C-DATA GPON OLT

User Manual

-- Installation and commissioning

FD16XX

(Note:The document takes 1608S-B1 as an example)

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Website: www.cdatatec.com

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Revision History

Version	Release date	Update Notes
1.0	2023.9.25	First release

Contents

1 Hardware Installation

This chapter includes the following topics:

- Installation
- Preparation for installation
- Unpack and inspect the goods
- Cable installation
- Power on the device

1.1Installation method

1.1.1 Desktop installation

Step I: Prepare for installation

- Ensure that the table is strong enough to support the weight of the equipment and the cable;
- Ensure that there are no obstacles around the installation location of the workbench equipment

Step II: Lift the equipment and place it lightly on the front of the table

Step III: Move the device to the designated location

1.1.2 Cabinet installation

The OLT can be installed in a 19-inch ETSI standard rack as shown below:

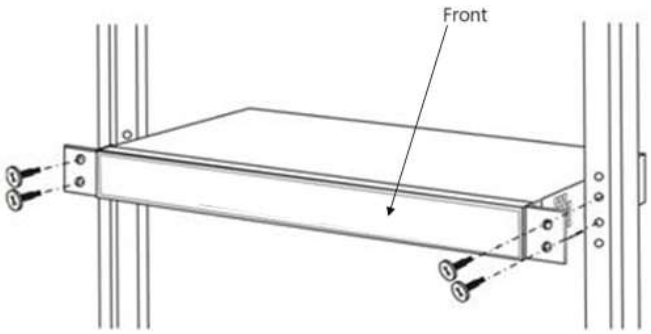


FIG. 1 Schematic diagram of the cabinet installation1

The installation process is as follows:

Step I: Confirm before installation

- Make sure the rack is installed and there are no obstacles in the installation location of the equipment.
- Prepare the equipment and move the equipment to a convenient location for installation.

Step II: Move the equipment from the front of the rack to the mounting position above the rack tray.

Step III: Bolt the device to the 19-inch rack.

1.2 Preparation for Installation

Check the following work environment requirements:

1 Power supply requirements:

-DC power supply: -48V DC, voltage fluctuation allowable range :-36VDC~ -72 VDC

-AC power supply: 110/220V AC, voltage fluctuation allowable range: 90VAC~ 264VAC

2 Equipment should be installed in a dry and cool place, at least 10 cm away from the surrounding for ventilation.

3. Avoid direct light and stay away from heat sources and other strong electromagnetic interference sources.

4. When OLT is installed in the frame, it should be equipped with the corresponding bolts, nuts and tools.

5 Check the cables and connectors used for installation.

6 For management, the following equipment should be configured to connect the OLT:

-Management platform, such as PC

- RJ45/DB9 RS232 Console line

1.3 Unpack inspection

According to the packing list or contract, check and check the products. If there is any omission, error or damage, please contact your customer service manager in time.

The list includes the following components:

- One OLT host

- SFP module configured according to customer order
- AC power cord or DC power accessories

1.4Cable installation

The cables of FD16XX include ground, power, configuration, network and fiber.

Installation Specifications

- Layout principles

The power cable should be straight and smooth in arc.

The power cable should use the whole section of wire material, there should be no joint or solder joint in the middle.

The excess part of the power cable should be cut off and not coiled.

The bending radius of the power cable when turning should be greater than 5 times the diameter of the cable.

After the power cable is laid out, there should be no crossing, no winding, no distortion, and moderate tightness

The signal cable must be tested before installation, and both ends should be marked or glued to the engineering label.

When laying the power cable and the signal cable, it is necessary to ensure that the distance is at least 300mm. It is strictly forbidden to tie the two together.

Optical fiber should consider the turning radius. Generally, the turning radius of optical fiber cannot be less than 4cm.

- Principles of binding

When the power cable is tied, it should be tied separately from the signal line.

The binding distance of each section of the power cable is 200mm.

Cable installation and placement should avoid the door and other rotating parts to squeeze and pull the cable, and should not be tied at the turn.

The cable buckle should be in the same direction, and the excess part should be cut off after tying, and the cutting edge should be flat and not pointed.

- The upper line principle

The cable is led from the top of the DC distribution cabinet to the wire rack, and is placed on

the top of the equipment cabinet along the wire rack.

- The principle of wiring down

The cable leads from the bottom of the DC distribution cabinet, and runs under the anti-static floor to the underside of the equipment cabinet.

1.4.1 Connect the power cord

The power cord is divided into AC power supply cable and DC power supply cable according to the different power modules.

Connect the AC power supply

The device supports dual power supply 1 + 1 redundant backup. If one of the power supplies fails, the system can continue to work with the remaining power supply modules. To ensure power input redundancy, it is recommended to connect the two power supplies to separate power lines. UPS power supply can also be used to provide reliability of power supply.

1. Find the AC power cord in the accessories of the OLT;
2. Connect one end of the power cord to the power connection inlet in the back panel of the OLT;
3. Connect the other end to the AC power supply socket.

Figure 2 Connect the AC power supply2

Connect DC power

Here are the steps:

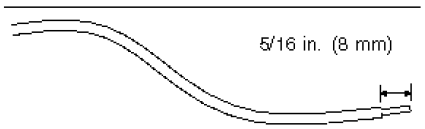
1. Prepare the cable used to connect the -48V DC source to the -48V input to the device
2. Turn off the -48VDC power supply to power the device

3. Remove the DC connection head from the OLT fittings
4. Connect the DC power supply to the device with 3 cables:

   -48V: Negative :NEG(-)

   -48V: Positive :RTN (+)

   -48V: Ground
5. Strip off 5/16 inches(8mm) insulation sheath



6. Insert the exposed copper wire into the hole in the DC fitting and lock the screws to hold the copper wire in place.

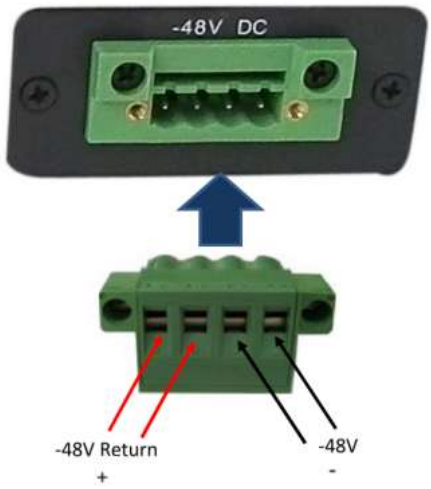


Figure 3 Connect the DC power supply3

7. Repeat steps 5-7 to connect the other wires.
8. Insert the DC plug connected to the cable into the DC connector.

Connect the BBU

BBU mainly provides continuous power supply when there is no external power supply, and it can charge the standby power supply when the external power supply is normal. The positive and negative poles of the standby power supply group and the positive and negative poles of the power supply port can be connected respectively. (The left side of Figure 123 shows the battery, and the right side shows the BBU power module of OLT.

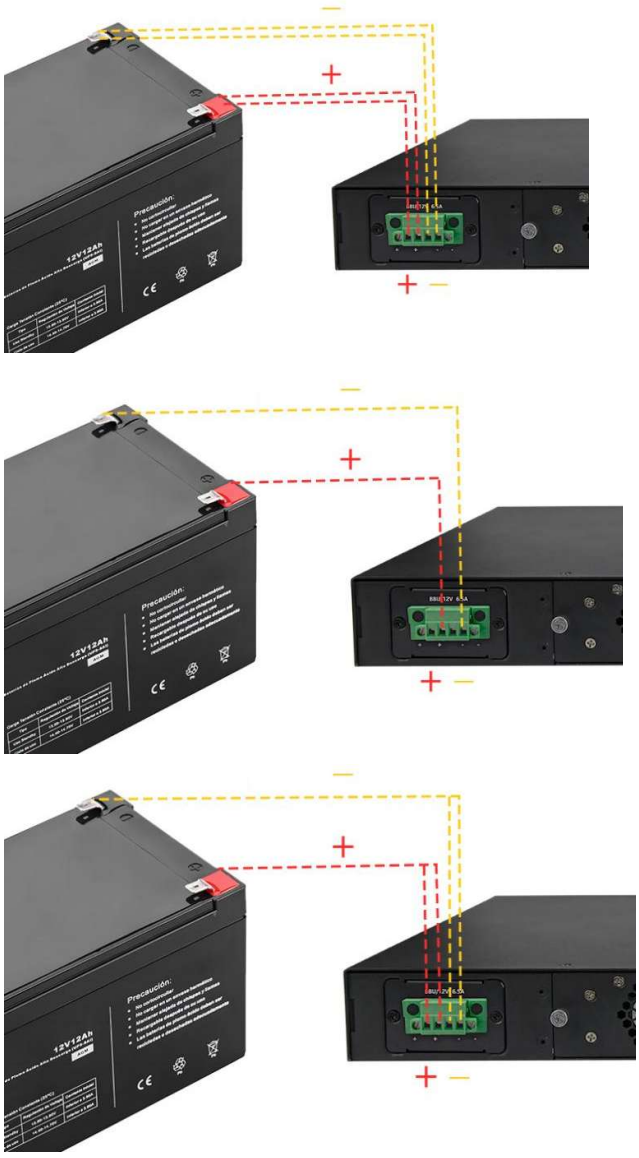


FIG. 4 Connecting the BBU4

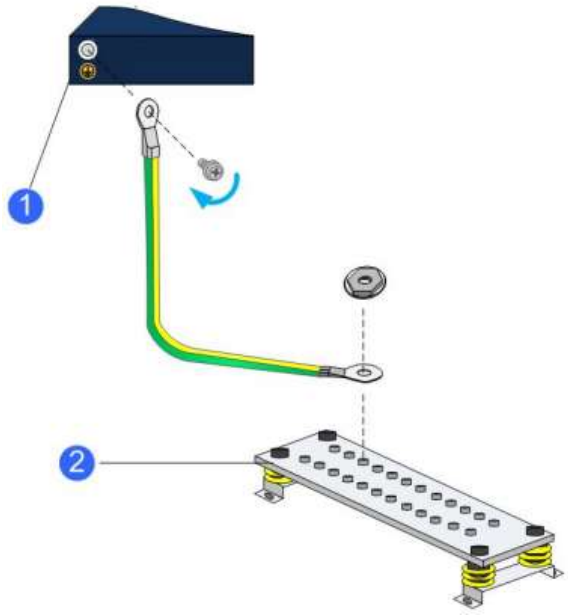
1.4.2 Protected Place connection

In order to ensure the normal and stable operation of OLT, the equipment should be grounded. The grounding screw is located on the left side of the rear panel of the equipment. To connect, loosen the grounding screw first, connect the grounding cable, and lock the screw. The appearance of the protective grounding wire of the equipment is shown in the figure:

FIG. 5 5Schematic diagram of equipment protection ground

Connect one end of the yellow and green double-color protective grounding cable of OLT to the terminal post of the grounding row, and tighten the fixing nut, as shown in the figure:

The protective grounding wire of the equipment is connected



1. OLT protective ground connection terminal 2. Ground row in computer room

FIG. 6 Protective ground connection6

1.4.3 Upper connector connection

Port Description

The OLT provides 4 COMBO GE (electrical ports), 4 GE SFP optical ports for uplink and 2 10 Gigabit uplink ports that can be connected to the OLT and uplink devices using Category 5 lines (cross or through) or fiber.

The SFP module follows the following standards:

- 1000Base-LX
- 1000Base-SX
- 10/100/1000Base-TX

The maximum transmission range is up to 10-40Km when using single-mode fiber and less than 500m when using multi-mode fiber.

Port connections

There are two ways to connect the uplink:

- Cable with RJ45 connector
- Fiber optic with LC connector

Depends on the port type of the OLT uplink device.

Cable Making

When the upper link uses the optical port, use the fiber optic jumper with the LC connector to connect.

The upper connection port supports 10Base-T/100Base-TX port and 1000Base-TX port. The ports are all using RJ45 connectors. The ports support MDI/MDIX adaptation. The following figure shows the appearance and pin arrangement of the RJ45 connector.

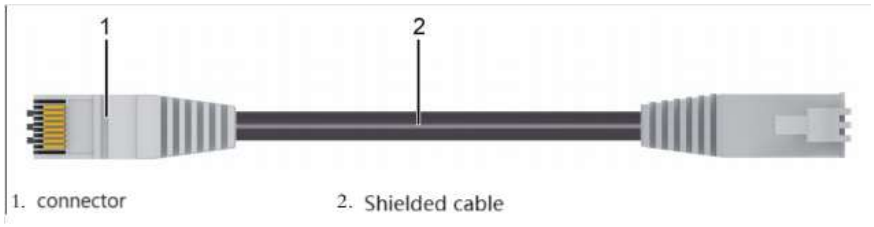


Figure 7 7Schematic diagram of Ethernet cable

See table for the wire order at both ends of the parallel network cable.

Table 1 1Parallel network cable two terminal line order

End A	Cable chromatography	B end	Cable chromatography
1	White orange	1	White orange
2	orange	2	orange
3	White and green	3	White and green
4	blue	4	blue
5	White and blue	5	White and blue
6	green	6	green
7	White brown	7	White brown
8	brown	8	brown

Table 2 2Cross mesh wire two-terminal wire order

End A	Cable chromatography	B end	Cable chromatography

1	White orange	1	White and green
2	orange	2	green
3	White and green	3	White orange
4	blue	4	blue
5	White and blue	5	White and blue
6	green	6	orange
7	White brown	7	White brown
8	brown	8	brown

1.4.4 PON port connection

The device supports GPON SFP slots, and each SFP slot can be installed with a GPON SFP module providing a PON interface.

SFP PON slots install standard ITU-T G.984.2 Class B+ or ITU-T G.984.2 Class C+ modules. The OLT SFP interface type is SC/PC. Use the correct jumper with SC/PC connector to connect the OLT to the ODN network.

1.4.5 Management Port connection

The OLT provides console management interface (marked as "CONSOLE", RJ45 interface) and MGMT management interface (marked as "MGMT", RJ45 interface) to configure the device locally.

To access the device from the Console port, the following tools are required:

- Console cable: RJ-45 turn DB-9 console cable
- Terminal software: Super Terminal

The Console cable is used to connect the serial port of the PC and the Console port of the device. Most computers or laptops no longer have a built-in serial port. If you don't have a serial port, you can use a USB port to establish a connection with the Console port. It is possible to use a USB to RS-232 adapter to make this connection.

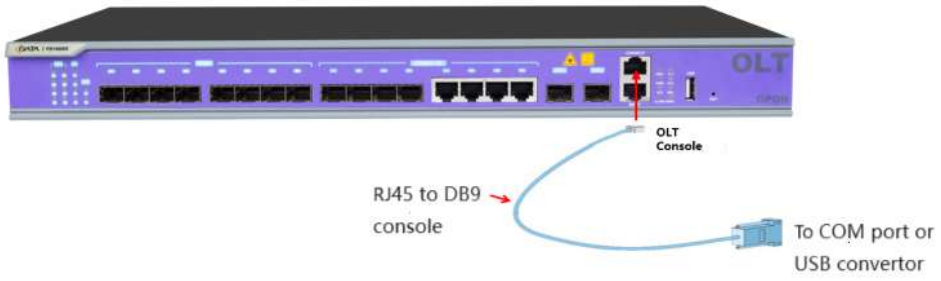


Figure 8 8Schematic of managing serial port connections

Table 3 3Manage serial cable demand Table

Computer ports	Cable	OLT interface
Serial port	RJ-45 RPM DB-9 Console cable	RJ-45 Console port
USB port	USB to RS-232 adapter (associated driver may be required) RJ-45 to DB-9 Console cable	

Figure 9 9Schematic diagram of the management serial port cable

1.5 Power on and off the device

Before the FD16XX is powered on, it is necessary to check the environment of the computer room and the hardware installation.

1. In order to ensure the normal operation and service life of the equipment, a certain temperature and humidity should be maintained in the computer room.

- If the long-term humidity in the computer room is too high, it is easy to cause poor insulation or even leakage of insulation materials, and sometimes it is also easy to change the mechanical properties of materials and rust of metal parts. If the relative humidity is too low, the insulation gasket will dry and shrink and cause the tightening screw to loosen. At the same time, in a dry climate environment, it is easy to generate static electricity and

harm the circuit on the equipment.

- High temperature is more harmful, long-term high temperature will accelerate the aging process of insulation materials, greatly reducing the reliability of the equipment, seriously affecting its life.

2. Check whether the power cord and cable are correct and reliable.
3. Check other hardware.

- Equipment labels are complete, correct, and clear.
- Whether the device is securely mounted to the 19-inch standard rack and smoothly mounted to the desktop.
- Whether the rack is well grounded and whether the grounding resistance meets the technical requirements.

4. The steps for powering up FD16XX are as follows:

a. Plug in the AC/DC power cable of the device.

b. Turn on an external power source.

5. Check the OLT working status

- Check the power LED. The power LED should be green and always on.
- The SYS LED indicator flashes every 1 second.
- The indicator light connected to the uplink port of the uplink device lights up.

6. The steps to power down the FD16XX are as follows:

a. Turn off the external power supply.

b. Unplug the AC/DC power cord of the device.

2 Initial configuration

This chapter includes the following topics:

- Configuration Preparation
- Configure base data

2.1 Configuration preparation

Hardware requirements

- The hardware is already installed.
- The wires are connected properly.
- The power supply is in place and the device has been powered on.

Software Requirements

- Network management software has been installed.
- The device version meets the business requirements.

The out-of-band network management IP address of FD16 series is 192.168.100.1. After logging into the network element through the serial port, the out-of-band network management IP address can be viewed using OLT(config)# show interface mgmt command.

Configure the serial port test and maintenance terminal

- Use the serial port cable to connect the CONSOLE port of the device and the serial port of the debugging terminal (PC).
- In the debug console, run the terminal tool (PuTTY for example).
- In the PuTTY dialog box, select Serial as Connection type, select COM port according to the connection of serial port cable (COM1 in this case), and click the "Open" button when the configuration is complete. Set COM port properties as shown in the following picture:

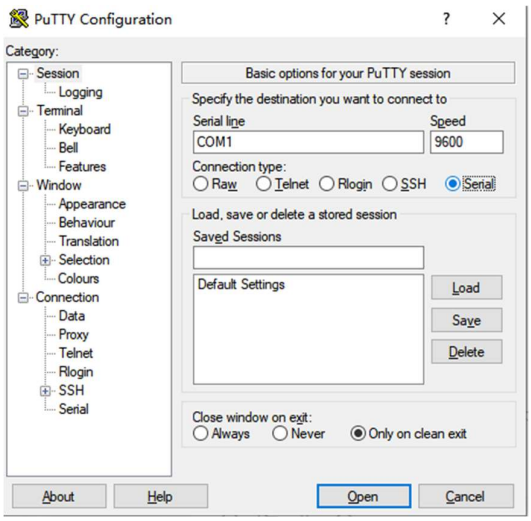


Figure 10 10Set COM attribute (Baud rate of OLT of C-DATA Company is 115200 or 9600)

When the serial port tool successfully connects to the OLT, in the displayed command line, username input: root password input: admin

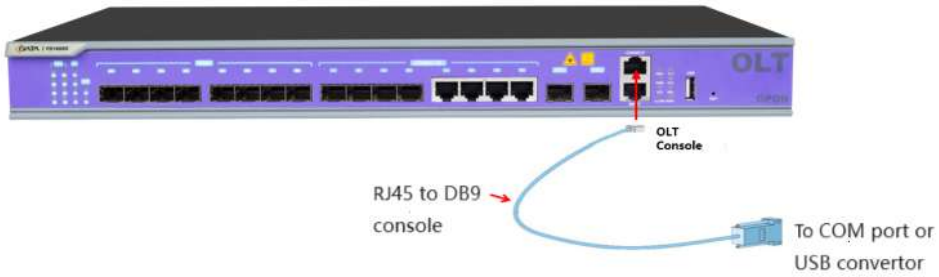


FIG. 11 11Schematic diagram of OLT console connection

Table 4 4Devices required for OLT console connection

PC interface	Cables required for PC and OLT connection	OLT interface
Serial port	RJ-45 RPM DB-9 Console cable	Console port
USB port	USB to RS-232 adapter (associated driver may be required) RJ-45 to DB-9 Console cable	

Configure out-of-band network port test and maintenance terminal

- Use the network cable to connect the MGMT network port of the device and the network port of the debug terminal (PC).

- On the debug terminal, run the terminal tool (take PuTTY as an example).
- After running Putty, select the Telnet button for Connection type, and the IP entered under Host Name (or IPaddress) is the out-of-band management IP of OLT. Here, 192.168.100.1 is taken as an example. After the configuration is completed, click the "Open" button. Set the Telnet property as shown in the following figure:

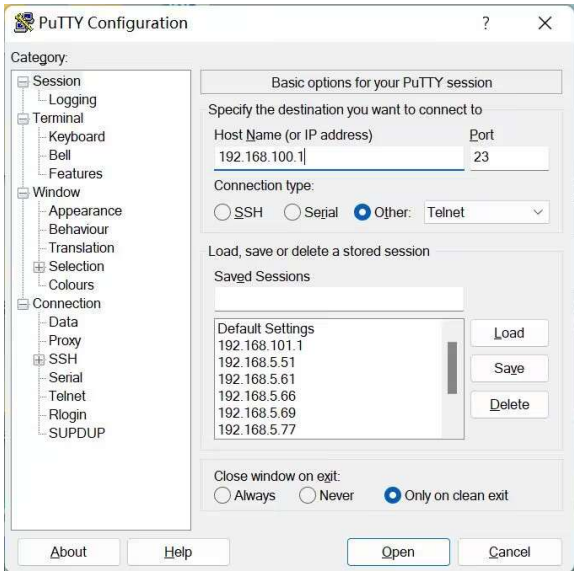


Figure 12 12Set the Telnet property

Login device

You must login to OLT before configuring OLT. Whether it is serial port login or out-of-band management port login, the following interface will pop up. Enter the user name and password (the administrator's account and password are root/admin) and then enter the administrator mode. For other configuration commands, please refer to "C-Data FD16XX User Manual - Command Reference".

```
*****************************************************************
**  OPTERNA-8G420 Integrated Operating System.                 **
**  Device Model     : OPTERNA-8G420                           **
**  Hardware version : V1.1                                    **
**  Firmware version : V2.1.0_230218                           **
**  BuildDate        : Sat, 18 Feb 2023 16:38:33 +0800         **
**  Mac Address      : E0:67:B3:7A:FD:E6                       **
**  Copyright(C) 2009-2023 by OPTERNA, All rights reserved.    **
*****************************************************************

>>User name:root
>>User password:

  OPTERNA-8G420 Integrated Operating System.
  Copyright(C) 2009-2023 by OPTERNA, All rights reserved.

  ID  Access-Type    User-Name          Group      IP-Address                                                Login-Time
 ---------------------------------------------------------------------------------------------------------------------
  56  Telnet         root               root       192.168.5.11                                              01:34:39
 >71  Telnet         root               root       192.168.5.11                                              00:00:00
```

Fig.13 Login the device13

2.2Configuring base data

The first: out-of-band management (connect OLT MGMT port)

The IP address of 192.168.1.X (except 192.168.1.100) network segment is added to the PC, the network port of PC is connected to the MGMT port of OLT, and the default management IP of OLT is used for telnet login. The default management ip of OLT is 192.168.1.100. After logging in, input the user name and password as root/admin

The out-of-band management IP on OLT is set as follows:

OLT> enable

OLT# config

OLT(config)# interface mgmt

OLT(config-interface-mgmt)# ip address 192.168.5.100 24

OLT(config-interface-mgmt)# exit

The second: in-band management (connected to the GE port of the OLT)

First log in OLT with Console port or out-of-band management mode, then establish a vlan layer 3 interface in OLT, configure an ip to the vlan interface, and add the corresponding uplink port to the vlan (the uplink vlan mode can be access or trunk mode, according to their own network specifications to configure). The PC connects to the OLT uplink port (ge1-ge4) for telnet login.

