ZXA10 C220
GPON Optical Access Convergence Equipment
Configuration Manual (CLI)

Version 1.1.2

ZTE CORPORATION
NO. 55, Hi-tech Road South, ShenZhen, P.R.China
Postcode: 518057
Tel: (86) 755 26771900
Fax: (86) 755 26770801
URL: http://ensupport.zte.com.cn
E-mail: support@zte.com.cn

Revision History

Revision No.	Revision Date	Revision Reason
1.0	30/05/2010	First Edition

Serial Number: SJ-20100531094419-004

Contents

Preface

Purpose

This manual provides the configuration through CLI on the ZXA10 C220 GPON Optical Access Convergence Equipment.

Intended Audience

This manual is intended for engineers and technicians who perform installation, operation and maintenance activities on ZXA10 C220 (V1.1.2) optical access convergence equipment.

Prerequisite Skill and Knowledge

To use this manual effectively, subscribers should have a general understanding of network technology. Familiarity with the following is helpful:

- Networking basics
- Access Network (AN) technologies
- GPON technology
- ZXA10 C220 system and its various components

What Is in This Manual

This manual contains the following chapters:

Chapter	Summary
Chapter 1, Basic Configuration	Introduces access methods, NM configuration, system configuration, and physical configuration.
Chapter 2, Data Service Configuration	Introduces data service configuration, F820 data service configuration, ONU configuration, bandwidth profile configuration, traffic profile configuration, T-CONT configuration, GEM port configuration, GEM port traffic limit configuration, and ONU service connection configuration.
Chapter 3, GPON Protection Service Configuration	Introduces GPON protection service configuration.
Chapter 4, Multicast Service Configuration	Introduces IGMP snooping multicast configuration, IGMP proxy multicast service configuration, F820 multicast service configuration, IGMP global parameter configuration, IGMP port parameters configuration, MVLAN configuration, IPTV package configuration ,CAC configuration, and CDR configuration.

Chapter	Summary
Chapter 5, CES Service Configuration	Introduces CES MEF8 service configuration, CES PWE3 service configuration, CES service configuration, CES TDM profile configuration, CES PW configuration, CES source address configuration, and clock-source configuration.
Chapter 6, VoIP Service Configuration	Introduces SIP VoIP service configuration, and H.248 VoIP configuration.
Chapter 7, VLAN Configuration	Introduces Port VLAN mode configuration, VLAN uplink port configuration, VLAN service port configuration, VLAN QinQ configuration, VLAN translate configuration, and VLAN stacking configuration.
Chapter 8, User Security Configuration	Introduces port location configuration.
Chapter 9, System Security Configuration	Introduces protocol packet limit configuration, anti-DOS attack configuration, SSH configuration, administrator authentication configuration, and management ACL configuration.
Chapter 10, DHCP Configuration	Introduces DHCP snooping configuration, DHCP source guard configuration, DHCP server configuration and DHCP relay configuration.
Chapter 11, ACL Configuration	Introduces standard ACL configuration, Extended ACL configuration, Layer-2 ACL configuration and Hybrid ACL configuration.
Chapter 12, QoS Configuration	Introduces traffic limit configuration, traffic shaping configuration, priority mark configuration, queue scheduling configuration, redirection configuration, traffic mirroring configuration and traffic statistics configuration.
Chapter 13, Uplink Protection Configuration	Introduces uplink aggregation configuration, UAPS configuration, and CL1A 1+1 configuration.

Related Documentation

The following documentation is related to this manual:

- *ZXA10 C220 (V1.1.2) GPON Optical Access Convergence Equipment Documentation Guide*
- *ZXA10 C220 (V1.1.2) GPON Optical Access Convergence Equipment Feature Description*

- *ZXA10 C220 (V1.1.2) GPON Optical Access Convergence Equipment Product Information*
- *ZXA10 C220 (V1.1.2) GPON Optical Access Convergence Equipment Hardware Description*
- *ZXA10 C220 (V1.1.2) GPON Optical Access Convergence Equipment Hardware Installation*
- *ZXA10 C220 (V1.1.2) GPON Optical Access Convergence Equipment Configuration Manual (NetNumen)*
- *ZXA10 C220 (V1.1.2) GPON Optical Access Convergence Equipment Maintenance Manual*
- *ZXA10 C220 (V1.1.2) GPON Optical Access Convergence Equipment Troubleshooting Manual*
- *ZXA10 C220 (V1.1.2) GPON Optical Access Convergence Equipment Alarms Manual*
- *ZXA10 C220 (V1.1.2) GPON Optical Access Convergence Equipment Command Manual (Volume I)*
- *ZXA10 C220 (V1.1.2) GPON Optical Access Convergence Equipment Command Manual (Volume II)*
- *ZXA10 C220 (V1.1.2) GPON Optical Access Convergence Equipment Command Manual (Volume III)*
- *ZXA10 C220 (V1.1.2) GPON Optical Access Convergence Equipment Command Manual (Volume IV)*

Conventions

ZTE documents employ the following typographical conventions.

TABLE 1 TYPOGRAPHICAL CONVENTIONS

Typeface	Meaning
Italics	References to other Manuals and documents.
"Quotes"	Links on screens.
Bold	Menus, menu options, function names, input fields, radio button names, check boxes, drop-down lists, dialog box names, window names.
CAPS	Keys on the keyboard and buttons on screens and company name.
Constant width	Text that you type, program code, files and directory names, and function names.
[ ]	Optional parameters
{ }	Mandatory parameters
I	Select one of the parameters that are delimited by it.
Note:	Note: Provides additional information about a certain topic.

Typeface	Meaning
 **Checkpoint:**	Checkpoint: Indicates that a particular step needs to be checked before proceeding further.
 **Tip:**	Tip: Indicates a suggestion or hint to make things easier or more productive for the reader.

Mouse Operation Conventions are as follows:

TABLE 2 MOUSE OPERATION CONVENTIONS

Typeface	Meaning
Click	Refers to clicking the primary mouse button (usually the left mouse button) once.
Double-click	Refers to quickly clicking the primary mouse button (usually the left mouse button) twice.
Right-click	Refers to clicking the secondary mouse button (usually the right mouse button) once.
Drag	Refers to pressing and holding a mouse button and moving the mouse.

How to Get in Touch

The following sections provide information on how to obtain support for the documentation and the software.

Customer Support

If you have problems, questions, comments, or suggestions regarding your product, contact us by e-mail at support@zte.com.cn. You can also call our customer support center at (86) 755 26771900.

Documentation Support

ZTE welcomes your comments and suggestions on the quality and usefulness of this document. For further questions, comments, or suggestions on the documentation, you can contact us by e-mail at doc@zte.com.cn; or you can fax your comments and suggestions to (86) 755 26770801. You can also browse our website at http://ensupport.zte.com.cn, which contains various interesting subjects like documentation, knowledge base, forum and service request.

Declaration of RoHS Compliance

To minimize the environmental impact and take more responsibility to the earth we live, this document shall serve as formal declaration that ZXA10 C220 manufactured by ZTE CORPORATION is in compliance with the Directive 2002/95/EC of the European Parliament - RoHS (Restriction of Hazardous Substances) with respect to the following substances:

- Lead (Pb)
- Mercury (Hg)

- Cadmium (Cd)
- Hexavalent Chromium (Cr (VI))
- PolyBrominated Biphenyls (PBB's)
- PolyBrominated Diphenyl Ethers (PBDE's)

This declaration is issued based on our current level of knowledge. Since conditions of use are outside our control, ZTE CORPORATION makes no warranties, express or implied, and assumes no liability in connection with the use of this information.

This page is intentionally blank.

Chapter 1

Basic Configuration

Table of Contents

Access Methods

ZXA10 C220 supports the following access methods:

- HyperTerminal
- Telnet
- NetNumen N31 NMS

This manual introduces CLI (Command Line Interface) configuration after logging in to the ZXA10 C220 through HyperTerminal or Telnet. Refer to *ZXA10 C220 (V1.1.2) GPON Optical Access Convergence Equipment Configuration Manual (NetNumen)* for NetNumen configuration.

HyperTerminal

Short Description

Perform this procedure to log in to the ZXA10 C220 through HyperTerminal.

Prerequisites

- Equipment installation is completed.
- Connect the maintenance computer to **CONSOLE** interface on the ZXA10 C220 with a console cable .
- Make sure that a Windows operating system supporting HyperTerminal is installed on the maintenance computer.
- Power on the ZXA10 C220 system.

Context

This topic takes the Windows XP professional operating system as an example.

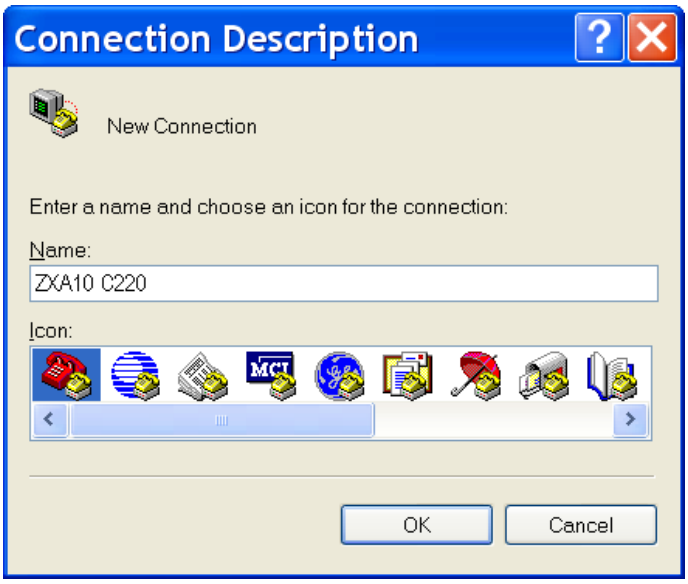
To log in to the system through HyperTerminal, perform the following steps:

Steps

1. In the Windows XP professional operating system, click **Start > All Programs > Accessories > Communications > Hy-**

perTerminal. The **Connection Description** interface pops up, as shown in Figure 1.

