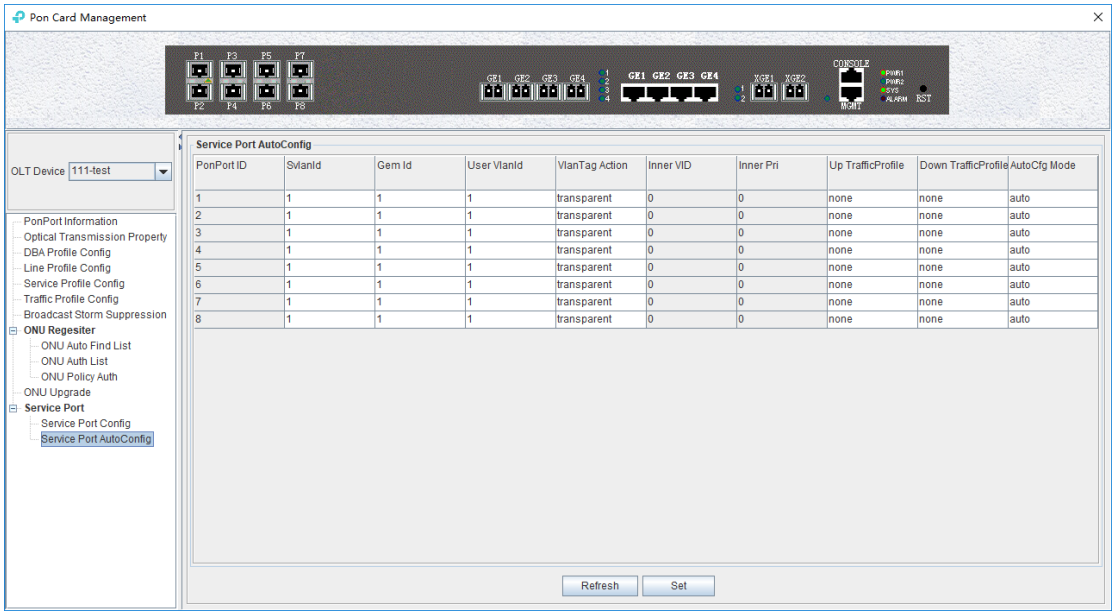
Inner VID:
The inner VLAN after switching. If not specified, the default VLAN 1 will be used. The inner VLAN can be specified only when the switching mode is "translate-and-add" or "add-double".

Inner Priority:
802.1p priority of the inner VLAN after switching. If not specified, the inner VLAN priority in the traffic template referenced by the service flow will be used. If the traffic flow does not reference a traffic template, the default priority of 0 is adopted. The priority of the inner VLAN in the traffic profile is recommended.

7.3.10.2 Service Port AutoConfig

Double click the '**PON Card**' icon on the left side of the main page, open the '**PON Card**

Management' window and enter the '**Service Port AutoConfig**' page:



You can choose to configure the service port to be in the auto mode and configure the service port Svlan id, Gem ID, and vlan tag rules. After the ONU is added to the line, the OLT automatically sends the service port configuration information to the ONU. The ONU will forward the data according to the configuration information of this automatic flow.

You can also choose to configure the service port to be in the manual mode. After the ONU is added to the line, the OLT does not automatically send the service port information. You need to add the service port manually or in batches according to your requirements.

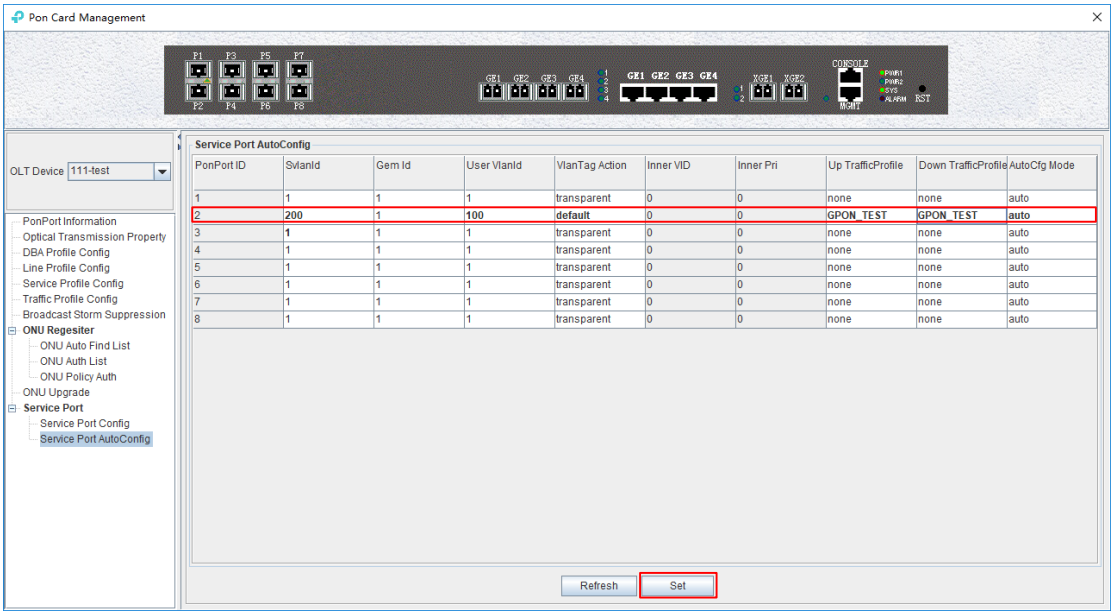
The automatic creation of a service port can be automatically delivered to a gem port. If the ONU has multiple gem ports, other gem ports need to be manually configured with the service port.

【Example of Service Port Configure】

Set the mode of creating a virtual interface on the PON2 interface to automatic mode. The Svlan is 200, the user vlan is 100, the vlan tag rule is default, and the upstream and downstream traffic templates are XR500V.

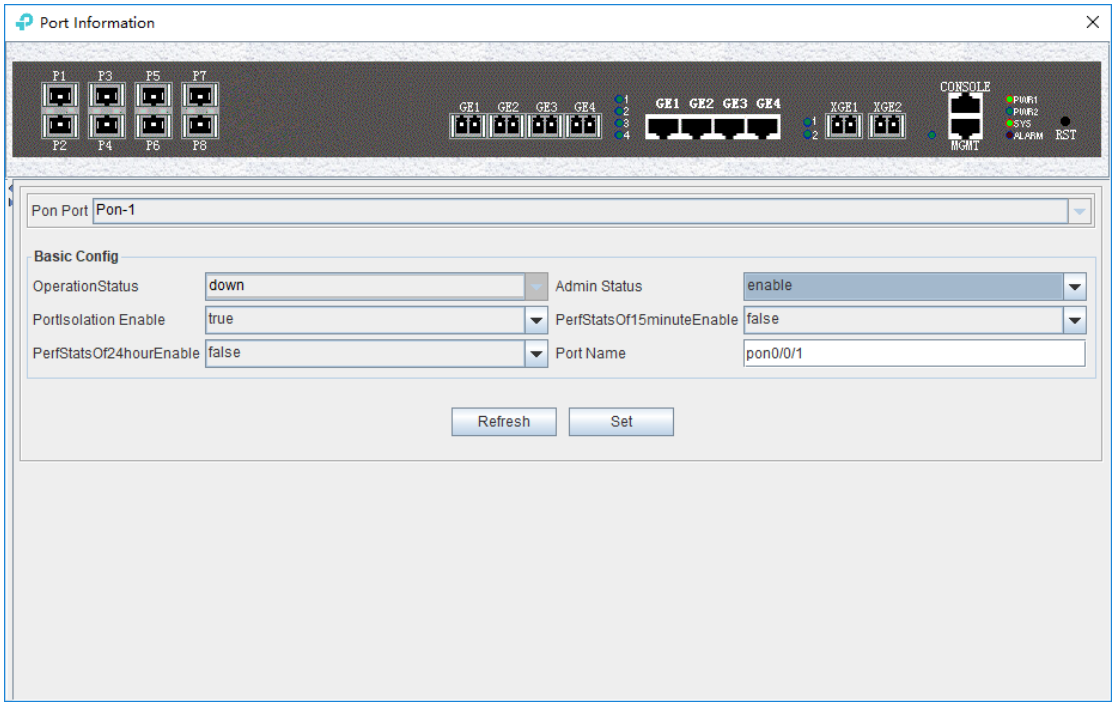
Double click the '**PON Card**' icon on the left side of the main page, open the '**PON Card Management**' window and enter the '**Service Port AutoConfig**' page:

Then, configure the Svlan as 200, the user vlan as 100, the vlan tag rule as default, and the upstream and downstream traffic profiles to select XR500V. Finally, click OK to complete the configuration of the service virtual interface of the PON2 port.



7.4 PON Port Is Managed Separately

Double click on the '**Port-1**' icon on the left side of the main page and enter the '**PON Card management**' page. The typical page is as follows:



In this page, user mainly conduct a separate configuration operation on the PON of OLT, and the specific parameter configuration is as follows:

- OperationState

  Display OLT's PON operation state, "**down**" state indicates that OLT has no registration ONU under the PON of OLT; The "**up**" state shows that the PON of OLT is registered ONU.

- Admin Status

  You can display and open the PON port of OLT, and '**enable**' open the PON; '**disable**' closes

the PON.

- PortIsolation Enable

  Show that the PON port isolates manage state, and the administrator can configure this option, which has two states, '**true**' and '**false**' respectively.

- PerfStatsOf15 minutesEnable

  Display 15 minutes of performance statistics to enable the managed state, the administrator can configure this option, which has two states: 'true' and 'false' respectively.

  When set to '**true**', the 15-minute performance statistics for the pon port will be enabled; When configured as' **false** ', the 15-minute performance statistics for the pon port will be disabled.

- PerfStatsOf24hourEnable

  Show the 24 hour performance statistics to enable the managed state, the administrator can configure this option, which has two states: 'true' and 'false' respectively.

  When set to '**true**', the function of the 24-hour performance statistics of the pon port will be enabled; When configured as' **false**', the function of the 24-hour performance statistics for the pon port will be disabled.

- Port Name

  The name of the configuration PON can be displayed.

8 ONU Device Management

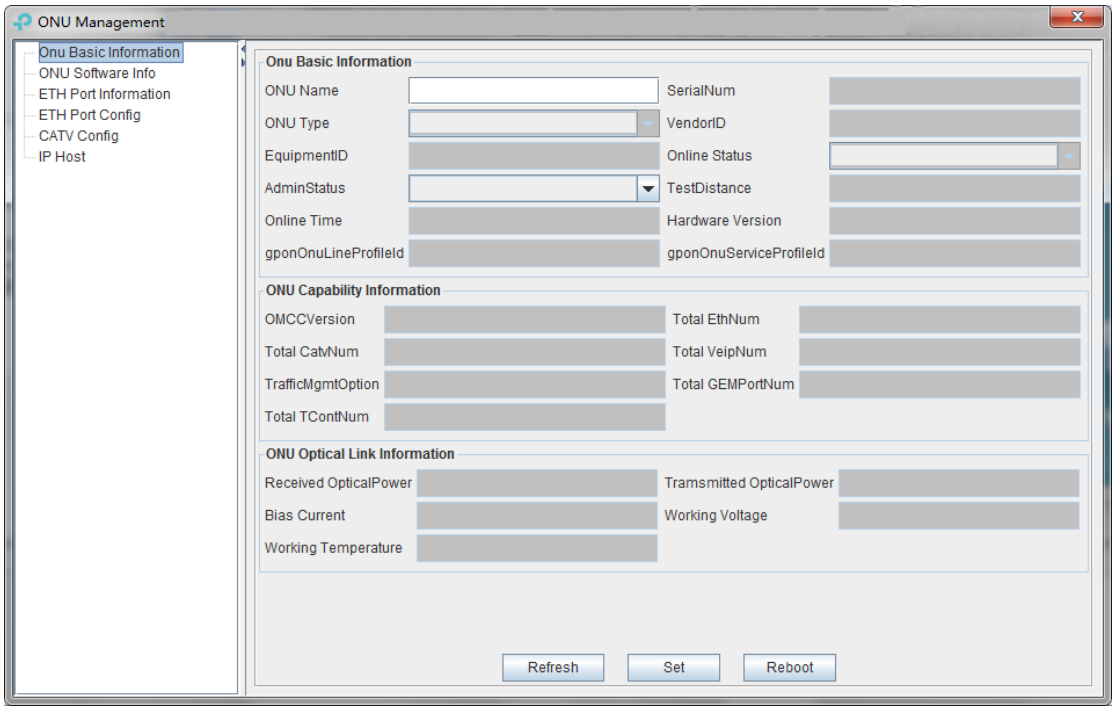
8.1 ONU Management Introduction

The ONU is the client device in the GPON system. The management of EMS software for ONU is carried out through the OLT connected to it. OLT's management of ONU is carried out by the OMCI management message based on itu-tg. 984. X standard.

EMS software support for a variety of types and models of ONU management, such as 1 FE ONU, 4 FE ONU, 8 FE ONU, 1 GE + WIFI ONU, 1 GE + CATV ONU, 4 FE + 2 POTS ONU, 4 FE + 1 CATV ONU, 4 FE + 2 + 1 CATV ONU POTS and so on.

This section with the commonly used 4FE + CATV ONU as an example to introduce the EMS software of ONU management, different port configuration type of data ONU, and more types of business data ONU part way through EMS software management basically the same, different parts in the device described in the relevant documents to type.

The ONU management window is opened by the corresponding ONU device icon on the left device tree of EMS software, and the ONU device is managed by the function parameters on the corresponding function page. The typical ONU management window page is shown below:



As shown in the figure above, the ONU device management includes the following contents:

- View ONU Basic information(ONU Basic information, ONU capability information, view ONU Optical link information)
- ONU Software Information
- ONU ETH Port information
- ONU ETH Port Config
- ONU CATV Config
- ONU IP Host

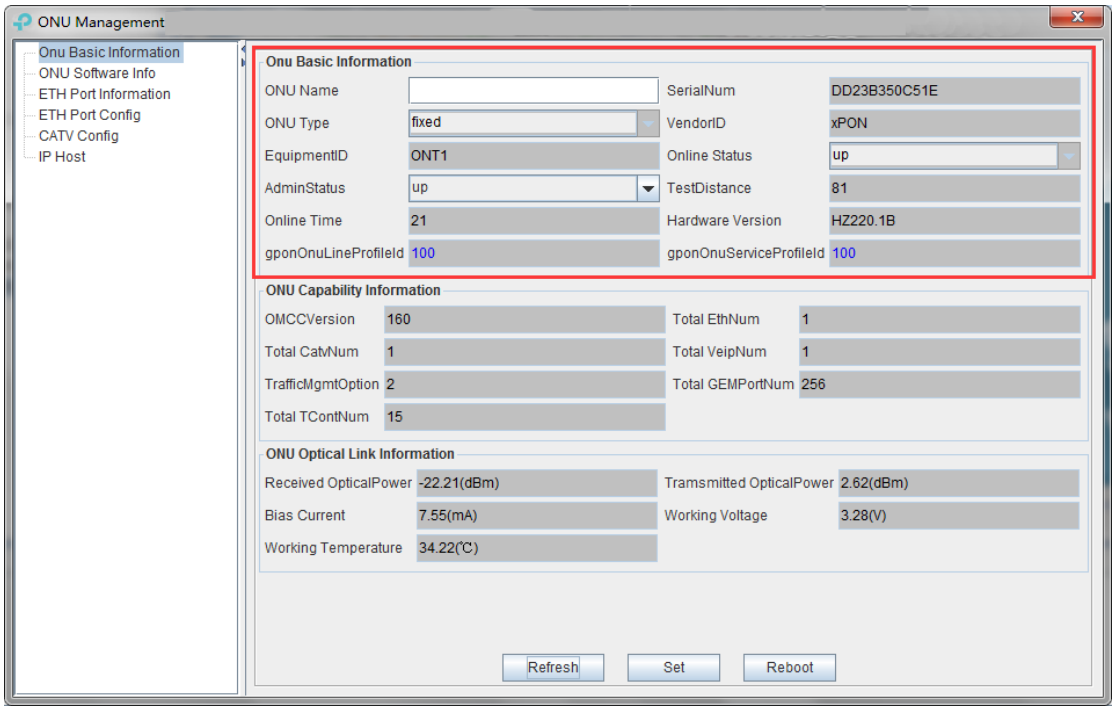
The following sections describe the contents of the ONU administration.

8.2 ONU Basic Information Management

8.2.1 View Basic Information of ONU

The basic information of ONU can be viewed mainly, which can see the online state of ONU, the admin status of ONU, the ONU distance, and the hardware version of ONU.