The OLT in-band management IP Settings are as follows:

OLT> enable

OLT# config

OLT(config)# vlan 100

OLT(config)# interface ge 0/0

OLT(interface-ge-0/0)# vlan access 1 100 ------- Here is to configure GE1 as an in-band management port

OLT(interface-ge-0/0)# exit

OLT(config)# interface vlanif 100

OLT(interface-vlanif-100)# ip address 192.168.100.9255.255.255.0

OLT(interface-vlanif-100)# exit

3 Basic Service Configuration

This chapter includes the following topics:

- FTTH service networking
- OLT discrete (non-profile) online service configuration - command line mode
- OLT discrete (non-profile) multicast service configuration - command line mode
- OLT profile-based online service configuration - Command line mode
- OLT profile-based multicast service configuration - Command line mode
- OLT Online service configuration -WEB mode
- OLT multicast service configuration -WEB mode
- QinQ service configuration

3.1 FTTH service networking

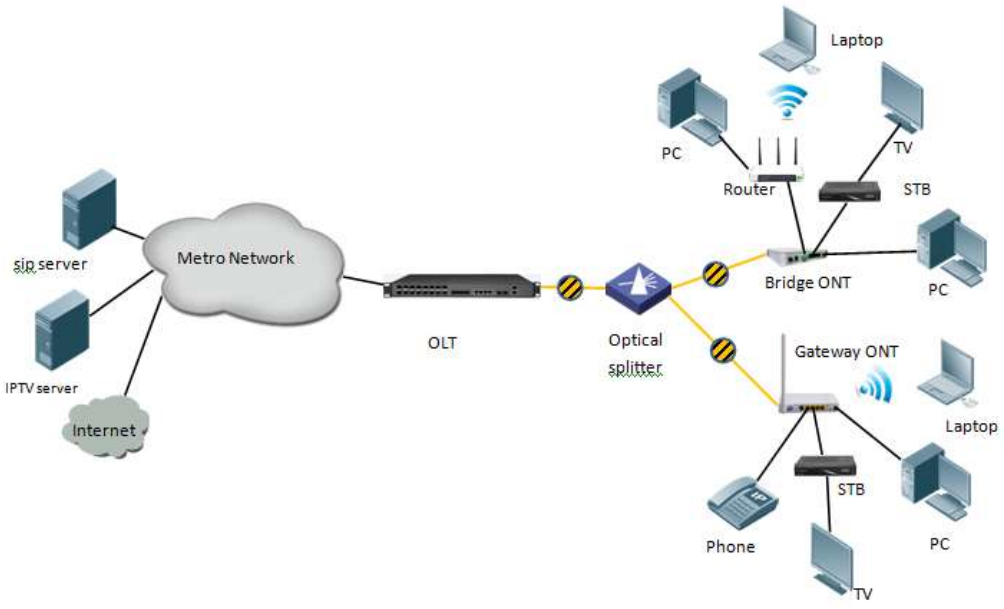


FIG. 14 FTTH service networking diagram14

3.2 OLT discrete (non-profile) online service configuration -- command line mode

This section is mainly used to introduce the OLT in discrete mode to configure the FTTH

networking scene of Internet service, voice service and multicast service configuration. Mainly according to the network in the Bridge (SFU) and Home Gateway (HGU) ONT to introduce respectively. In the following, the service configuration methods of OLT and ONT will be introduced respectively according to the two forms of ONT.

3.2.1 Data Planning

Table 5 Data Planning Table5

List of key data planning	
Configuration items	Specific data
OLT Port configuration	GE1: VLAN 100 access mode
DBA profile (Uplink bandwidth control)	profile No. : 1
ONT Line profile	profile Number: 0 T-CONT ID used: 1 Online service GEM Port ID: 2 Mapping Vlan: 100
ONT Service profile	profile Number: 0ONT Port Capability Set: Adaptive
Bridged ONT port configuration	LAN1: VLAN 100
Gateway type ONT port configuration	LAN1: VLAN 100

3.2.2 Configuration process

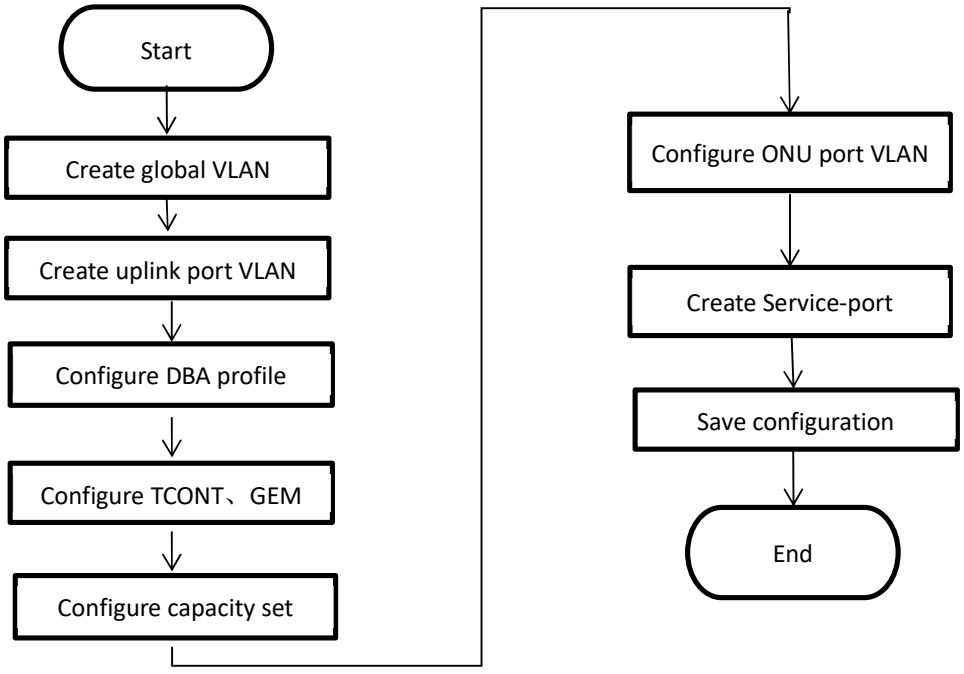


Figure 15 OLT discrete (non-profile) online service configuration process15

3.2.3 Global service VLAN configuration on OLT

The command OLT(config)# show vlan all in config mode on the OLT can be used to query the created vlan.

If the created vlan cannot meet the requirements, the OLT(config)# vlan vLAN-list command can be used to create the vlan. According to the data planning, we first create the vlan100:

```
OLT(config)# vlan 100
```

3.2.4 GE port service VLAN configuration on OLT

The uplinking GE port vlan mode is divided into access, hybrid and trunk, which can be configured according to their own network planning. Each configuration method is as follows:

Configure GE 1 port vlan mode for access (start guide GE port because the connection is PC so configure for access mode) :

```
OLT(config)# interface ge 0/0
OLT(config-interface-ge-0/0)# vlan mode 1 access
OLT(config-interface-ge-0/0)# vlan access 1 100
OLT(config-interface-ge-0/0)# exit
```

Configure GE 1-port vlan mode to trunk:

```
OLT(config)# interface ge 0/0
OLT(config-interface-ge-0/0)# vlan mode 1 trunk
OLT(config-interface-ge-0/0)# vlan trunk 1 100
OLT(config-interface-ge-0/0)# exit
```

Configure GE 1-port vlan mode to hybrid:

```
OLT(config)# interface ge 0/0
OLT(config-interface-ge-0/0)# vlan mode 1 hybrid
OLT(config-interface-ge-0/0)# vlan hybrid 1 tagged 100
OLT(config-interface-ge-0/0)# exit
```

Note:

The OLT vlan is handled as follows:

Table 6 VLAN processing mode table6

vlan mode	Directions	Whether the packet has a tag	Processing method
access	Entry direction	vlan tag available	Discard
		No vlan tag	Type the vlan configured in access mode (main parameter is VID) and forward.
	Outgoing direction	With vlan tag	Follow the VID forward to the appropriate port and strip the Tag; If the VLAN ID of the outgoing Tagged packet is not equal to the VID configured by the port, the packet is dropped.
		No vlan tag	Discard
trunk	Entry direction	vlan tag available	If the VLAN the packet is carrying belongs to the "allowed through VLAN" of the port, it is forwarded down directly; If the packet is carried by a VLAN that does not belong to the "allowed through VLAN" of the port, it is dropped.
		No vlan tag	Tag the untagged packet with the default (native-vlan) VLAN and forward it.
	Outgoing direction	With vlan tag	If the VLAN ID carried by the packet belongs to the "allowed through VLAN" of the port, it is forwarded outward directly; If the VLAN ID of the packet is "default (native-vlan) VLAN", the VLAN tag will be stripped and forwarded outward. If the VLAN carried by the packet does not belong to the "Allowed through VLAN" of the port, it will be dropped.
		No vlan tag	Discard.
Hybrid	Entry direction	vlan tag available	If the VLAN the packet is carrying belongs to the "allowed through VLAN" of the port, it is forwarded inward; If the packet is carried by a VLAN that does not belong to the "allowed through VLAN" of the port, it is dropped.
		No vlan tag	The untagged packet is tagged with the default (native-vlan) VLAN and forwarded.
	Outgoing	With vlan tag	If the VLAN ID carried by the packet belongs to the "Allowed through VLAN" of the port, whether

	direction		to strip the tag or not to strip the tag is forwarded according to the tag and untag modes configured by the vlan; If the VLAN ID of the packet is "default (native-vlan) VLAN", the VLAN tag will be stripped and forwarded outward; If the VLAN carried by the packet does not belong to the "Allowed through VLAN" of the port, it will be dropped.
		No vlan tag	Discard.

3.2.5 Configuring the DBA profile

In discrete mode, ONT adopts automatic registration mode, line profile 0 and service profile 0 are default in automatic binding system after ONT goes online, DBA profile 1 is default in TCONT 1 automatic binding system of line profile 0. DBA profile 1 is not operated here, and the default configuration of DBA profile 1 is used directly.

3.2.6 Configure TCONT

In discrete mode, ONT adopts automatic registration mode, and automatically binds system default line profile 0 and service profile 0 after ONT is online. gem 1 is automatically created by line profile, and gem 1 is automatically bound to TCONT 1. The system default GEM ID1 can be deleted. The configuration method is as follows:

The No. 1 ONT of PON1 port creates the TCONT numbered 1 and binds the DBA profile numbered 1 for the created TCONT

```
OLT(config-gpon-0/0)# ont tcont 1 1 1 dba-profile-id 1
```

No. 1 ONT device with PON1 Port is configured with GEM Port

```
OLT(config-gpon-0/0)# ont gemport 1 1 2 tcont 1
```

The configuration service mapping mode of No. 1 ONT device of PON1 port is according to VLAN mapping

```
OLT(config-gpon-0/0)# ont mapping-mode 1 1 vlan
```

No. 1 ONT device with PON1 Port is created with GEM Port number 2 and gemport mapping index 1

```
OLT(config-gpon-0/0)# ont gemport mapping 1 1 2 1 vlan 100
```

3.2.7 Configure ONT port capability set

Configure a port capability set for pon 1 onu 1 with the number of eth ports as adaptive, the number of POTS ports as adaptive, the number of CATV ports as adaptive, and the number of iphost ports as adaptive.

```
OLT(config-gpon-0/0)# ont ont-port 1 1 eth adaptive pots adaptive catv adaptive iphost adaptive
```

3.2.8 Check ONT registration status

The ONT is automatically registered with the default discrete configuration on the OLT. After the ONT is automatically registered, use the show ont info command to query the on-line status of the ONT. Make sure the ONT's "Control flag" is "Active", "Run State" is "Online", "Config state" is "Success" and "Match state" is "Match".

```
OLT(config-interface-gpon-0/0)# show ont info 1 all
-----------------------------------------------------------------------------------------------
  F/S P   ONT SN                    Control     Run        Config     Match
          ID                        flag        state      state      state
 -----------------------------------------------------------------------------------------------
  0/0 1   1   DB19B34F0C16         Active      online     success    match
  0/0 1   2   XPONE067B341         Active      online     success    match
-----------------------------------------------------------------------------------------------
  Total: 2,   online 2,   deactive: 0,   failed: 0
```

3.2.9 Bridged (SFU) ONT online service configuration

ONT Online service opening preconditions:

- OLT has connected the uplink equipment and opened the Internet service
- The OLT has created an Internet vlan
- The OLT has been configured with an Internet vlan with GE port
- ONT registered

The port vlan mode of the bridge ONT is divided into pass-through, tag (access) and trunk modes, which can be configured according to your own network planning. All vlan configurations are configured separately for the ONT in the OLT as follows:

Configure the traffic profile:

```
OLT(config)# traffic-profile profile-id 1 profile-name 10M cir 10240 pir 10240 cbs 2000 pbs 2000
```

Configure the ONT port vlan mode in the service profile to tag (access) :

```
OLT(config)# ont-srvprofile gpon profile-id 0
OLT(config-ont-srvprofile-0)# port vlan eth 1 100
OLT(config-ont-srvprofile-0)# commit
OLT(config-ont-srvprofile-0)# exit
```

Configure ONT port native-vlan 100:

```
OLT(config)# interface gpon 0/0
OLT(config-interface-gpon-0/0)# ont port native-vlan 1 1 eth 1 vlan 100
OLT(config-interface-gpon-0/0)# exit
```

Create the service flow:

- Use traffic profile One way to configure: service VLAN is 100, ONT ID is 1, GEM Port ID is 2, user side VLAN is 100, use traffic profile with id 1.

```
OLT(config)# service-port 3 vlan 100 gpon 0/0 port 1 ont 1 gemport 2 multi-service user-vlan 100 tag-action transparent inbound id 1 outbound id 1
```

- There are two ways to configure your business volume without using a traffic profile

```
OLT(config)# service-port 3 vlan 100 gpon 0/0 port 1 ont 1 gemport 2 multi-service user-vlan 100 tag-action transparent
```

```
OLT(config)#ont gemport 1 1 2 vlan 100 user-vlan 100 tag-action transparent
```

Note:

The opening guide uses a single layer vlan, 100 for SVLAN, also 100 for USERVLAN, choose transparent for Tag-action, same for USERVLAN as SVLAN, and 100 for service-port pass-through vlan. More TAG transformation rules are as follows:

Table 7 Table of TAG processing methods7

TAG transformation rules	Handling

DEFAULT	Default way, that is, add a layer of SVLAN directly on the packet
ADD_DOUBLE	Add two layers of VLans, that is, add one layer of SVLAN and one layer of USERVLAN
TRANSPARENT	Transparent transmission, when the USERVLAN is the same as SVLAN, the packet can be transmitted transparently
TRANSLATE	Switch, switch USERVLAN to SVLAN
TRANSLATE_AND_ADD	Switch and add a layer of VLAN, the outer VLAN is SVLAN, and the memory VLAN is the new USERVLAN

3.2.10 Gateway (HGU) ONT online service configuration

Prerequisites

- The OLT has connected the uplink device and opened the Internet service
- The OLT has created an Internet vlan
- The OLT has been configured with an Internet vlan with GE port
- ONT registered

Configuring Traffic profiles:

```
OLT(config)# traffic-profile profile-id 2 profile-name 20M cir 20480 pir 20480 cbs 2000 pbs 2000
```

Create a traffic flow:

- Use traffic profile One way to configure: service VLAN is 100, ONT ID is 1, GEM Port ID is 2, user side VLAN is 100, use traffic profile with id 1.

```
OLT(config)# service-port 3 vlan 100 gpon 0/0 port 1 ont 1 gemport 2 multi-service user-vlan 100 tag-action transparent inbound id 1 outbound id 1
```

- There are two ways to configure your business volume without using a traffic profile

```
OLT(config)# service-port 3 vlan 100 gpon 0/0 port 1 ont 1 gemport 2 multi-service user-vlan 100 tag-action transparent
ont gemport 1 1 2 vlan 100 user-vlan 100 tag-action transparent
```

Create a route WAN(this ONU is C-Data ONU):

```
OLT(config-gpon-0/0)# ont wan 1 1 1 vlan 100 ipv4 dhcp
```

3.3OLT Discrete (non-profile) multicast service configuration --

command line mode

This section is mainly used to introduce OLT configuring multicast service in FTTH networking scenario in discrete mode. Mainly according to the network in the bridge (SFU) type and Home Gateway (HGU) ONT respectively. In the following, the service configuration methods of OLT and ONT will be introduced respectively according to the two forms of ONT.

3.3.1 Data Planning

Table 8 Data Planning Table8

List of key data planning	
Configuration items	Specific data
OLT Port configuration	GE3: VLAN 200 access mode
DBA profile (Uplink Bandwidth control)	profile No. : 1
ONT Line profile	profile Number: 0 T-CONT ID used: 1 Video Service GEM Port ID: 3 Mapping Vlan: 200
ONT Service profile	profile number: 0ONT Port Capability set: Adaptive
Bridged ONT port configuration	LAN 3: VLAN 200
Gateway type ONT port configuration	POTS1: VLAN 200

3.3.2 Configuration process

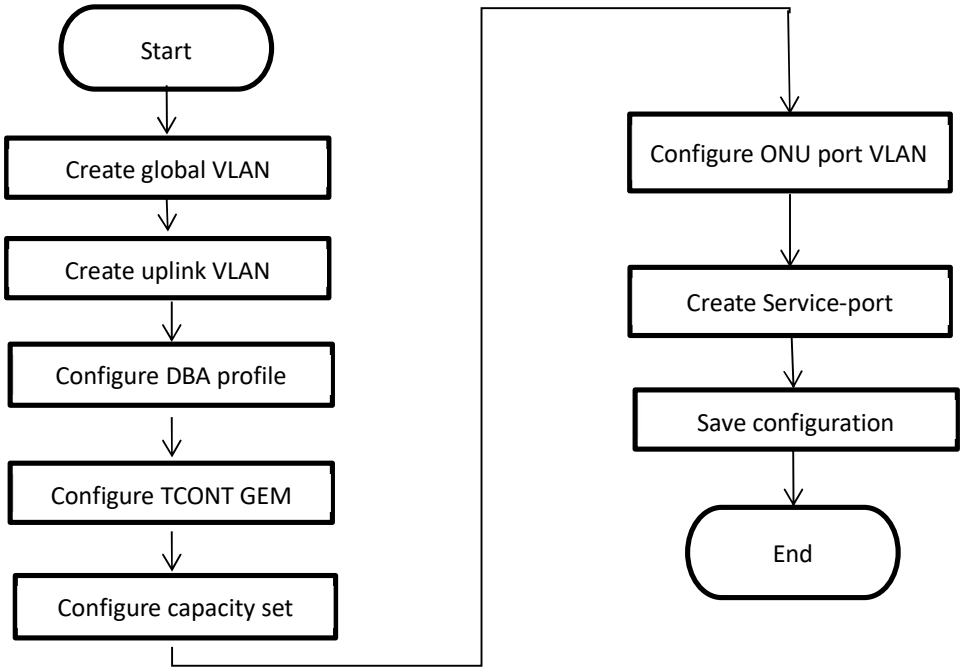


FIG. 16 OLT discrete (non-profile) multicast configuration process16

3.3.3 Global service VLAN configuration on OLT

The command OLT(config)# show vlan all in config mode on the OLT can be used to query the created vlan.

If the created vlan cannot meet the requirements, the OLT(config)# vlan vLAN-list command can be used to create the vlan. According to the data planning, we first create the vlan200:

```
OLT(config)# vlan 200
```

3.3.4 GE port service VLAN configuration on OLT

The uplinking GE port vlan mode is divided into access, hybrid and trunk, which can be configured according to their own network planning. Each configuration method is as follows:

Configure GE 3 port vlan mode for access (start guide GE port because connected to the PC so configure for access mode) :

```
OLT(config)# interface ge 0/0
OLT(config-interface-ge-0/0)# vlan mode 3 access
OLT(config-interface-ge-0/0)# vlan access 3 200
OLT(config-interface-ge-0/0)# exit
```

Configure GE 3-port vlan mode to trunk:

```
OLT(config)# interface ge 0/0
OLT(config-interface-ge-0/0)# vlan mode 3 trunk
OLT(config-interface-ge-0/0)# vlan trunk 3 200
OLT(config-interface-ge-0/0)# exit
```

Configure GE 3-port vlan mode to hybrid:

```
OLT(config)# interface ge 0/0
OLT(config-interface-ge-0/0)# vlan mode 3 hybrid
OLT(config-interface-ge-0/0)# vlan hybrid 3 tagged 200
OLT(config-interface-ge-0/0)# exit
```

3.3.5 Configure the DBA profile

In discrete mode, ONT adopts automatic registration mode, line profile 0 and service profile 0 are default in automatic binding system after ONT is online, DBA profile 1 is default in TCONT 1 automatic binding system of line profile 0. DBA profile 1 is not operated here, and the default configuration of DBA profile 1 is used directly.