FIGURE 1 CONNECTION DESCRIPTION INTERFACE



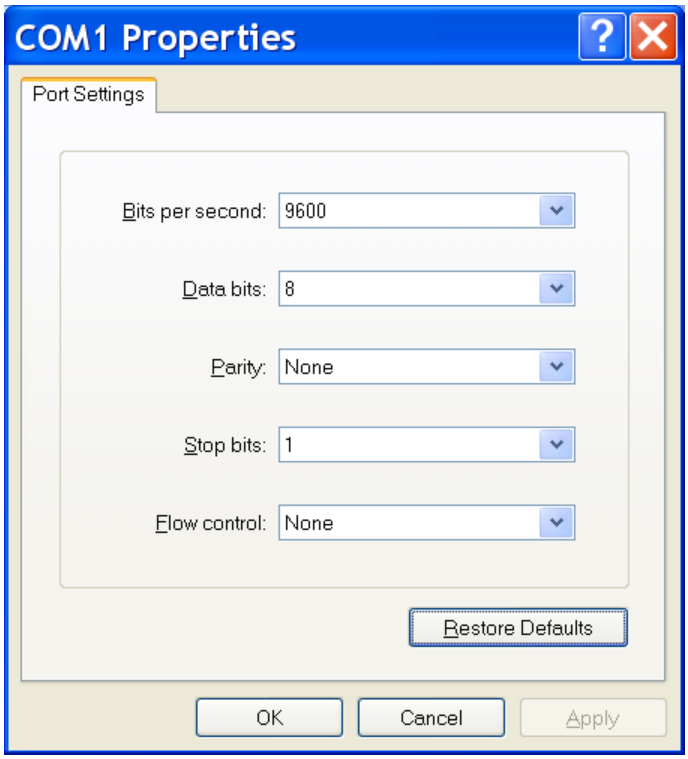
2. Enter the **Name** and click **OK**. The **Connect To** interface pops up, as shown in Figure 2.

FIGURE 2 CONNECT TO INTERFACE

3. Select serial port (**COM1** in this instance) that the console cable is attached to from the **Connect using** drop-down list and click **OK**. The **COM1 Properties** interface appears as shown

in Figure 3. Click **Restore Defaults** to select the default settings. Then click **OK**.

FIGURE 3 COM1 PROPERTIES INTERFACE



4. If the system runs normally, the login interface pops up. Input the command `enable` and the default password `zxr10` to enter the administration mode.

```
**********************************************
Welcome to ZXAN product C220 of ZTE Corporation
**********************************************
ZXAN>enable
Password:
ZXAN#
```

END OF STEPS

Result The connection to ZXA10 C220 is successful through HyperTerminal.

Telnet

Short Description Perform this procedure to log in to the ZXA10 C220 through Telnet.

Prerequisites

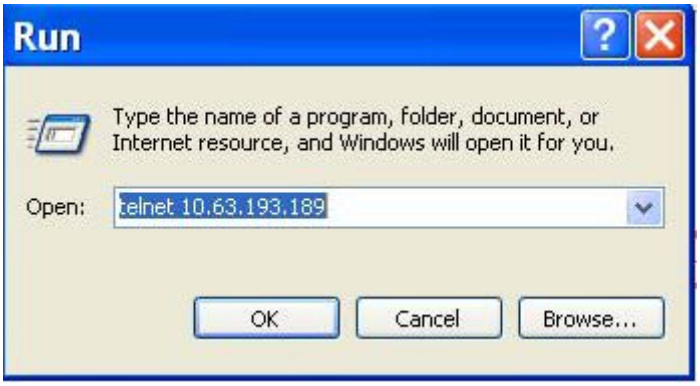
- In-band or out-of-band NM IP address is configured.
- Ensure that the NM IP address can be ping through from the maintenance computer.

Context To log in to the device through Telnet, perform the following steps:

Steps

1. In the Windows operating system, click **Start > Run**. Enter `telnet x.x.x.x` (x.x.x.x is in-band/out-of-band NM IP address) in the **Run** interface as shown in Figure 4. Click **OK** to start Telnet client.

FIGURE 4 RUN INTERFACE



2. If the connection is normal, the login interface pops up. Enter `zte` as both username and password to log in to the system.

```
**********************************************
Welcome to ZXAN product C220 of ZTE Corporation
**********************************************

Username:zte
Password:
ZXAN#
```

END OF STEPS

Result The connection to the ZXA10 C220 through Telnet is successful.

NM Configuration

Overview

ZXA10 C220 supports both in-band NM and out-of-band NM.

- In-band NM is implemented through uplink port. It is usually used in practical engineering.
- Out-of-band NM is implemented through the **Q** port on the control switching card. It is usually used in local management.

Configuring In-Band NM

Short Description Perform this procedure to configure in-band NM.

Prerequisites

- Make sure the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal.

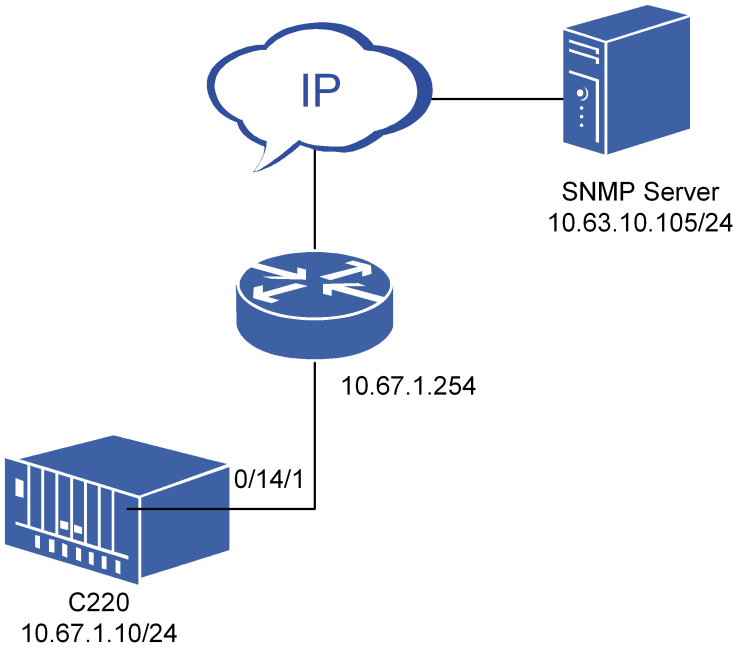
Background Information

In the in-band NM mode, NMS information is transmitted through service channel of ZXA10 C220. It is flexible in networking without any auxiliary devices, and low in cost. But it is hard to maintain ZXA10 C220 when the service is down.

Network Diagram

Figure 5 shows the in-band NM networking diagram.

FIGURE 5 IN-BAND NM NETWORKING DIAGRAM



Configuration Data

Table 3 describes in-band NM configuration data.

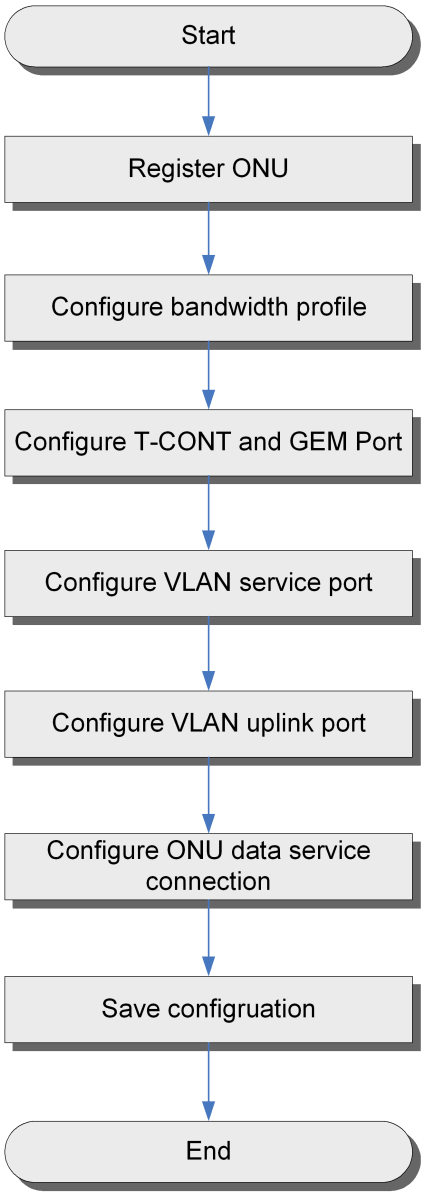
TABLE 3 IN-BAND NM CONFIGURATION DATA

Item	Data
ZXA10 C220 in-band NM interface	▪ VLAN ID: 1000 ▪ Port: 0/14/1 ▪ IP address: 10.67.1.10/24
Router interface	IP address: 10.67.1.254/24
SNMP server host	▪ IP address; 10.63.10.105/24 ▪ Version: V2C ▪ Community: private ▪ Alarm: NOTIFICATIONS

Configuration Flowchart

Figure 6 shows in-band NM configuration flowchart.