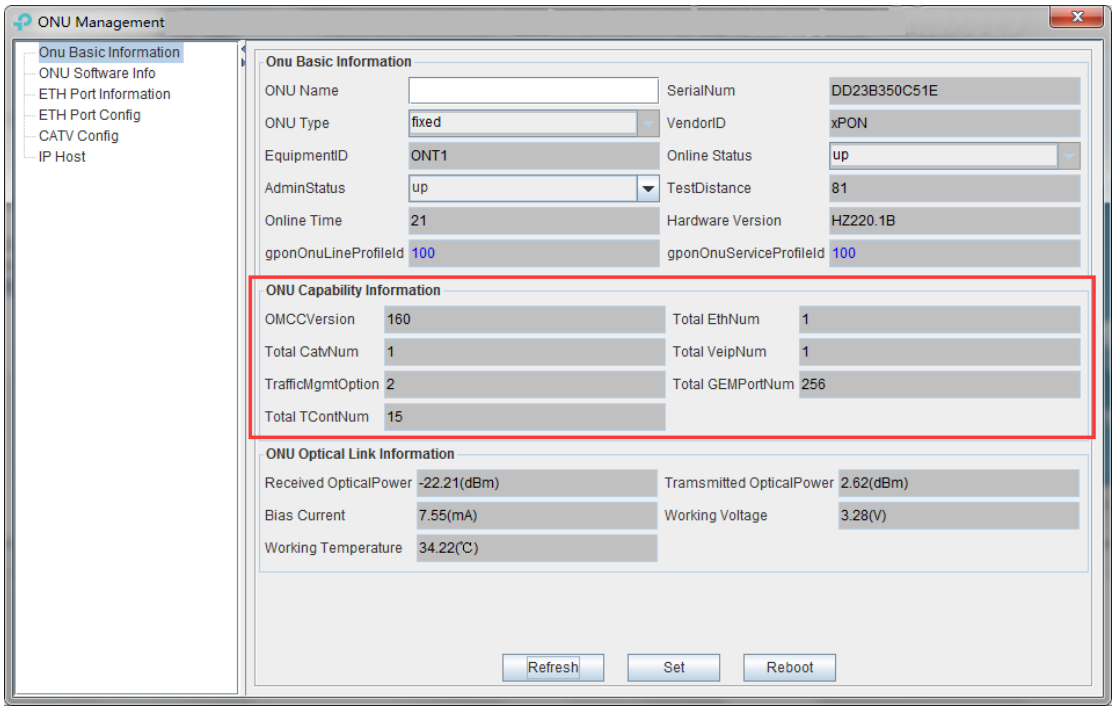
Double click on the left side of the main page to manage the ONU, enter the ONU management page, and click '**ONU Basic Information**' to enter the page to see the basic information of the ONU device:



8.2.2 ONU Capability Set Information View

The information of the ONU capability is mainly to see the number of ETH port number, CATV port number, post number and the support number of GPON related parameters such as gemport and tcont.

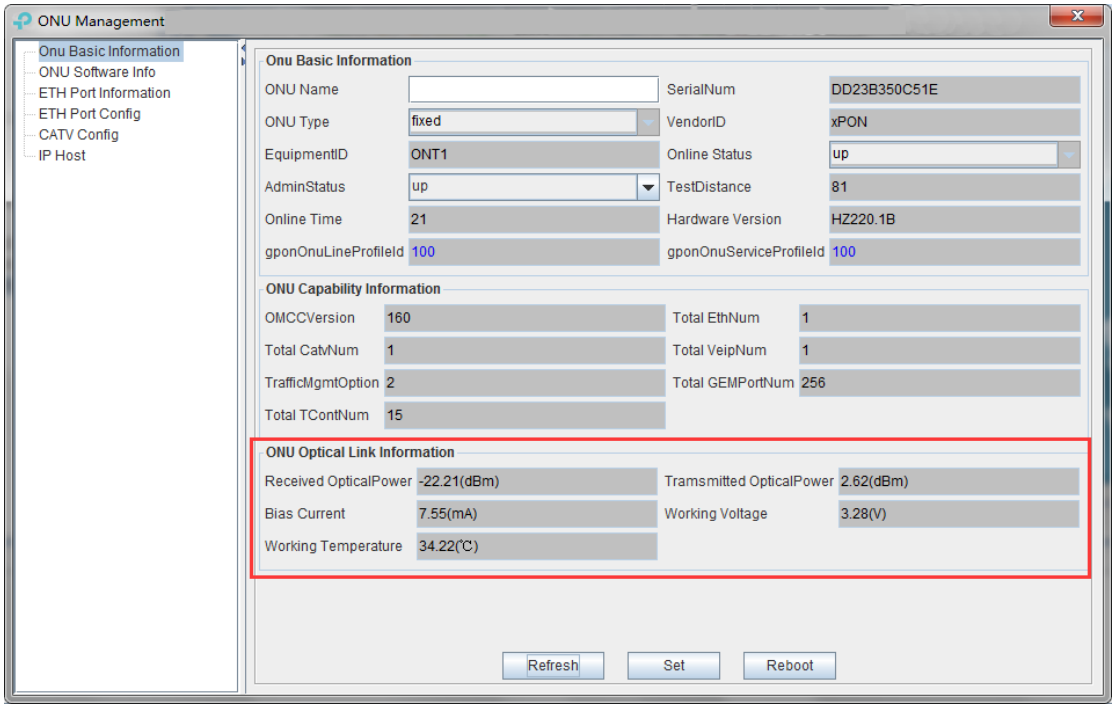
Double click on the left side of the main page to manage the ONU, enter the ONU admin page, and click '**ONU Basic Information**' to enter this page to view the port ability information of the ONU device.



8.2.3 ONU Optical Link Information

The optical link information of ONU is mainly to check the optical link information of the PON of ONU, such as: ONU receiving optical power information, and ONU transmitting optical power information.

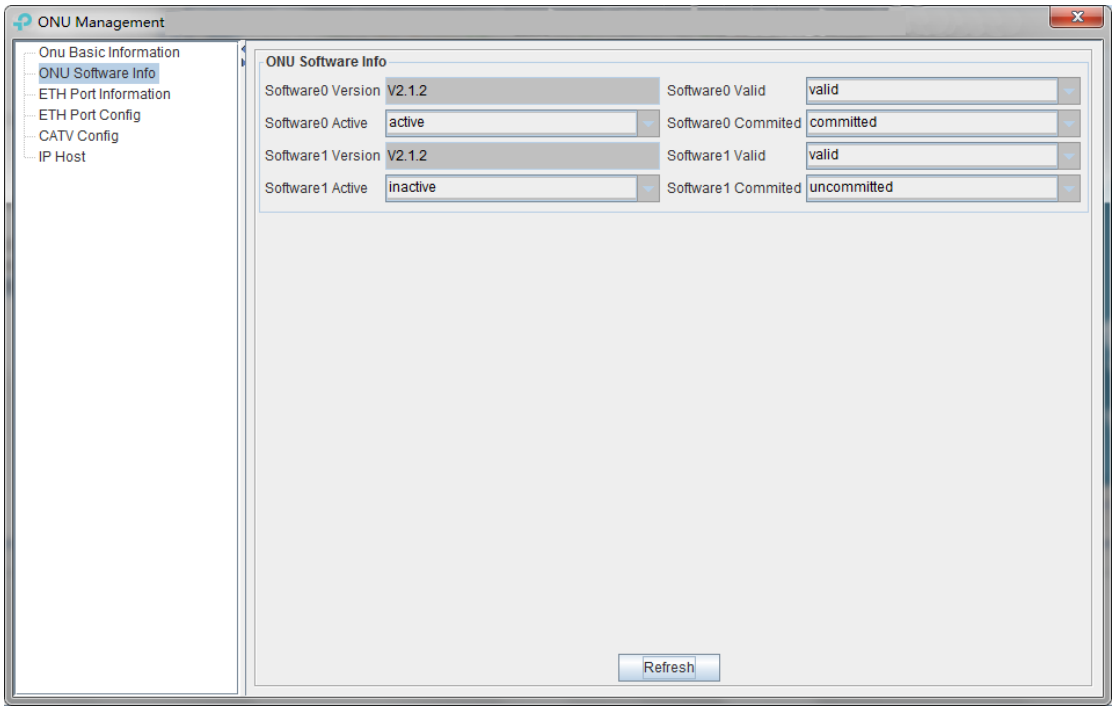
Double click on the left side of the main page to manage the ONU, enter the ONU management page, and click '**ONU Basic Information**' to enter the page to view the optical link information of the device's PON.



Note: GPON ONU registration for ONU receives light power requirement is very high, here on this side of the ONU receives the light power range must be between -8 ~ -27, OLT can automatically discover to the ONU, otherwise the OLT will always prompt ONU receives light power is too high. And it's easy to burn off the PON module of ONU if the ONU is too high.

8.3 View ONU Software Version

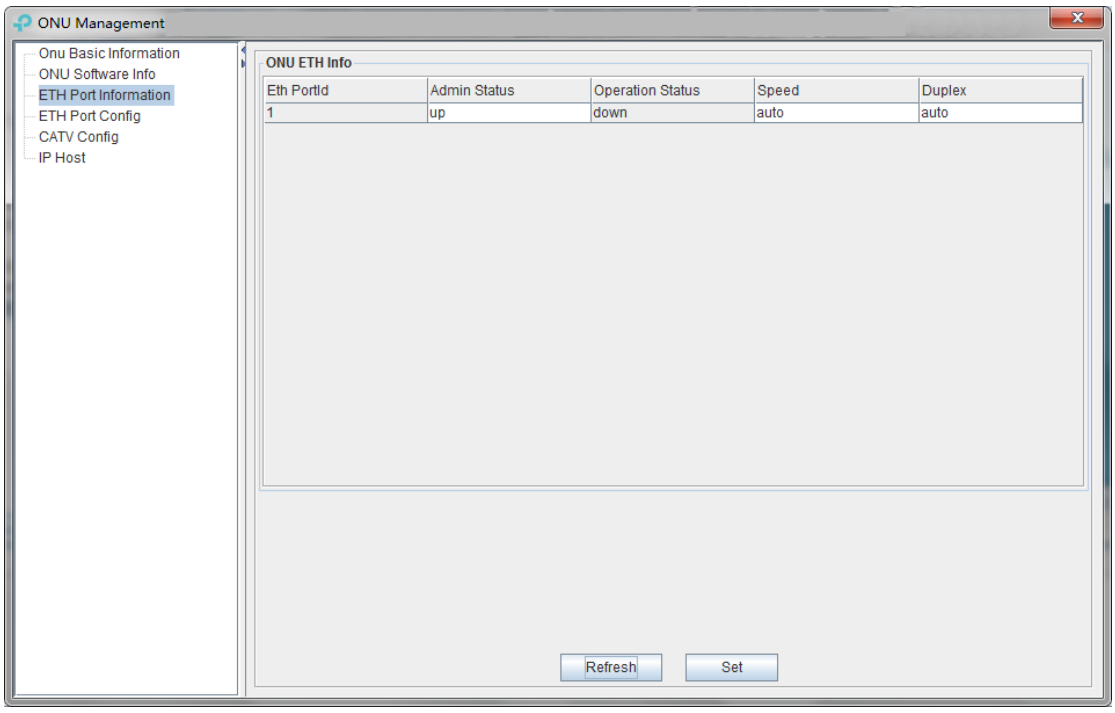
This chapter is mainly about the ONU software information. Double click on the left side of the main page to manage the ONU, enter the ONU management page, and click '**ONU Software Infor**' to enter the page to view the ONU softwae information.



8.4 ONU ETH Port Management

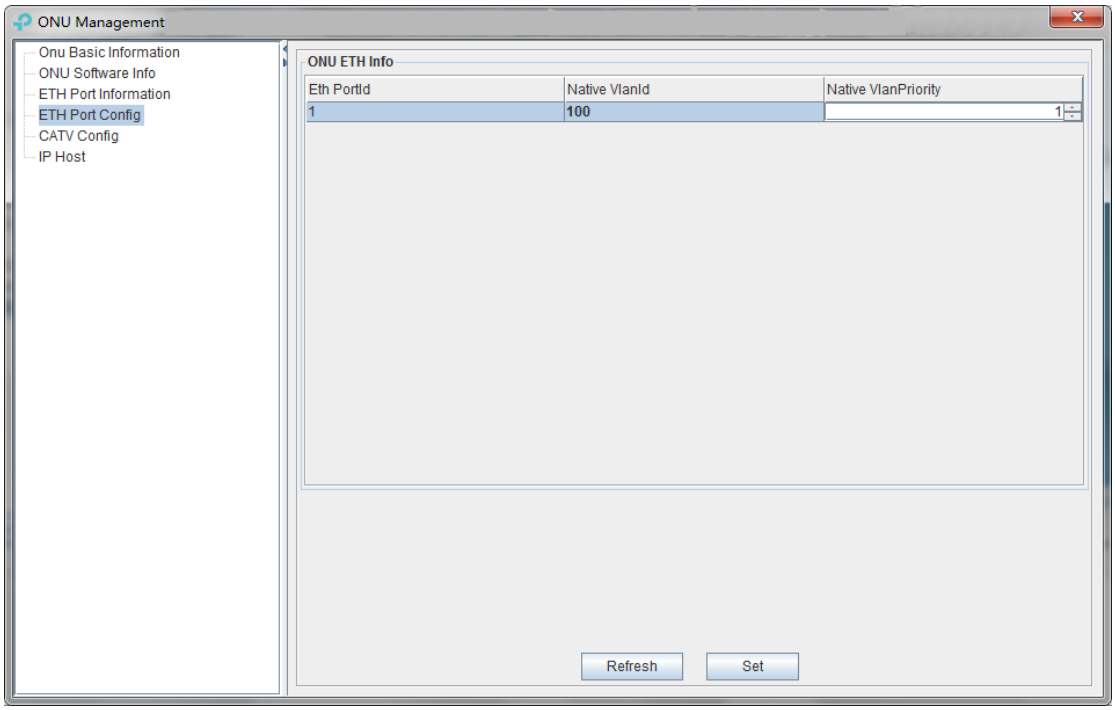
8.4.1 ONU ETH Port Information

This chapter is mainly about the ONU Eth port status, speed and duplex. Double click on the left side of the main page to manage the ONU, enter the ONU management page, and click '**ETH Port Information**' to enter the page to view the ONU port information.



8.4.2 ONU ETH Port access vlan mode config

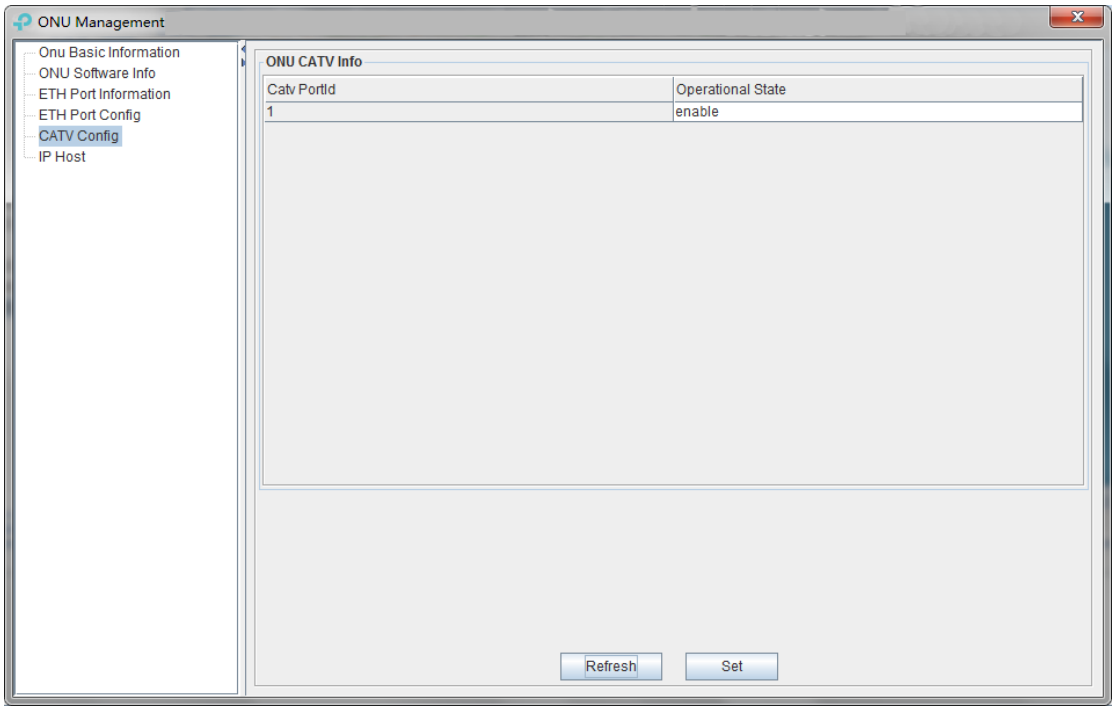
In section **#6.3.5.2.1** ont-srvprofile introduce ONU trunk mode, transparent mode, translate mode, QinQ configuration. But access mode need configure in ONU ETH port Config page. Double click on the left side of the main page to manage the ONU, enter the ONU management page, and click '**ETH Port Config**' configure ONU ETH port access mode. As shown below configure ONU ETH port to access vlan 100, priority to 1.



8.5 ONU CATV Port Management

Double click ONU managed in the left of main page, entering ONU management page, and click **'CATV Config'** to open or close CATV function.

Note: Before managing ONU's CATV function, users need to configure ONU's CATV port numbers at **#6.3.5** service profile configuration.



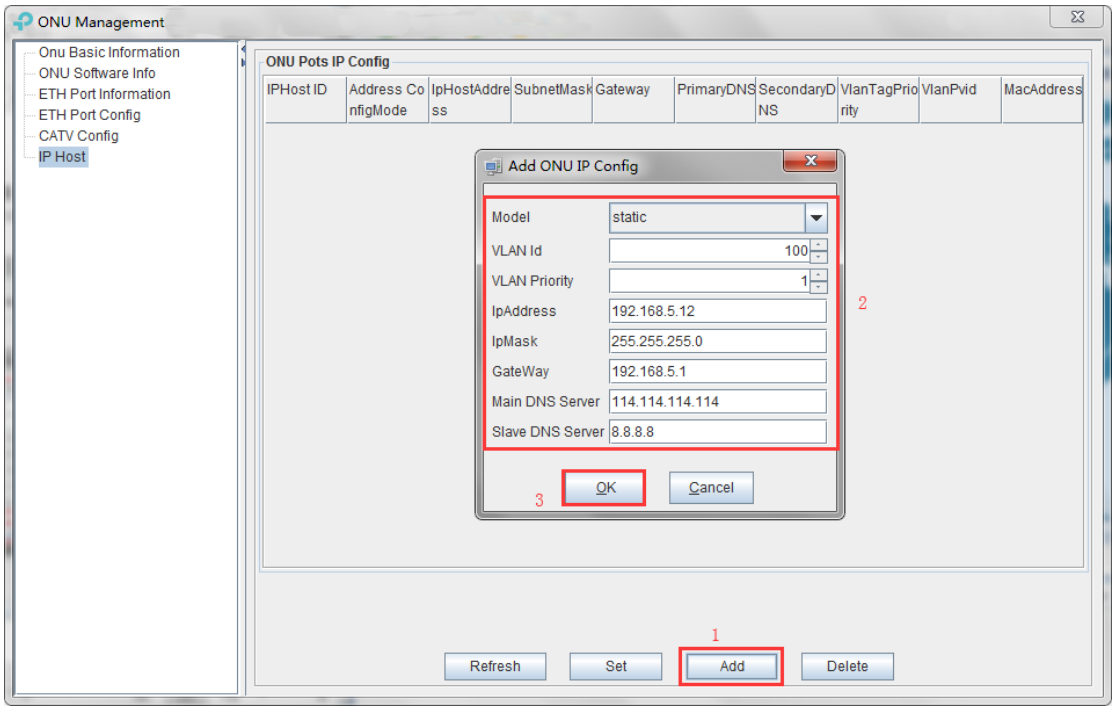
8.6 ONU IP Host Function Config

Double click ONU managed in the left of main page, entering ONU management page, and click '**IP Host**' to configure ONU management ip for accesst to ONU web from OLT uplink network.