3.3.6 Configure TCONT

In discrete mode, ONT adopts automatic registration mode, and automatically binds system default line profile 0 and service profile 0 after ONT is online. gem 1 is automatically created by line profile, and gem 1 is automatically bound to TCONT 1. The system default GEM ID1 can be deleted. The configuration method is as follows:

The No. 1 ONT of PON1 port creates the TCONT numbered 1 and binds the DBA profile numbered 1 for the created TCONT

```
OLT(config-gpon-0/0)# ont tcont 1 1 1 dba-profile-id 1
```

No. 1 ONT device with PON1 Port is configured with GEM Port

```
OLT(config-gpon-0/0)# ont gemport 1 1 3 tcont 1
```

The configuration service mapping mode of No. 1 ONT device of PON1 port is according to

VLAN mapping

```
OLT(config-gpon-0/0)# ont mapping-mode 1 1 vlan
```

The number 1 ONT device of PON1 Port is created with GEM Port number 3 and gemport mapping index 1

```
OLT(config-gpon-0/0)# ont gemport mapping 1 1 3 1 vlan 200
```

3.3.7 Configure ONT port capability set

Configure a port capability set for pon 1 onu 1 with the number of eth ports as adaptive, the number of POTS ports as adaptive, the number of CATV ports as adaptive, and the number of iphost ports as adaptive

```
OLT(config-gpon-0/0)# ont ont-port 1 1 eth adaptive pots adaptive catv adaptive iphost adaptive
```

3.3.8 Multicast service configuration on OLT

Configure multicast mode and multicast vlan 200

```
OLT (config) # ont multicast mode 1 1 unconcern | snooping | proxy (the default is unconcern)
OLT(config)#ont multicast fast-leave 1 1 enable|disable
OLT (config - multicast) # ont port multicast 239.1.1 vlan 1 eth 1 in 200
OLT(config-multicast)# exit
```

3.3.9 Check ONT registration status

The ONT is automatically registered with the default discrete configuration on the OLT. After the ONT is automatically registered, use the show ont info command to query the on-line status of the ONT. Make sure the ONT's "Control flag" is "Active", "Run State" is "Online", "Config state" is "Success" and "Match state" is "Match".

```
OLT(config-interface-gpon-0/0)# show ont info 1 all
-----------------------------------------------------------------------------------------------
  F/S P   ONT SN                    Control     Run        Config     Match
          ID                        flag        state      state      state
 ----------------------------------------------------------------------------------------------
  0/0 1   1   DB19B34F0C16         Active      online     success    match
  0/0 1   2   XPONE067B341         Active      online     success    match
```

```
----------------------------------------------------------------------------------------------
  Total: 2,    online 2,    deactive: 0,    failed: 0
```

3.3.10 Bridged (SFU) ONT multicast service configuration

Prerequisites

- The OLT has connected the uplink device and initiated multicast service
- The OLT has created a multicast vlan
- The OLT has configured the multicast vlan with the GE port
- ONT registered

Configure the ONT port vlan mode within the service profile to tag (access) :

```
OLT(config-gpon-0/0)# ont port vlan 1 1 eth 1 200
```

Configure ONT port native-vlan 200:

```
OLT(config)# interface gpon 0/0
OLT(config-interface-gpon-0/0)# ont port native-vlan 1 1 eth 1 vlan 200
OLT(config-interface-gpon-0/0)# exit
```

Create the service flow:

- Use traffic profile One way to configure: service VLAN is 200, ONT ID is 1, GEM Port ID is 3, user side VLAN is 200, use traffic profile with id 1.

```
OLT(config)# service-port 3 vlan 200 gpon 0/0 port 1 ont 1 gemport 3 multi-service user-vlan 200 tag-action transparent inbound id 1 outbound id 1
```

- There are two ways to configure your business without using a traffic profile

```
OLT(config)# service-port 3 vlan 200 gpon 0/0 port 1 ont 1 gemport 3 multi-service user-vlan 200 tag-action transparent
```

```
ont gemport 1 1 3 vlan 200 user-vlan 200 tag-action transparent
```

3.3.11 Gateway (HGU) type ONT Multicast Service Configuration -RTK scheme

Prerequisites

- The OLT has connected the uplink device and initiated multicast service
- The OLT has created a multicast vlan
- The OLT has configured the multicast vlan with the GE port
- ONT registered

Create a business Flow:

- Use traffic profile One way to configure: service VLAN is 200, ONT ID is 1, GEM Port ID is 3, user side VLAN is 200, use traffic profile with id 1.

```
OLT(config)# service-port 3 vlan 200 gpon 0/0 port 1 ont 1 gemport 3 multi-service user-vlan 200 tag-action transparent inbound id 1 outbound id 1
```

- There are two ways to configure your business without using a traffic profile

```
OLT(config)# service-port 3 vlan 200 gpon 0/0 port 1 ont 1 gemport 3 multi-service user-vlan 200 tag-action transparent
```

```
ont gemport 1 1 3 vlan 200 user-vlan 200 tag-action transparent
```

Create bridge WAN at ONT web and bind LAN2 port

Click on WAN→

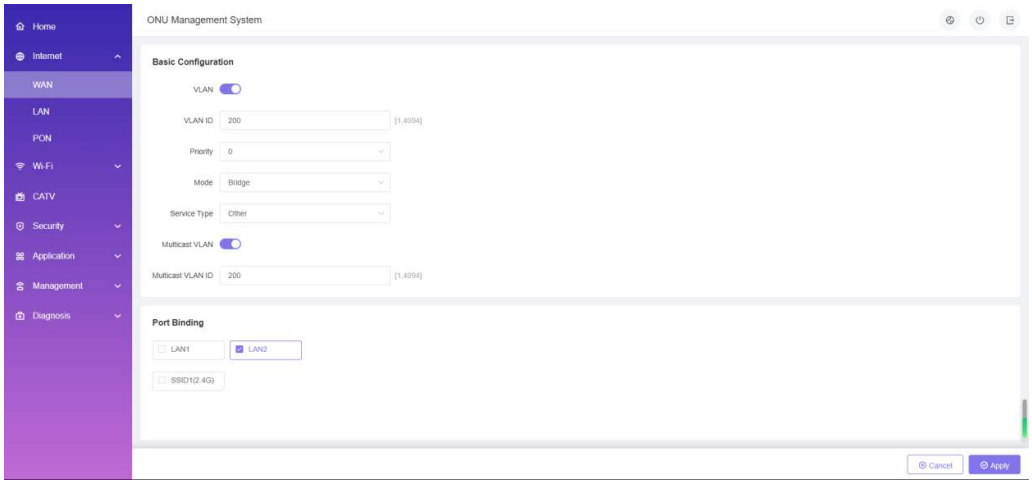


Figure 17 Multicast WAN configuration17

Note:

Choose the Mode as Bridge. Turn on the VLAN and fill in 200 for the Vlan ID. Select Other for Service Mode. Fill in 200 for Multicast VLAN ID and check LAN2 for Bind

port.

3.4 OLT profile type online service configuration -- command line mode

This section is mainly used to introduce the OLT in the profile mode of FTTH networking scene online service configuration. The configuration of profile type can configure different business profiles according to different types of ONT, which can be handled flexibly. This paper mainly introduces the SFU type and HGU type ONT respectively. The following will introduce the service configuration methods of the two forms of ONT.

3.4.1 Data Planning

Table 9 Data Planning Table9

List of key data planning	
Configuration items	Specific data
OLT Port Configuration	GE1: VLAN 100 access mode
DBA profile (Uplink bandwidth control)	profile No. : 1
ONT Line profile	profile Number: 0 T-CONT ID used: 1 Online service GEM Port ID: 2 Mapping Vlan: 100
ONT Service profile	profile Number: 0ONT Port Capability Set: Adaptive
Bridged ONT port configuration	LAN1: VLAN 100
Gateway type ONT port configuration	LAN1: VLAN 100

3.4.2 Configuration process

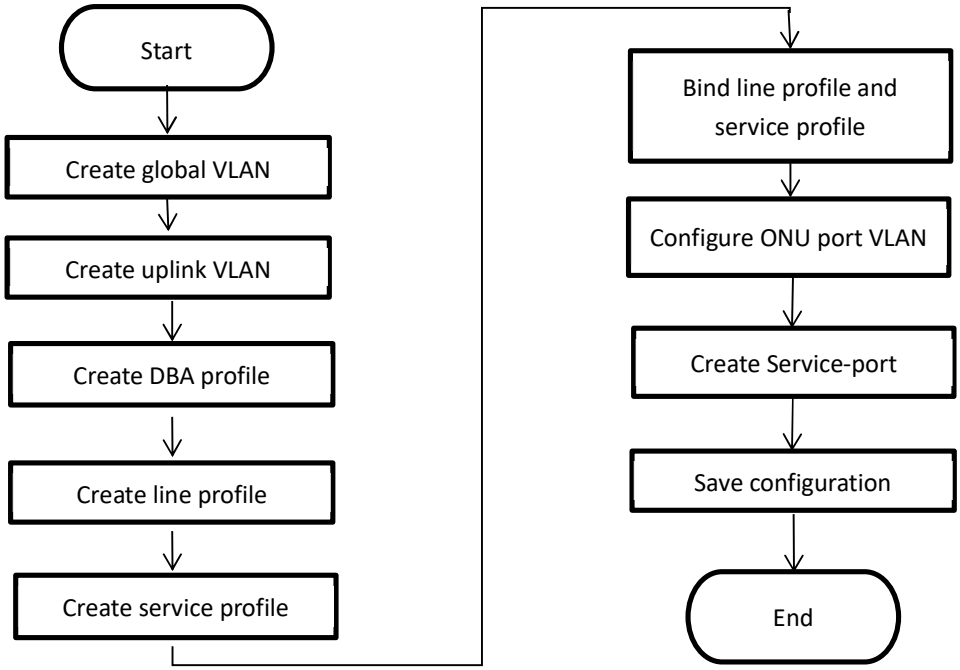


FIG. 18 Configuration process of OLT profile type online service18

3.4.3 Global service vlan configuration on OLT

The command OLT(config)# show vlan all in config mode on the OLT can be used to query the created vlan.

If the created vlan cannot meet the requirements, the OLT(config)# vlan vLAN-list command can be used to create the vlan. According to the data planning, we first create the vlan100:

```
OLT(config)# vlan 100
```

3.4.4 GE port service vlan configuration on OLT

The vlan mode of GE port on the upper link is divided into access, hybrid and trunk, which can be configured according to their own network planning. Each configuration method is as follows:

Configure GE 1 port vlan mode for access (start guide GE port with access mode) :

```
OLT(config)# interface ge 0/0
OLT(config-interface-ge-0/0)# vlan mode 1 access
OLT(config-interface-ge-0/0)# vlan access 1 100
OLT(config-interface-ge-0/0)# exit
```

Configure GE 1-port vlan mode to trunk:

```
OLT(config)# interface ge 0/0
OLT(config-interface-ge-0/0)# vlan mode 1 trunk
OLT(config-interface-ge-0/0)# vlan trunk 1 100
OLT(config-interface-ge-0/0)# exit
```

Configure GE 1-port vlan mode to hybrid:

```
OLT(config)# interface ge 0/0
OLT(config-interface-ge-0/0)# vlan mode 1 hybrid
OLT(config-interface-ge-0/0)# vlan hybrid 1 tagged 100
OLT(config-interface-ge-0/0)# exit
```

3.4.5 ONT profile creation

GPON ONT profiles include DBA profiles, line profiles, and service profiles.

- DBA profile: DBA profile describes the traffic parameters of GPON, T-CONT dynamically allocates bandwidth by binding DBA profile to improve uplink bandwidth utilization.
- Line profile: The line profile describes the binding relationship between T-CONT and DBA profile, the QoS pattern of the traffic flow, the mapping relationship between GEM Port and ONT side traffic, etc.
- Service profile: The service profile provides a service configuration channel for ONT managed by OMCI.

3.4.6 DBA profile creation for ONT

You can query existing DBA profiles in your system using the show dBA-profile all command. If the existing dba profiles in the system do not meet the requirements, you will need to execute dba-profile to add them. Create different DBA profiles for different business types.

Create DBA profile number 1, type Type3, guaranteed bandwidth of 8Mbit/s, maximum bandwidth of 20Mbit/s:

```
OLT(config)# dba-profile profile-id 1
OLT(config-dba-profile-1)# type3 assure 8192 max 20480
OLT(config-dba-profile-1)# commit
```

```
OLT(config-dba-profile-1)# exit
```

Note:

DBA is scheduled based on the whole ONT, and the appropriate bandwidth type and bandwidth size should be selected according to the service type and the number of users in ONT. Please note that the sum of fixed bandwidth (fix) and guaranteed bandwidth (assure) cannot be greater than the total bandwidth of the PON interface.

3.4.7 Line profile creation for ONT

Create the GPON ONT line profile with profile number 1 and bind the DBA profile 1

```
OLT(config)# ont-lineprofile gpon profile-id 1
OLT(config-ont-lineprofile-1)# tcont 1 dba-profile-id 1
```

Create different GEM ports for different service types. GEM ports with index 1 are used to host online services.

```
OLT(config-ont-lineprofile-1)# gem add 1 tcont 1
```

Configure the mapping mode of GEM PORT to vlan.

```
OLT(config-ont-lineprofile-1)# mapping-mode vlan
```

Different GEM ports are mapped to different VLans for different service types. Among them, the GEM Port with index 1 is mapped to VLAN100 for carrying online services.

```
OLT(config-ont-lineprofile-1)# gem mapping 1 1 vlan 100
```

Once the configuration is complete, use the commit command to make the configured parameters take effect

```
OLT(config-ont-lineprofile-1)# commit
OLT(config-ont-lineprofile-1)# exit
```

3.4.8 Service profile creation for ONT

Create the GPON ONT Service profile with profile number 1. Configure the number of ETH ports and the number of POTS ports for ONT to be adaptive:

```
OLT(config)# ont-srvprofile gpon profile-id 1
OLT(config-ont-srvprofile-1)# ont-port eth adaptive
OLT(config-ont-srvprofile-1)# ont-port pots adaptive
OLT(config-ont-srvprofile-1)# commit
OLT(config-ont-srvprofile-1)# exit
```

Once the configuration is complete, use the commit command to make the configured parameters take effect

```
OLT(config-ont-lineprofile-1)# commit
OLT(config-ont-lineprofile-1)# exit
```

3.4.9 Add the registered ONT manually

1. Change the ONT authentication method for PON ports to manual registration:

```
OLT(config)# interface gpon 0/0
OLT(config-interface-gpon-0/0)# ont authmode all manual
```

2. Open the ONT auto-discovery function of PON port:

```
OLT(config)# interface gpon 0/0
OLT(config-interface-gpon-0/0)#ont autofind 1 enable
OLT(config-interface-gpon-0/0)#show ont autofind 1 all
// This command displays information about all unregistered ONTs that are connected to this GPON port through the splitter
```

3. Manually add the registered ONT and bind the line profile and service profile:

```
OLT(config-interface-gpon-0/0)# ont add 1 1 sn-auth DB19B34F0C16 ont-lineprofile-id 1 ont-srvprofile-id 1
OLT(config-interface-gpon-0/0)# ont add 1 2 sn-auth XPONE067B341 ont-lineprofile-id 1 ont-srvprofile-id 1
```

4. Batch increase all ONTs under PON port:

The ont confirm command can be used to add all ONTs under the PON port in bulk, as well as add ONTs individually:

```
OLT(config-interface-gpon-0/0)# ont confirm 1 all sn-auth ont-lineprofile-id 1 ont-srvprofile-id 1
```

3.4.10 Check ONT registration status

After adding ONT, use the show ont info command to query ONT's on-line status, Make sure the ONT's "Control flag" is "Active," "Run State" is "Online," "Config state" is "Success," and "Match state" is "Match."

```
OLT(config-interface-gpon-0/0)# show ont info 1 all
------------------------------------------------------------------------------------------------------
  F/S P   ONT MAC                  Control     Run         Config      Match
          ID                       flag        state       state       state
 ------------------------------------------------------------------------------------------------------
  0/0 1   1   DB19B34F0C16        active      online      success     match
  0/0 1   2   XPONE067B341        active      online      success     match
------------------------------------------------------------------------------------------------------
  Total: 2,   online 2,   deactive: 0,   failed: 0
```

When the ONT configuration state fails, ONT fails to up, etc. :

- If the "Control flag" is "deactive", the ont needs to be activated using the ont activate command in GPON port mode.
- If the ONT fails to go online, that is, the "Run state" is "offline", it may be the physical line interruption, or the optical module damage, and it needs to be checked from both aspects of the device and the line.
- If the ONT configuration state fails, that is, the "Config state" is "failed", it means that the configured ONT is not applicable to some configurations in the service profile, and it is necessary to capture packets on the ONT to analyze which configurations are not accepted by the ONT.
- If the "Match state" of ONT is "Mismatch", it means that the ONT capability set configured by the service profile (number of ports) and the actual capability set of ONT do not match. You can use the show ont capability with the show ont config-capability command to compare the ONT actual capability set with the set of capabilities configured in the business profile.

3.4.11 Bridged (SFU) ONT online service configuration

ONT Online service opening preconditions:

- OLT has connected the uplink equipment and opened the Internet service
- The OLT has created an Internet vlan
- The OLT has been configured with an Internet vlan with GE port
- The ONT has registered and bound the line profile and service profile

The port vlan mode of the bridged ONT is divided into pass-through, tag (access) and trunk modes. By default, ONT focuses on port native vlan. If ONT wants to work in pass-through mode, it needs to be configured to not focus on port native vlan in the service profile. The profile configuration is described as follows.

Configuring traffic profile:

```
OLT(config)# traffic-profile profile-id 1 profile-name 10M cir 10240 pir 10240 cbs 2000 pbs 2000
```

Configure the ONT port vlan mode in the service profile to tag (access) :

```
OLT(config)# ont-srvprofile gpon profile-id 1
OLT(config-ont-srvprofile-1)# port vlan eth 1 100
OLT(config-ont-srvprofile-1)# commit
OLT(config-ont-srvprofile-1)# exit
```

Configure ONT port native-vlan 100:

```
OLT(config)# interface gpon 0/0
OLT(config-interface-gpon-0/0)# ont port native-vlan 1 1 eth 1 vlan 100
OLT(config-interface-gpon-0/0)# exit
```

Configure virtual port auto-configuration in line profile:

Service VLAN is 100, ONT ID is 1, GEM Port ID is 2, user side VLAN is 100.

```
OLT(config-ont-lineprofile-1)#gemport 2 vlan 100 user-vlan 100 tag-action transparent
```

3.4.12 Gateway (HGU) type ONT service configuration instructions

Prerequisites

- The OLT has connected the uplink device and opened the Internet service
- The OLT has created an Internet vlan
- The OLT has been configured with an Internet vlan with GE port
- ONT registered

Configuring Traffic profiles:

```
OLT(config)# traffic-profile profile-id 2 profile-name 20M cir 20480 pir 20480 cbs 2000 pbs 2000
```

Configure automatic configuration of virtual port in line profile:

Service VLAN is 100, ONT ID is 1, GEM Port ID is 2, user side VLAN is 100.

```
OLT(config-ont-lineprofile-1)#gemport 2 vlan 100 user-vlan 100 tag-action transparent
```

Create a route WAN(this ONU is C-Data ONU):

```
OLT(config-gpon-0/0)# ont wan 1 1 1 vlan 100 ipv4 dhcp
```

3.5 OLT profile-based Multicast service Configuration - Command line mode

This section is mainly used to introduce the configuration of multicast service in FTTH networking scenario of new 8-port OLT and new 16-port OLT in profile mode. The configuration of profile mode can configure different service profiles according to different types of ONT, which can be handled flexibly. This paper mainly introduces the SFU type and HGU type ONT respectively. The following will introduce the service configuration methods of the two forms of ONT.

3.5.1 Data Planning

Table 10 Data Planning Table10

List of key data planning	
Configuration items	Specific data
OLT Port configuration	Ge3: VLAN 200 access mode
DBA profile (Uplink Bandwidth control)	profile No. : 1
ONT Line profile	profile Number: 0 T-CONT ID used: 1 Video Service GEM Port ID: 3 Mapping Vlan: 200

ONT business profile	profile Number: 0ONT Port Capability Set: Adaptive
Bridged ONT port configuration	LAN 3: VLAN 200
Gateway type ONT port configuration	POTS1: VLAN 200

3.5.2 Configuration process

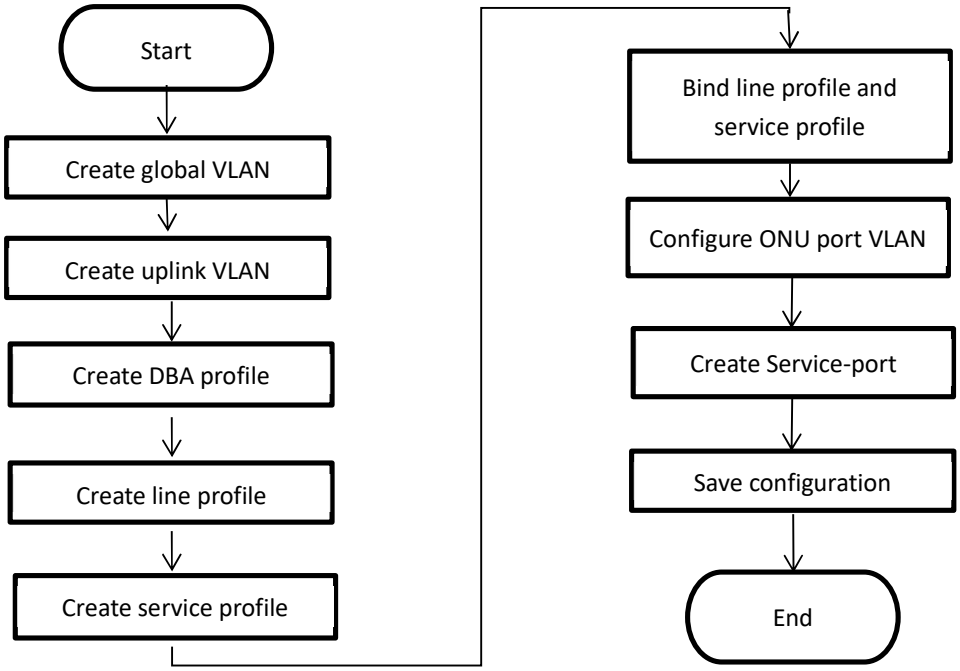


Figure 19 Configuration process of OLT profile-based multicast service19

3.5.3 Global service VLAN configuration on OLT

The command OLT(config)# show vlan all in config mode on the OLT can be used to query the created vlan.