FIGURE 6 IN-BAND NM CONFIGURATION FLOWCHART



Note:

This section introduces the configuration on the ZXA10 C220. The corresponding data must be configured on the router as well.

Steps

To configure the in-band NM, perform the following steps:

1. Configure in-band NM VLAN.
   i. Enter global configuration mode.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#
```

ii. Enter uplink interface configuration mode.

```
ZXAN(config)#interface gei_0/14/1
ZXAN(config-if)#
```

iii. Add uplink port to NM VLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 1000 tag
ZXAN(config-if)#exit
ZXAN(config)#
```

Note:

When a port is added to a VLAN, the VLAN is added automatically.

2. Configure IP address of in-band NM interface.

   i. Enter VLAN interface configuration mode.

```
ZXAN(config)#interface vlan 1000
ZXAN(config-if)#
```

   ii. Configure IP address of in-band NM interface.

```
ZXAN(config-if)#ip address 10.67.1.10 255.255.255.0
ZXAN(config-if)#exit
ZXAN(config)#
```

Note:

In-band NM IP address and out-of-band NM IP address must not be in the same network segment.

3. Configure in-band NM route.

```
ZXAN(config)#ip route 10.63.10.0 255.255.255.0 10.67.1.254
```

4. Configure SNMP community.

   There is a default public community in the system. To configure other community, use the **snmp-server community** command. Refer to .

5. Configure SNMP server (Trap server).

```
ZXAN(config)#snmp-server host 10.63.10.105 trap version 2c private
enable NOTIFICATIONS server-index 1 udp-port 162
```

Note:

When there is trap server from other vendors besides ZTE NetNumen NMS, multiple snmp-server hosts can be configured.

6. Configure Trap types (optional).

   ZXA10 C220 supports six types of traps: SNMP, BGP, OSPF, RMON, STALARM, VPN. All traps are enabled by default.

```
ZXAN(config)#snmp-server enable trap
ZXAN(config)#exit
ZXAN#
```

7. Save configuration data.

```
ZXAN#write
Building configuration...
...[OK]
```

--End of Steps--

Result The ZXA10 C220 can be managed through the in–band NM IP address.

Configuring Out-of-Band NM

Short Description Perform this procedure to configure out-of-band NM.

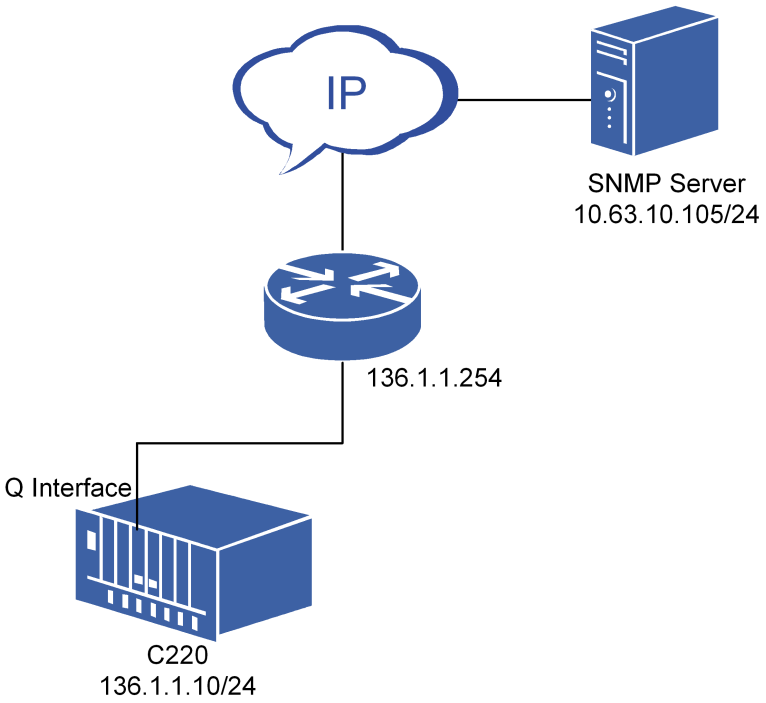
Prerequisites

- Make sure network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal.

Background Information In the out-of-band NM mode, NMS information is transmitted through non-service channel. The management channel is independent from the service channel. Thus out-of-band NM is more reliable comparing with the in-band NM.

Networking Diagram Figure 7 shows the out–of-band NM networking diagram.

FIGURE 7 OUT–OF-BAND NM NETWORKING DIAGRAM



Configuration Data

Table 4 describes out–of-band NM configuration data.

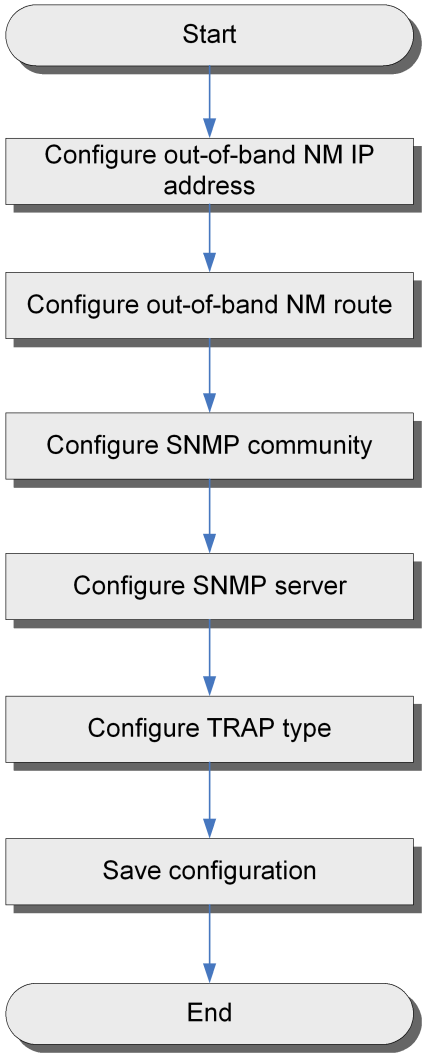
TABLE 4 OUT–OF-BAND NM CONFIGURATION DATA

Item	Data
ZXA10 C220 out–of-band NM interface	IP address: 136.1.1.100/24
Router interface	IP address: 136.1.1.254/24
SNMP server host	▪ IP address; 10.63.10.105/24 ▪ Version: V2C ▪ Community: private ▪ Alarm: NOTIFICATIONS

Configuration Flowchart

Figure 8 shows out–of-band NM configuration flowchart.

FIGURE 8 OUT–OF-BAND NM CONFIGURATION FLOWCHART



Note:

This topic introduces the configuration on the ZXA10 C220. The corresponding data must be configured on the router as well.

To configure the out-of-band NM, perform the following steps:

Steps

1. Configure out-of-band NM IP address.

   i. Enter the global configuration mode.

   ```
   ZXAN#configure terminal
   Enter configuration commands, one per line.  End with CTRL/Z.
   ZXAN(config)#
   ```

   ii. Configure out-of-band NM IP address.

   ```
   ZXAN(config)#nvram mng-ip-address 136.1.1.100 255.255.255.0
   ```

   Note:

   In-band NM IP address and out-of-band NM IP address must not be in the same network segment.

2. Configure out-of-band NM route.

   ```
   ZXAN(config)#ip route 136.1.1.0 255.255.255.0 136.1.1.254
   ```

3. (Optional) Configure SNMP community.

   There is a default public community in the system. To configure other community, use the **snmp-server community** command.

   ```
   ZXAN(config)#show snmp config
   snmp-server location No.889 BiBo Rd. PuDong District, ShangHai, China
   snmp-server contact +86-021-68895000
   snmp-server packetSize 3000
   snmp-server engine-id 830900020300010289d64401
   snmp-server community public view allview rw
   snmp-server view allview internet included
   snmp-server view DefaultView system included
   snmp-server enable trap SNMP
   snmp-server enable trap VPN
   snmp-server enable trap BGP
   snmp-server enable trap OSPF
   snmp-server enable trap RMON
   snmp-server enable trap STALARM
   ```

4. Configure SNMP server (Trap server).

   ```
   ZXAN(config)#snmp-server host 10.63.10.105 trap version 2c private
   enable NOTIFICATIONS server-index 1 udp-port 162
   ```

   Note:

   When there is trap server from other vendors besides ZTE NetNumen NMS, multiple snmp-server hosts can be configured.

5. Configure Trap types (optional).

   ZXA10 C220 supports six types of traps: SNMP, BGP, OSPF, RMON, STALARM, VPN. All traps are enabled by default.

```
ZXAN(config)#snmp-server enable trap
ZXAN(config)#exit
ZXAN#
```

6. Save configuration data.

```
ZXAN#write
Building configuration...
...[OK]
```

--End of Steps--

Result The ZXA10 C220 can be managed through the out-of-band NM IP address.