Note: This feature also need ONU supported IP Host function.

【Example of ONU IP Host Configuration】

Example: Configure ONU IP Host. Mode is static. VLAN 100. VLAN Priority 1. IP address is 192.168.5.12 mask is 255.255.255.0 Gateway is 192.168.5.1. Main DNS Server is 114.114.114.114. Slave DNS Server is 8.8.8.8

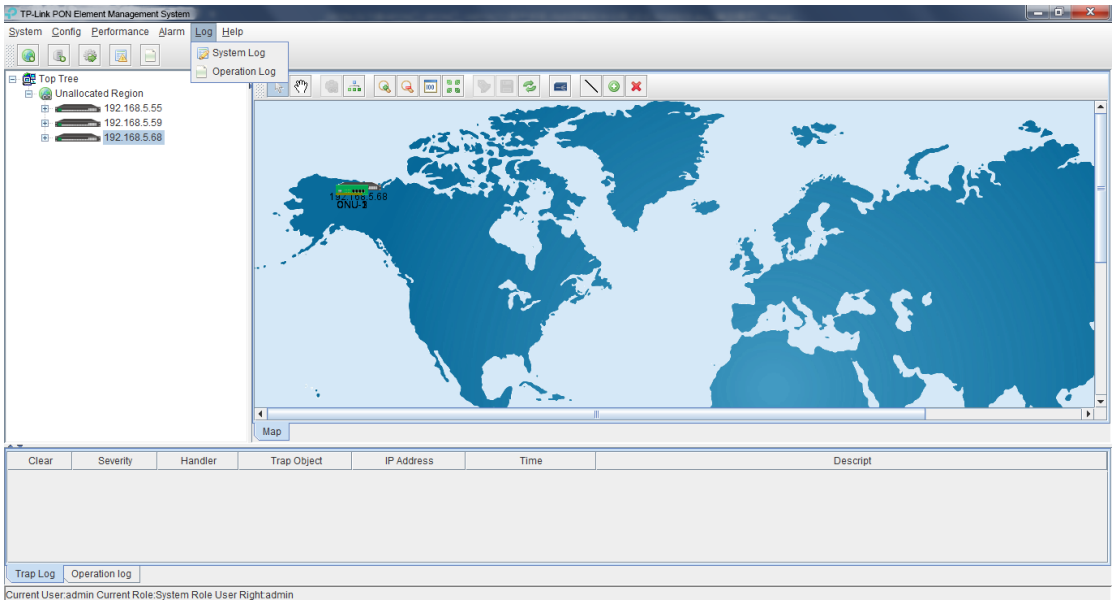


9 Operation Logs Management

It's convenient for administrator to view historic records of EMS operation. EMS provides operation logs query function.

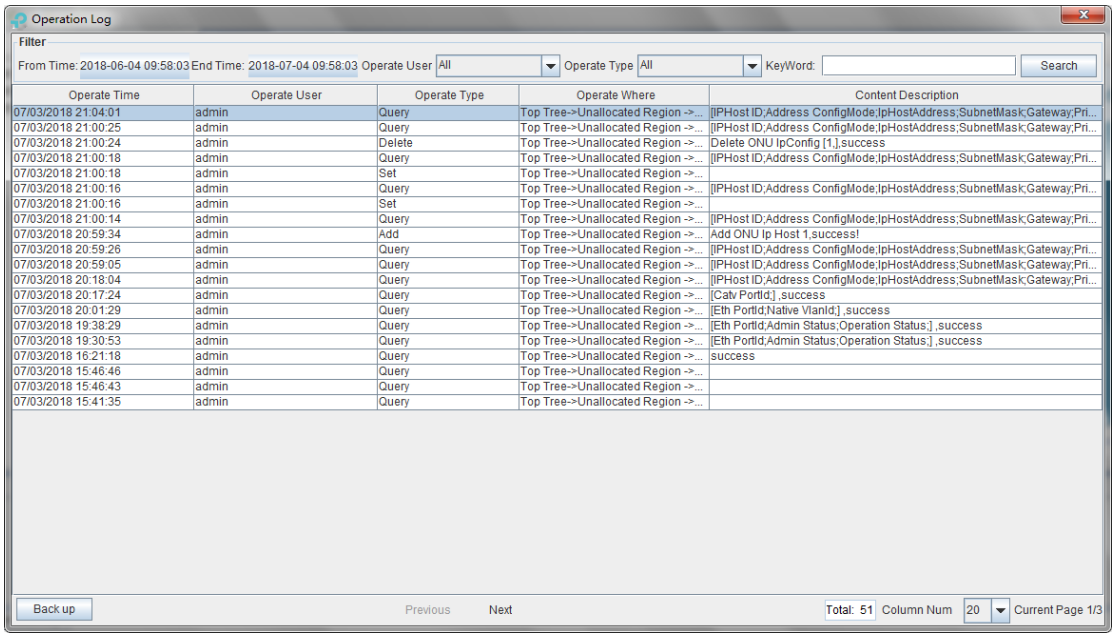
9.1 System Logs Management

Open **'System Logs'** window of **'Log'** menu to view historic system log records. The typical interface is shown below:



At this point, the following '**System Log Query**' window will appear to select the start time and deadline of the system log, select the user name to be queried, enter the filtered keyword, and then

click the **'search'** button to view the eligible system Log：

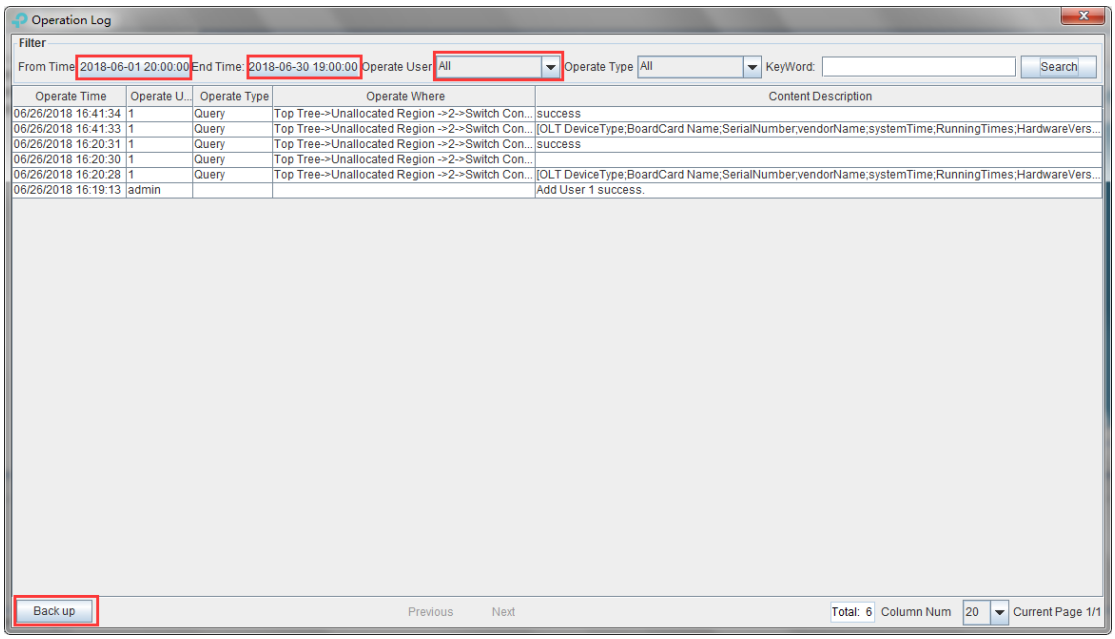


【Example of system logs management】

Example： Inquire and save all user's operation event from June 1,2018 20:00:00 to June 30,2017 19:00:00.

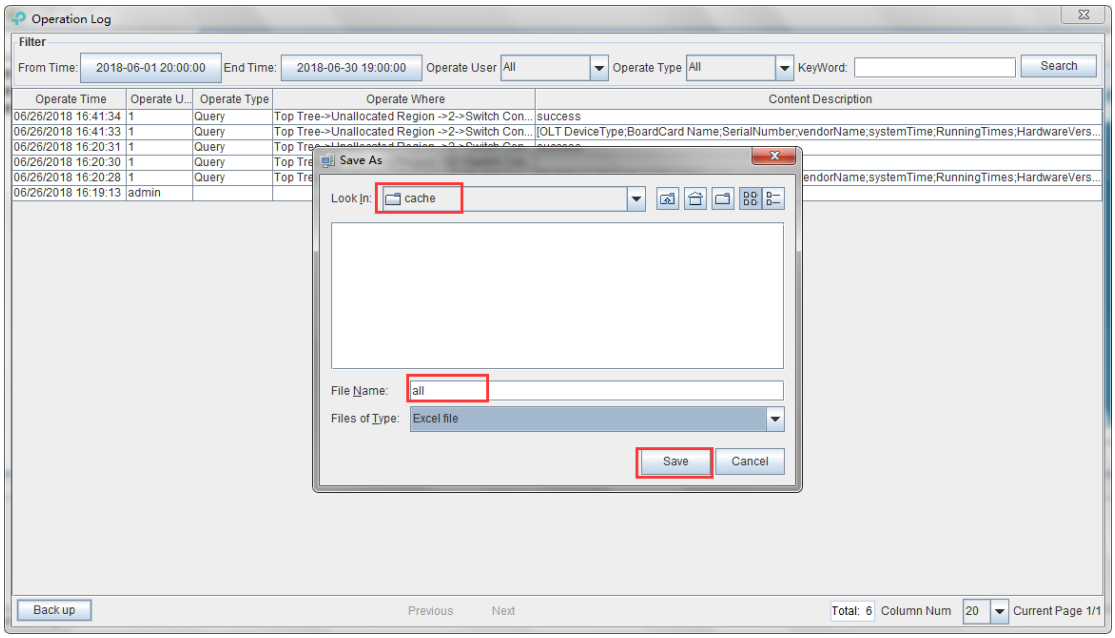
Step 1：

Choose specified time from menu of From Time and End Time. Operate User chooses 'All'. then click **'Search'** button, displaying log events in the below, and click **'Back up'.**



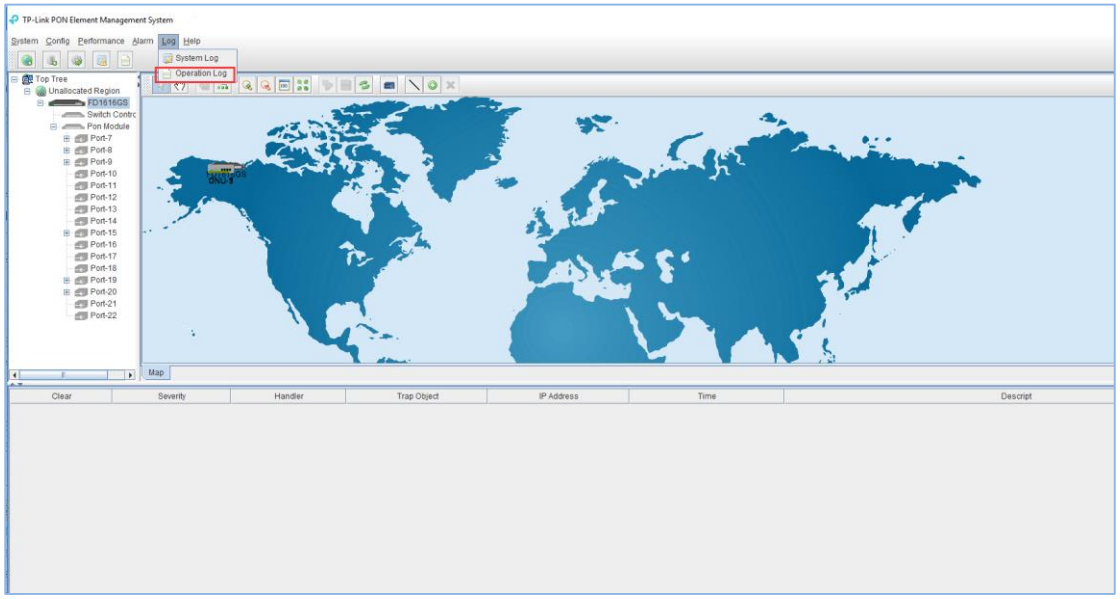
Step 2：

Choose specified dictionary to make a backup of all user's operation logs.

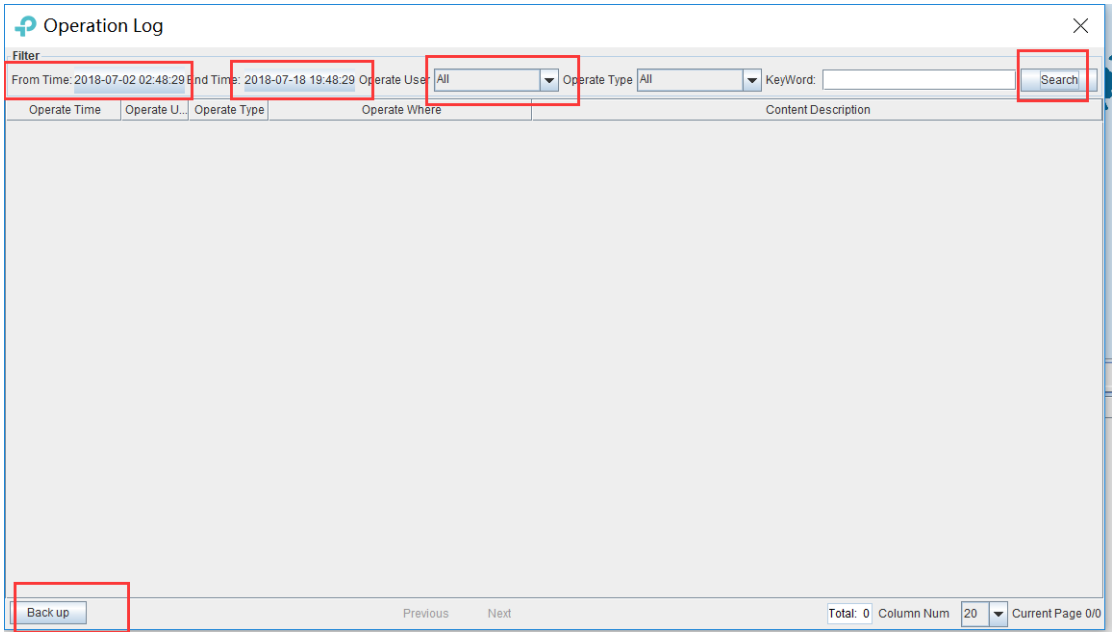


9.2 Operation Logs Management

Open the **'Log'** menu bar **'Operation Log'** window to query historical operation log records. The typical interface is shown below:



Select the start time and deadline for the operation log, select the user name to be queried, or enter the filtered keywords, then click the **'Search'** button to view the system logs that match the criteria:



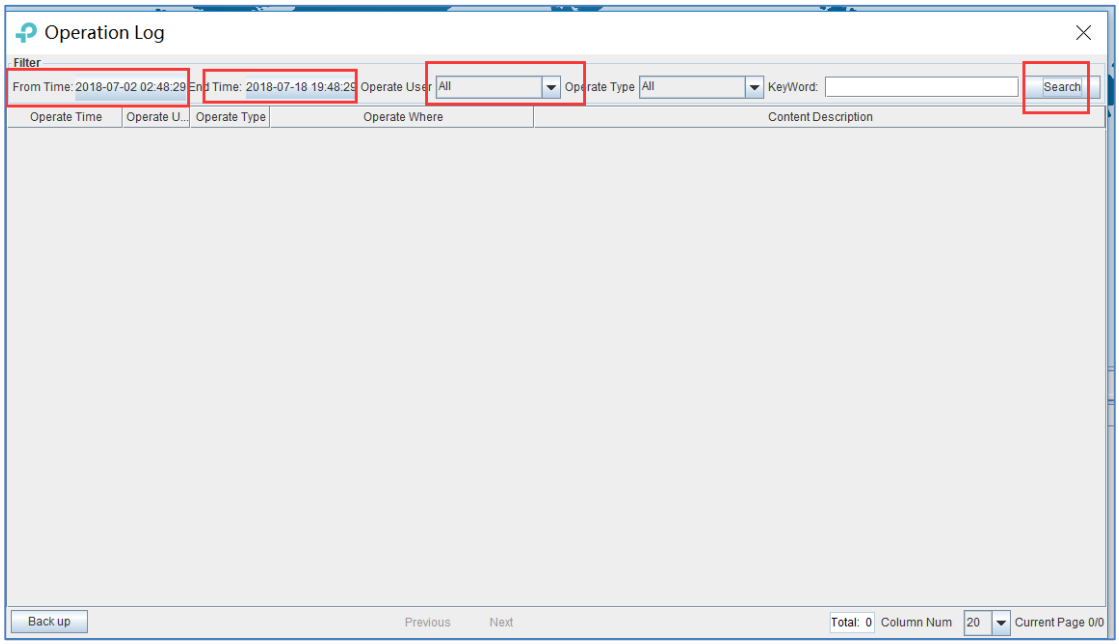
As shown in the figure above, the final query results can be saved as a separate file.