If the created vlan cannot meet the requirements, the OLT(config)# vlan vLAN-list command can be used to create the vlan. According to the data planning, we first create the vlan200:

```
OLT(config)# vlan 200
```

3.5.4 GE port service VLAN configuration on OLT

The uplinking GE port vlan mode is divided into access, hybrid and trunk, which can be configured according to their own network planning. Each configuration method is as follows:

Configure GE 3 port vlan mode for access (start guide GE port because connected to the PC so

configure for access mode) :

```
OLT(config)# interface ge 0/0
OLT(config-interface-ge-0/0)# vlan mode 3 access
OLT(config-interface-ge-0/0)# vlan access 3 200
OLT(config-interface-ge-0/0)# exit
```

Configure GE 3-port vlan mode to trunk:

```
OLT(config)# interface ge 0/0
OLT(config-interface-ge-0/0)# vlan mode 3 trunk
OLT(config-interface-ge-0/0)# vlan trunk 3 200
OLT(config-interface-ge-0/0)# exit
```

Configure GE 3-port vlan mode to hybrid:

```
OLT(config)# interface ge 0/0
OLT(config-interface-ge-0/0)# vlan mode 3 hybrid
OLT(config-interface-ge-0/0)# vlan hybrid 3 tagged 200
OLT(config-interface-ge-0/0)# exit
```

3.5.5 Multicast service configuration on OLT

Configure multicast mode and multicast vlan 200

```
OLT(config)# igmp mode snooping
OLT(config)# multicast-vlan 200
OLT(config-multicast-vlan-200)# igmp router-port ge 0/0/3
OLT(config-multicast-vlan-200)# igmp program add Program-index 1 ip 224.3.3.3
OLT(config-multicast-vlan-200)# exit
```

3.5.6 ONT profile creation

GPON ONT profiles include DBA profiles, line profiles, and service profiles.

- DBA profile: DBA profile describes the traffic parameters of GPON, T-CONT dynamically allocates bandwidth by binding DBA profile to improve uplink bandwidth utilization.
- Line profile: The line profile describes the binding relationship between T-CONT and DBA

profile, the QoS pattern of the traffic flow, the mapping relationship between GEM Port and ONT side traffic, etc.

- Service profile: The service profile provides a service configuration channel for ONT managed by OMCI.

3.5.7 DBA profile creation for ONT

You can query existing DBA profiles in your system using the show dBA-profile all command. If the existing dba profiles in the system do not meet the requirements, you will need to execute dba-profile to add them. Create different DBA profiles for different business types.

Create DBA profile number 1, type Type3, guaranteed bandwidth of 8Mbit/s, maximum bandwidth of 20Mbit/s:

```
OLT(config)# dba-profile profile-id 1
OLT(config-dba-profile-1)# type3 assure 8192 max 20480
OLT(config-dba-profile-1)# commit
OLT(config-dba-profile-1)# exit
```

Note:

DBA is scheduled based on the whole ONT, and the appropriate bandwidth type and bandwidth size should be selected according to the service type and the number of users in ONT. Please note that the sum of fixed bandwidth (fix) and guaranteed bandwidth (assure) cannot be greater than the total bandwidth of the PON interface.

3.5.8 Line profile creation for ONT

Create the GPON ONT line profile with profile number 1 and bind the DBA profile 1:

```
OLT(config)# ont-lineprofile gpon profile-id 1
OLT(config-ont-lineprofile-1)# tcont 1 dba-profile-id 1
```

Create different GEM ports for different service types. GEM ports with index 3 are used to host video services.

```
OLT(config-ont-lineprofile-1)# gem add 3 tcont 1
```

Configure the mapping mode of GEM PORT to vlan.

```
OLT(config-ont-lineprofile-1)# mapping-mode vlan
```

Different GEM ports are mapped to different VLans for different service types. Among them, the GEM Port with index 3 is mapped to VLAN200 for carrying video services.

```
OLT(config-ont-lineprofile-1)# gem mapping 3 1 vlan 200
```

Once the configuration is complete, use the commit command to make the configured parameters take effect

```
OLT(config-ont-lineprofile-1)# commit
OLT(config-ont-lineprofile-1)# exit
```

3.5.9 Business profile creation for ONT

Create the GPON ONT business profile with profile number 1. Configure the number of ETH ports and the number of POTS ports for ONT to be adaptive:

```
OLT(config)# ont-srvprofile gpon profile-id 1
OLT(config-ont-srvprofile-1)# ont-port eth adaptive
OLT(config-ont-srvprofile-1)# ont-port pots adaptive
OLT(config-ont-srvprofile-1)# commit
OLT(config-ont-srvprofile-1)# exit
```

Once the configuration is complete, use the commit command to make the configured parameters take effect

```
OLT(config-ont-lineprofile-1)# commit
OLT(config-ont-lineprofile-1)# exit
```

3.5.10 Add the registered ONT manually

1. Change the ONT authentication method for PON ports to manual registration:

```
OLT(config)# interface gpon 0/0
OLT(config-interface-gpon-0/0)# ont authmode all manual
```

2. Open the ONT auto-discovery function of PON port:

```
OLT(config)# interface gpon 0/0
OLT(config-interface-gpon-0/0)#ont autofind 1 enable
OLT(config-interface-gpon-0/0)#show ont autofind 1 all
// This command displays information about all unregistered ONTs that are connected to this GPON port through the splitter
```

3. Manually add the registered ONT and bind the line profile and service profile:

```
OLT(config-interface-gpon-0/0)# ont add 1 1 sn-auth DB19B34F0C16 ont-lineprofile-id 1 ont-srvprofile-id 1
OLT(config-interface-gpon-0/0)# ont add 1 2 sn-auth XPONE067B341 ont-lineprofile-id 1 ont-srvprofile-id 1
```

4. Batch increase all ONTs under PON port:

The ont confirm command can be used to add all ONTs under the PON port in bulk, as well as add ONTs individually:

```
OLT(config-interface-gpon-0/0)# ont confirm 1 all sn-auth ont-lineprofile-id 1 ont-srvprofile-id 1
```

3.5.11 Check ONT registration status

After adding ONT, use the show ont info command to query ONT's on-line status, Make sure the ONT's "Control flag" is "Active," "Run State" is "Online," "Config state" is "Success," and "Match state" is "Match."

```
OLT(config-interface-gpon-0/0)# show ont info 1 all
------------------------------------------------------------------------------------------------------
  F/S P   ONT MAC                  Control    Run         Config     Match
          ID                       flag       state       state      state
 ------------------------------------------------------------------------------------------------------
  0/0 1   1   DB19B34F0C16        active     online      success    match
  0/0 1   2   XPONE067B341        active     online      success    match
------------------------------------------------------------------------------------------------------
  Total: 2,   online 2,   deactive: 0,   failed: 0
```

When the ONT configuration state fails, ONT fails to up, etc. :

- If the "Control flag" is "deactive", the ont needs to be activated using the ont activate command in GPON port mode.

- If the ONT cannot go online, that is, the "Run state" is "offline", it may be the physical line interruption, or the optical module damage, and it is necessary to check from both aspects of the device and the line.
- If the ONT configuration state fails, that is, the "Config state" is "failed", it means that the configured ONT is not applicable to some configurations in the service profile, and it is necessary to capture packets on the ONT to analyze which configurations are not accepted by the ONT.
- If the "Match state" of ONT is "Mismatch", it means that the ONT capability set configured by the service profile (number of ports) and the actual capability set of ONT do not match. You can use the show ont capability with the show ont config-capability command to compare the ONT actual capability set with the set of capabilities configured in the business profile.

3.5.12 Bridged (SFU) type ONT IPTV service configuration

Prerequisites

- The OLT has connected the uplink device and opened IPTV service
- The OLT has created a multicast vlan
- The OLT has been configured with an IPTV vlan with a GE port
- The ONT has registered and bound the line profile and service profile

IPTV service configuration for a bridged ONT can be configured either in the ONT service profile or in discrete mode (Note: If both profile and discrete ONT multicast service configuration exist, discrete configuration has higher priority than profile configuration. When discrete configuration ONT port multicast service is in default state, profile configuration will be applied). Discrete configuration is not introduced here, but profile configuration is described in the following configuration.

Configure the vlan mode of ONT port in the service profile as tag (access) :

```
OLT(config)# ont-srvprofile gpon profile-id 1
OLT(config-ont-srvprofile-1)# port vlan eth 1 200
OLT(config-ont-srvprofile-1)# commit
```

```
OLT(config-ont-srvprofile-1)# exit
```

Configure Service profile ONT port native-vlan 200:

```
OLT(config-srv-profile-2)# port native-vlan eth 1 200
```

Configure virtual port auto-configuration in line profile:

Service VLAN is 200, GEM Port ID is 3, and user side VLAN is 200.

```
OLT(config-ont-lineprofile-1)#gemport 3 vlan 200 user-vlan 200 tag-action transparent
```

3.5.13 Gateway (HGU) type ONT service configuration instructions

Same configuration as discrete (non-profile) multicast service.

3.6 OLT online service configuration --WEB mode

3.6.1 Data planning

Table 11 Data Planning Table11

List of key data planning	
Configuration items	Specific data
OLT Port configuration	GE1: VLAN 222 access mode
DBA profile (Uplink Bandwidth control)	profile No. : 1
Lineprofile	profile No. : 1 T-CONT ID : 1 GEM Port ID:2
Srvprofile	profile No. : 1 ONT port Capability set:Adaptive
Bridge-type ONT port configuration	LAN1: VLAN 222
Gateway type ONT port configuration	LAN1: VLAN 222

3.6.2 Configuration process

3.6.3 Log in to the OLT web management system

Prerequisites

OLT Web management system adopts B/S architecture, please ensure that the network connection between the current PC and OLT equipment is normal, and the OLT equipment is working normally before login.

Background Information

OLT Web provides four initial users by default, as follows:

Table 12 Initial User Table12

Usernames	Roles	Password	Notes
root	Root	admin	This user has all the operation rights of all the objects managed by the OLT Web management system
admin	Admin	admin	This user has all the operation rights of OLT Web management system except for user deletion
operator	Operator	admin	The user has access and operation rights to common functions of OLT Web management system
guest	Guest	guest	This user has access only

Log in to the OLT Web management system

- Enter the out-of-band management IP address (192.168.1.100 by default) or in-band management IP of the OLT device in the browser address bar to access the login page of the OLT Web management system.
- Enter the username and password on the login page and click the "Login" button;
- After the user successfully logs in, the system will jump to the main page of the OLT Web management system, and the typical initial page is shown in the figure

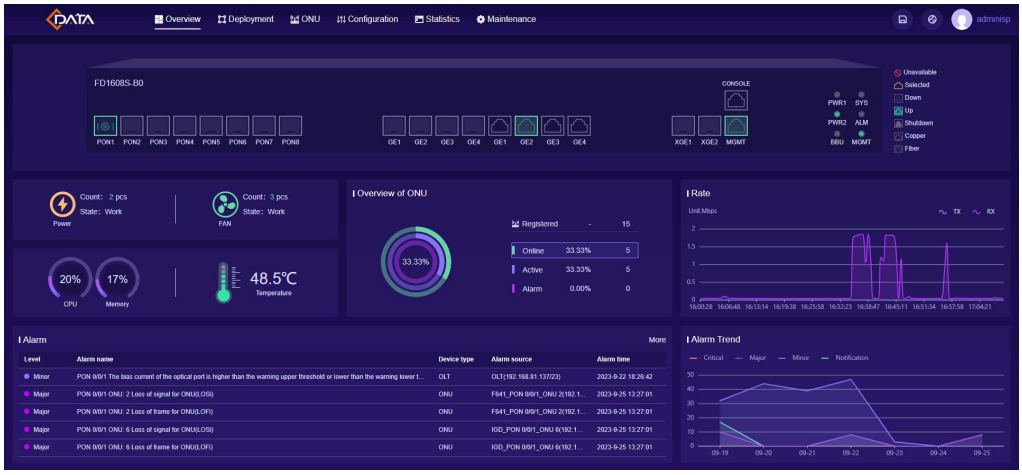


FIG. 20 Initial page of OLT Web

20

3.6.4 Creating a VLAN

- Access path: Configuration ----> VLAN---->VLAN Planning ----> Click the "Add VLAN" button

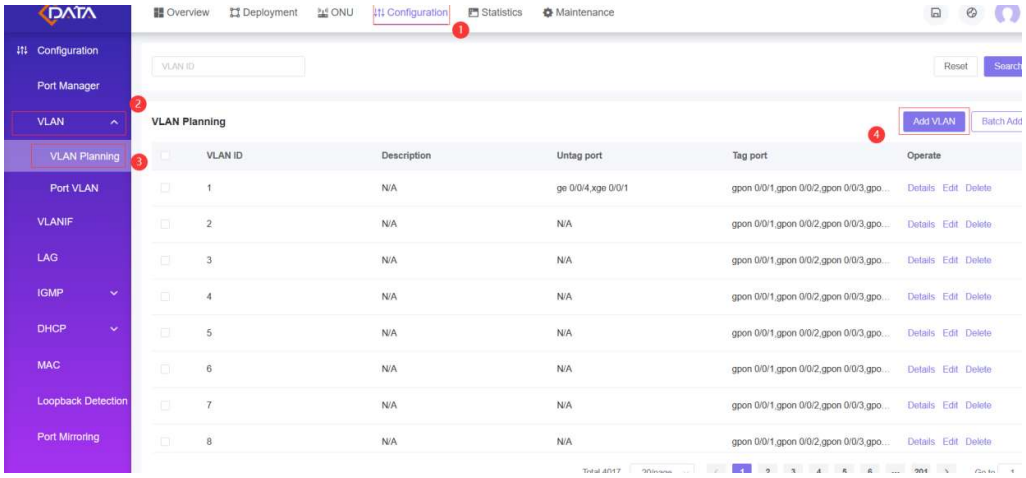


FIG.21 Create VLAN-121

The page brings up a pop-up window to add a VLAN22

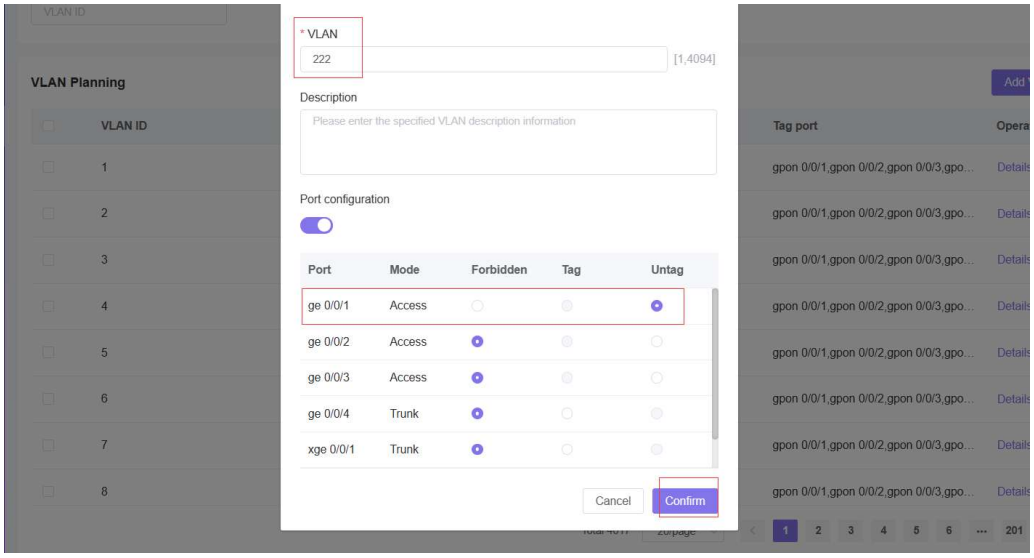


FIG.22 Creating VLAN-2

1. Enter the planned VLAN in the VLAN box

2. Edit port to join VLAN, start guide to use VLAN222,Untag23

Once you're done creating your VLAN, click the "Confirm" button to close the pop-up window.

3.6.5 Create ONT DBA Profile

- Access path: Deployment ----> Profile---->DBA Profile ----> Click the "Add" button

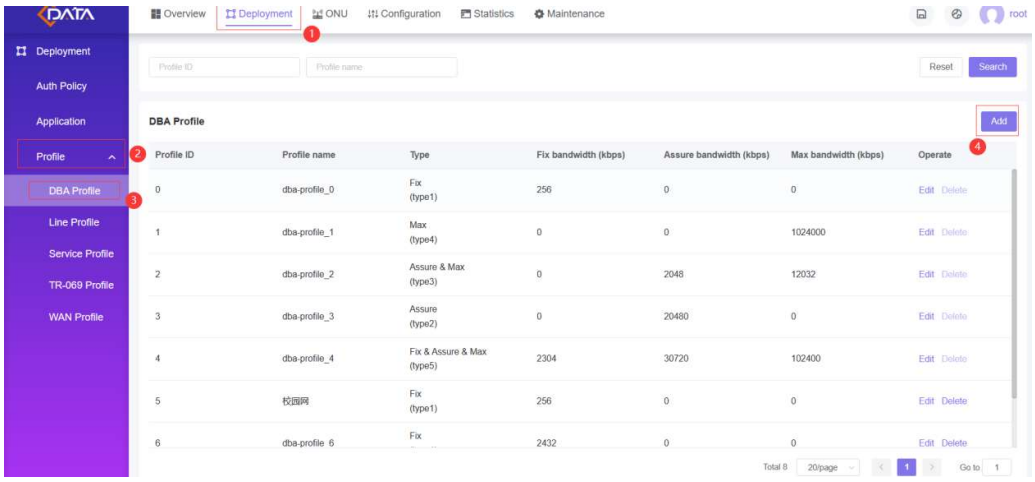


FIG.23 DBA configuration-1

The page brings up a pop-up window to create DBA Profile

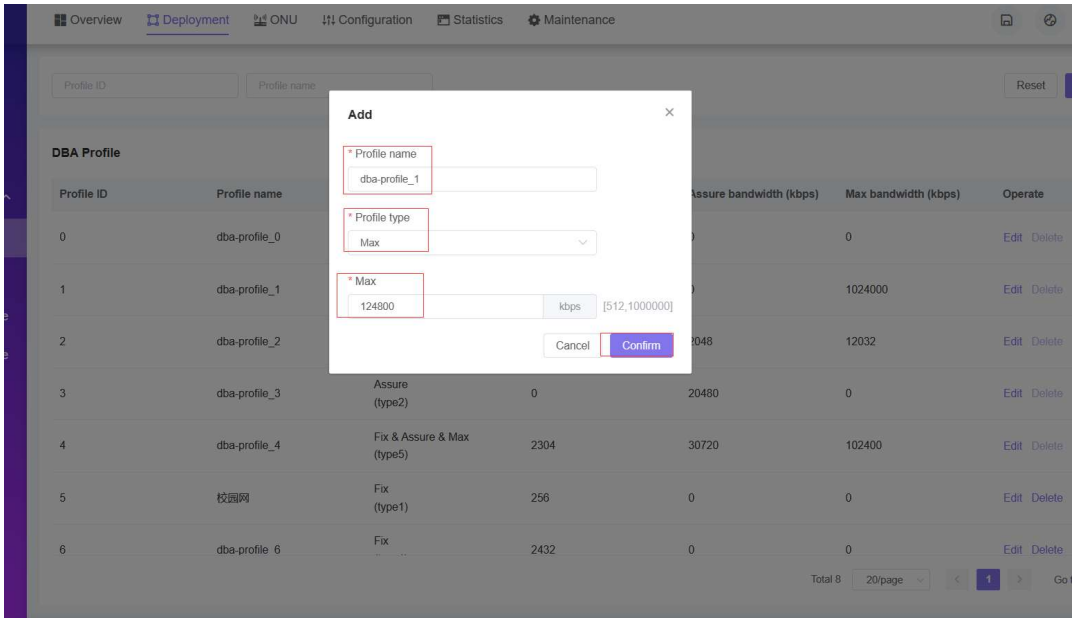


FIG.24 DBA configuration-2

Here, for example, create a DBA template with a max bandwidth of 124800 with the name of 1 and click "Confirm" to create a template.