System Configuration

Configuring SNMP Server

Short Description Perform this procedure to configure SNMP server.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context SNMP is essentially a request-reply protocol running over UDP (ports 161 and 162), though TCP operation is possible. SNMP is an asymmetric protocol, operating between a management station and an agent. The agent is the device being managed - all its software has to do is implement a few simple packet types and a generic get-or-set function on its MIB variables. The management station presents the GUI by collecting MIB data over time.

The ZXA10 C220 supports SNMP v1/v2/v3.

To configure the SNMP server, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **snmp-server community** command to configure SNMP community.
3. Use the **snmp-server location** command to configure physical location information.
4. Use the **snmp-server enable** command to configure trap type.

> **Note:**
>
> Trap is the unsolicited information which is sent to the NMS by a managed device . It is used to report urgent events. The ZXA10 C220 supports six types of traps: SNMP, BGP, OSPF, RMON, STALARM, and VPN.

5. Use the **snmp-server host** command to configure SNMP server (trap destination host).

6. Use the **show snmp config** command to query SNMP configuration.

END OF STEPS

Example

Configure SNMP server:

- Community: Public
- Right: Read only
- SNMP server host: 10.62.31.123
- SNMP version: v2

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#snmp-server community public view allview ro
ZXAN(config)#snmp-server enable trap
ZXAN(config)#snmp-server host 10.62.31.123 trap version 2c pulic enable
NOTIFICATIONS server-index 1
ZXAN(config)#show snmp config
snmp-server location No.889 BiBo Rd. PuDong District, ShangHai, China
snmp-server contact +86-021-68895000
snmp-server packetSize 3000
snmp-server engine-id 830900020300010289d64401
snmp-server community public view allview rw
snmp-server view allview internet included
snmp-server view DefaultView system included
snmp-server host 10.62.31.123 trap version 2c pulic enable NOTIFICATIONS
server-index 1 udp-port 162
snmp-server enable trap SNMP
snmp-server enable trap VPN
snmp-server enable trap BGP
snmp-server enable trap OSPF
snmp-server enable trap RMON
snmp-server enable trap STALARM
```

Configuring System Time

Short Description

Perform this procedure to configure system time.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

The ZXA10 C220 supports NTP and works as an NTP client.

To configure the system time, performs the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **ntp enable** command to enable NTP.
3. Use the **ntp server** command to configure NTP server.
4. Use the **ntp interval-time** command to configure NTP synchronizing interval.
5. Use the **ntp source** command to configure source address of NTP synchronization.
6. Use the **ntp alarm-threshold** command to configure NTP alarm threshold.
7. Use the **clock timezone** command to configure system timezone.

8. Use the **show ntp status** command to query NTP status.

END OF STEPS

Example Configure system time:

- NTP server IP address: 192.168.1.1/24
- Interface VLAN ID: 24
- Interface IP address: 192.168.2.2/24

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#interface vlan 24
ZXAN(config-if)#ip address 192.168.2.2 255.255.255.0
ZXAN(config-if)#exit
ZXAN(config)#ntp enable
ZXAN(config)#ntp server 192.168.2.1 version 2
ZXAN(config)#show ntp status
Clock is unsynchronized , stratum 16, no reference clock
nominal freq is 250.0000 Hz, actual freq is 250.0000 Hz, precision is 2**16
reference time is 0.0 ()
clock offset is 0.00 msec, root delay is 0.00  msec
root dispersion is 0.00  msec, peer dispersion is 0.00 msec
```

Configuring System Log

Short Description Perform this procedure to configure system log.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context To configure the system log, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **syslog-server host** command to configure system log server.
3. Use the **logging on** command to enable system log function.
4. Use the **logging buffer** command to configure log buffer size.
5. Use the **logging console** command to configure information level sent to console.
6. Use the **logging level** command to configure information level of log file.
7. Use the **logging mode** command to configure clear mode of log buffer.
8. Use the **logging snmplog-save enable** command to enable the function of saving SNMP log to buffer.
9. Use the **show logging configure** command to query log configuration.

END OF STEPS

Example Configure log server:

- Log server IP address: 168.1.1.1

- Log type: alarm log, command log, and SNMP log
- Log function: On
- Console log level: Notification

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#syslog-server host 168.1.1.1 fport 514 lport 514 alarmlog
level notifications cmdlog snmplog get-pdu set-pdu
ZXAN(config)#logging console NOTIFICATIONS
ZXAN(config)#logging on
ZXAN#show logging configure
logging on
logging buffer 200
logging mode fullcycle
logging console notifications
logging level notifications
logging snmplog-save disable
syslog facility local0
syslog severity 6
syslog-server host 168.1.1.1 fport 514 lport 514 alarmlog level notifi
cations cmdlog snmplog get-pdu set-pdu
```

Physical Configuration

Configuring Rack

Short Description

Perform this procedure to configure rack.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

The ZXA10 C220 supports only one type of racks: ZXPON.

To configure the rack, performs the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **add-rack** command to configure rack.

   Note:

   The ZXA10 C220 supports only one rack at present, thus the *rackno* can only be 0.

3. Use the **show rack** command to query rack configuration.

END OF STEPS

Example

Configure rack 0, and the rack type is ZXPON.

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#add-rack rackno 0 racktype ZXPON
```

Adding Shelf

Short Description Perform this procedure to add shelves to the rack.

Prerequisites

- Make sure that the network device works normally.
- The rack is configured.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context The ZXA10 C220 supports two types of shelves:

- ZXA10C220-A: the slot 1 of which supports only the power card.
- ZXA10C220-B: the slot 1 of which does not support the power card.

To configure the shelf, performs the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **add-shelf** command to configure shelf.

> **Note:**
> ZXA10 C220 supports only one shelf at present, thus *shelfno* can only be 0.

3. Use the **show shelf** command to query shelf configuration.

END OF STEPS

Example Configure shelf 0, and the shelf type is ZXA10C220-B.

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#add-shelf shelfno 0 shelftype ZXA10C220-B
ZXAN(config)#show shelf
Rack    Shelf    ShelfType        HwNo       CleiCode
-------------------------------------------------------------------
0       0        ZXA10C220-B      0          ZXA10C220-B_CleiCode
```

Configuring Card

Short Description Perform this procedure to configure card.

Prerequisites

- Make sure that network device works normally.
- Make sure that the shelf is configured.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context To configure the card, performs the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **add-card** command to configure card.

Note:

The ZXA10 C220 identifies control switching cards automatically. The other cards are installed in slots 1 – 6 and 9 – 14.

3. Use the **show card** command to query card configuration.

END OF STEPS

Example Add a GPON card (GPFA) to slot 5. Add a uplink card (EIGM) to slot 14.

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#add-card slotno 5 GPFA
ZXAN(config)#add-card slotno 14 EIGM
ZXAN(config)#show card
Rack Shelf Slot CfgType RealType Port  HardVer SoftVer         Status
------------------------------------------------------------------------------
0    0     5    GPFA    GPFAB    4     V0      V1.1.2P1T6      INSERVICE
0    0     7    GCSD    GCSD     0     V1      V1.1.2P1T6      INSERVICE
0    0     8    GCSD             0                             OFFLINE
0    0     14   EIGM    EIGM     4     V0      V1.1.2P1T6      INSERVICE
```

Deleting Card

Short Description Perform this procedure to delete card.

Prerequisites

- Make sure that network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context When a card in a slot is replaced with a card of another type, delete the card and configure it again.

The control switching cards cannot be deleted.

To delete the card, performs the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **del-card** command to delete card.
3. Use the **show card** command to query card configuration.

END OF STEPS

Example Delete the card in slot 5.

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#show card
Rack Shelf Slot CfgType RealType Port  HardVer SoftVer         Status
------------------------------------------------------------------------------
0    0     5    GPFA    GPFAB    4     V0      V1.1.2P1T6      INSERVIC
0    0     7    GCSD    GCSD     0     V1      V1.1.2P1T6      INSERVICE
0    0     8    GCSD             0                             OFFLINEE
0    0     14   EIGM    EIGM     4     V0      V1.1.2P1T6      INSERVICE
ZXAN(config)#del-card slotno 5
Confirm to delete card? [yes/no]:yes
ZXAN(config)#show card
Rack Shelf Slot CfgType RealType Port  HardVer SoftVer         Status
------------------------------------------------------------------------------
```

```
0    0     7    GCSD    GCSD     0     V1      V1.1.2P1T6      INSERVICE
0    0     8    GCSD             0                             OFFLINEE
0    0     14   EIGM    EIGM     4     V0      V1.1.2P1T6      INSERVICE
```

Resetting Card

Short Description Perform this procedure to reset card.

Prerequisites

- Make sure network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context A card is reset in the following scenarios.

- The card is faulty.
- The card version is upgraded.

To reset the card, performs the following steps:

Steps

1. Use the **reset-card** command to reset card.

END OF STEPS

Example Reset the card in slot 5.

```
ZXAN#reset-card slotno 5
Confirm to reset card? [yes/no]:y
```

Swapping Main/Backup Card

Short Description Perform this procedure to swap main control switching card and backup control switching card.

Prerequisites

- Make sure that the network device works normally.
- Both main control switching card and backup control switching cards work normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context When there is a fault on the control switching card or version upgrading, swap the main and back control switching cards.

To swap main/backup control switching cards, performs the following steps:

Steps

1. Use the **swap** command to swap main/backup control switching cards.

END OF STEPS

Example Swap the main control switching card and the backup control switching card.