【Example of operation logs management】

Example: Query and save the operation event of the admin user during the period from June 1st, 2018, 17:00:00 to June 27, 2018, 20:00:00.

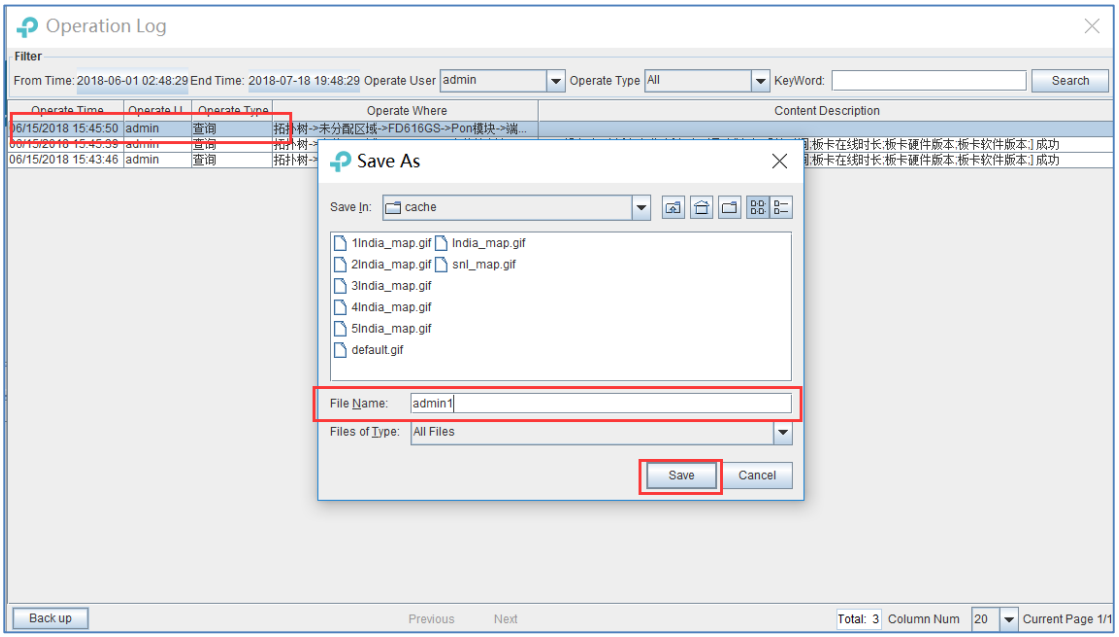
step 1:

Select the specified time from the drop-down menu of the start time and deadline of the upper side, select **'admin'** in the User Name drop-down menu, click **'Search',** the record will be displayed on the lower side, and click **"Backup"**:



Step 2:

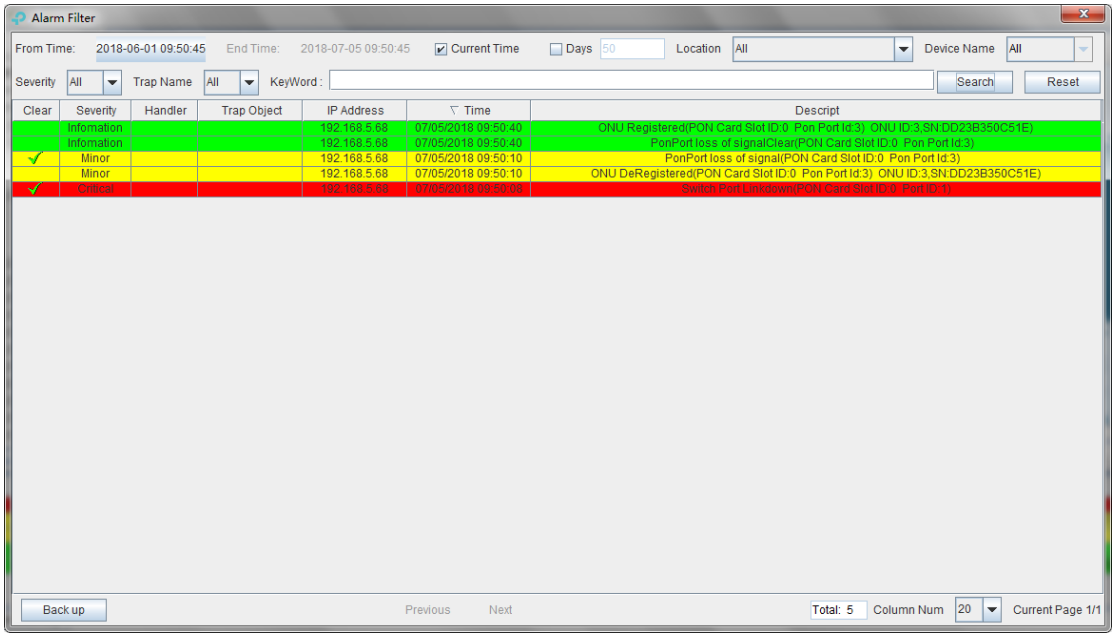
Select the specified directory to back up the operation log of the admin user.



10 Alarm Logs Management

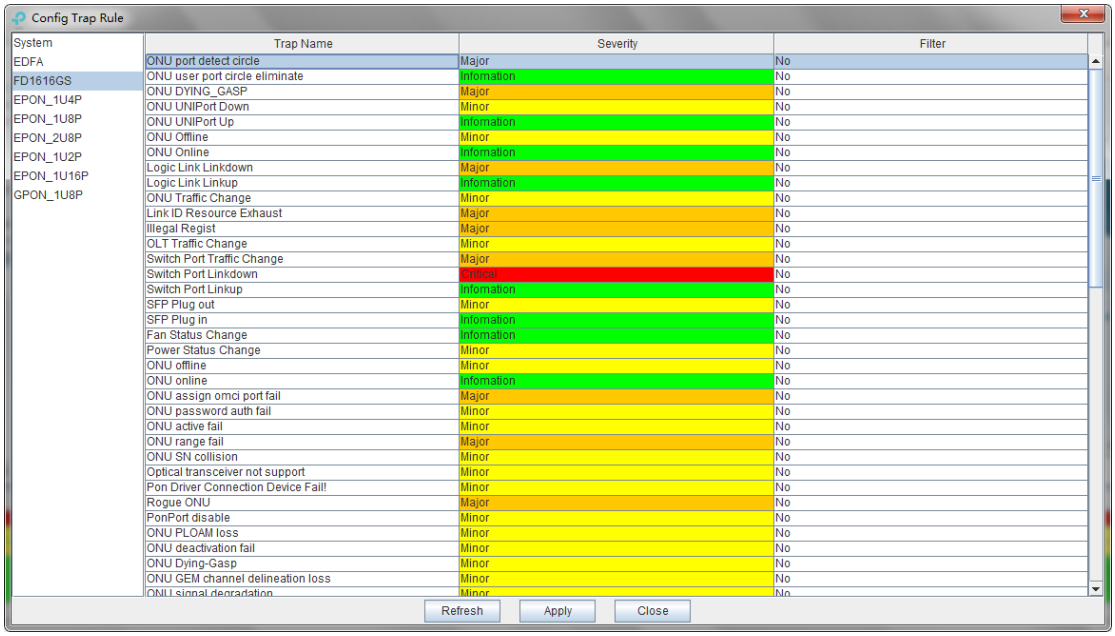
It's convenient for administrator to search alarm record of EMS operation. EMS provides alarm filter , backup and query function.

As shown below, open **'Alarm Query'** window of **'Alarm'** menu to search alarm information. You can set alarm filter conditions in the left page, including alarm time, alarm status, alarm severity, alarm element, alarm page record count and alarm type. Clicking **'Search'** menu can view alarm information meeting filter conditions in the right. Clicking **'Reset'** menu can reset filter conditions. Clicking **'Back up'** menu can save query information to chosen dictionary.



As shown below, open **'Config Trap Rule'** window of **'Alarm'** menu to configure alarm rule.

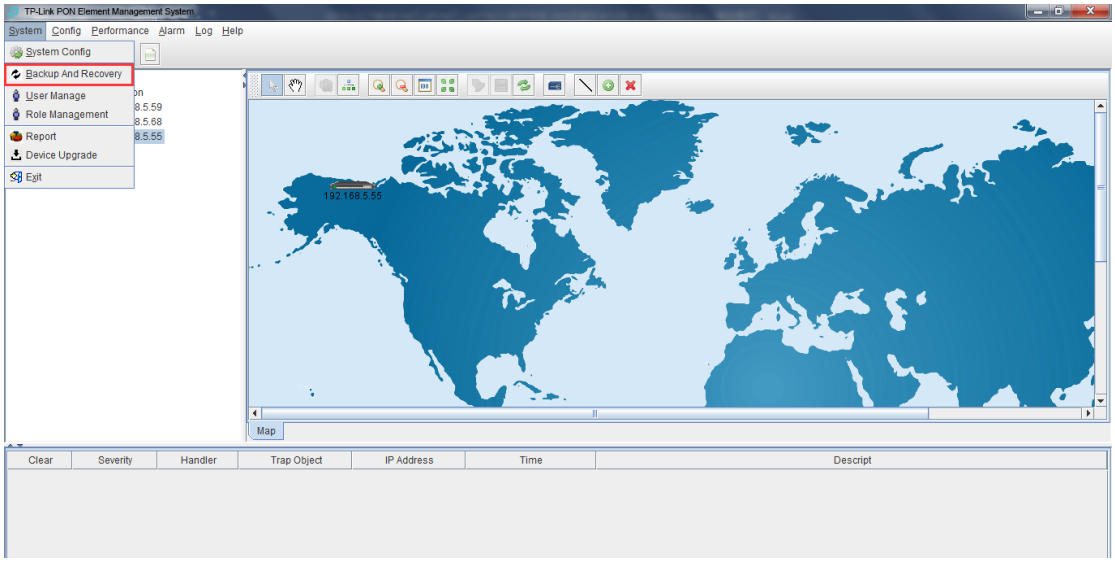
Choose device type in the left. On the right is corresponding alarm rule information. Firstly ,You can choose **'Yes'** or **'No'** of filter menu to modify alarm rules. Secondly, click **'Apply'** menu. Finally, choose **'Yes'** button from the pop-up menu. Clicking **'Refresh'** button can update alarm rule information. Clicking **'Close'** button can close current page.



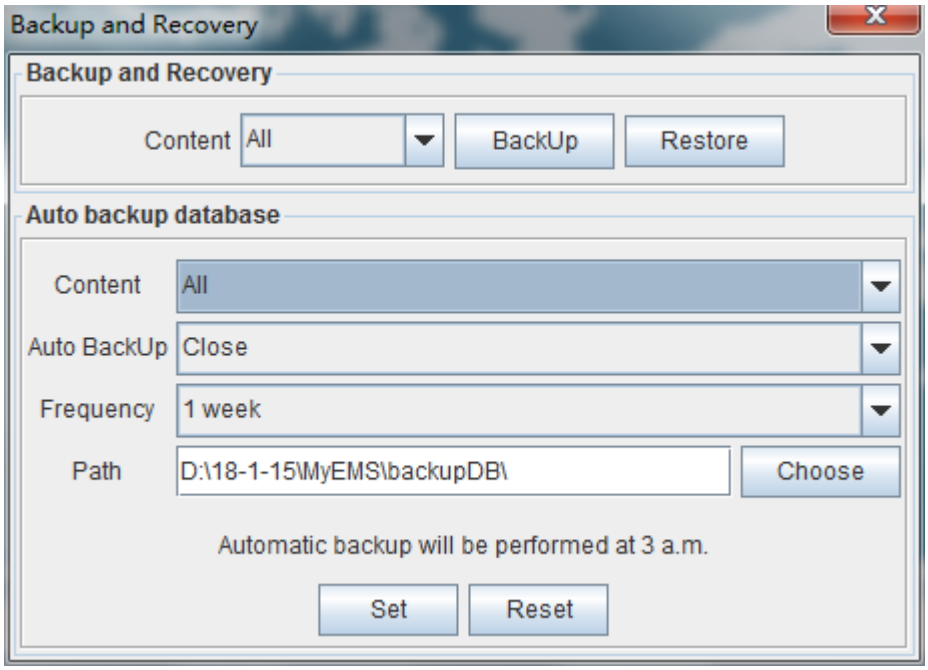
11 Backup and Recovery

EMS backup and recovery function includes log backup , log restore, alarm backup , alarm restore, Device Name backup , Device Name restore, ONU name backup, ONU name restore .

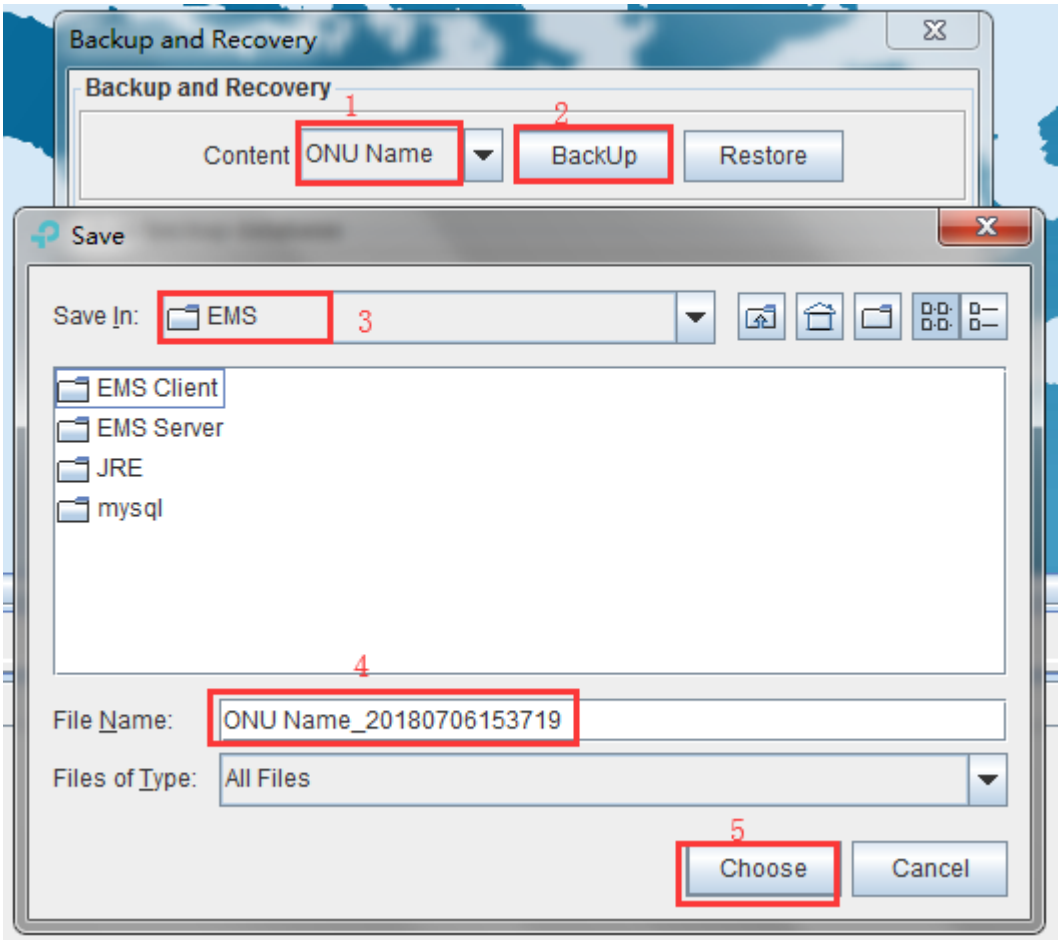
EMS configuration information, such as added device node, device port id name, user name and so on, is saved in EMS database file. In order to configurations not to be lost when system is abnormal, users can backup database regular intervals. Users have access to past configuration information via restoring database in case of software upgrade, operation system installation, system error or management server change.