24

3.6.6 Create ONT Lineprofile

- Access path: Deployment ----> Profile---->Line Profile ----> Click the "Add " button

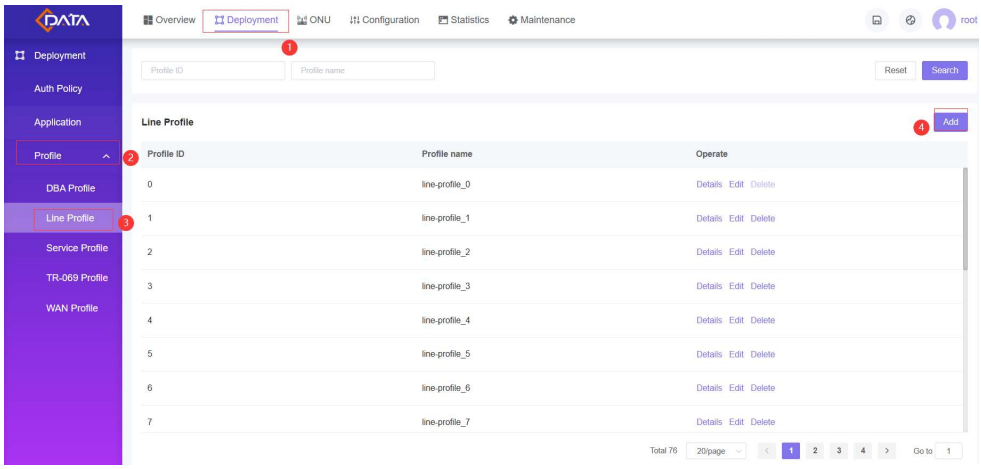


FIG.25 Line configuration-1

The page will skip to anther page to create Lineprofile

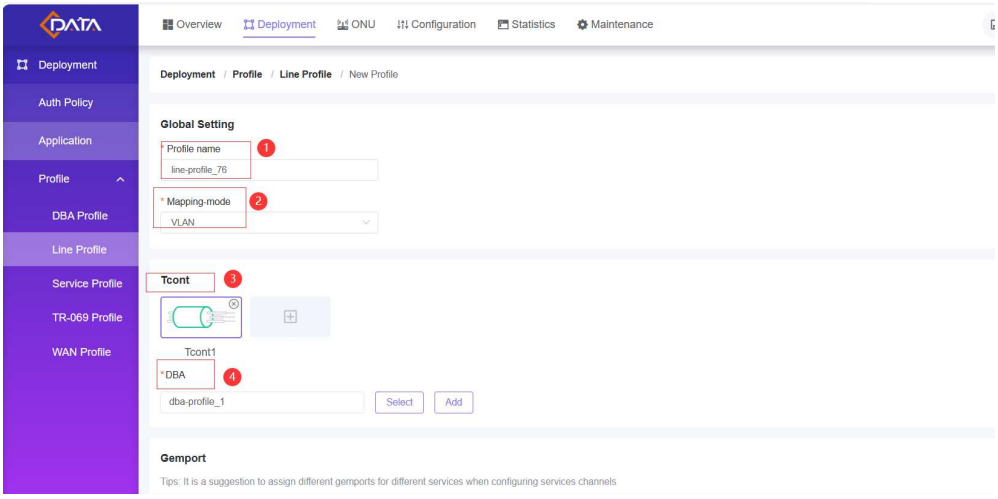


FIG.26 Line configuration-2

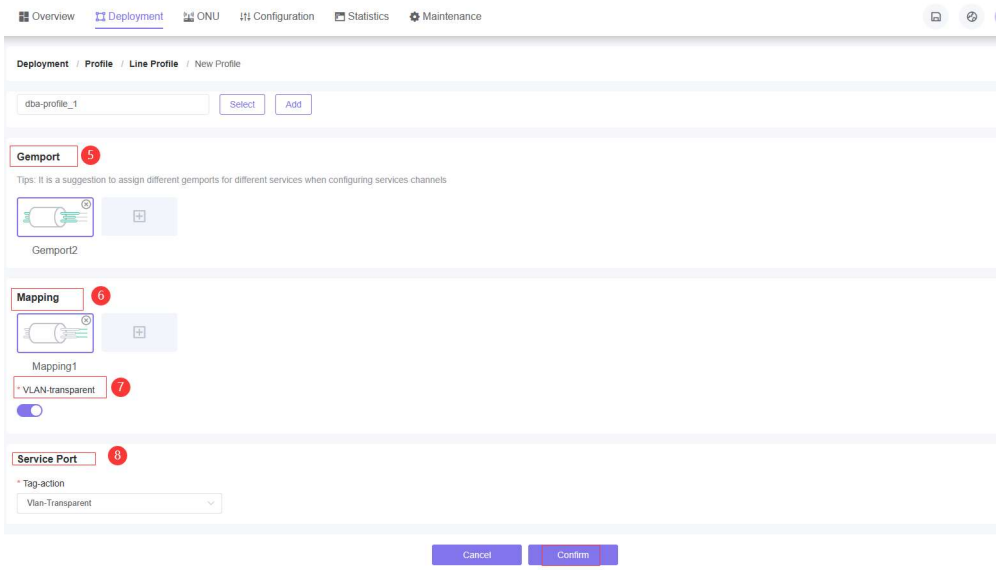


FIG.27 Line configuration-3

1. Take a lineprofile name25

2. Select the Mapping mode as VLAN

3. Click the "+" button, the page will pop up the Add TCONT pop-up box, create the required TCONT, click the "Confirm" button after completion, the pop-up window will close, the start guide to use TCONT1 configuration

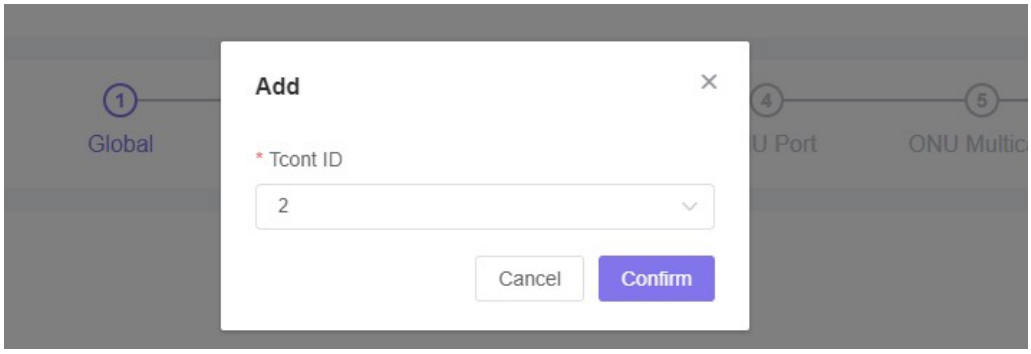


FIG.28 Line configuration-426

4. Click the "Select" button to select the created DBA profile; You can also click the "Add" button, the page will pop up the Add dba profile popup, configure according to the required requirements, click the "Confirm" button after completion, the popup will close. The opening guide is to use dba1 profile.

5. Click "+" next to Gemport, the page will pop up Add Gempot pop-up box, create different Gemport to host different service, when finished, click "Confirm" button, the pop-up

window will close. Start guide to use GEMport id 2

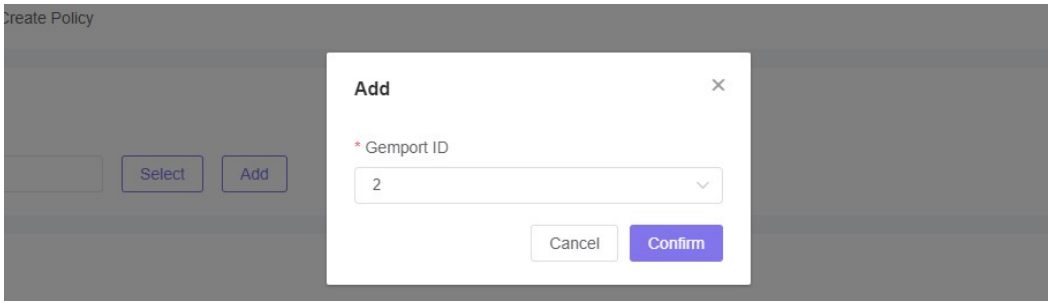


FIG.29 Line configuration-527

6. Create a gem mapping
7. Mapping pass-through is on by default and needs to be turned on
8. Select transparent for the virtual port

Click "Confirm" once you are done with the above configuration

3.6.7 Create ONT Srvprofile

- Access path: Deployment ----> Profile---->Service Profile ----> Click the "Add " button

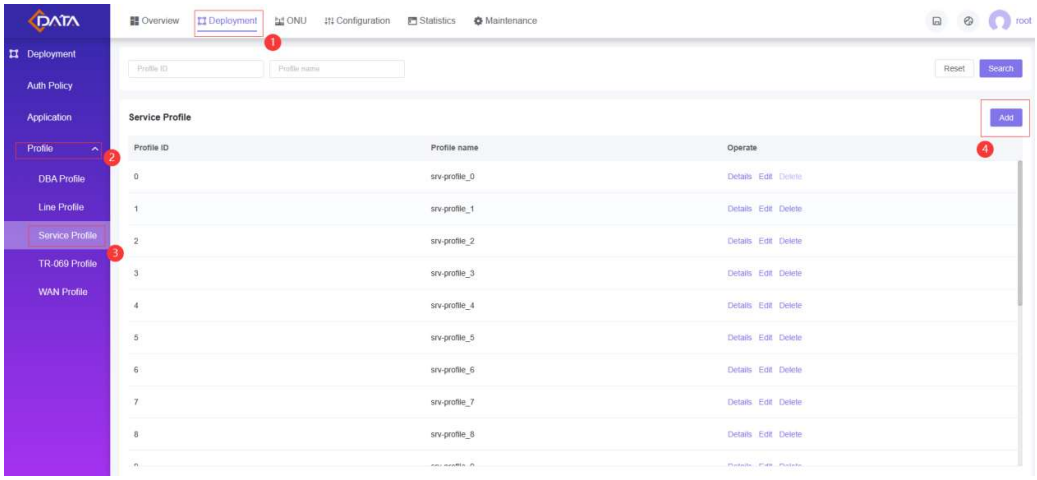


FIG.30 Service configuration-1

The page will skip to anther page to create Srvprofile

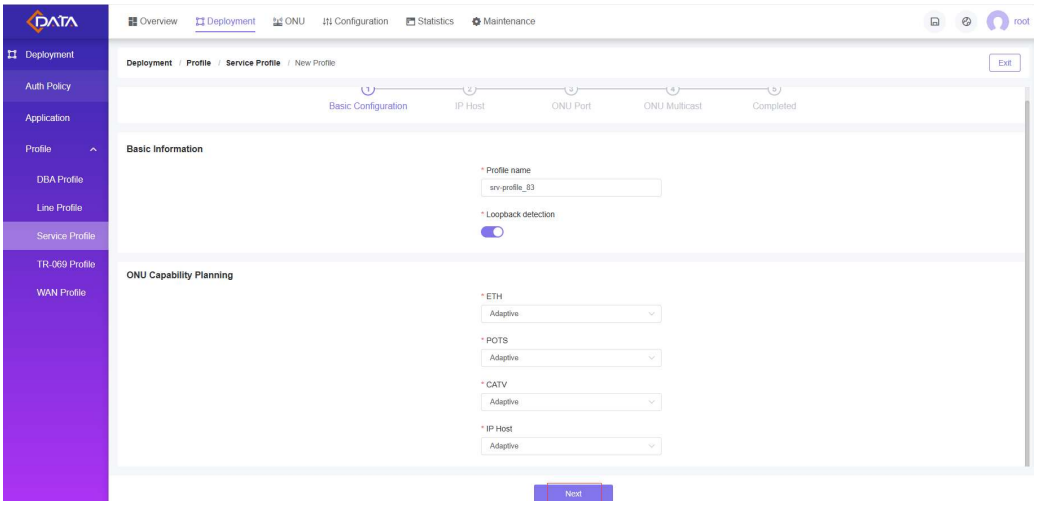


FIG.31 Service configuration-2

The number of ETH number , POTS number ,CATV number and IP Host number configured are adapt. After you finished,click" Next "button ,The page will skip to IP Host Configuration,In the part ,you can choose not config it .

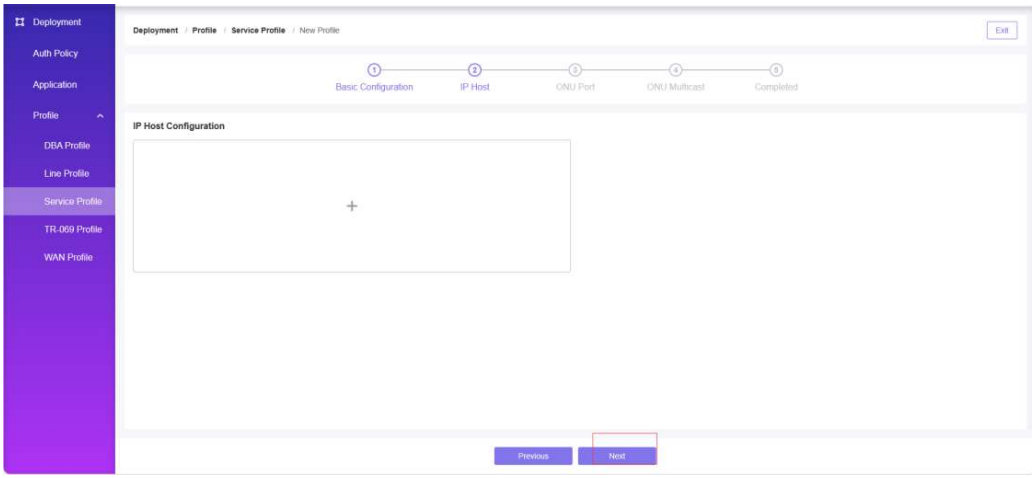


FIG.32 Service configuration-3

Then click" Next "button ,The page will skip to ONU port config,If onu is SFU,you need config it .If it is the HGU,this step is unnecessary.The specific operation is as follows:

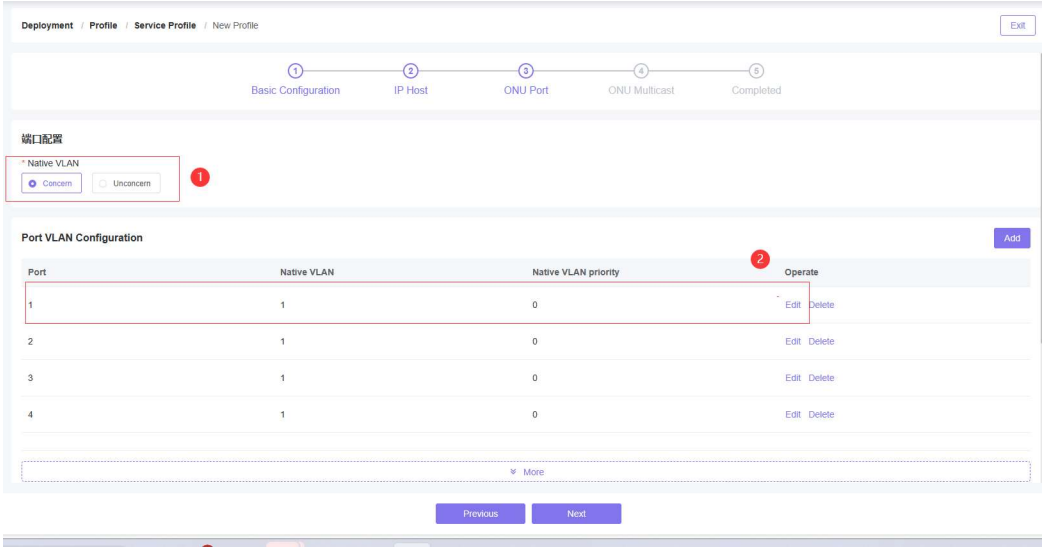


FIG.33 Service configuration-428

1. Native VLAN Click the "Concern" button

2. According the port choose the "Edit" button, the page pops up a window,Enter the Native VLAN, the start guide to use VLAN 222, select the priority of the Native VLAN according to the needs. Click the "Confirm" button when you are done, and the popup window will close.

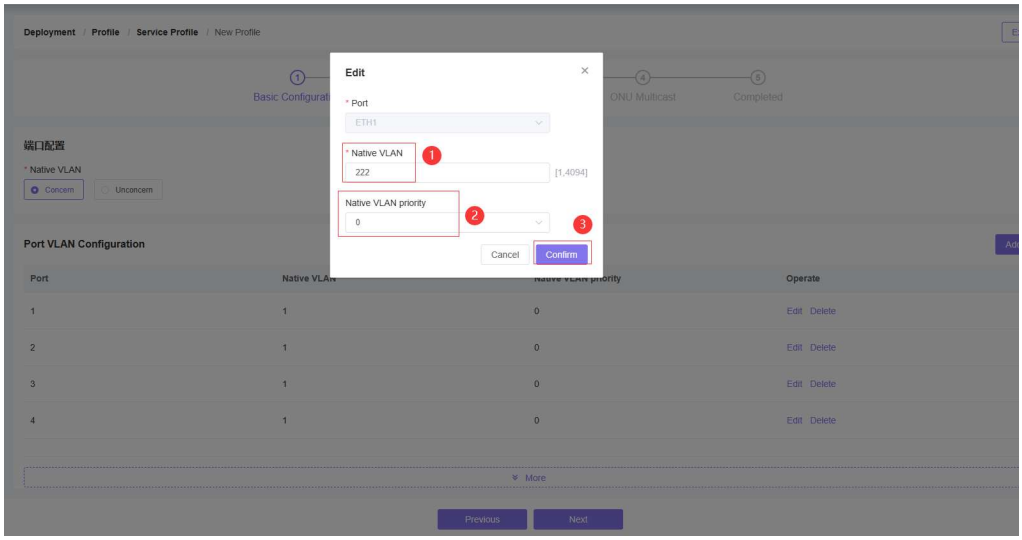


FIG.34 Service configuration-5

Click "Next" button, the page will jump to the multicast page, open or close the multicast configuration according to the requirements, do not do any requirements, continue to click "Next", the page will skip, the creation strategy is completed, click "Confirm" button

3.6.8 Create ONT WAN Profile

In this part ,If onu is HGU,you need config it .If it is the SFU,this step is unnecessary.The specific operation is as follows

- Access path: Deployment ----> Profile---->WAN Profile ----> Click the "Add " button

The page will skip to anther page to create WAN Profile

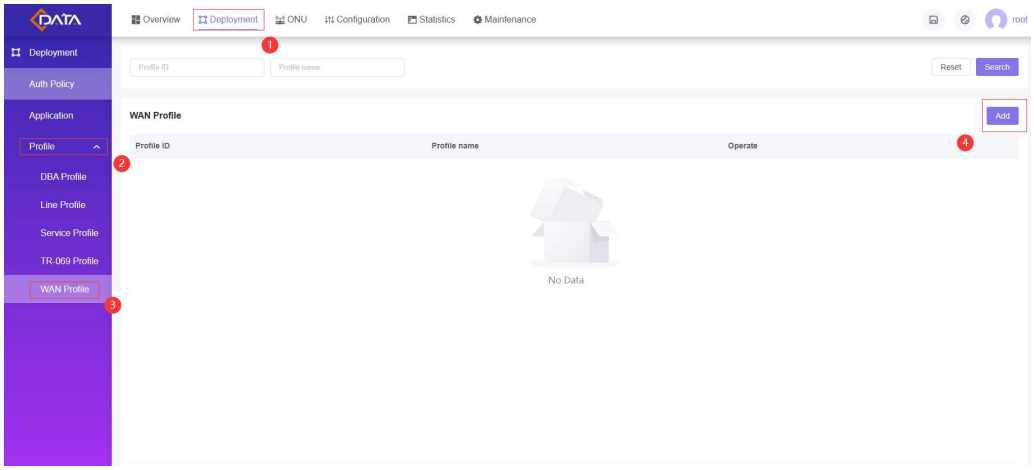


FIG.35 WAN configuration-1

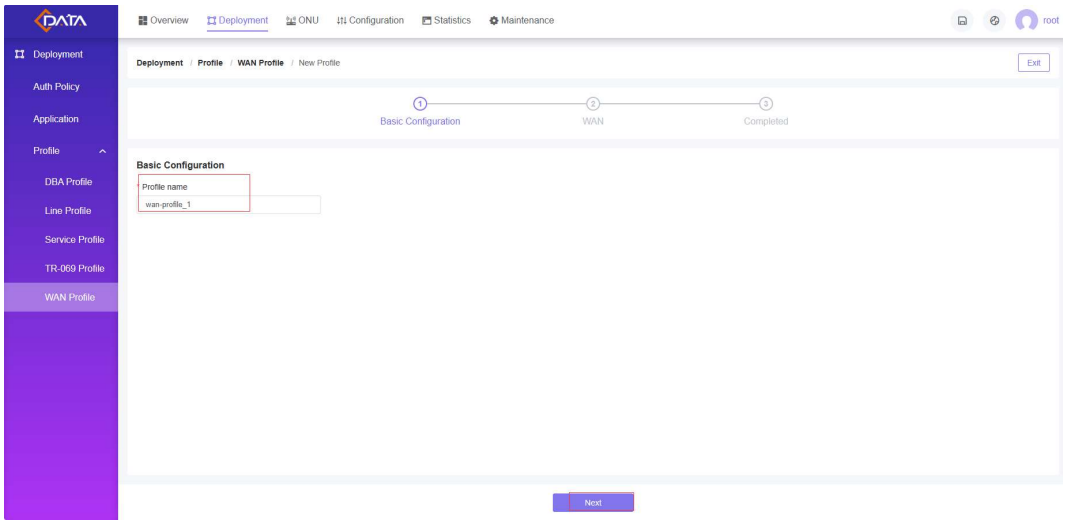


FIG.36 WAN configuration-2

Setting the WAN Profile name ,then click the “next”button,the page skip the follow page

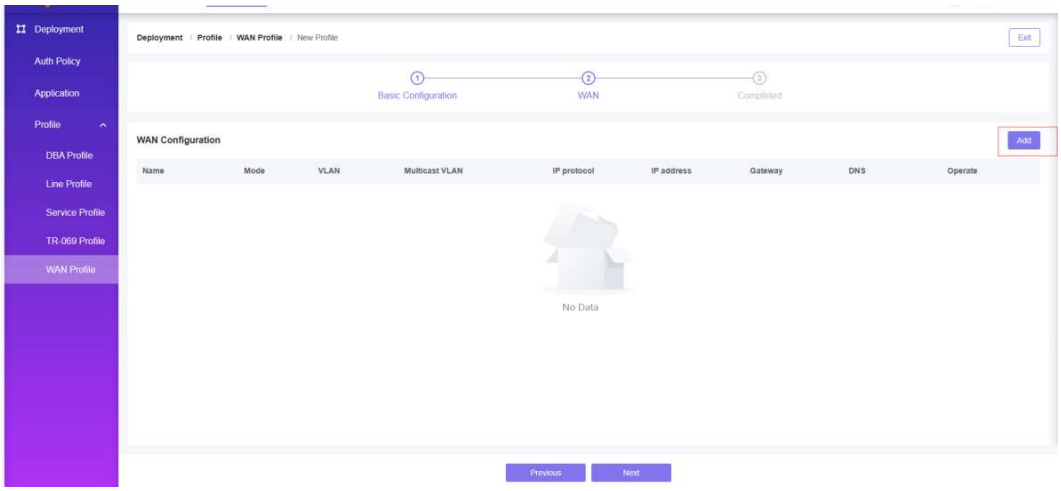


FIG.37 WAN configuration-3

Then click the “Add”button,the page brings up a pop-up window to set WAN parameters

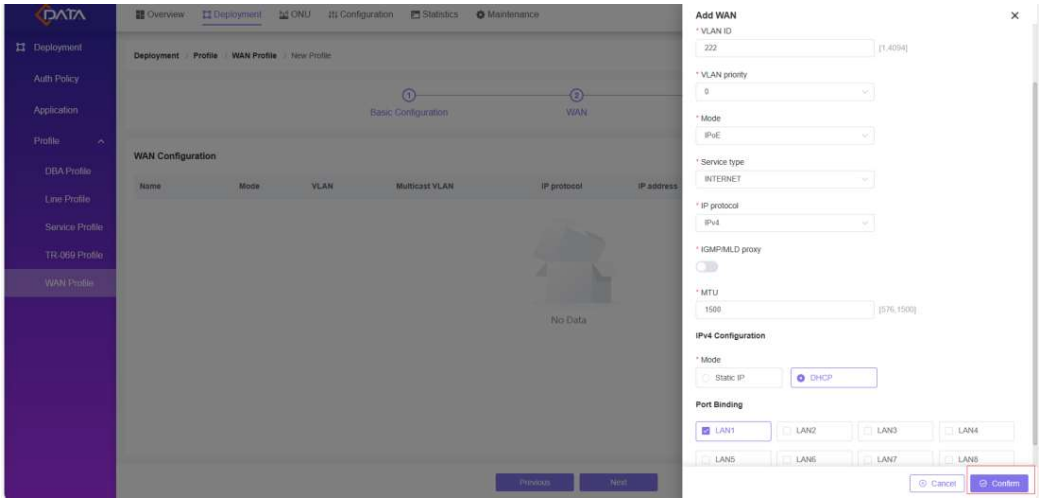


FIG.38 WAN configuration-4

After you finished,click the “Confirm”button ,the pop-up window will be closed.