```
ZXAN#swap
Confirm to master swap? [yes/no]:y
```

This page is intentionally blank.

Chapter 2

Data Service Configuration

Table of Contents

Introduction

Service Description

GPON provides integrated broadband and narrowband service with high rates of multiple modes. It supports triple play of voice, data and video.

Service Specification

ZXA10 C220 supports GPON service through GTGO/GTCQ card.

- GTGO card supports eight GPON ports.
- GTGQ card supports four GPON ports.

With the splitter rate 1:64, each GTGO/GTCQ card supports maximum 512/256 ONUs/ONTs).

Configuring Data Service

Short Description

This section introduces an instance of configuring data service. (The ONU in this instance is F621.)

Prerequisites

- Make sure that the network device works normally.
- Make sure that the VLAN is configured properly on uplink equipment.
- Make sure that the GPON card works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Background Information

Data service is applicable to various scenarios such as FTTH, FTTB and FTTC. For different scenarios, the basic configuration steps are similar. However, configuration data are different. Table 5 describes data configuration in various scenarios. This instance takes FTTH as an example.

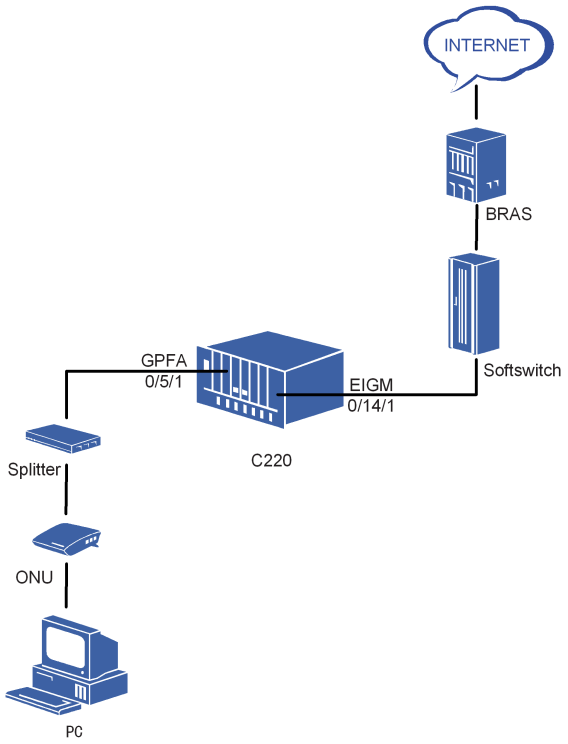
TABLE 5 DATA CONFIGURATION IN VARIOUS SCENARIOS

Scenario	Networking Mode	Configuration
FTTH	Install ONU at user home. Provide Ethernet ports and phone interface. Serve a single user.	▪ For triple-play service, the voice, data and video service should be configured with different T-CONT and GEM port to isolate traffic. Configure different VLANs for the three services. ▪ Data packets of computer and IPTV service which go into an OUN are added with VLAN tag. For data packets which go out of the OUN, the VLAN tag is removed.
FTTB	Install ONU in the building. Use Layer-2 switch to provide Ethernet ports. Serve multiple users.	▪ If multiple users access to Internet via the same ONU, users must be isolated from one another. Each user needs to register ONU separately. The VLAN of each port must be different. Configure different T-CONT and GEM port to isolate traffic. ▪ For SOHO network, ONU is connected to Layer-2 switch. It is recommended to configure services of each port to different T-CONT and GEM port. ▪ When ONU is connected to Layer-2 switch, packets which go into ONU are added with VLAN tag. ONU can transmit the packets transparently. Make sure that the uplink port and V-port of ZXA10 C220 are in the VLAN at user side.
FTTC	Install 'ONU Mini DSLAM' or Mini DSLAM (such as ZXDSL 9806H) with GPON uplink interface at the curb. Serve many users.	When ZXA10 C220 is connected to Mini DSLAM (such as the ZXDSL 9806H), service on ZXA10 C220 is configured according to the uplink port of Mini DSLAM. It is recommended to configure different T-CONT and GEM port for each service virtual port.

Networking Diagram

Figure 9 shows the data service networking diagram.

FIGURE 9 DATA SERVICE NETWORKING DIAGRAM



Connect a PC to an FE/GE port of an ONU. The ONU adds VLAN tag to user's data at FE/GE port and sends user data to different service channel according to VLAN and priority. The ZXA10 C220 performs the mapping from GEM port to Ethernet frame and sends data out through the uplink port.

Configuration Data

Table 6 describes the configuration data of the data service.

TABLE 6 DATA SERVICE CONFIGURATION DATA

Item	Data
Service VLAN	▪ VLAN ID: 100 ▪ Priority: 1
Uplink port	0/14/1
GPON port	0/5/1
Bandwidth profile	Profile name: T1–50M
	Bandwidth type: Maximum (Type 4)
	Bandwidth: 50 Mbps
ONU	▪ ONU ID: 1 ▪ ONU type: F621 ▪ ONU SN: ZTE_06120664

Item	Data
T-CONT	▪ T-CONT index: 1 ▪ T-CONT name: Tcont50M ▪ Bandwidth profile: T1–50M ▪ Alloc ID: Auto-allocate
GEM port	▪ T-CONT index: 1 ▪ GEM Port index: 1 ▪ GEM Port nameGemport1 ▪ Port ID: Auto-allocate
ONU unicast service connection	▪ GEM port name: Gemport1 ▪ UNI: eth_0/1 ▪ Bridge: 0/1 ▪ Uplink interface: 0/1/1 ▪ Connection type: 802.1p + bridge

Note:

The ZXA10 C220 supports 8 service priorities (0 - 7), where 0 is the lowest priority and 7 is the highest priority.

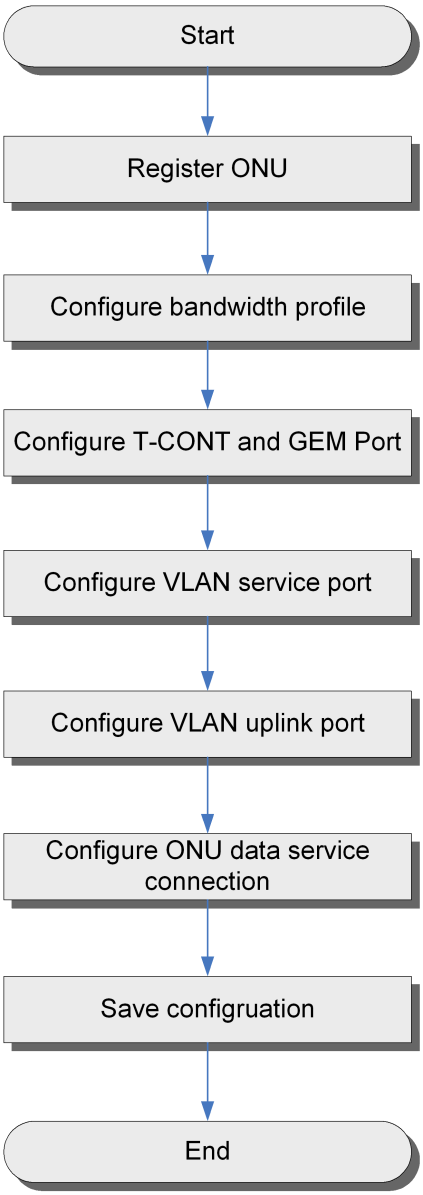
It is recommended to configure the service priority as follows:

- Priority of data service: 1
- Priority of IPTV service: 5
- Priority of VoIP service: 7
- Priority of CES service: 7

Configuration Flow

Figure 10 shows the data service configuration flowchart.

FIGURE 10 DATA SERVICE CONFIGURATION FLOWCHART



Steps

To configure the data service, perform the following steps:

1. Register ONU.
   i. Query unconfigured ONU on the GPON-OLT port.

```
ZXAN#show gpon onu uncfg gpon-olt_0/5/1
OnuIndex                 Sn                  State
-------------------------------------------------------------
gpon-onu_0/5/1:1         ZTE_06120664        unknown
```

   ii. Enter the GPON-OLT interface configuration mode.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gpon-olt_0/5/1
ZXAN(config-if)#
```

iii. Register ONU.

```
ZXAN(config-if)#register 1 type ZTE-F621 ZTE_06120664 state ready
```

iv. Query ONU state.

```
ZXAN(config-if)#show gpon onu state gpon-olt_0/5/1
OnuIndex               Admin State  Omcc State   O7 State     Phase State
-------------------------------------------------------------------------------
gpon-onu_0/10/1:1      enable       enable       operation    working
ZXAN(config-if)#exit
ZXAN(config)#
```

2. Configure bandwidth profile.

   A bandwidth profile defines upstream bandwidth of a T-CONT.

   i. Enter the GPON configuration mode.

```
ZXAN(config)#gpon
ZXAN(config-gpon)#
```

   ii. Configure bandwidth profile.

```
ZXAN(config-gpon)#bandwidth-profile T1-50M type 4 maximum 50000
ZXAN(config-gpon)#exit
ZXAN(config)#
```

3. Configure T-CONT and GEM port.

   - T-CONT (Transmission Container) is the minimum unit of upstream bandwidth scheduling which is identified by Alloc ID.
   - GEM port is the minimum unit of downstream traffic which is identified by port ID.

   i. Enter the GPON-ONU interface configuration mode.