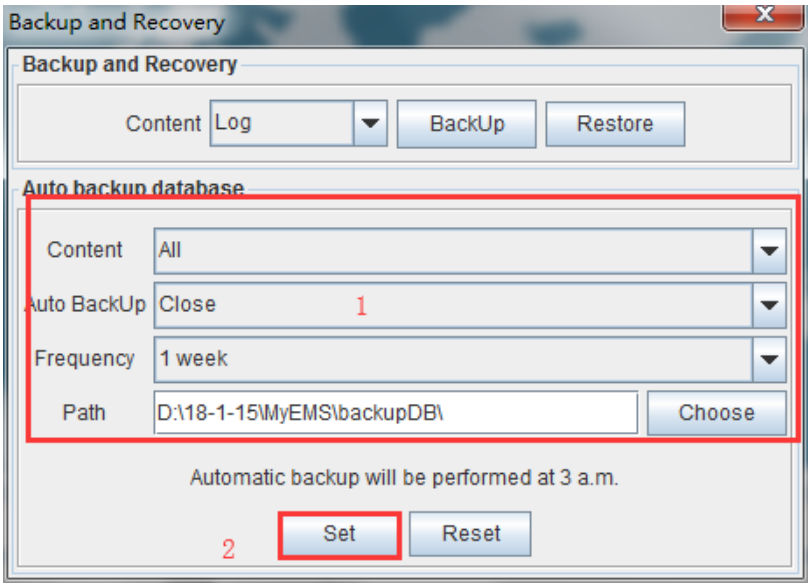
Choose **'Backup And Recovery'** bar of **'System'** menu to execute database backup and restore operation. As shown below:



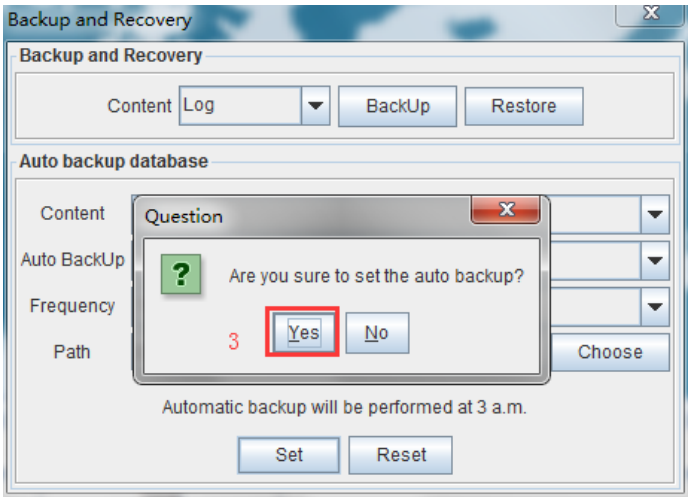
【Example of manually backup and restore】



【Example of auto backup and restore】



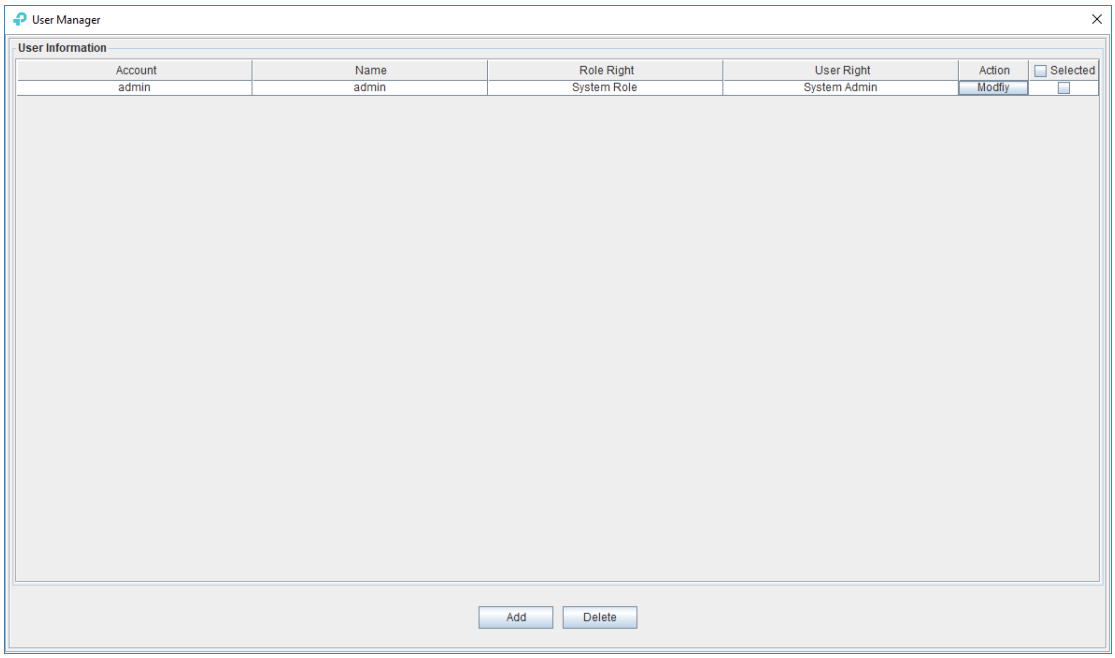
In the pop-up dialog windows, select "Yes" and the scheduled auto backup setting is successful.



12 User Management

EMS support multi-user operation and set different operation rights for different users, thus improving system operation security. By user management operation, administrator can add, delete and modify existing user information.

Open **'User Manage'** window of **'System'** menu to execute user information management.

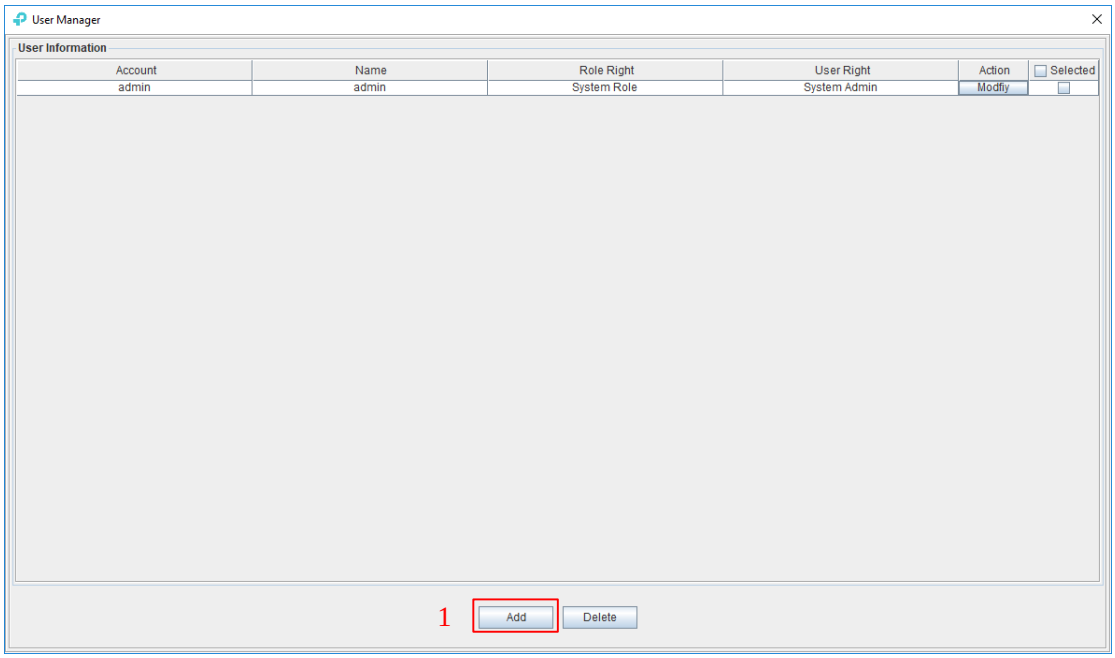


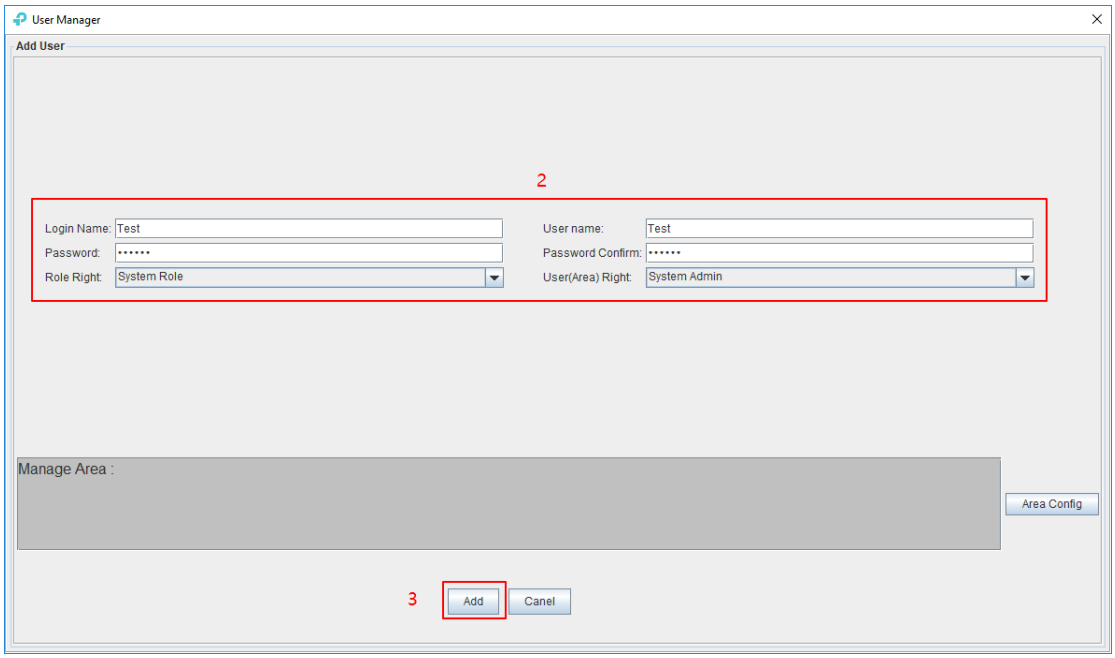
As shown above, the following is user management operations:

Add user

Input login name , user name and password into text-box at the bottom of window, and choose operation right, then click **'Add'** button, thus account set up successfully.

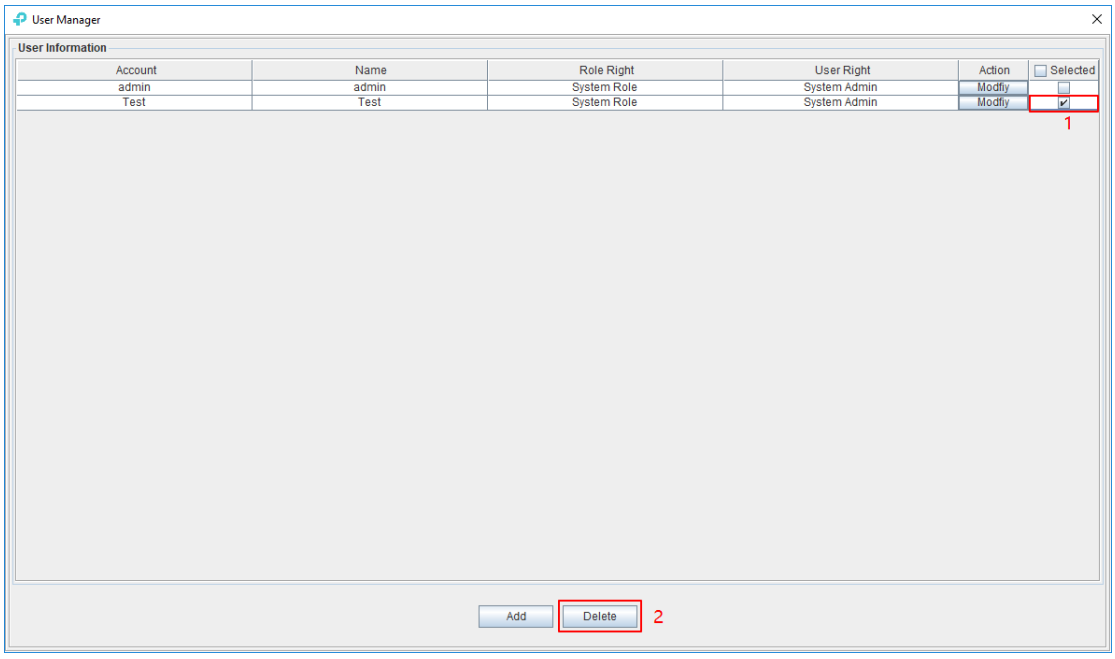
Add a new user, the Login Name is test, User name is test. The Role Right is the system Role, and the User(Area) Right is the system Admin.





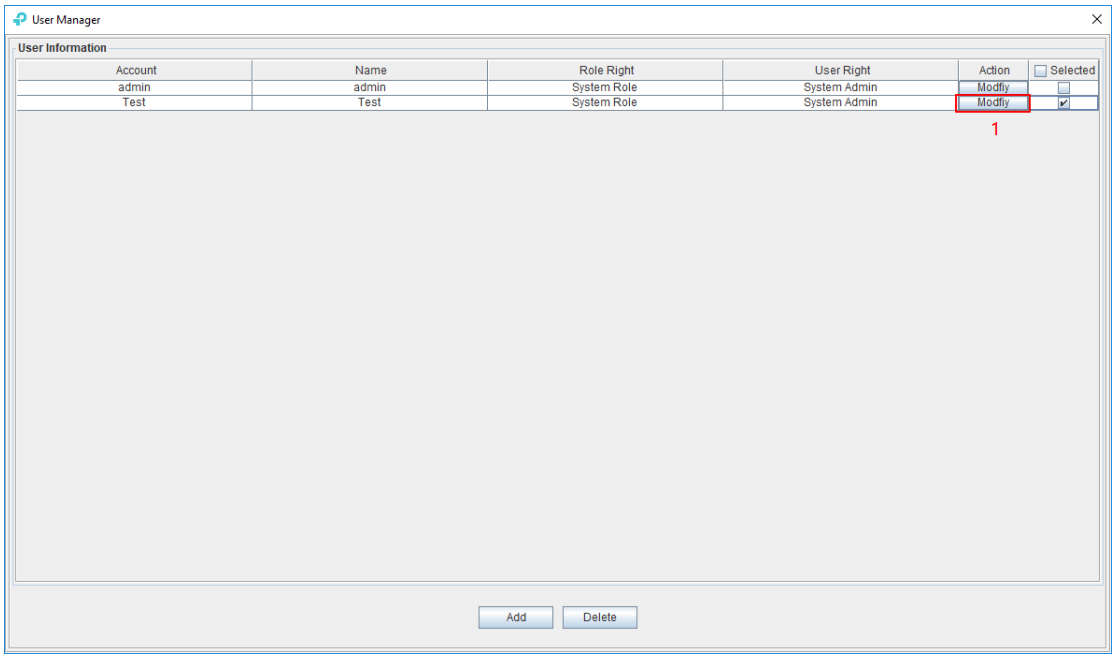
Delete user

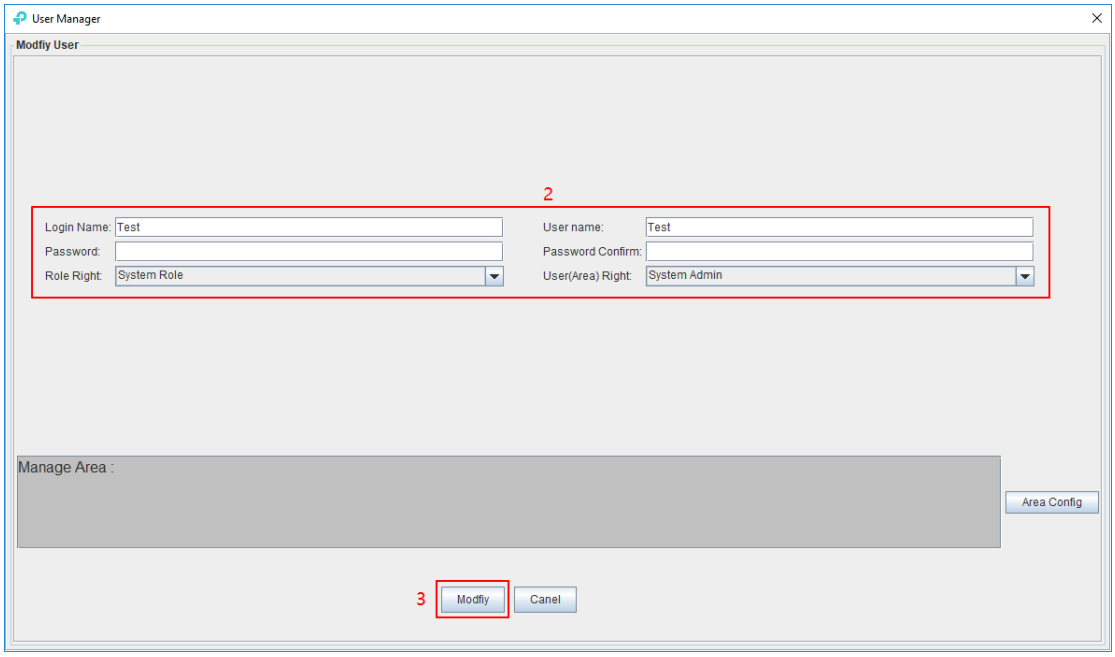
Choose a user account which needs to delete from current user lists, click **'Delete'** button to delete the user.



Modify user information

Choose a user account which needs to modify from current user lists, and can view current the user's information at the bottom of window. After modifying user information, clicking **'Modify'** button to save the configuration.





User account privilege

EMS Support **'System Admin' , 'Net Manager'** and **'Guest'** three user rights. **'System Admin'** level is the highest privilege, has all the operation rights of EMS software. **'Net Manager'** level has all of operation rights, expect of user account management function. **'Guest'** is the lowest privilege, the users with this privilege only can view management information and have not the rights to do any set operations.

13 Device Upgrade

EMS software support device firmware on-line upgrade. The main procedure for device upgrade has two step. First, download firmware files to target device via FTP server to be upgraded. The

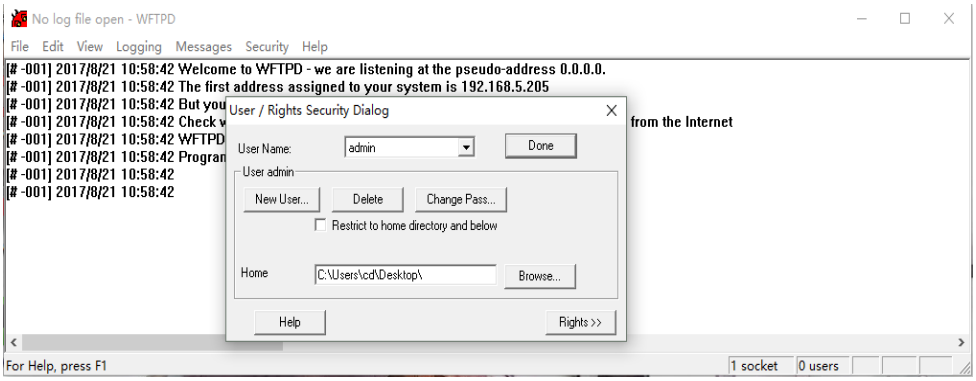
target device will go through the whole firmware upgrade process according to upgrade commands received from EMS.