3.6.9 Policy Application

In the GPON/EPON OLT network deployment, a large number of ONU devices need to be deployed, and the related work of deployment and debugging is cumbersome and costly. ONU is easy to deploy, only the ONU deployment strategy needs to be configured in the OLT Web management system in advance, and it is applied to the OLT PON port. When the ONU is online for the first time, the OLT device can automatically detect the online ONU and automatically match with the existing policy. After the match is successful, the OLT device will automatically

create and execute the ONU deployment task to complete the ONU plug and play deployment, which greatly improves the deployment efficiency and reduces the cost of network construction.

Create Policy

- Access path: Deployment ----> Auth Policy ----> Click the "Create Policy " button

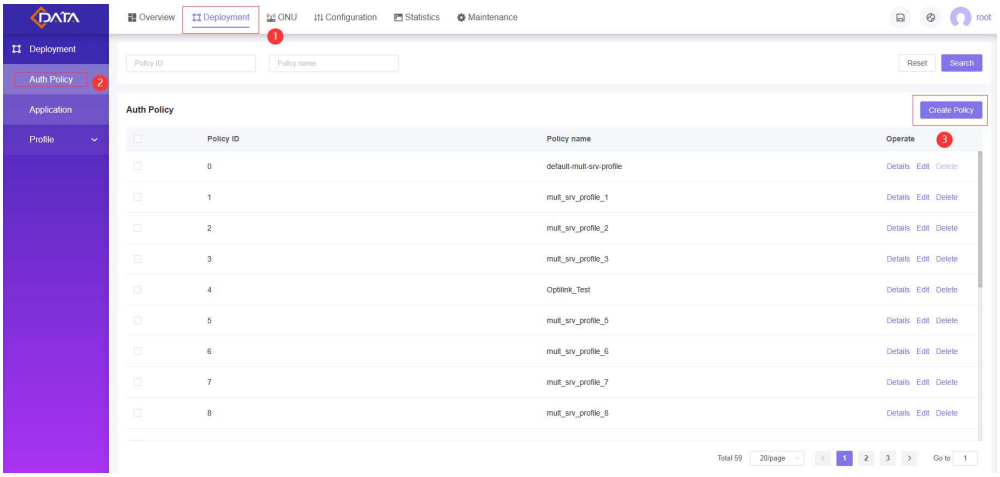


FIG. 39 Configuration Application-1

The page will skip to anther page

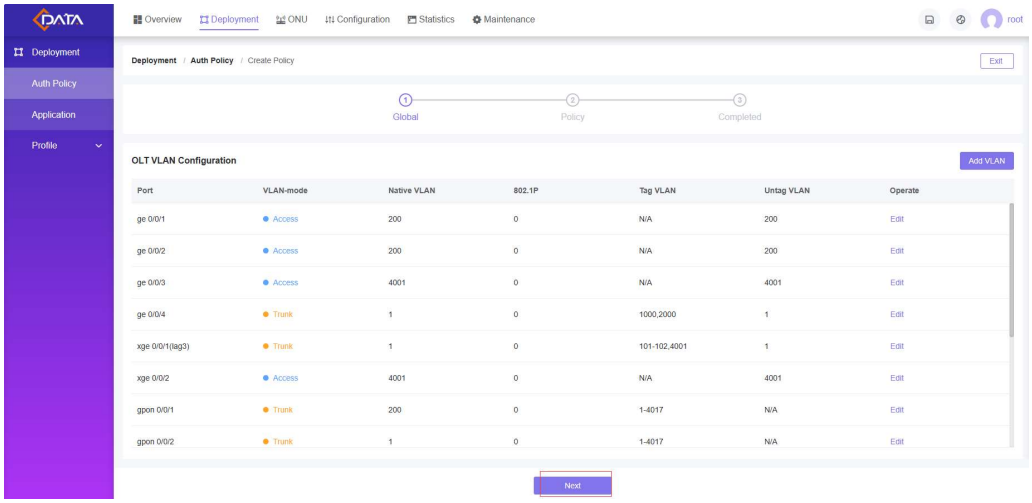


FIG. 40 Configuration Application-2

Click “next”button,The page will skip to anther page to choose the profile

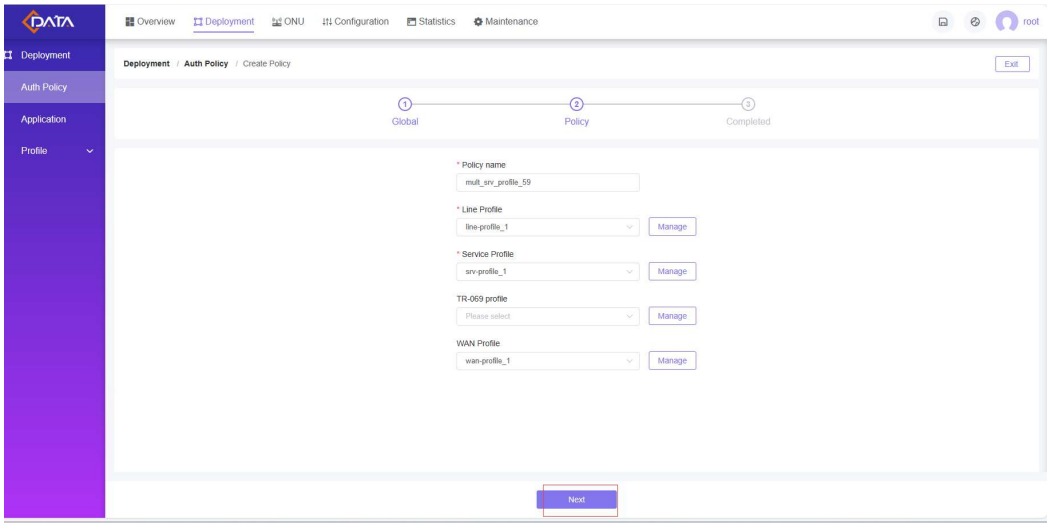


FIG. 41 Configuration Application-3

This completes the creation of the policy.

Policy Application

- Access path: Deployment ----> Application ----> Click the "Add " button

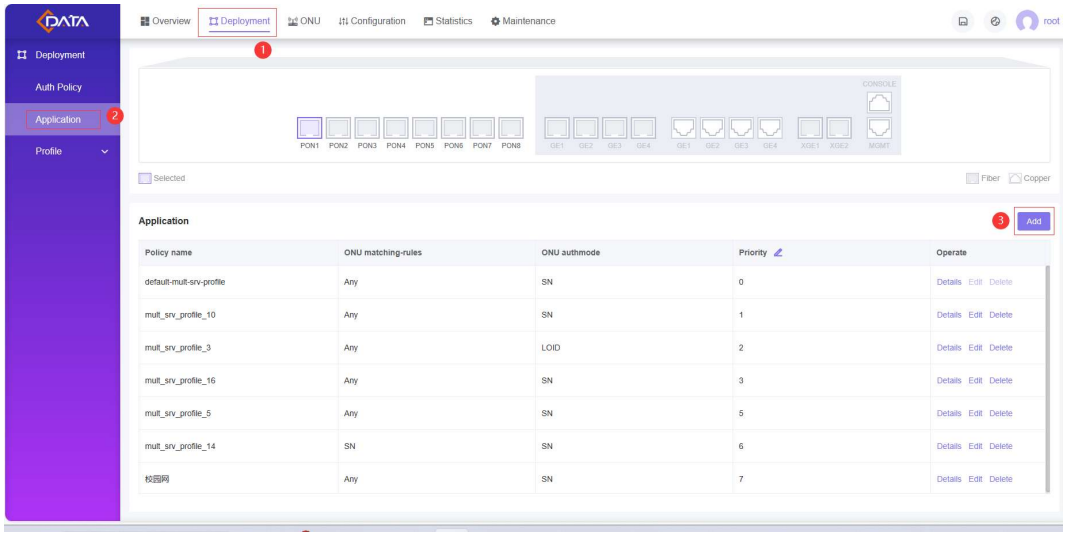


FIG. 42 Configuration Application-4

The page brings up a pop-up window.

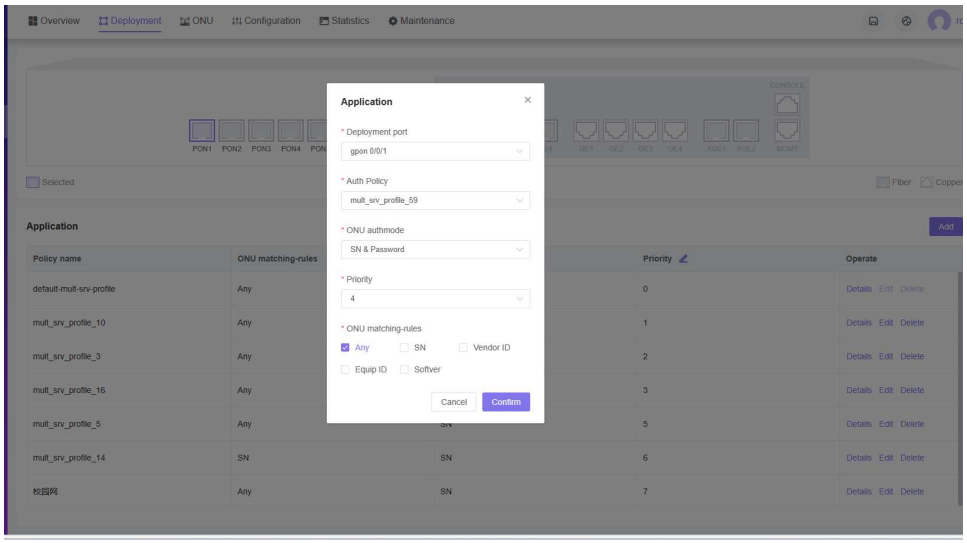


FIG. 43 Configuration Application-5

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1. Select the PON port where you want to apply the policy application

2. Select ONU Auth Policy

3. Select the ONU's authentication mode

4. Select the policy priority

5. Determine the matching conditions for the ONU

Click the "Confirm" button and the configuration is complete.

Note: Check to see if the configuration was successful

- Access path: Deployment ----> Application ----> Click the "Details" button

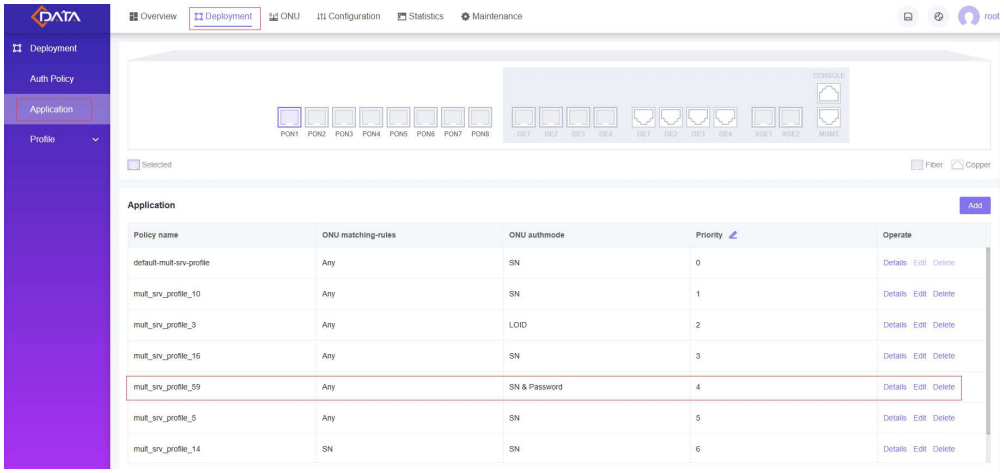

FIG. 44 Configuration Application-6

Note: The above configuration is a plug-and-play part of the Internet service configuration, configuration application in that PON port, as long as the ONU connected to the PON port can be applied.30

3.7OLT multicast configuration -WEB mode

3.7.1 Data planning

Table 13 Data Planning Table

List of key data planning	
Configuration items	Specific data
OLT Port configuration	GE1: VLAN 222 access mode
DBA profile (Uplink Bandwidth control)	profile No. : 1
Lineprofile	profile No. : 1 T-CONT ID : 1 GEM Port ID:2
Srvprofile	profile No. : 1 ONT port Capability set:Adaptive
Bridge-type ONT port configuration	LAN1: VLAN 222
Gateway type ONT port configuration	LAN1: VLAN 222

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3.7.2 Log in to the OLT web management system

Prerequisites

The OLT Web management system adopts B/S architecture, please ensure that the network connection between the current PC and OLT equipment is normal and the OLT equipment is working properly before logging in.

Background Information

OLT Web provides four initial users by default, as follows:

Table 14 OLT Web Initial user Table14

User name	Roles	Password	Notes
root	Root	admin	This user has all the operation rights of all the objects

			managed by the OLT Web management system
admin	Admin	admin	This user has all the operation rights of OLT Web management system except for user deletion
operator	Operator	admin	The user has access and operation rights to common functions of OLT Web management system
guest	Guest	guest	This user has access only

Log in to the OLT Web management system

- Enter the out-of-band management IP address (192.168.1.100 by default) or in-band management IP of the OLT device in the browser address bar to access the login page of the OLT Web management system.
- Enter the username and password on the login page and click the "Login" button;
- After the user successfully logs in, the system will jump to the main page of the OLT Web management system, and the typical initial page is shown in the figure

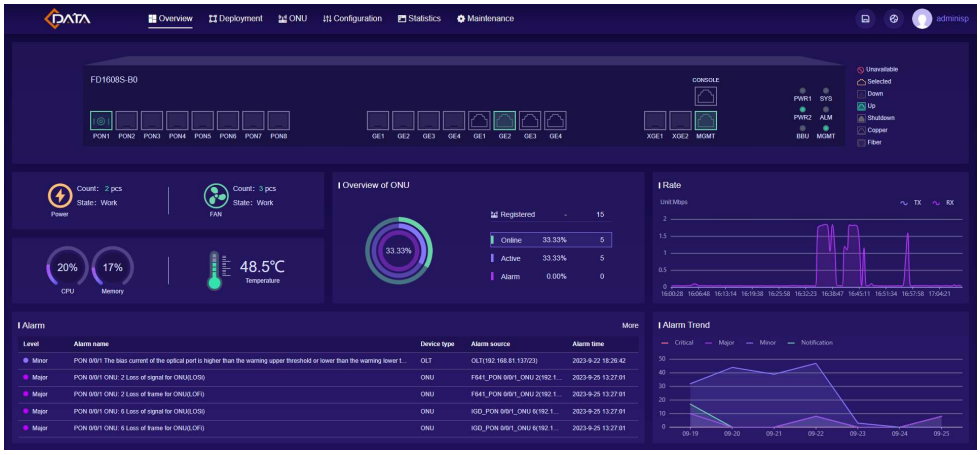

FIG. 45 Initial page of OLT Web

3.7.3 Creating a VLAN

- Access path: Configuration ----> VLAN---->VLAN Planning ----> Click the "Add VLAN" button

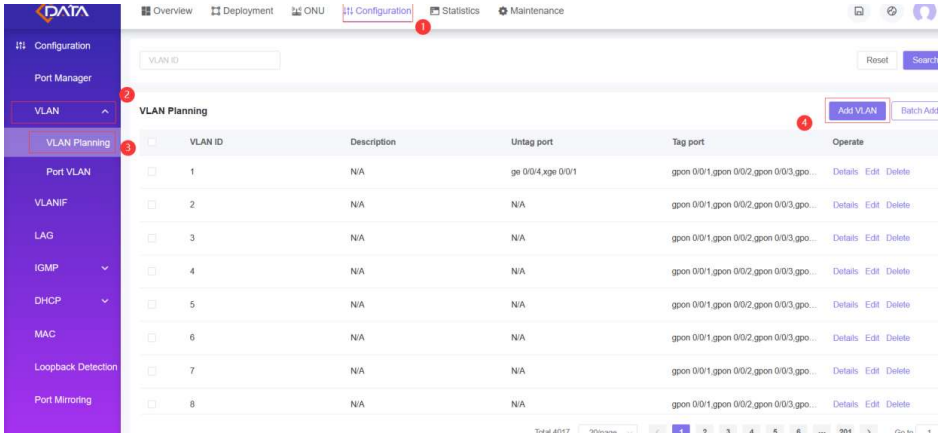

FIG.46 Create VLAN-132

The page brings up a pop-up window to add a VLAN33

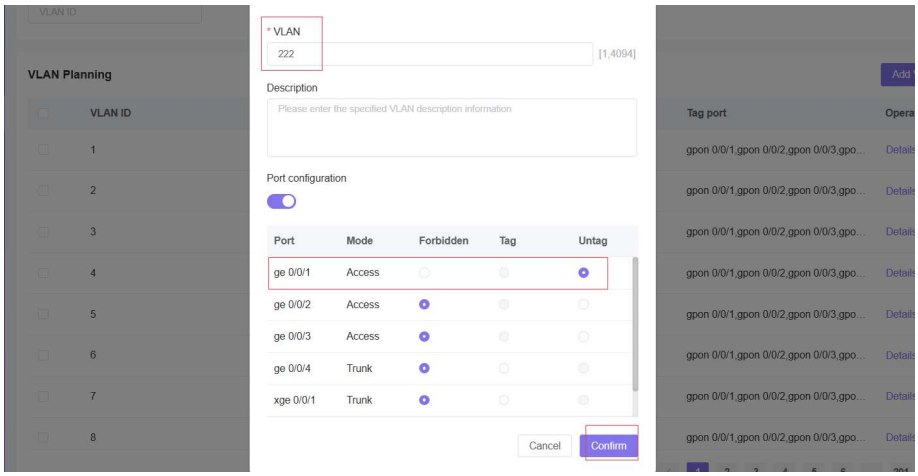

FIG.47 Creating VLAN-2

1. Enter the planned VLAN in the VLAN box

2. Edit port to join VLAN, start guide to use VLAN222,Untag34

Once you're done creating your VLAN, click the "Confirm" button to close the pop-up window.

3.7.4 Create ONT DBA Profile

- Access path: Deployment ----> Profile---->DBA Profile ----> Click the "Add" button

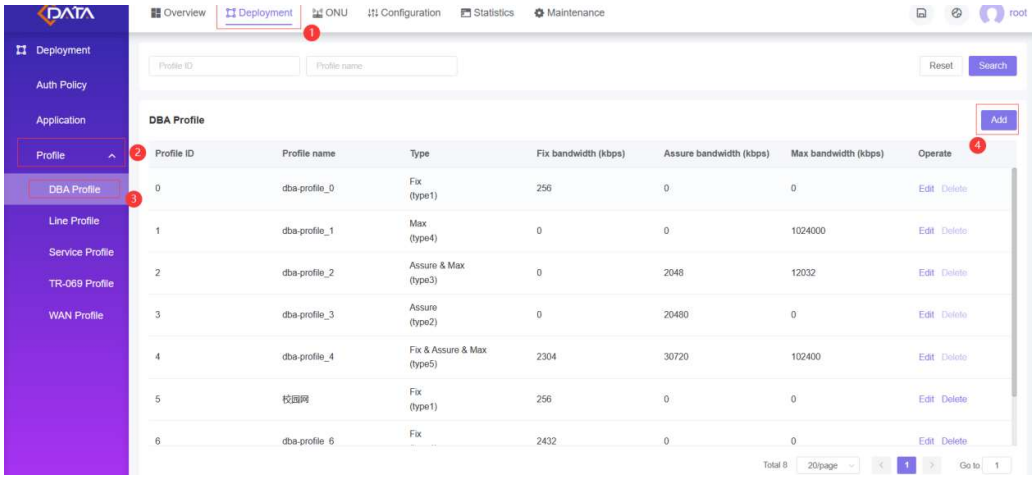

FIG.48 DBA configuration-1

The page brings up a pop-up window to create DBA Profile

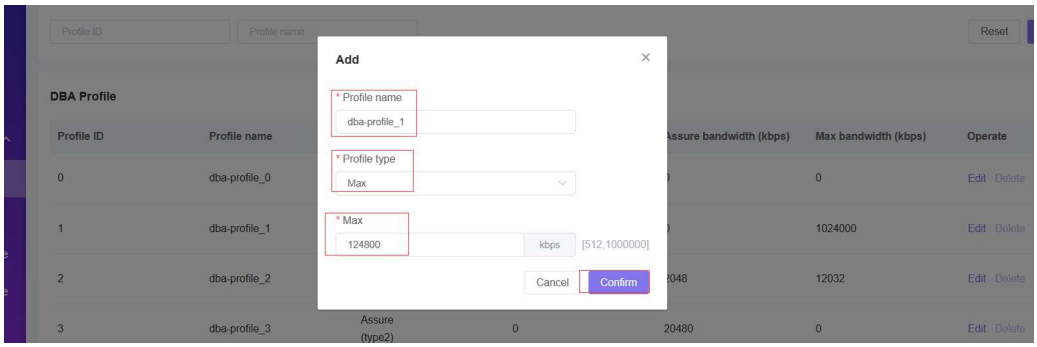

FIG.49 DBA configuration-2

Here, for example, create a DBA template with a max bandwidth of 124800 with the name of 1 and click "Confirm" to create a template.