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

   ii. Create T-CONT.

```
ZXAN(config-if)#tcont 1 name Tcont50M traffic T1-50M
```

   iii. Create GEM port.

```
ZXAN(config-if)#gemport 1 name Gemport1 unicast tcont 1
ZXAN(config-if)#exit
ZXAN(config)#
```

4. Configure VLAN service port.

   i. Enter the GPON-ONU interface configuration mode.

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

   ii. Configure port mode to hybrid.

```
ZXAN(config-if)#switchport mode hybrid vport 1
```

> **Note:**
>
> By default, one V-port corresponds to one GEM port.

   iii. Add port to service VLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 100 tag vport 1
ZXAN(config-if)#exit
ZXAN(config)#
```

Note:

When a port is added to a VLAN, the VLAN is added automatically.

5. Configure VLAN uplink port.
   i. Enter the OLT uplink port configuration mode.

```
ZXAN(config)#interface gei_0/14/1
```

   ii. Configure uplink port mode to hybrid.

```
ZXAN(config-if)#switchport mode hybrid
```

   iii. Add uplink port to service VLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 100 tag
ZXAN(config-if)#exit
ZXAN(config)#
```

6. Configure ONU unicast service connection.
   i. Enter the ONU remote management mode.

```
ZXAN(config)#pon-onu-mng gpon-onu_0/5/1:1
ZXAN(gpon-onu-mng)#
```

   ii. Configure the map between GEM port and uplink interface.

```
ZXAN(gpon-onu-mng)#interwork gemport Gemport1 dot1p-bridge up
link_0/1/1 prio-list 1
```

   iii. Bind the UNI to bridge interface.

```
ZXAN(gpon-onu-mng)#bridge-port uni-bind eth_0/1 bridge_0/1
```

   iv. Configure UNI VLAN and priority.

```
ZXAN(gpon-onu-mng)#vlan-tag uni eth_0/1 up-mode overwrite up-
prio 1 up-vid 100 down-mode untag
```

   v. Configure VLAN filter mode on UNI.

```
ZXAN(gpon-onu-mng)#vlan-filter-mode uni eth_0/1 tag-filter vid
-filter untag-filter transparent
```

   vi. Configure VLAN filter entry on UNI.

```
ZXAN(gpon-onu-mng)#vlan-filter uni eth_0/1 priority 1 vid 100
```

   vii. Configure VLAN filter mode on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter-mode uplink uplink_0/1/1 tag-
filter vid-filter untag-filter discard
```

   viii. Configure VLAN filter entry on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/1 priority 1
vid 100
```

7. Save configuration data.

```
ZXAN#write
Building configuration...
..[OK]
ZXAN#
```

--End of Steps--

Result The PC connected to this ONU can access the Internet after the data service is configured successfully.

Configuring F820 Data Service

Short Description

This section introduces an instance of configuring F820 data service.

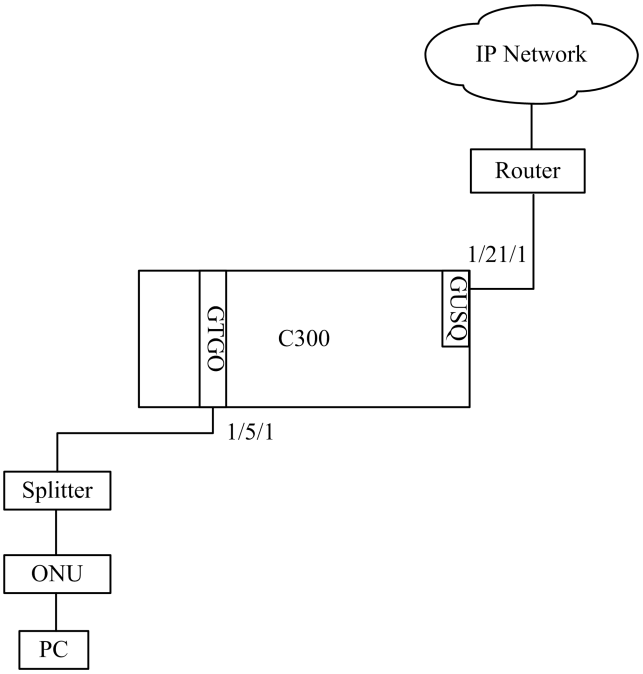
Prerequisites

- Make sure that the network device works normally.
- Make sure that the VLAN is configured properly on uplink equipment.
- Make sure that the in-band NM IP address of the ZXA10 C220 is configured.
- Make sure that the GPON card works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Networking Diagram

Figure 11 shows the F820 data service networking diagram.

FIGURE 11 F820 DATA SERVICE NETWORKING DIAGRAM



Connect a PC to an FE/GE port of an ONU. The ONU adds VLAN tag to user's data at FE/GE port and sends user data to different service channel according to VLAN and priority. ZXA10 C220 performs the mapping from GEM port to Ethernet frame and sends data out through the uplink port.

Configuration Data

Table 7 describes the F820 data service configuration data.

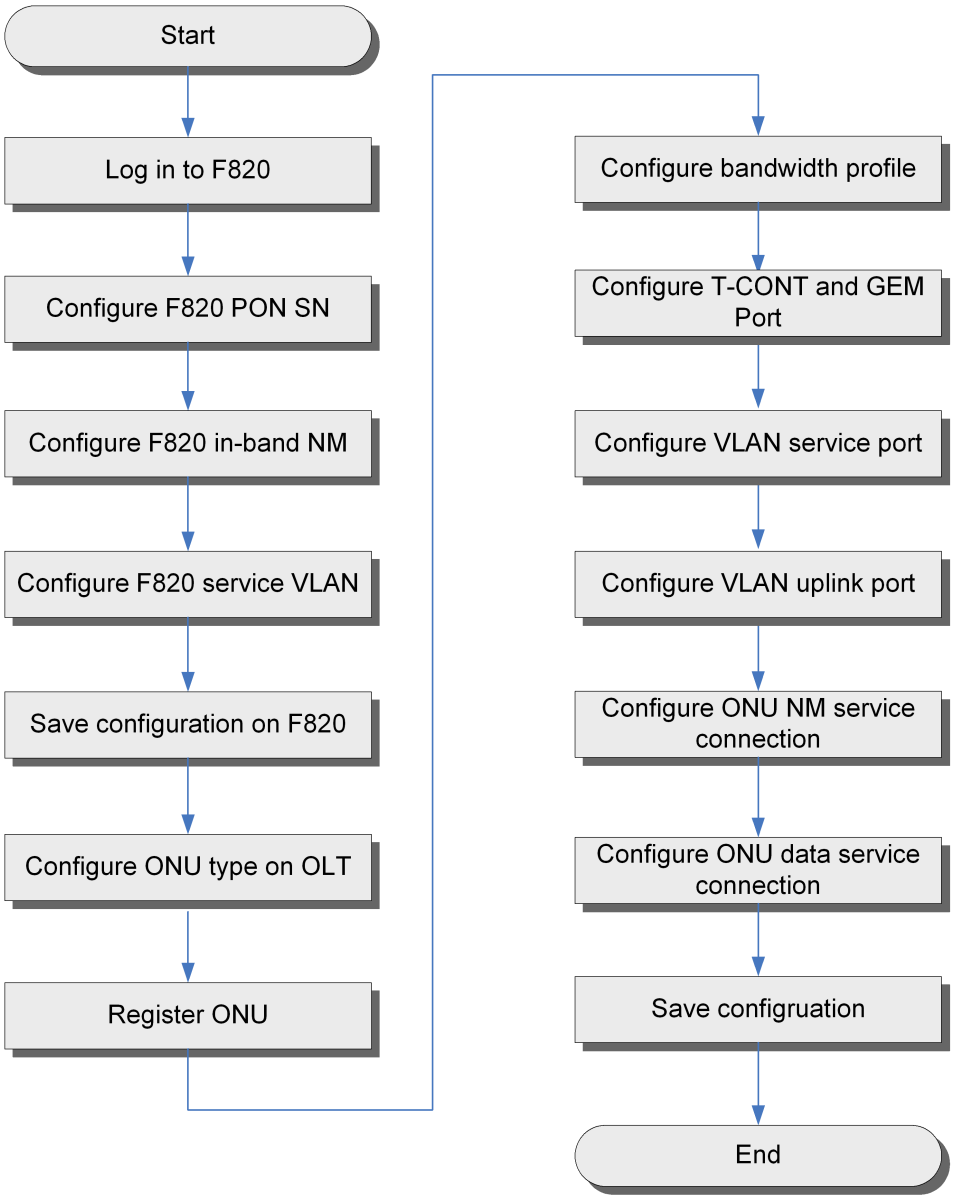
TABLE 7 F820 GPON SERVICE CONFIGURATION DATA

Item	Data
Service VLAN	▪ VLAN ID: 100 ▪ Priority: 1
Uplink port	0/14/1
GPON port	0/5/1
Bandwidth profile	Profile name: T1–50M
	Bandwidth type: Maximum (Type 4)
	Bandwidth: 50 Mbps
ONU	▪ ONU ID: 1 ▪ ONU authentication mode: SN ▪ ONU type: F820 ▪ ONU SN: ZTEG9000002B
ONU in-band NM	▪ VLAN ID: 1000 ▪ Priority: 1 ▪ IP address: 10.67.1.11 ▪ Subnet mask: 255.255.255.0 ▪ Gateway: 10.67.1.254
T-CONT	▪ T-CONT index: 1 ▪ T-CONT name: Tcont50M ▪ Bandwidth profile: T1–50M ▪ Alloc ID: Auto-allocate
GEM port 1	▪ T-CONT index: 1 ▪ GEM Port index: 1 ▪ GEM Port name: NMport ▪ Port ID: Auto-allocate
GEM port 2	▪ T-CONT index: 1 ▪ GEM Port index: 2 ▪ GEM Port name: Gemport2 ▪ Port ID: Auto-allocate
ONU NM service connection	▪ GEM port name: NMport ▪ Bridge: 0/1 ▪ Uplink interface: 0/1/1 ▪ Connection type: bridge + dot1p
ONU unicast service connection	▪ GEM port name: Gemport2 ▪ UNI: fei_0/1/1 ▪ Bridge: 0/1 ▪ Uplink interface: 0/1/2 ▪ Connection type: 802.1p + bridge