Device upgrade steps are introduced as follows：

1. FTP Server configure

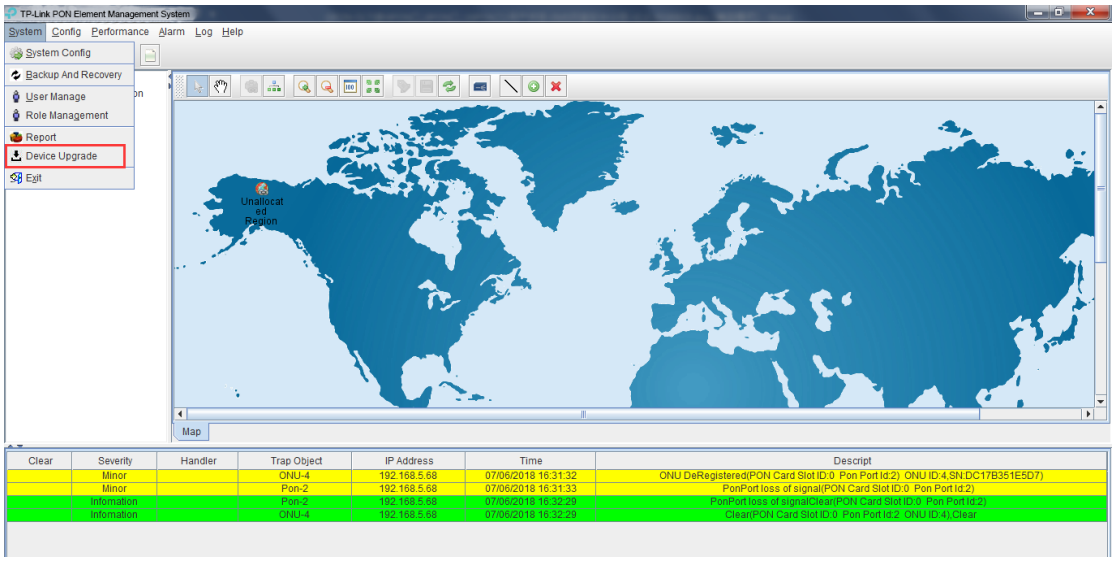
   First open FTP server, then configure file path and IP address. IP address and OLT mgmt port's IP address should in the same network segment.

As shown below：



2. Copy upgrade file to root dictionary of FTP Server
3. Parameter configure

   1） Choose **'System'** -> **'Device Upgrade'** from main interface, as shown below：



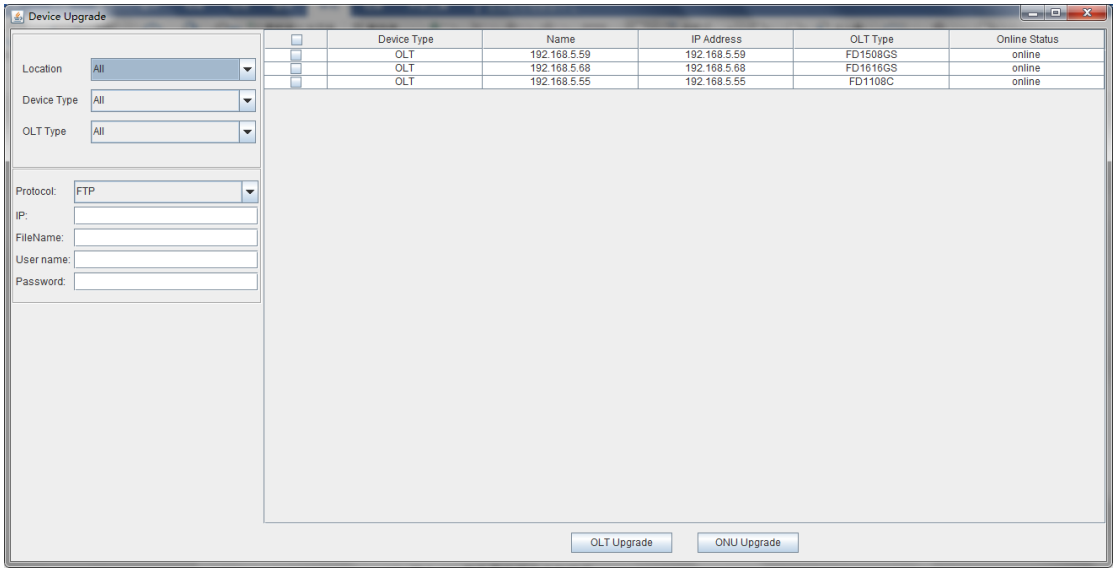


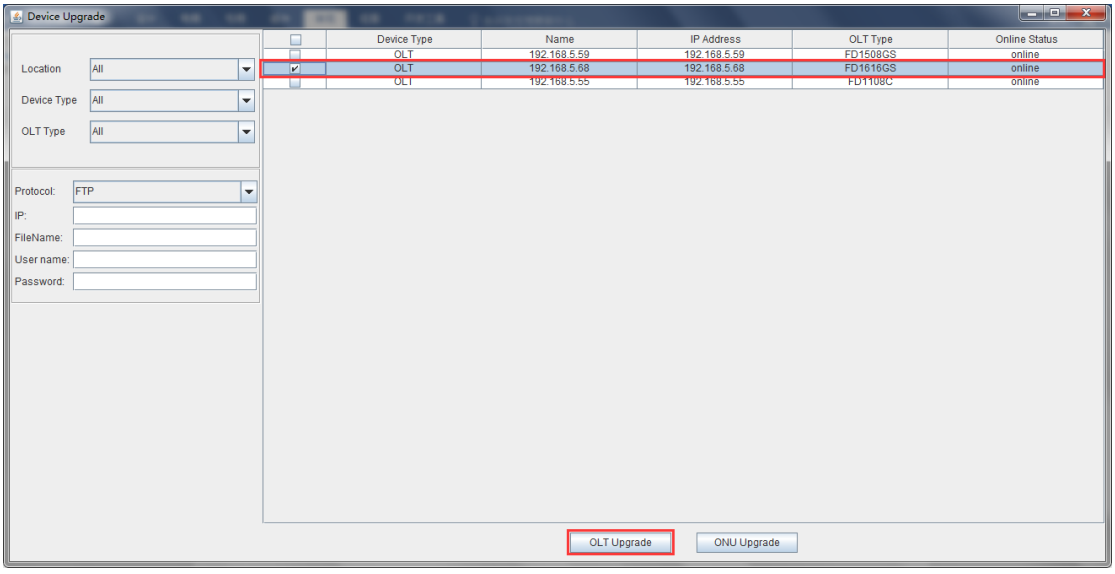
Figure 1: Device upgrade

2） Select the location of the device to be upgraded, the device type, OLT type, enter the IP address of the FTP server, and the file name of the upgrade.

3） Input FTP Server’s user name and password.

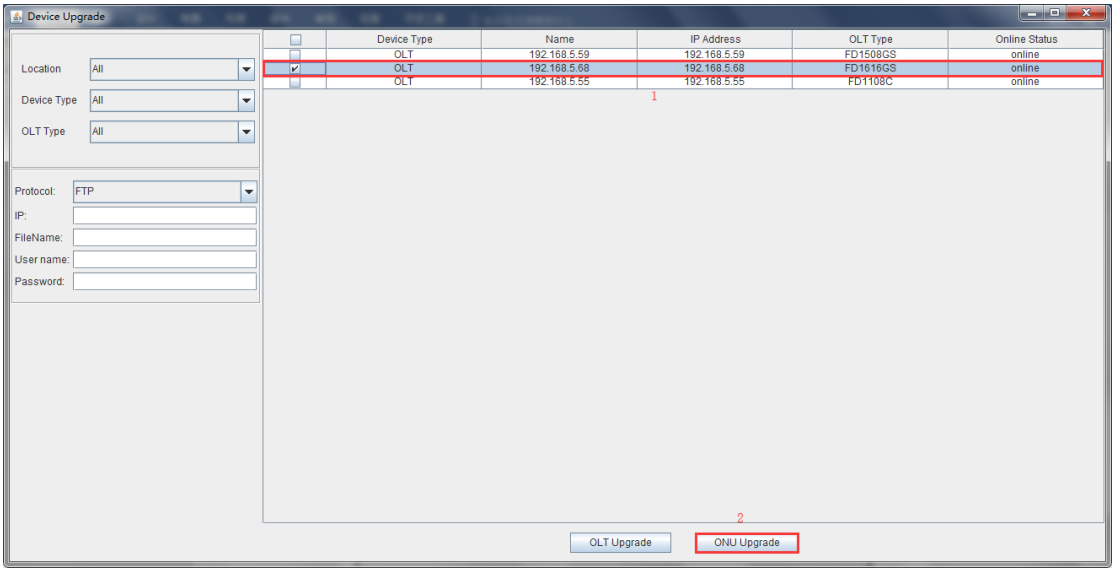
4） If upgrade OLT, the steps as follows:

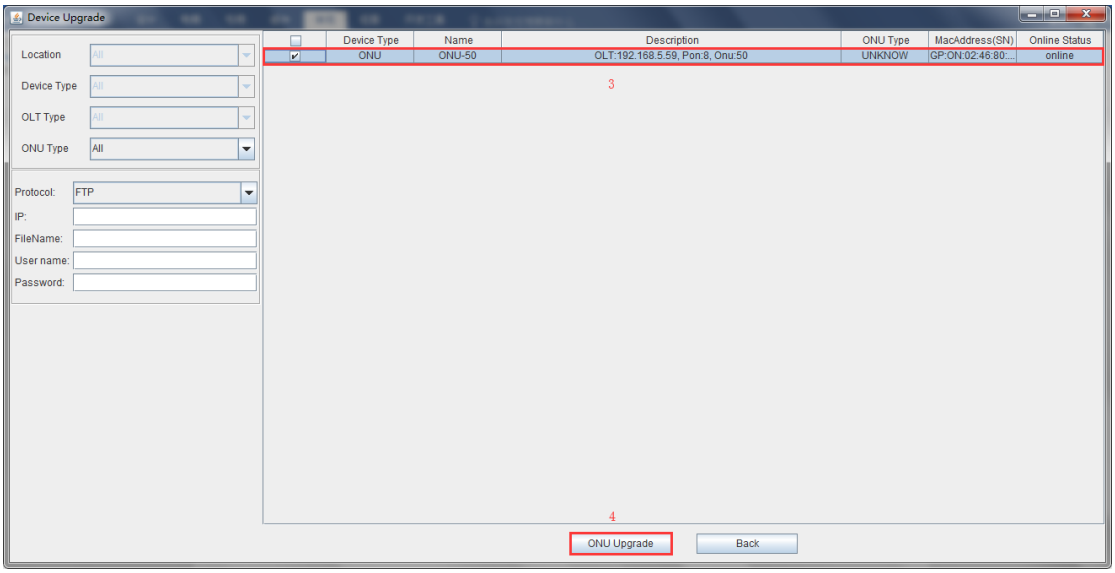
Check the OLT that needs to be upgraded, and then click the OLT Upgrade button to start upgrading the OLT.



5） If upgrade ONU, the steps as follows:

First check the OLT where the ONU is located, then click "ONU Upgrade", select the ONU to be upgraded in the next interface, and finally click ONU Upgrade to start the upgrade of the ONU.



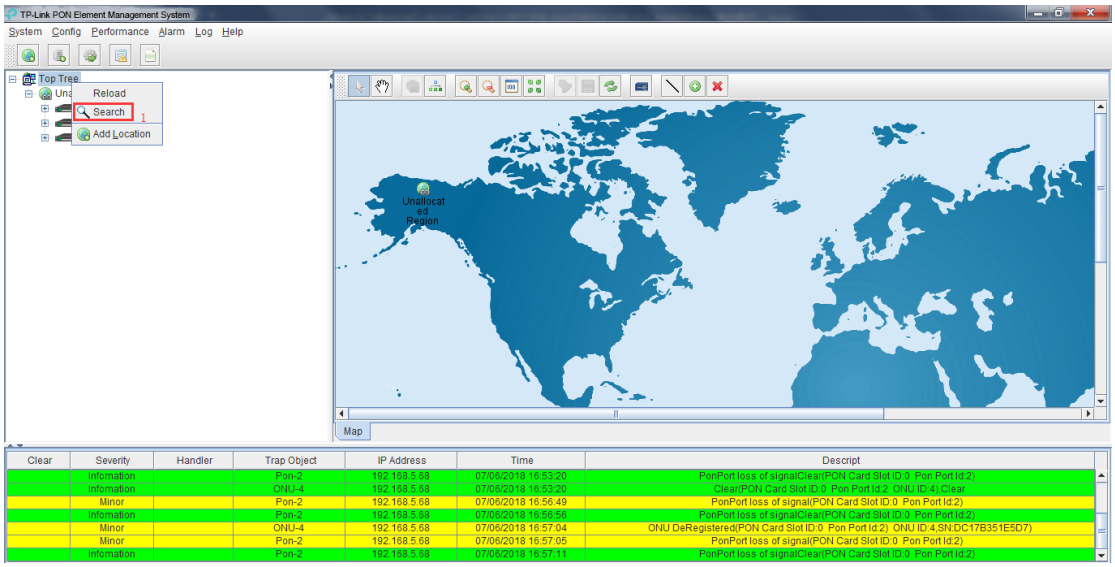


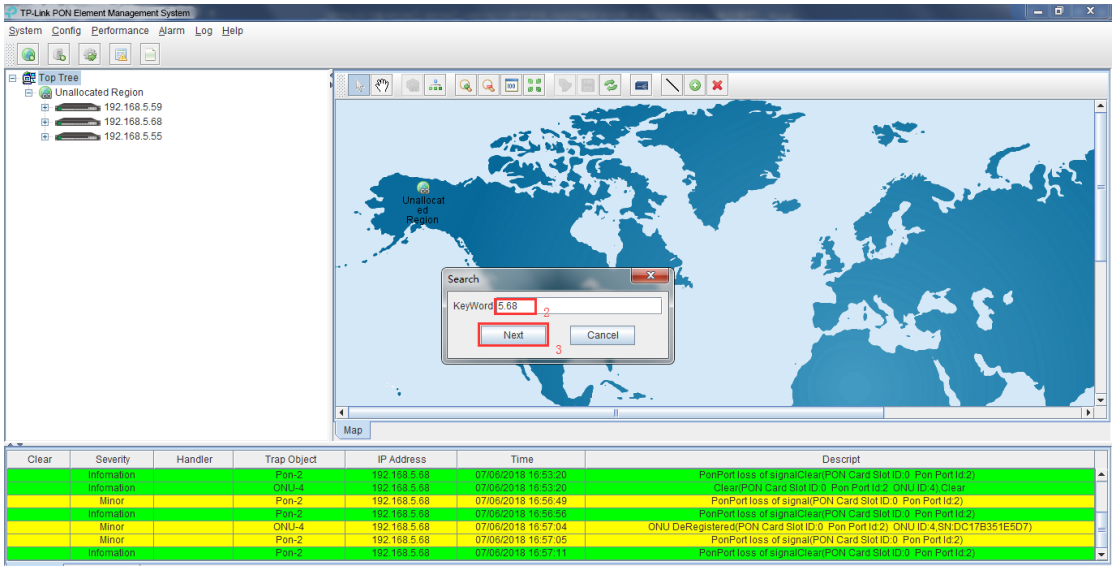
14 Device Search Function

EMS support device search function. When there are more OLT and ONU devices connected EMS, we can find a device from a number of devices via EMS 's search function.

The specific operation method is as follows:

Right-click **'Top Tree'** of EMS main page , and click **'Search'** , then input device name in **'Key Word'** of pop-up **'Search Box'**.



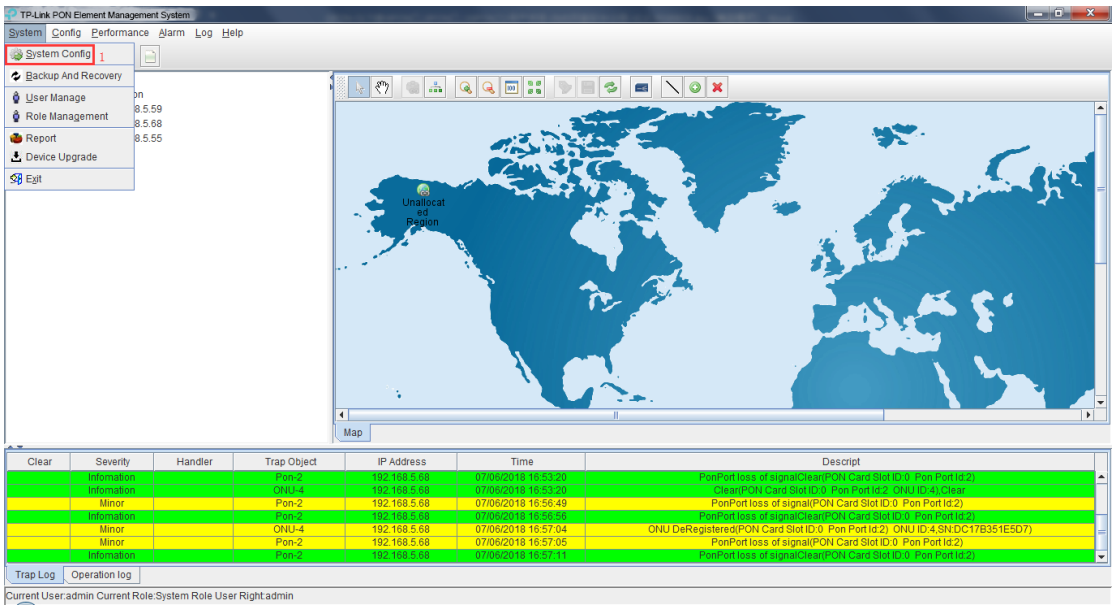


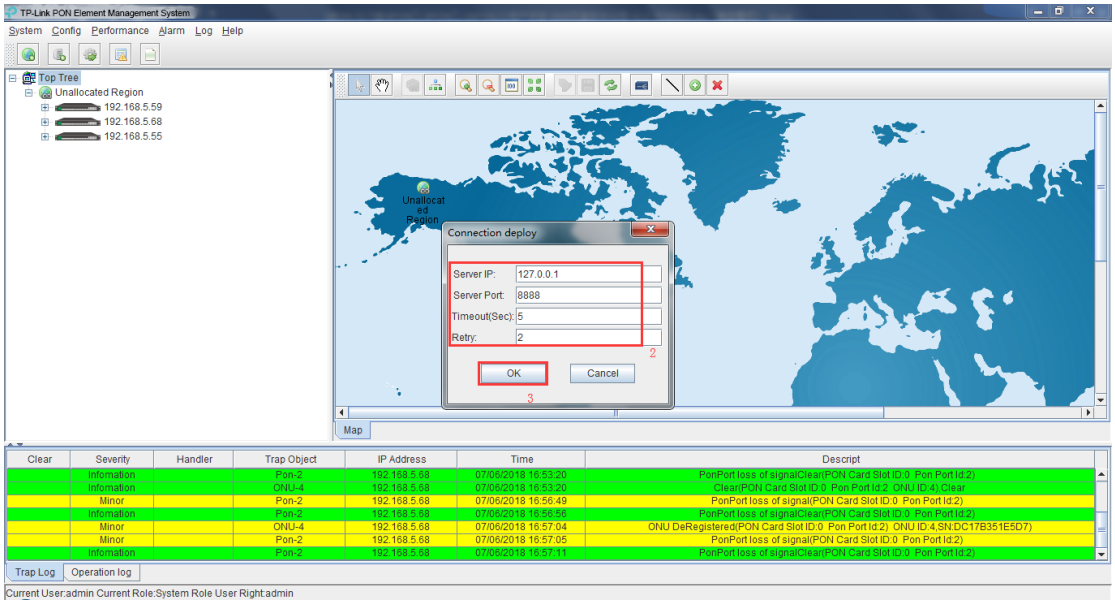
15 System Config

EMS supports system configuration. You can configure the EMS server's IP address, port number, client and server connection timeout period, and the number of retransmissions after a connection failure.