3.7.5 Create ONT Lineprofile

- Access path: Deployment ----> Profile---->Line Profile ----> Click the "Add " button

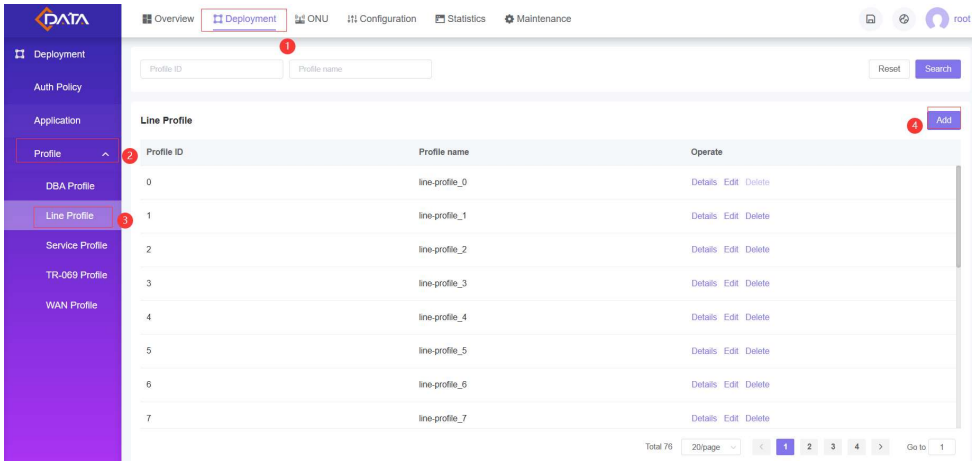

FIG.50 Line configuration-1

The page will skip to anther page to create Lineprofile

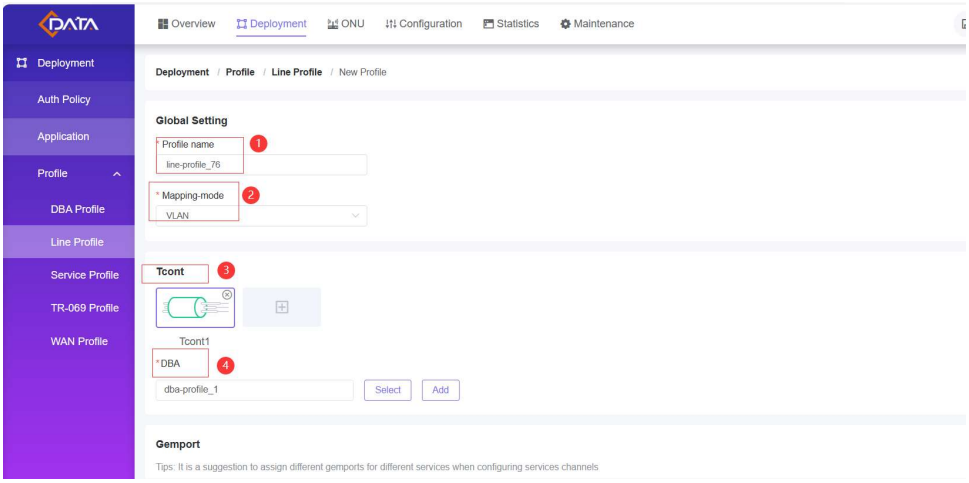

FIG.51 Line configuration-2

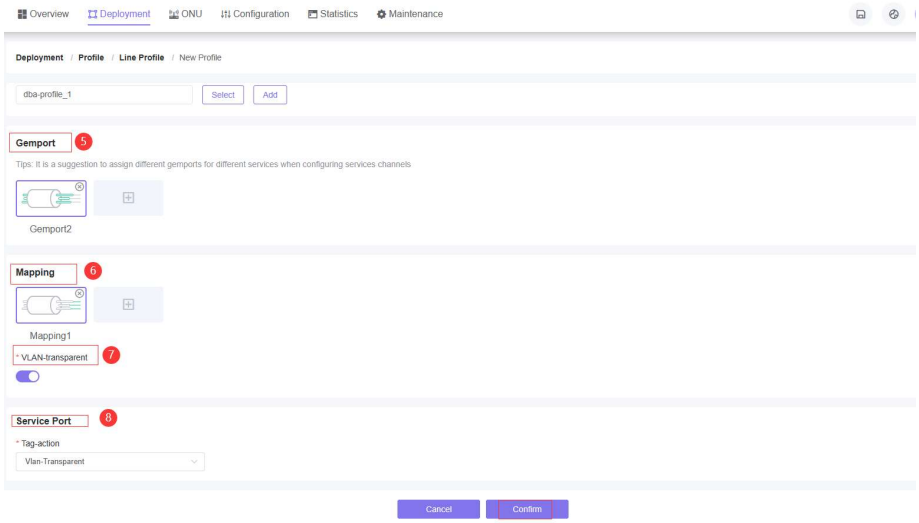

FIG.52 Line configuration-3

1 Take a lineprofile name36

2.Select the Mapping mode as VLAN

3.Click the "+" button, the page will pop up the Add TCONT pop-up box, create the required TCONT, click the "Confirm" button after completion, the pop-up window will close, the start guide to use TCONT1 configuration

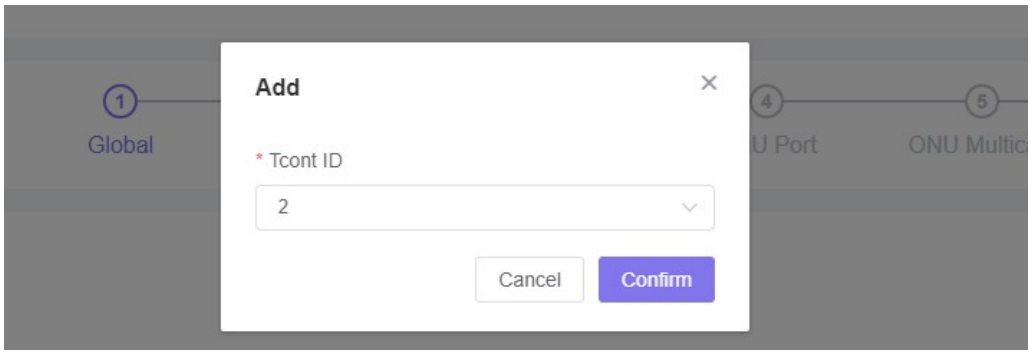

FIG.53 Line configuration-437

4.Click the "Select" button to select the created DBA profile; You can also click the "Add" button, the page will pop up the Add dba profile popup, configure according to the required requirements, click the "Confirm" button after completion, the popup will close. The opening guide is to use dba1 profile.

5.Click "+" next to Gemport, the page will pop up Add Gempot pop-up box, create different Gemport to host different service, when finished, click "Confirm" button, the pop-up window will close. Start guide to use GEMport id 2

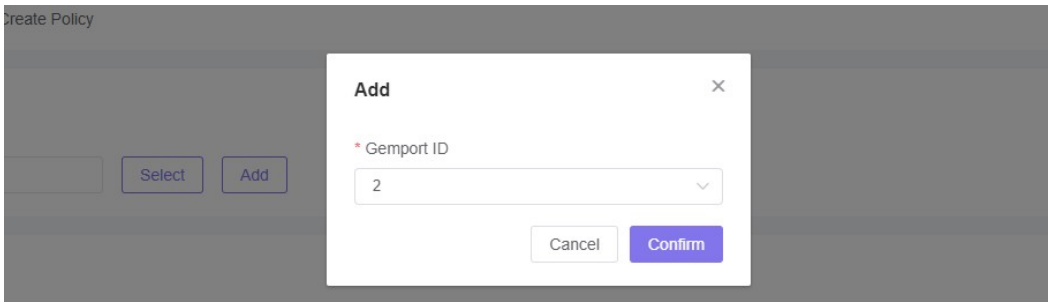

FIG.54 Line configuration-538

6.Create a gem mapping

7.Mapping pass-through is on by default and needs to be turned on

8.Select transparent for the virtual port

Click "Confirm" once you are done with the above configuration

3.7.6 Create ONT Srvprofile

- Access path: Deployment ----> Profile---->Service Profile ----> Click the "Add " button

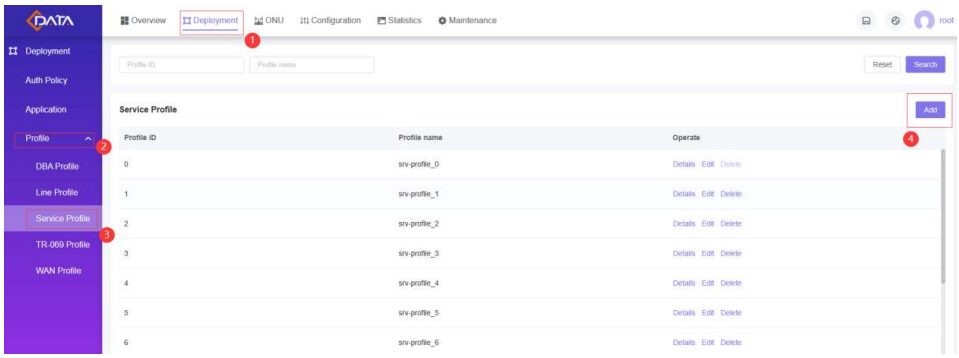

FIG.55 Service configuration-1

The page will skip to anther page to create Srvprofile.

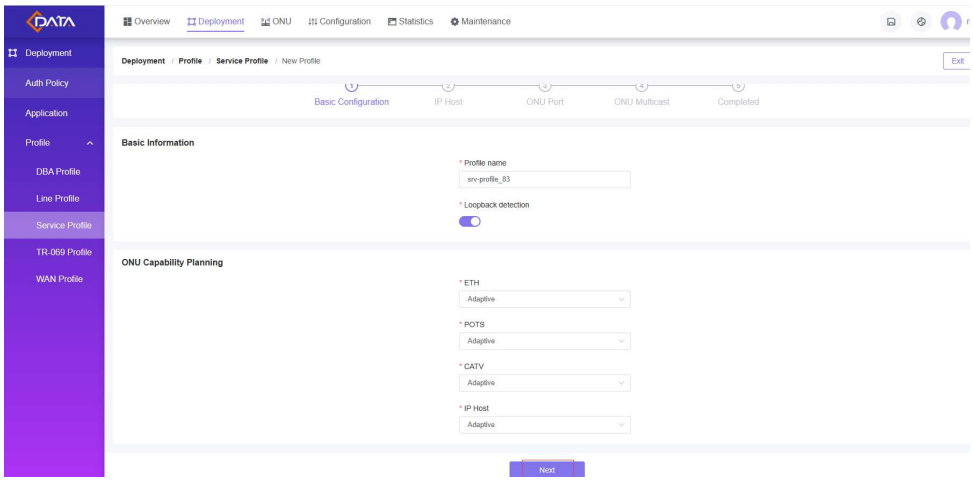

FIG.56 Service configuration-2

The number of ETH number , POTS number ,CATV number and IP Host number configured are adapt. After you finished,click" Next "button ,The page will skip to IP Host Configuration,In the part ,you can choose not config it .

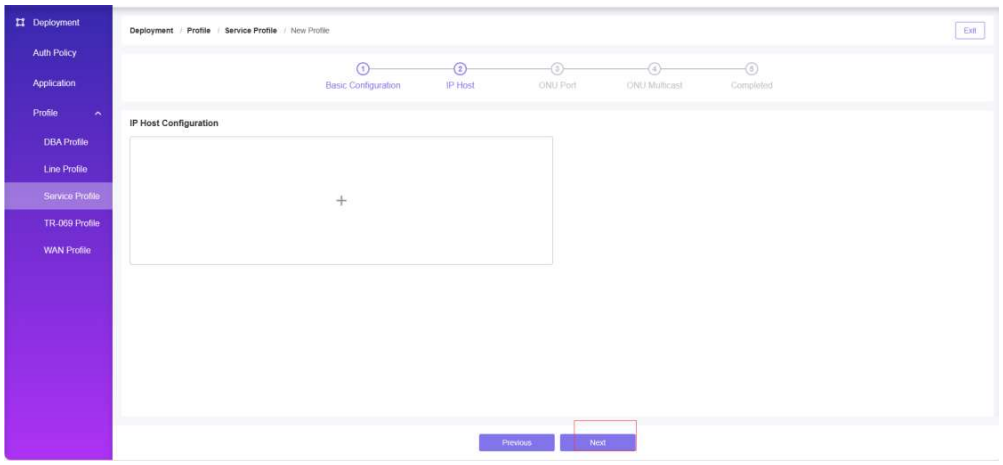

FIG.57 Service configuration-3

Then click" Next "button ,The page will skip to ONU port config,If onu is SFU,you need config it .If it is the HGU,this step is unnecessary.The specific operation is as follows:

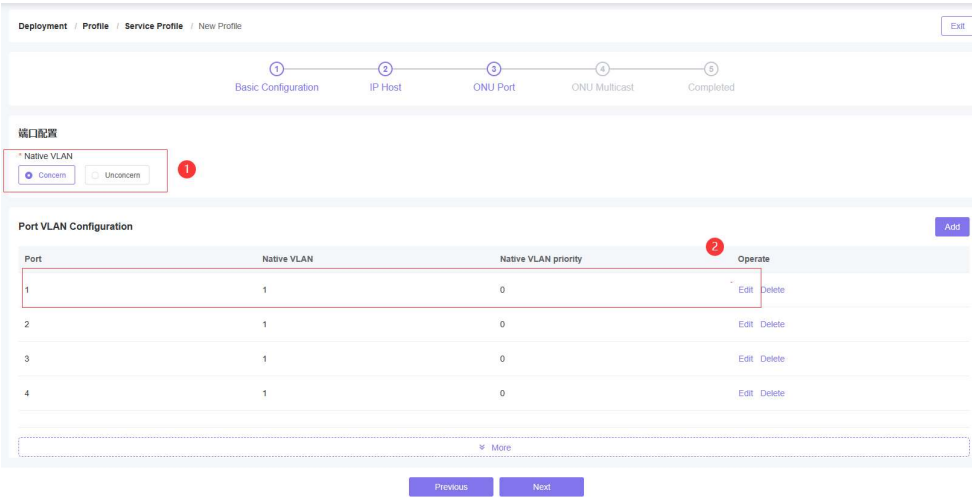

FIG.58 Service configuration-439

3. Native VLAN Click the "Concern" button

4. According the port choose the "Edit" button, the page pops up a window,Enter the Native VLAN, the start guide to use VLAN 222, select the priority of the Native VLAN according to the needs. Click the "Confirm" button when you are done, and the popup window will close.

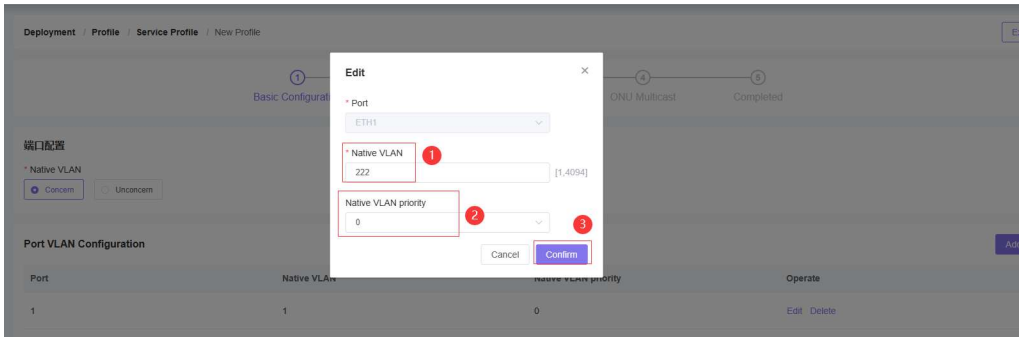

FIG.59 Service configuration-5

Click "Next" button, the page will jump to the multicast page

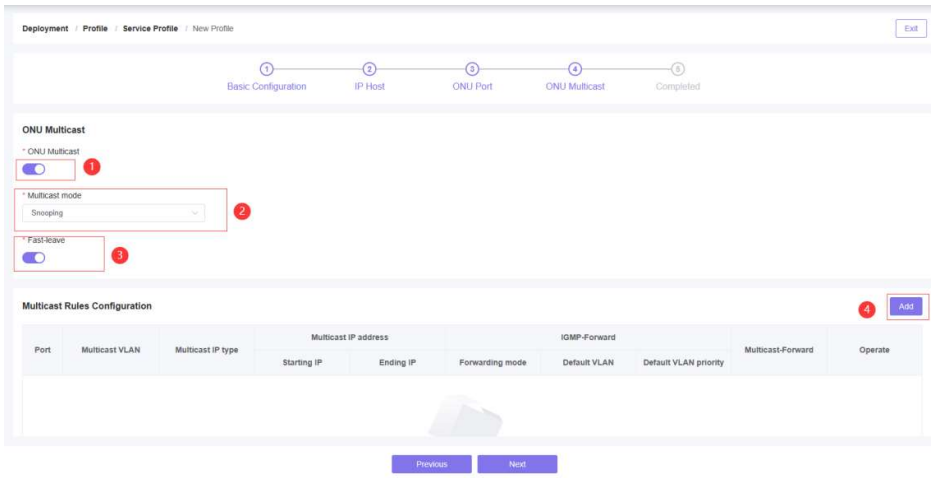

FIG.60 Service configuration-6

1. Click the blue button below "Multicast Configuration" to open the multicast configuration
2. Select "snooping" for multicast mode
3. Click the blue button below "Fast-leave" to turn on Fast-leave
4. Tap the "Add" button. The Add popup window of port Multicast rule configuration appears on the page, fill in the port number of ONU, multicast VLAN ID, type of multicast IP,IGMP-Forward and multicast-forward select transparent, after completion, click "Confirm" button, and the popup window will close.Then click the “Confirm”button to finish the Srvprofile Config .

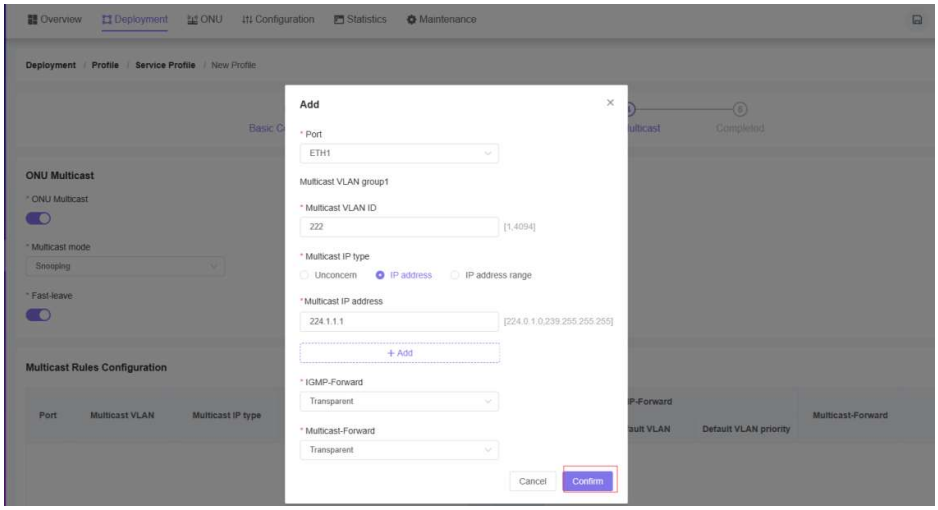

FIG.61 Service configuration-7

3.7.7 Create ONT WAN Profile

In this part ,If onu is HGU,you need config it .If it is the SFU,this step is unnecessary.The specific operation is as follows

- Access path: Deployment ----> Profile---->WAN Profile ----> Click the "Add " button

The page will skip to anther page to create WAN Profile

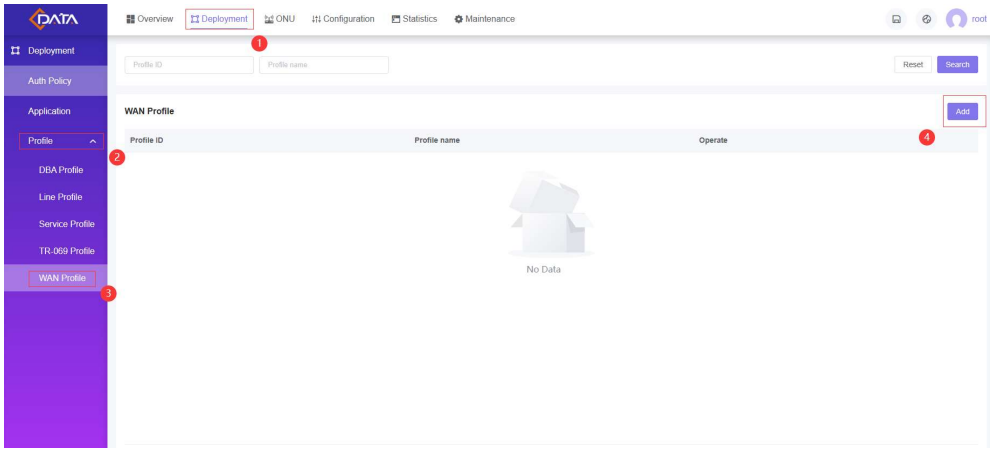

FIG.62 WAN configuration-1

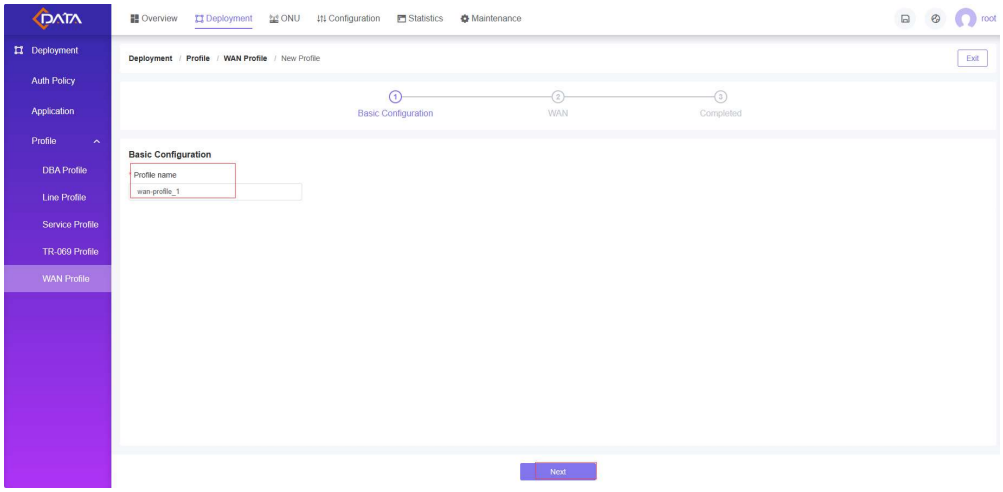

FIG.63 WAN configuration-2

Setting the WAN Profile name ,then click the “next”button,the page skip the follow page

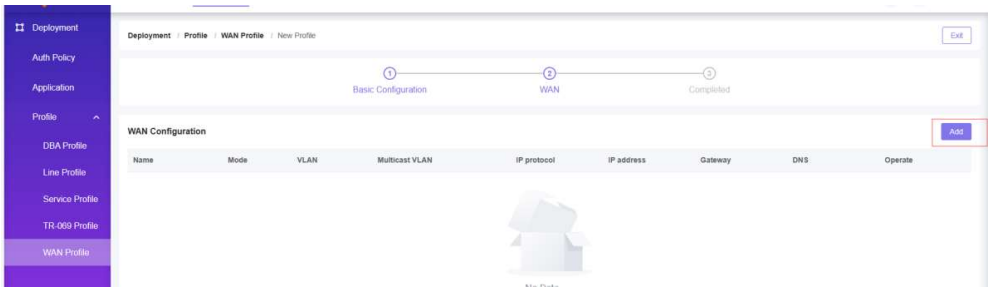

FIG.64 WAN configuration-3

Then click the “Add”button,the page brings up a pop-up window to set WAN parameters

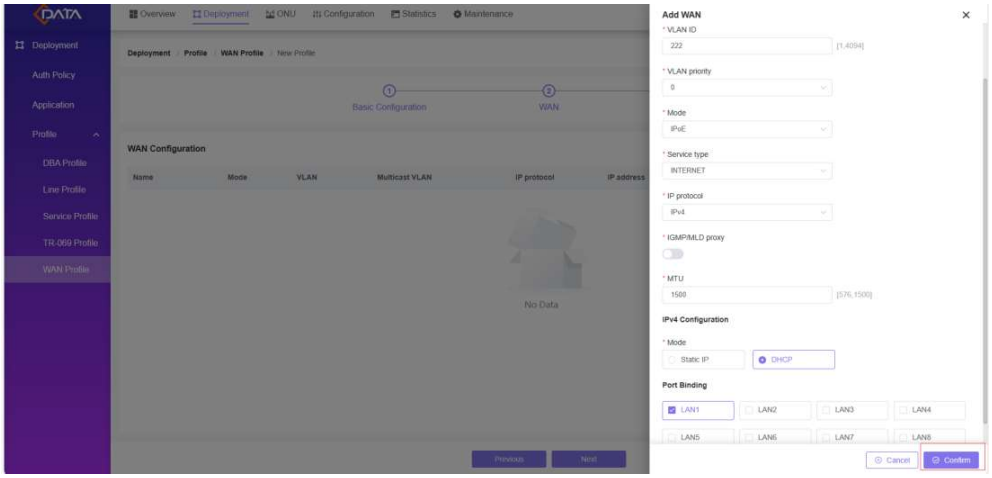

FIG.65 WAN configuration-4

After you finished,click the “Confirm”button ,the pop-up window will be closed.