Configuration Flow

Figure 12 shows the F820 data service configuration flowchart.

FIGURE 12 DATA SERVICE CONFIGURATION FLOWCHART



Steps

To configure the data service, perform the following steps:

1. Log in to the F820 through HyperTeminal (username: zte, password: zxr10).
2. Configure GPON SN on the F820.
   i. Query card status.

```
ZXAN#show card
Rack Shelf Slot CfgType RealType Port  HardVer SoftVer         Status
-------------------------------------------------------------------------
0    0     1    MS8E    MS8E     8     V0      V1.0.0T8        INSERVICE
0    0     2    GPUA    GPUA     1                             INSERVICE
0    0     4    EI8E    EI8E     1                             INSERVICE
0    0     5    EI8E    EI8E     1                             INSERVICE
```

   ii. Enter global configuration mode and configure GPON SN.

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#pon sn ZTEG9000002B
ZXAN(config)#exit
ZXAN#
```

iii. Reset GPON card (GPUA card) in slot 2 and wait for 1 minute.

```
ZXAN#reset-card slotno 2
Confirm to reset card?[yes/no]:y
```

3. Configure F820 in-band NM.

i. Enter VLAN interface configuration mode, configure in-band NM IP address.

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#interface inband-vlan1000
ZXAN(config-if)#ip address 10.67.1.11 255.255.255.0
ZXAN(config-if)#exit
ZXAN(config)#
```

Note:

VLAN 1 – VLAN 4093 are created by default.

The in-band NM IP address should be in the same network segment with the ZXA10 C220.

ii. Configure in-band NM route.

```
ZXAN(config)#ip route 0.0.0.0 0.0.0.0 10.67.1.254
```

4. Configure service VLAN on the F820.

Configure VLAN service port.

```
ZXAN(config)#interface fei_0/1/1
ZXAN(config-if)#switchport default vlan 100
ZXAN(config-if)#end
ZXAN#
```

Note:

By default, VLAN 1 – VLAN 4093 exist in F820 and the uplink GPON port is each VLAN.

5. Save configuration data.

```
ZXAN#write
Building configuration...
..[OK]
```

6. Configure F820 ONU type on the ZXA10 C220.

Note:

On the ZXA10 C220, the default ONU type of F820 is EPON ONU. To discriminate the ONU types, configure a GPON ONU type, for example, ZTEG-F820.

i. Enter the global configuration mode.

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#
```

ii. Enter PON configuration mode and configure ONU type.

```
ZXAN(config)#pon
ZXAN(config-pon)#onu-type ZTEG-F820 gpon
```

Note:

By default, the ONU type of the F820 is an EPON ONU on the ZXA10 C220. To discrimitate the GPON ONU from the EPON ONU, configure a GPON ONU type, such as ZTEG-F820.

iii. Configure ONU port type.

```
ZXAN(config-pon)#onu-type-if ZTEG-F820 eth_0/1-24
ZXAN(config-pon)#exit
ZXAN(config)#
```

7. Register ONU.

i. Query unconfigured ONU on the GPON-OLT port.

```
ZXAN(config)#show gpon onu uncfg gpon-olt_0/5/1
OnuIndex                  Sn                  State
-------------------------------------------------------------
gpon-onu_0/5/1:1          ZTEG9000002B        unknown
```

ii. Enter the GPON-OLT interface configuration mode.

```
ZXAN(config)#interface gpon-olt_0/5/1
ZXAN(config-if)#
```

iii. Register ONU.

```
ZXAN(config-if)#register 1 type ZTEG-F820 sn ZTEG9000002B state
ready
```

iv. Query ONU state.

```
ZXAN(config-if)#show gpon onu state gpon-olt_0/5/1
OnuIndex              Admin State  Omcc State   O7 State     Phase State
-------------------------------------------------------------------------
gpon-onu_0/5/1:1      enable       enable       operation    working
ZXAN(config-if)#exit
ZXAN(config)#
```

8. Configure bandwidth profile.

A bandwidth profile defines upstream bandwidth of a T-CONT.

i. Enter the GPON configuration mode.

```
ZXAN(config)#gpon
ZXAN(config-gpon)#
```

ii. Configure bandwidth profile.

```
ZXAN(config-gpon)#bandwidth-profile T1-50M type 4 maximum 50000
ZXAN(config-gpon)#exit
ZXAN(config)#
```

9. Configure T-CONT and GEM ports.

- T-CONT (Transmission Container) is the minimum unit of upstream bandwidth scheduling which is identified by Alloc ID.
- GEM port is the minimum unit of downstream traffic which is identified by port ID.

i. Enter the GPON-ONU interface configuration mode.

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

ii. Create T-CONT.

```
ZXAN(config-if)#tcont 1 name Tcont50M traffic T1-50M
```

iii. Create GEM ports.

```
ZXAN(config-if)#gemport 1 name NMport unicast tcont 1
ZXAN(config-if)#gemport 2 name Gemport2 unicast tcont 1
ZXAN(config-if)#exit
ZXAN(config)#
```

10. Configure VLAN service port.

i. Enter the GPON-ONU interface configuration mode.

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

ii. Configure port mode to hybrid.

```
ZXAN(config-if)#switchport mode hybrid vport 1
ZXAN(config-if)#switchport mode hybrid vport 2
```

Note:

By default, one V-port corresponds to one GEM port.

iii. Add port to in-band NM and service VLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 1000 tag vport 1
ZXAN(config-if)#switchport vlan 100 tag vport 2
ZXAN(config-if)#exit
ZXAN(config)#
```

Note:

When a port is added to a VLAN, the VLAN is added automatically.

11. Configure VLAN uplink port.

i. Enter the OLT uplink port configuration mode.

```
ZXAN(config)#interface gei_0/14/1
```

ii. Configure uplink port mode to hybrid.

```
ZXAN(config-if)#switchport mode hybrid
```

iii. Add uplink port to service VLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 100 tag
ZXAN(config-if)#exit
ZXAN(config)#
```

12. Configure ONU NM service connection.

i. Enter the ONU remote management mode.

```
ZXAN(config)#pon-onu-mng gpon-onu_0/5/1:1
ZXAN(gpon-onu-mng)#
```

ii. Configure the map between GEM port and uplink interface.

```
ZXAN(gpon-onu-mng)#interwork gemport NMport dot1p-bridge upli
nk_0/1/1 prio-list 1
```

iii. Configure VLAN filter mode on uplink interface.

```
ZXAN(gpon-onu-mng)# vlan-filter-mode uplink uplink_0/1/1 tag-
filter
vid-filter untag-filter discard
```

iv. Configure VLAN filter entry on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/1 priority 1
vid 1000
```

13. Configure ONU unicast service connection.

i. Configure the map between GEM port and uplink interface.

```
ZXAN(gpon-onu-mng)#interwork gemport Gemport2 dot1p-bridge up
link_0/1/2 prio-list 1
```

ii. Configure VLAN filter mode on uplink interface.

```
ZXAN(gpon-onu-mng)# vlan-filter-mode uplink uplink_0/1/2 tag-
filter vid-filter untag-filter discard
```

iii. Configure VLAN filter entry on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/2 priority 1
vid 100
```

14. Save configuration data.

```
ZXAN#write
Building configuration...
..[OK]
ZXAN#
```

--End of Steps--

Result The PC connected to this ONU can access the Internet after the data service is configured successfully.

Registering ONU

Short Description Perform this procedure to register an ONU.

Prerequisites

- Make sure that the network device works normally.
- Make sure that the GPON card works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context To register the ONU, perform the following steps:

Steps

1. Use the **show onu-type gpon** command to query GPON ONU types.
2. Use the **show gpon onu uncfg** command to query unauthenticated ONU.
3. Use the **configure terminal** command to enter the global configuration mode.
4. Use the **interface** command to enter the GPON-OLT interface configuration mode.
5. Use the **register** command to register ONU.

6. Use the **show gpon onu state** command to query state of registered ONU.

END OF STEPS

Example Query unconfigured ONU on the GPON-OLT port 0/5/1 and register the ONU. The ONU type is ZTE-F622.