The specific operation method is as follows:

Click '**System**' in the EMS menu bar, then click '**System Config**' and then enter the information of the EMS server you want to set in the pop-up '**Connection deploy**' windows. Finally, click OK to apply the configuration.



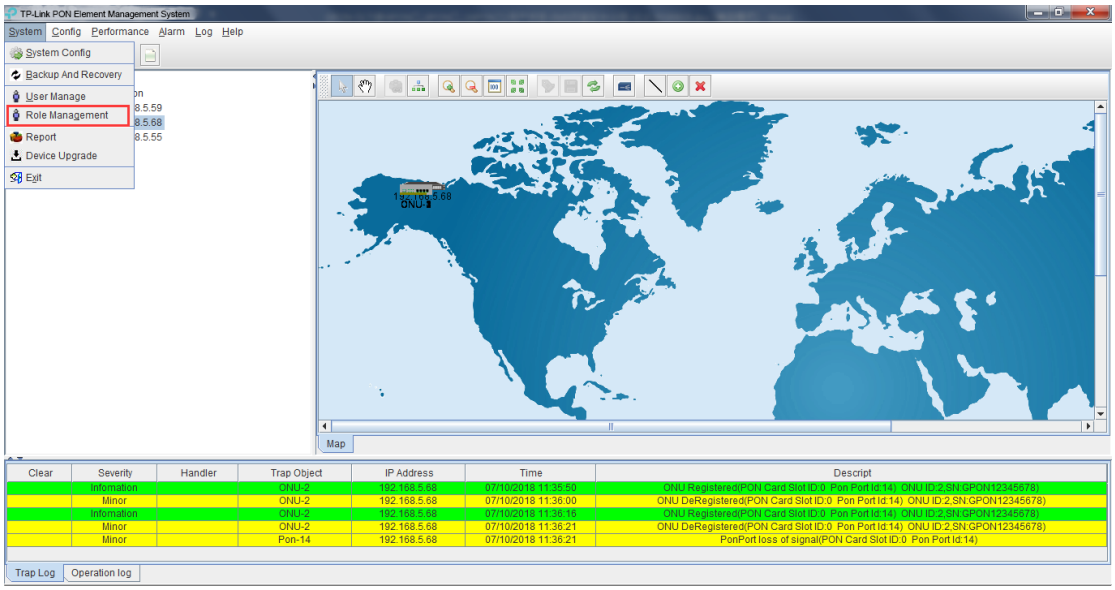


16 Role Management

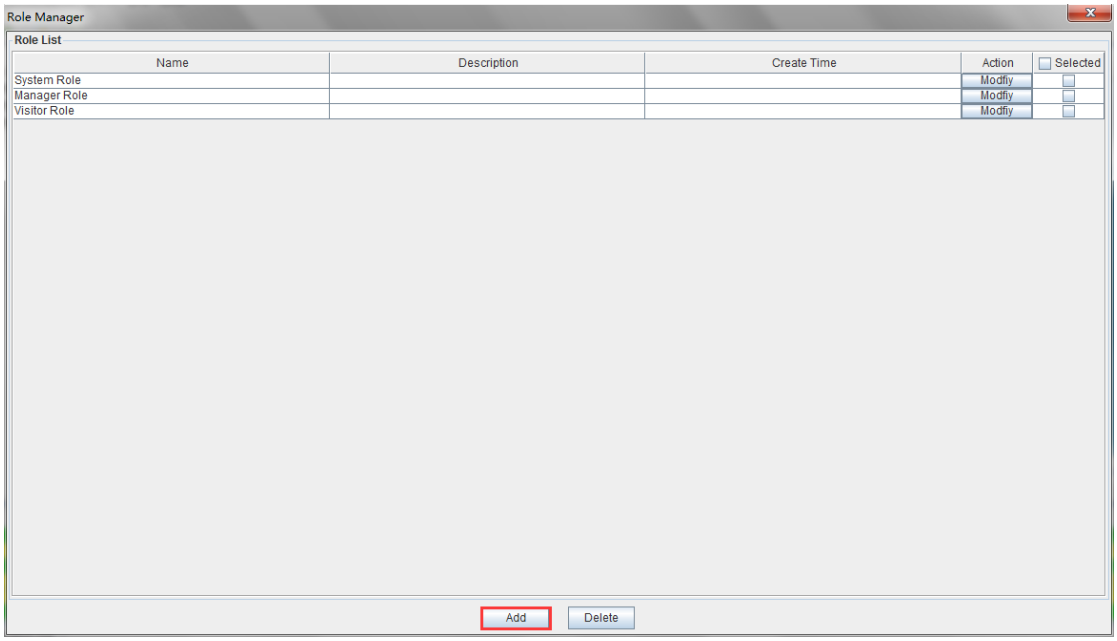
Role Management include role add, role delete and role modification. Role Management use to limit User Operation authority.

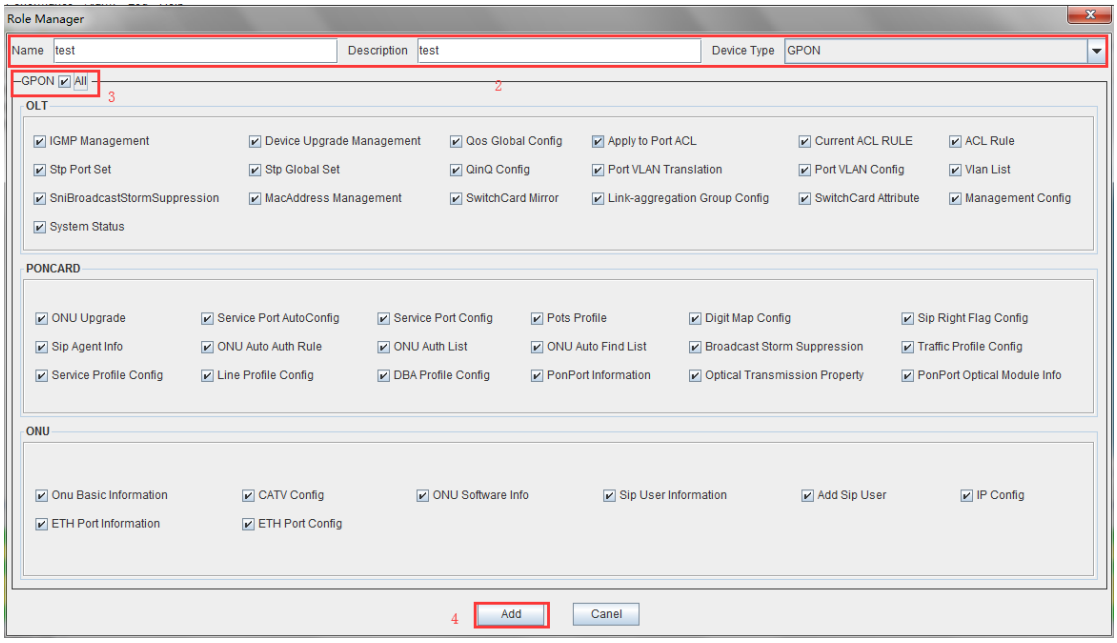
Specific operation method shown as follows:

Click '**System**' in the EMS menu bar, then click '**Role Management**' and then add the role or modify the role in the pop-up '**Role Manager**' windows.



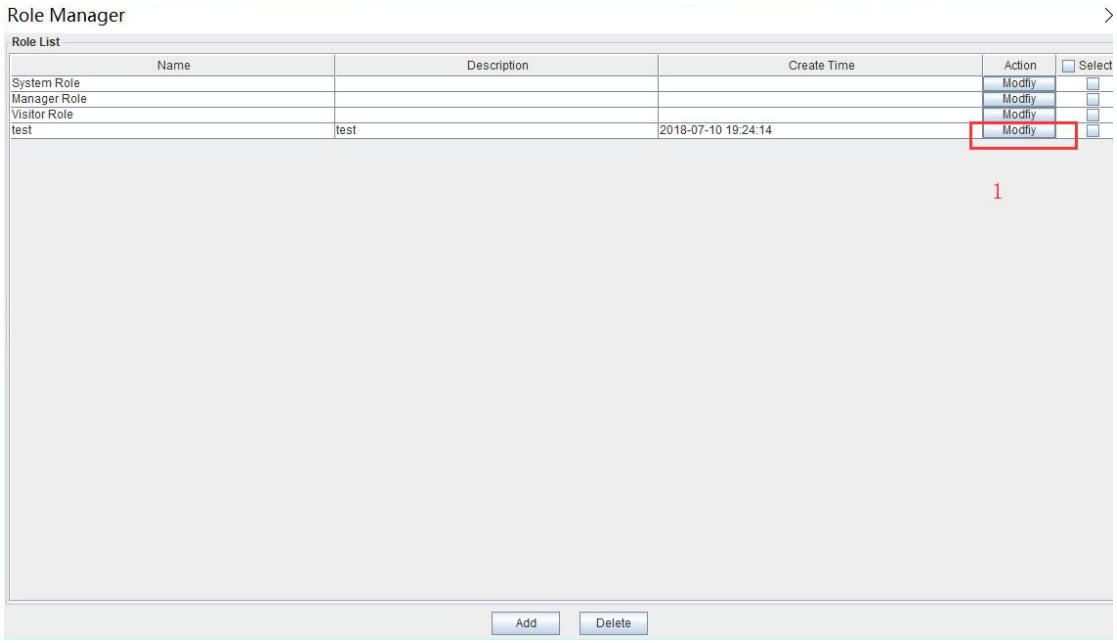
Add a role. Name is test, descriptions is test, and the device type is GPON. The steps for configure the operation rights as follows:



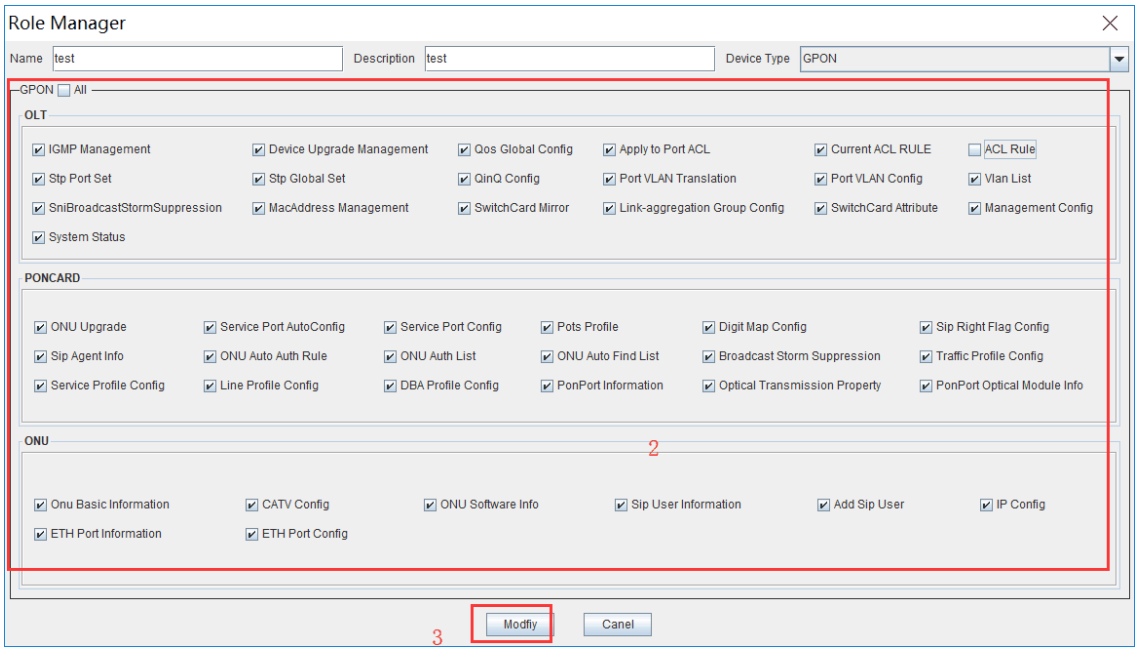


The steps to modify role test are as follows:

Double-click the Modify button after modifying the role:

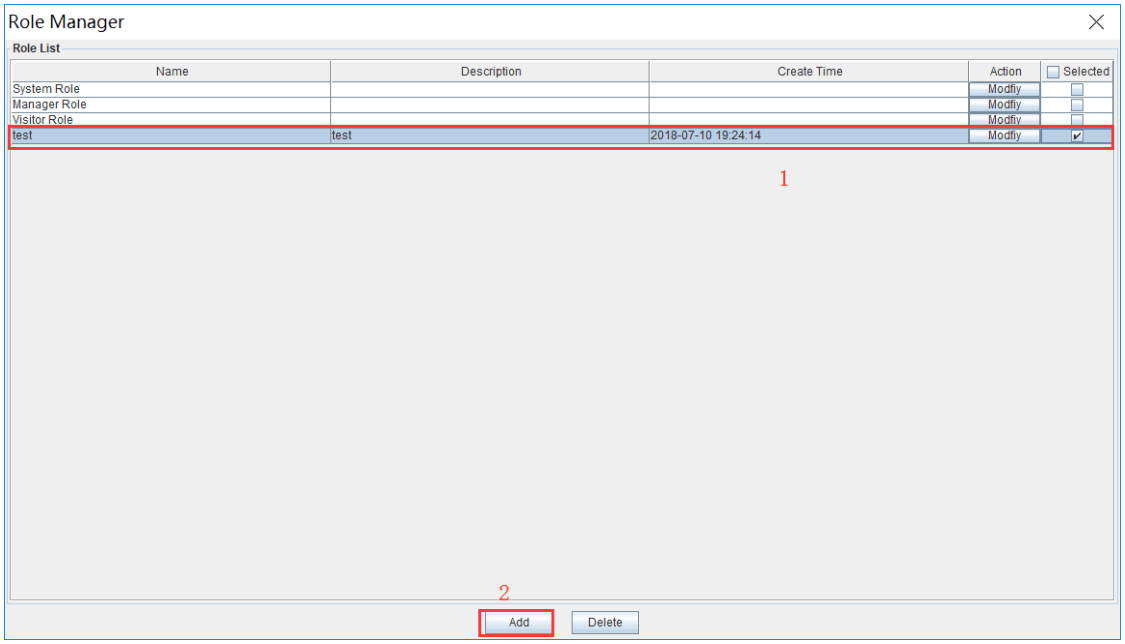


In the pop-up interface, you can modify the name of the role, the device type, and the permissions. After the modification, click the '**Modify**' button.



The steps to delete the permissions of the role test are as follows:

Check the role you want to delete in the role management interface, and then click the '**Delete**' button.