3.7.8 Policy Application

In the GPON/EPON OLT network deployment, a large number of ONU devices need to be deployed, and the related work of deployment and debugging is cumbersome and costly. ONU is easy to deploy, only the ONU deployment strategy needs to be configured in the OLT Web management system in advance, and it is applied to the OLT PON port. When the ONU is online for the first time, the OLT device can automatically detect the online ONU and automatically match with the existing policy. After the match is successful, the OLT device will automatically create and execute the ONU deployment task to complete the ONU plug and play deployment, which greatly improves the deployment efficiency and reduces the cost of network construction.

Create Policy

- Access path: Deployment ----> Auth Policy ----> Click the "Create Policy " button

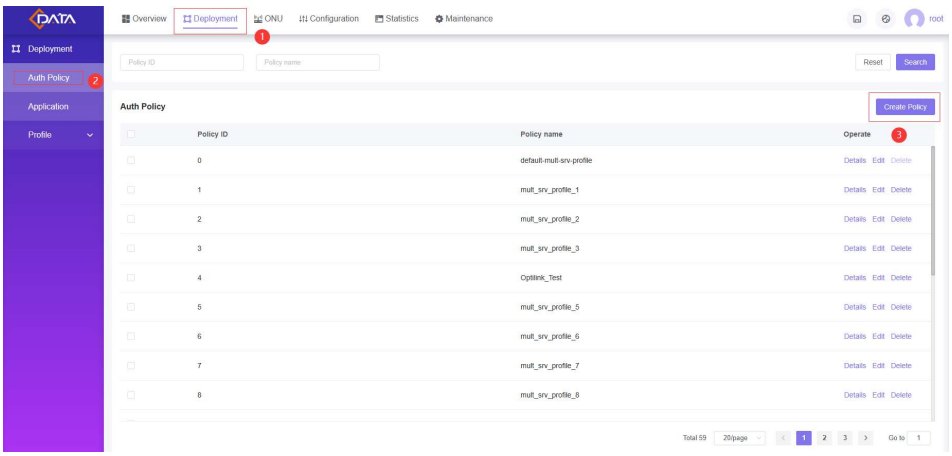

FIG. 66 Configuration Application-1

The page will skip to anther page

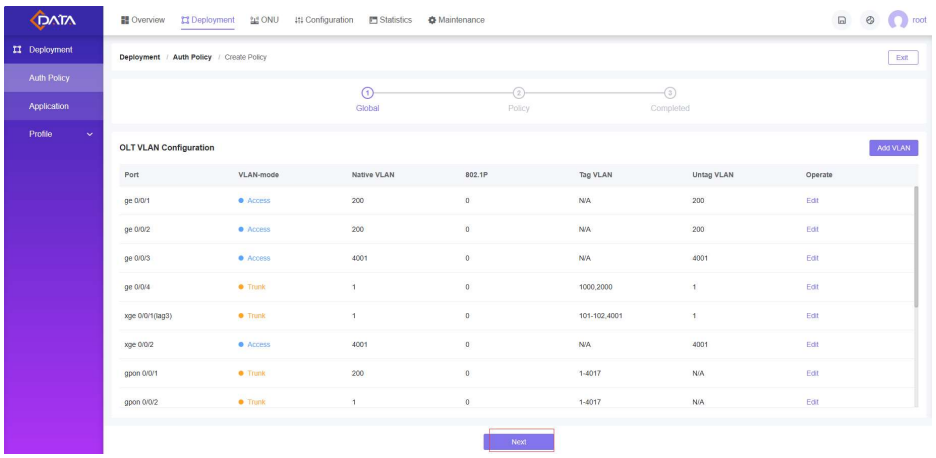

FIG. 67 Configuration Application-2

Click “next”button,The page will skip to anther page to choose the profile

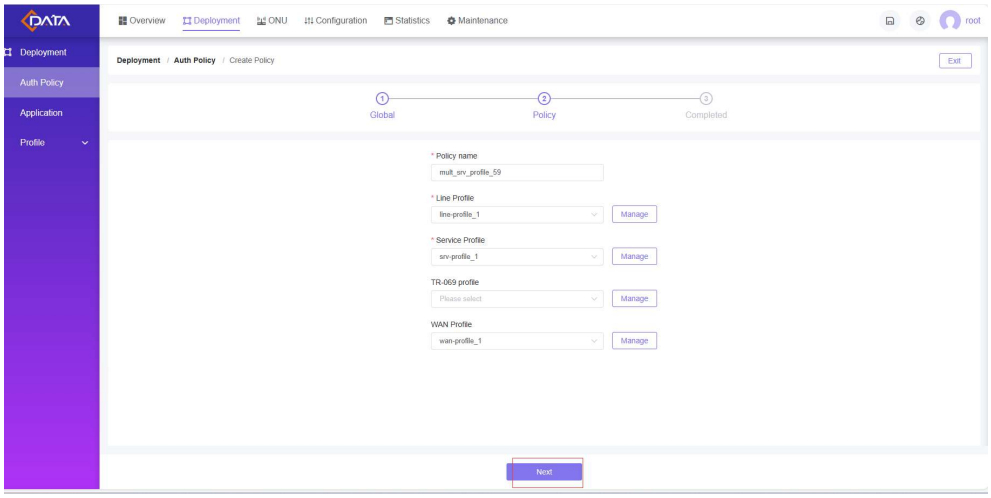

FIG. 68 Configuration Application-3

This completes the creation of the policy.

Policy Application

- Access path: Deployment ----> Application ----> Click the "Add " button

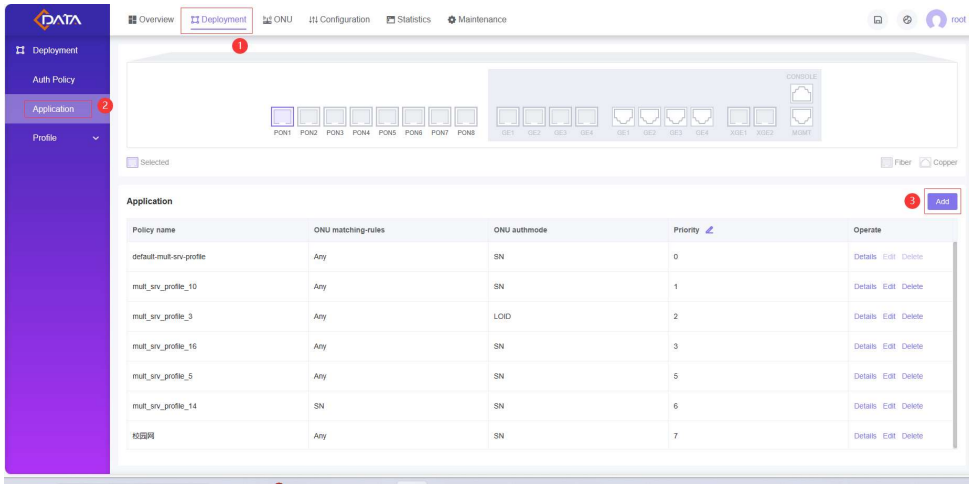

FIG. 69 Configuration Application-4

The page brings up a pop-up window.

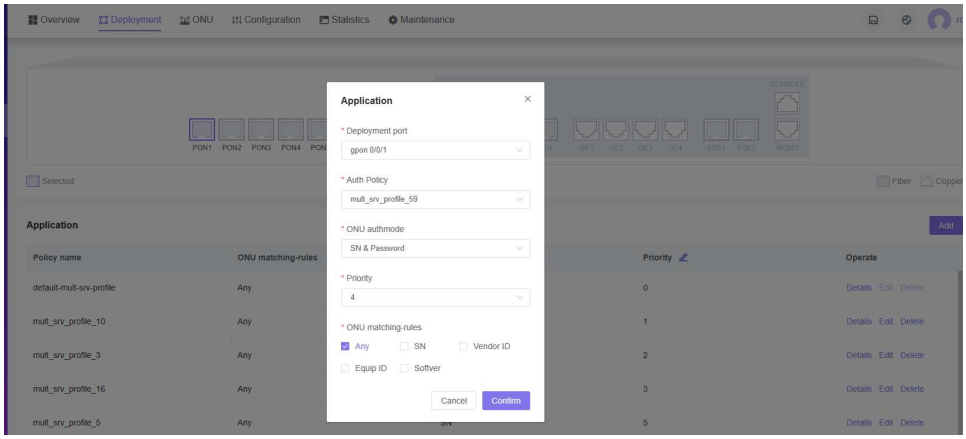

FIG. 70 Configuration Application-540

1.Select the PON port where you want to apply the policy application

2.Select ONU Auth Policy

3.Select the ONU's authentication mode

4.Select the policy priority

5.Determine the matching conditions for the ONU

Click the "Confirm" button and the configuration is complete.

Note: Check to see if the configuration was successful

- Access path: Deployment ----> Application ----> Click the "Details" button

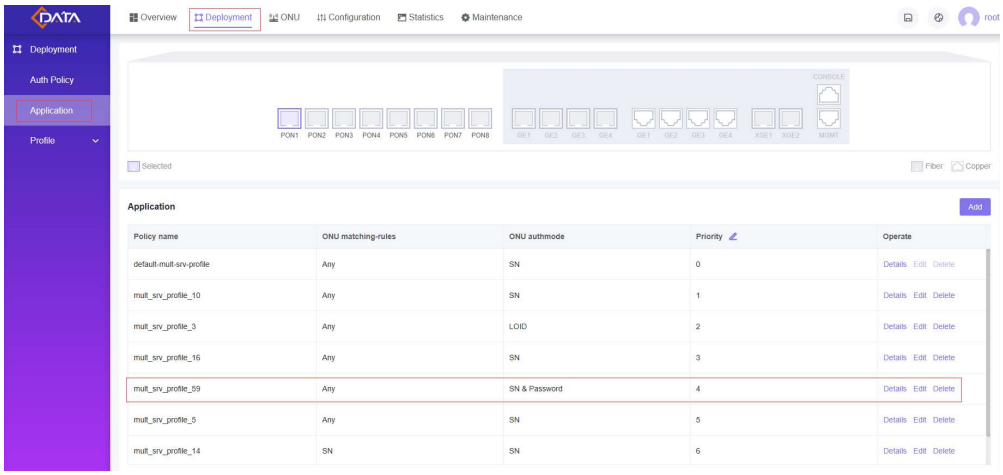

FIG. 71 Configuration Application-6

Note: The above configuration is a plug-and-play part of the Internet service configuration, configuration application in that PON port, as long as the ONU connected to the PON port can be applied.41

3.7.9 IGMP global configuration

Access path: Configuration ---->IGMP----> Global Setting

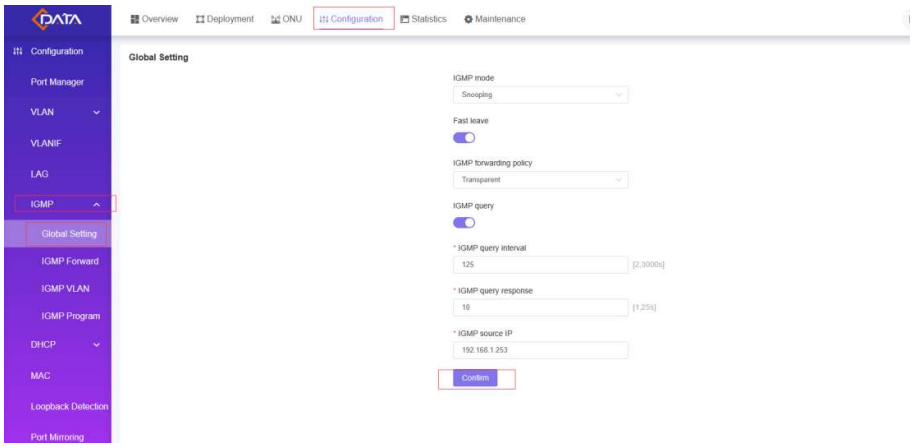

Figure 72 IGMP global configuration42

1. IGMP mode is selected as Snooping
2. Tap the button under Fast leave to open Fast leave
3. The forwarding strategy for IGMP is chosen to be pass-through
4. Click the button under IGMP Query to open IGMP Query
5. Enter the IGMP source IP which is the multicast source IP(the ip of the server that is broadcasting the show)

3.7.10 Multicast forwarding

Access path:Configuration ---->IGMP----> IGMP Forwarding -----> Click "Add" button, fill in the multicast IP address,VLAN, and member port in turn in the pop-up window, click "Confirm" button after completion, the pop-up window closes.

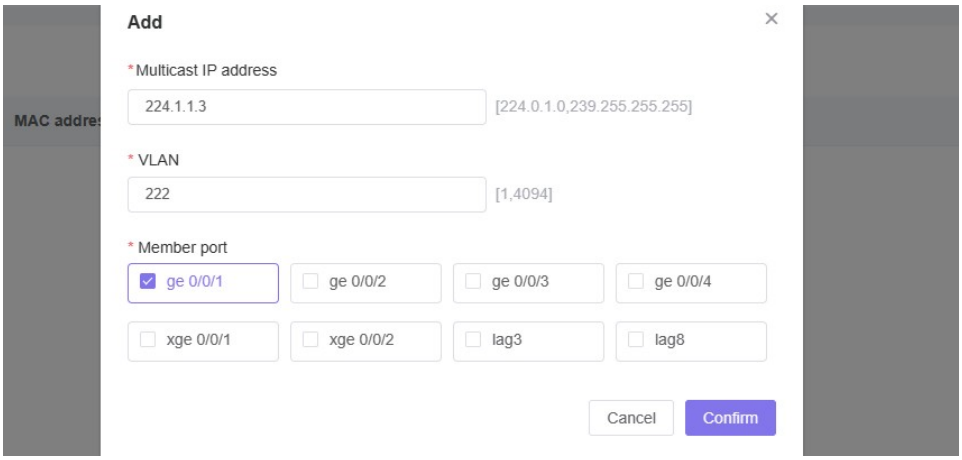

FIG. 73 Configuration of multicast forwarding43

3.7.11 Multicast VLAN configuration

Operation path: Configuration ---->IGMP----> IGMP VLAN----> Click "Add" button, the page pops up multicast VLAN add popup window

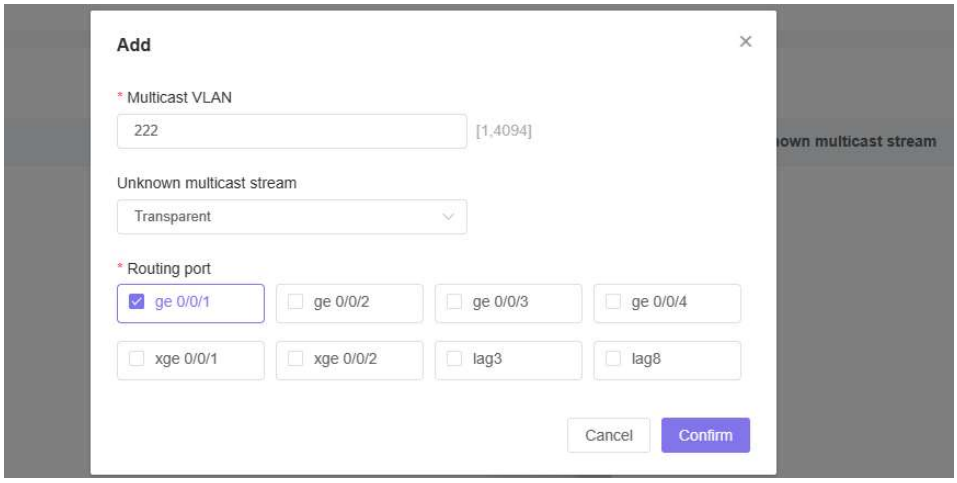

FIG. 74 Multicast VLAN configuration

3.7.12 Multicast VLAN program added

Operation path: Configuration ---->IGMP----> IGMP Program ----> Click "Add" button, the page will pop up multicast VLAN program add popup window

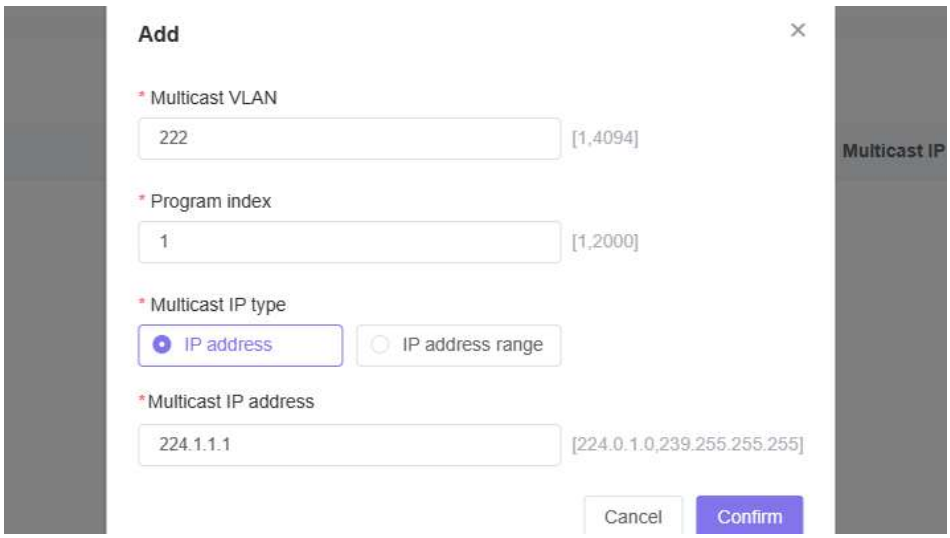

Figure 75 Multicast VLAN program add

4546

3.8QinQ service configuration

3.8.1 Data planning

Table 15 Data planning15

List of key data planning	
Configuration items	Specific data
VLAN	SVLAN 400: QinQ service outer layer vlan. CVLAN 100: QinQ service inner layer vlan.
OLT Port Configuration	Ge1: VLAN 400 Hybrid mode
Bridged ONT port configuration	LAN 1: VLAN 100
Gateway type ONT port configuration	LAN 1: VLAN 100

3.8.2 Configuration process

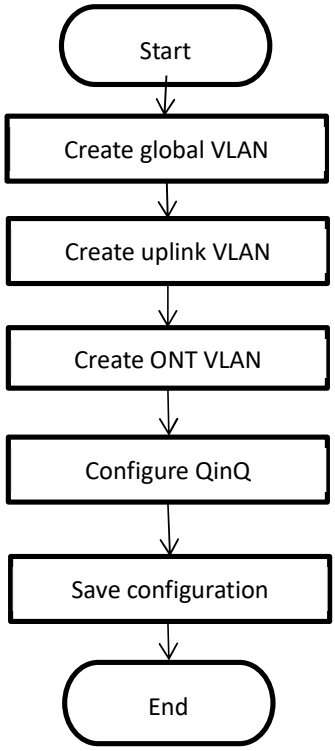

Figure 76 QinQ service configuration process47

3.8.3 Configuring the OLT

To create the outer vlan:

Running the show vlan all command can be used to query the created vlan, if the created vlan can not meet the requirements, you can create the outer vlan through the vlan command.

```
OLT(config)# vlan 400
```

Configure QinQ outer vlan with GE port:

```
OLT(config)# interface ge 0/0
OLT(config-interface-ge-0/0)# vlan mode 1 hybrid
OLT(config-interface-ge-0/0)# vlan hybrid 1 tagged 400
OLT(config-interface-ge-0/0)# exit
```

Configure ONT port vlan mode to tag (access)

```
OLT(config)# interface gpon 0/0
OLT(config-interface-gpon-0/0)# ont port native-vlan 1 1 eth 1 vlan 100
OLT(config-interface-gpon-0/0)# exit
```

Note:

Gateway (HGU) type ONT please configure LAN 1 port vlan at ONU web.

Configure service-port, inner vlan 100, outer vlan 400:

```
OLT(config)# service-port 10 vlan 400 gpon 0/0 port 1 ont 1 gemport 2 multi-service user-vlan 100 tag-action default
```