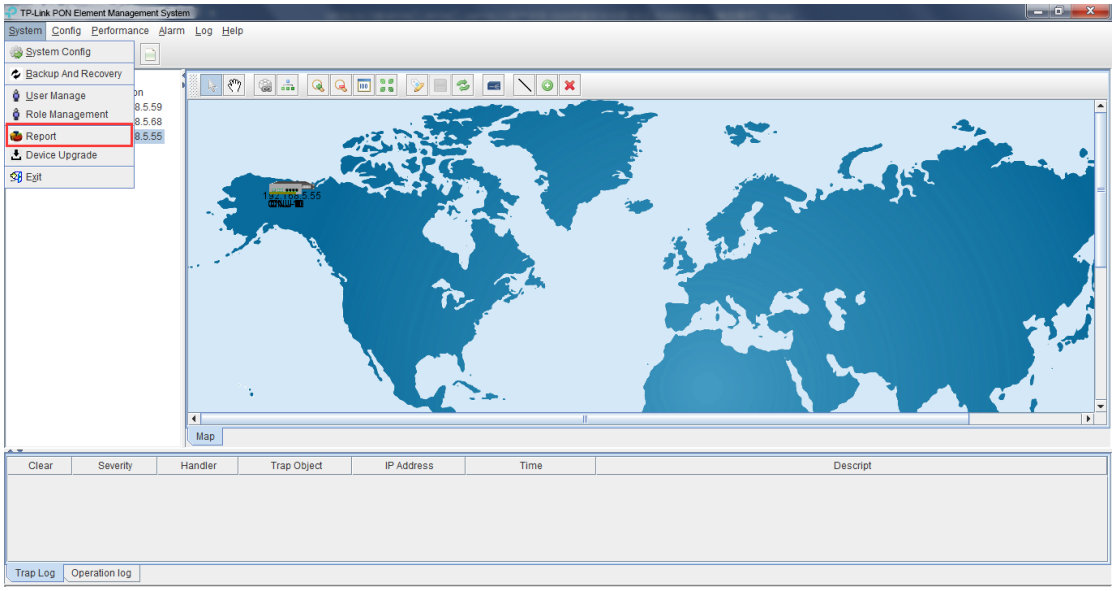
17 Report

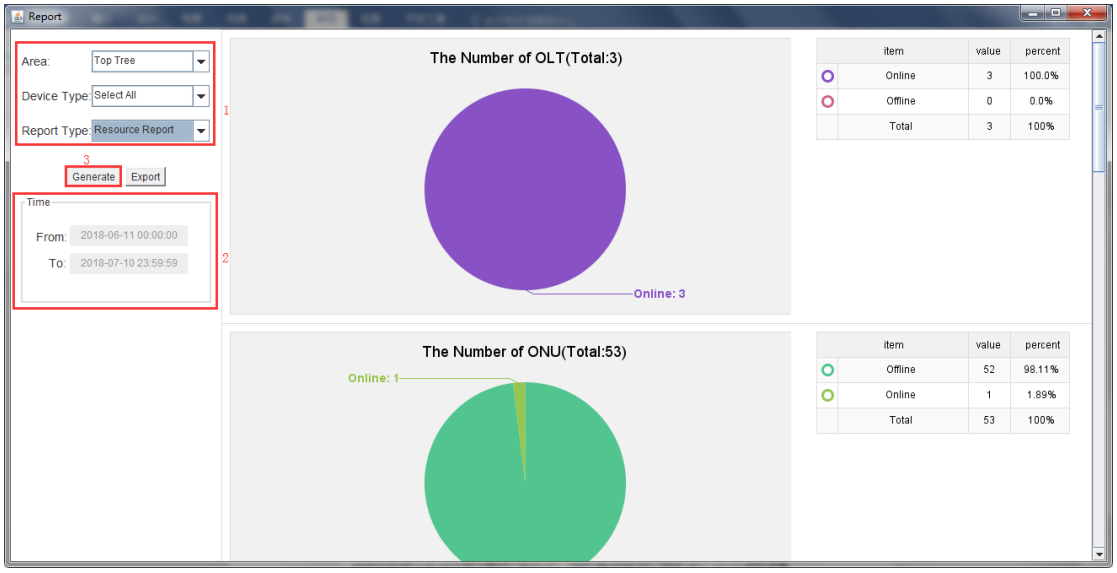
The report can generate related reports according to the requirements of related devices in the selected area. And the report supports exporting for subsequent viewing.

Specific operation method shown as follows:

Click '**System**' in the EMS menu bar, then click '**Report**' and then select Are, Device Type, Report Type in the pop-up '**Report**' windows. Need indicate the time if Report Type selected to the failure

report.



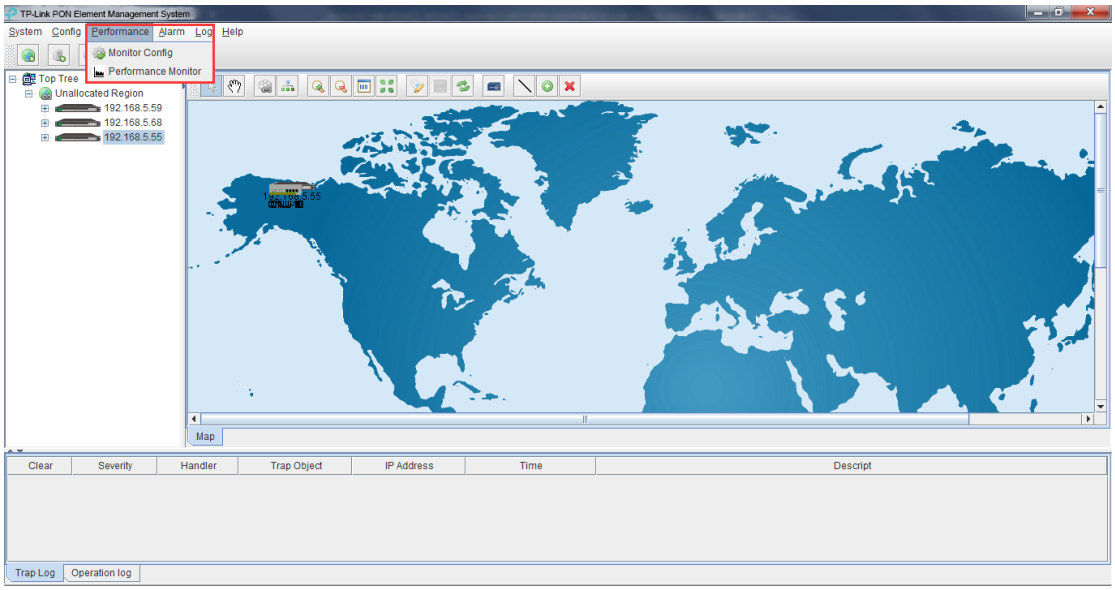


18 OLT Performance Monitor

Performance monitoring can monitor the traffic of the OLT's uplink port, PON port, ONU PON port, and ONU LAN port, and display it in the form of a graph, which is convenient for users to query OLT traffic and ONU traffic in real time.

Specific operation method shown as follows:

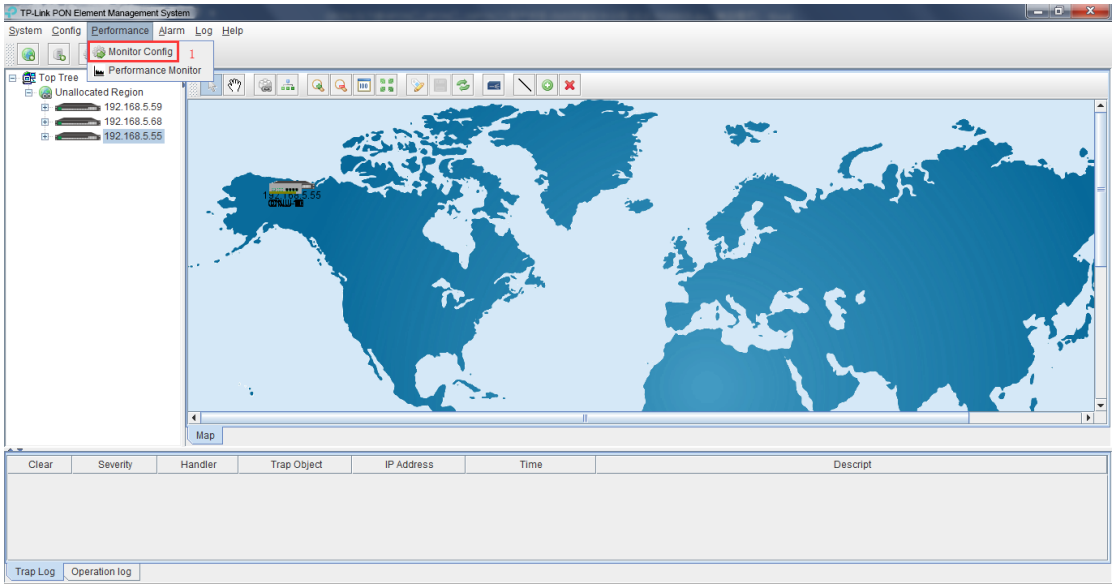
Click '**Performance**' in the EMS menu bar. Have two option: Monitor Config that turn on and turn off the monitoring function, Performace Monitor that view real-time traffic.



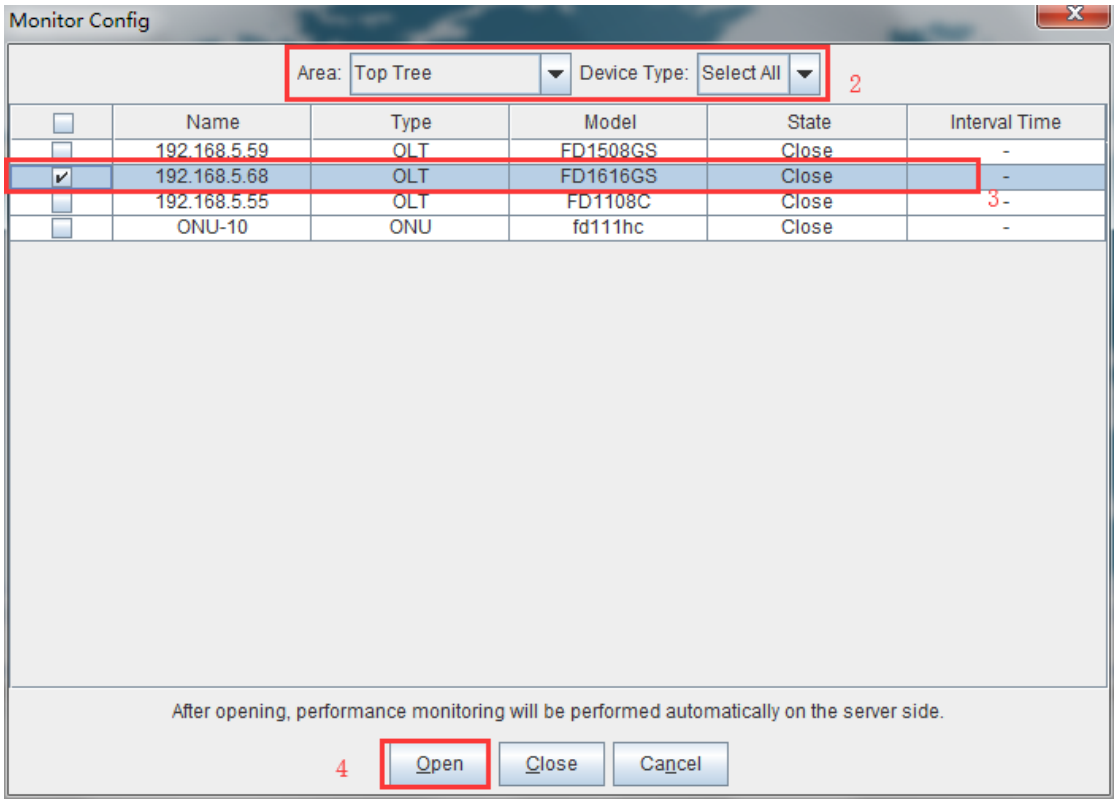
18.1 Performance Monitor Config

Enable OLT and ONU port performance statistics are as follows:

Click on 'Performance' in the EMS menu bar, then click on '**Monitor Config**'

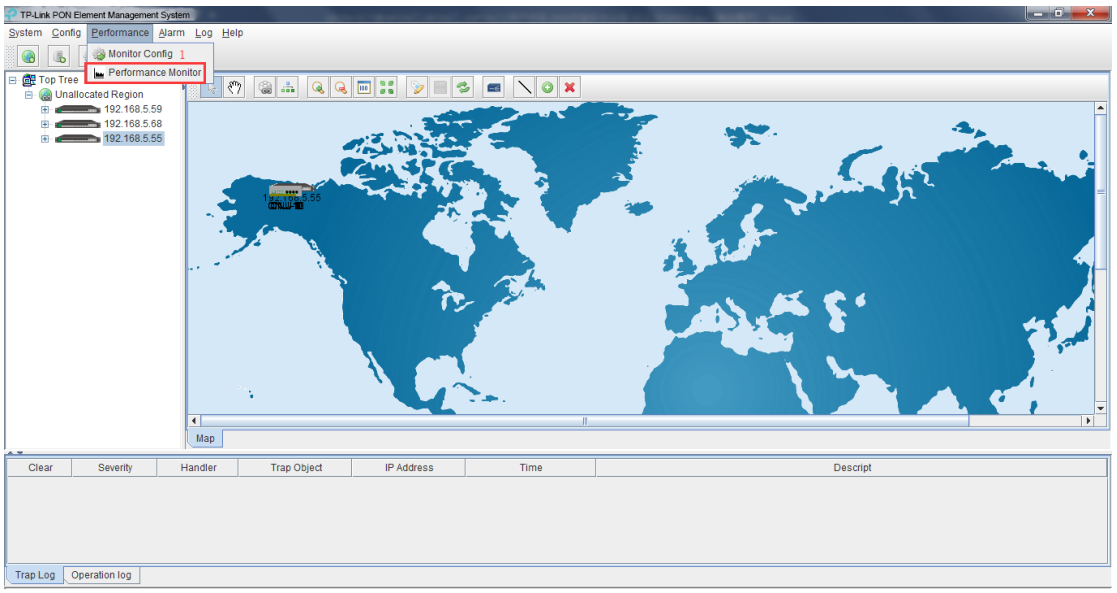


Then select the area and device type to be set in the pop-up performance parameter configuration dialog box, and select the OLT or ONU that needs to enable performance monitoring. Finally, click the '**Open**' button to open the performance monitoring function of the corresponding device.

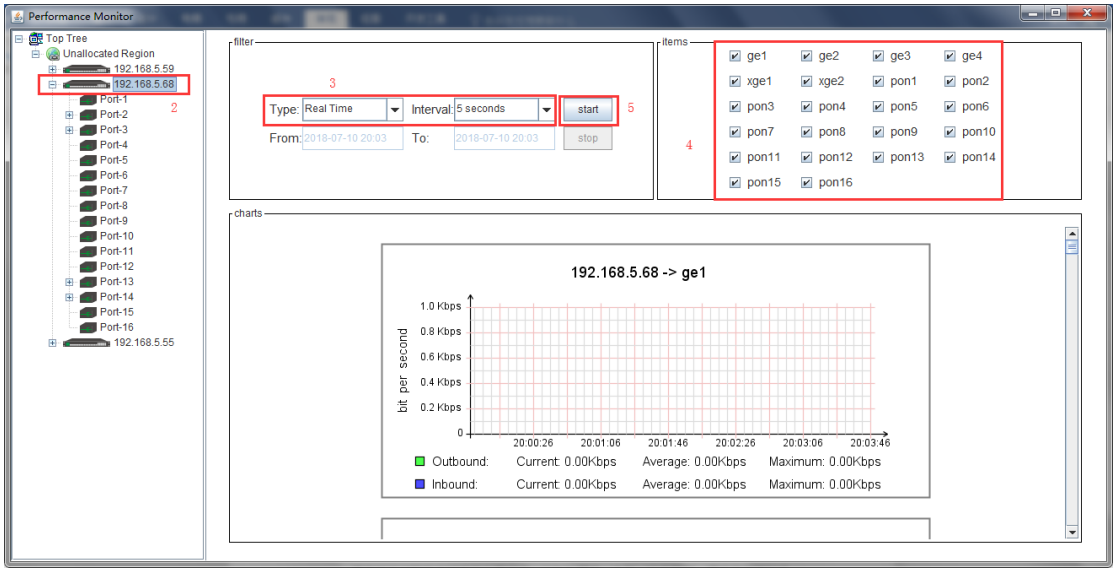


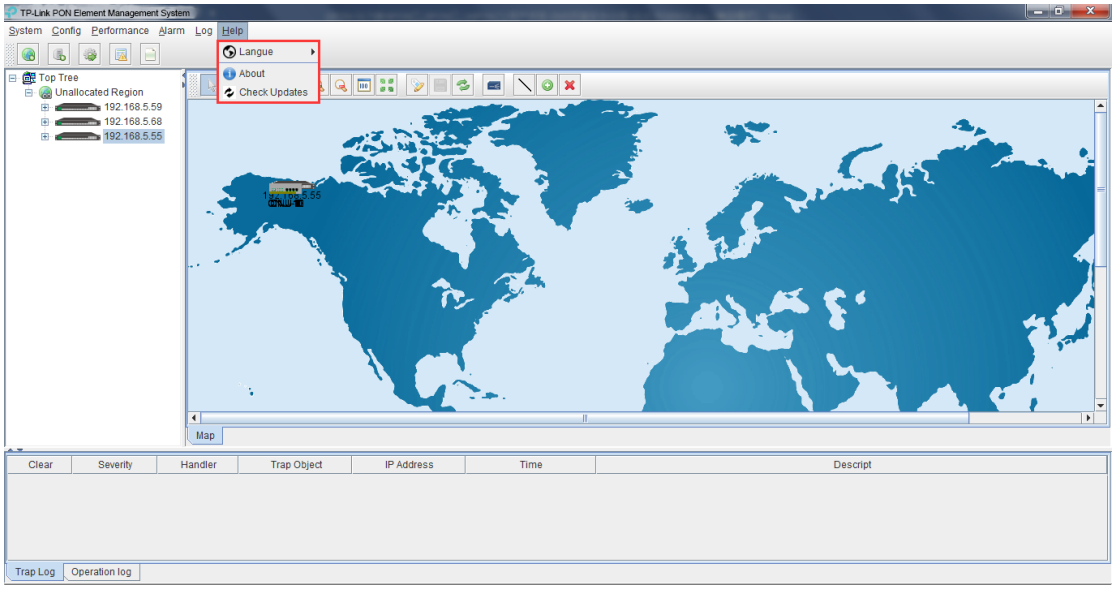
18.2 OLT Port Performance Monitor

Viewing the performance statistics of the OLT and ONU ports are as follows:
Click on 'Performance' in the EMS menu bar, then click on '**Performance Monitor**'



Then select the OLT or ONU to be monitored in the pop-up performance monitoring dialog windows, and then select the type of monitoring, and the time interval. There are two options: real-time and historical. The time interval is 5 seconds, 10 seconds and 30 seconds. , then select the port you want to monitor, and finally click the '**Start**' button.



19 Help

The help options in the menu bar have three sub-options: Language, About and check updates. Language options can choose EMS display language, currently supports Chinese and English languages; click About can view the EMS version. If the computer with EMS can connect to the Internet, click the check for update button to get the latest from our company server. EMS software and complete automatic upgrades.