```
ZXAN#show onu-type gpon
Pon Type Onu type Description
------------------------------------------------------
gpon ZTE-9806H 2ETH
gpon ZTE-F601 1ETH
gpon ZTE-F621 6ETH,4E1
gpon ZTE-F621A 6ETH,4E1
gpon ZTE-F622 4ETH,2POTS
gpon ZTE-F625 4ETH,2POTS,1RF
gpon ZTE-F628 6ETH,2POTS,1RF,1WiFi
gpon ZTE-F640 1ETH,2POTS,1RF
gpon ZTE-F641 4ETH
ZXAN#show gpon onu uncfg gpon-olt_0/5/1
OnuIndex                 Sn                  State
------------------------------------------------------------------------
gpon-onu_0/5/1:1         ZTE_06120664        unknownt
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gpon-olt_0/5/1
ZXAN(config-if)#register 1 type ZTE-F622 ZTE_06120664 state ready
ZXAN(config-if)#show gpon onu state gpon-olt_0/5/1
OnuIndex               Admin State  Omcc State   O7 State     Phase State
------------------------------------------------------------------------------
gpon-onu_0/5/1:1       enable       enable       operation    working
```

Configuring Bandwidth Profile

Short Description Perform this procedure to configure T-CONT bandwidth profile.

Prerequisites

- Make sure that the network device works normally.
- Make sure that the GPON card works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context A bandwidth profile defines the upstream bandwidth of a T-CONT. The default bandwidth profile is Default.

To configure the bandwidth profile, performs the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **gpon** command to enter the GPON configuration mode.
3. Use the **bandwidth-profile** command to configure bandwidth profile.

   The ZXA10 C220 supports five types of bandwidth profiles:

   - Type 1: Only fixed bandwidth is configured.
   - Type 2: Only assured bandwidth is configured.

- Type 3: Assured bandwidth and maximum bandwidth are configured with compliance to assured bandwidth ≤ maximum bandwidth.
- Type 4: Only maximum bandwidth is configured.
- Type 5: Fixed bandwidth, assured bandwidth and maximum bandwidth are configured with compliance to fix bandwidth + assured bandwidth ≤ maximum bandwidth.

4. Use the **show gpon profile bandwidth** command to query bandwidth profile.

END OF STEPS

Example Configure a bandwidth profile.

- Profile name: T1-50M
- Type: 1
- Fixed bandwidth: 50 Mbps

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#gpon
ZXAN(config-gpon)#bandwidth T1-50M type 1 fixed 50000
ZXAN(config-gpon)#show gpon profile bandwidth

Name :default
  Type:1, FBW: 10000(kbps)

Name :iptv-tcont
  Type:1, FBW: 50000(kbps)

Name :T1-100M
  Type:1, FBW: 100000(kbps)
```

Configuring Traffic Profile

Short Description Perform this procedure to configure GEM port traffic profile.

Prerequisites

- Make sure that the network device works normally.
- Make sure that the GPON card works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context A traffic profile defines the downstream bandwidth of a GEM port.

To configure the traffic profile, performs the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **gpon** command to enter the GPON configuration mode.
3. Use the **traffic-profile** command to configure traffic profile.
4. Use the **show gpon profile traffic** command to query traffic profile.

END OF STEPS

Example Configure a traffic profile.

- Profile name: abc
- SIR: 50000 kbps
- PIR: 60000 Kbps

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#gpon
ZXAN(config-gpon)#traffic-profile abc sir 50000 pir 60000
ZXAN(config-gpon)#show gpon profile traffic
Name  :default
 SIR                 PIR
 10000               10000
Name  :abc
 SIR                 PIR
 50000               60000
```

Configuring T-CONT

Short Description

Perform this procedure to configure T-CONT.

Prerequisites

- Make sure that network device works normally.
- Make sure that GPON card works normally.
- Make sure that ONU is registered normally.
- Make sure that T-CONT profile is configured.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

T-CONT (Transmission Container) is the minimum unit of upstream bandwidth scheduling which is identified by Alloc ID.

To configure the T-CONT, performs the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **interface** command to enter the GPON-ONU interface configuration mode.
3. Use the **tcont** command to configure T-CONT.

END OF STEPS

Example

Configure a T-CONT.

- GPON-ONU port: 0/5/1:1
- T-CONT index: 2
- T-CONT name: Tcont50M
- T-CONT profile: T1-50M

```
ZXAN#configure terminal
Enter the configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#tcont 2 name Tcont50M traffic T1-50M
```

Configuring GEM Port

Short Description

Perform this procedure to configure GEM port.

Prerequisites

- Make sure network device works normally.
- Make sure GPON card works normally.
- Make sure T–CONT is configured.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

GEM port is the minimum unit of downstream traffic which is identified by port ID.

To configure the GEM port, performs the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **interface** command to enter the GPON-ONU interface configuration mode.
3. Use the **gemport** command to configure GEM port.

END OF STEPS

Example

Configure a GEM port.

- GPON-ONU port: 0/5/1:1
- T-CONT index: 2
- GEM port index: 1
- GEM port name: Gemport1

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#gemport 1 name Gemport1 unicast tcont 2
```

Configuring GEM Port Traffic Limit

Short Description

Perform this procedure to configure GEM port traffic limit.

Prerequisites

- Make sure that the network device works normally.
- Make sure that the GPON card works normally.
- The bandwidth profile is configured.
- The traffic profile is configured.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

GEM port is the minimum unit of downstream traffic which is identified by port ID.

The downstream traffic is only effective when the schedule mode is based on ONU or GEM port.

To configure the GEM port traffic limit, performs the following steps:

Steps

1. In the global configuration mode, use the **gpon** command to enter the GPON configuration mode.
2. Use the **schedule-mode** command to configure the schedule mode.
3. In the administrator mode, use the **reset-card** command to reset the GPON card.

   Note:

   When a GPON card is reset, all configuration on the card are deleted.

4. Use the **interface** command to enter GPON-ONU interface configuration mode.
5. Use the **qos-mgmt schedulemod** command to enter the downstream scheduler mode.

   The ZXA10 C220 supports the following downstream schedule modes:

   - None: the schedule mode between four queues in a GEM port is SP/WRR.
   - SP: the schedule mode between GEM ports is SP.
   - WRR: the schedule mode between GEM ports is WRR.
6. Use the **tcont** command to configure T-CONT.
7. Use the **gemport** command to configure GEM port traffic limit.

END OF STEPS

Example

Configure GEM port downstream traffic limit:

- GPON–ONU port: 0/5/1
- GEM port index: 1
- GEM port name: Gemport1
- Scheduler mode: none
- Traffic profile: abc
- T-CONT index: 2
- T-CONT name: Tcont50M
- T-CONT profile: T1-50M

```
ZXAN(config)#gpon
ZXAN(config-gpon)#schedule-mode slotid 5 OnuOrGemport
%Code 32364: Please reset corresponding pon card to make configura
tion take effect.
ZXAN(config-gpon)#end
ZXAN#reset-card slotno 5
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#qos-mgmt schedulemode none
ZXAN(config-if)#tcont 2 name Tcont50M traffic T1-50M
ZXAN(config-if)#gemport 1 name Gemport1 unicast tcont 2 downtraffic abc
```

Configuring ONU Service Connection

Short Description

Perform this procedure to configure service connection between Ethernet frames and GEM port.

Prerequisites

- Make sure that the network device works normally.
- Make sure that the GPON card works normally.
- Make sure that the GEM port is configured.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

ZXA10 C220 supports four types of service connection.

- 802.1p

  The upstream packets arrived on the UNI of an ONU are mapped to a GEM port according to UNI and 802.1p priority.

- UNI

  The upstream packets arrived on the UNI of an ONU are mapped to a GEM port according to UNI.

- Bridge

  The upstream packets arrived on the UNI of an ONU are mapped to a GEM port according to VLAN ID. Meanwhile, the VLAN tag can be processed according VLAN filter rules. I and 802.1p priority.

- 802.1p + bridge

  The upstream packets arrived on the UNI of an ONU are mapped to a GEM port according to VLAN ID and 802.1p priority. Meanwhile, the VLAN tag can be processed according VLAN filter rules.

describes the map of UNI, bridge, uplink interface, and GEM port.

Table 8

TABLE 8 MAP OF UNI BRIDGE, UPLINK INTERFACE, AND GEM PORT

Connection Type	UNI to Bridge Map	Bridge to Uplink Interface Map	Uplink Interface to GEM port Map
Bridge	N:1	1:N	1:1
802.1p + bridge	N:1	1:N	1:N

Steps

1. In the global configuration mode, use **pon-onu-mng** command to enter ONU remote management mode.
2. Use **interwork gemport** command to configure the connection between GEM port to user side interface.
   - Use the **interwork gemport bridge** command to configure a bridge connection.

- Use the **interwork gemport dot1p** command to configure 802.1p connection.
- Use the **interwork gemport dot1p-bridge** command to configure 802.1p + bridge connection.
- Use the **interwork gemport uni** command to configure UNI connection.

3. For bridge or 802.1p + bridge connection, use the the **bridge -port uni-bind** command to bind UNI to bridge.

END OF STEPS

Example Configure a connection between the GEM port and user side interface.

- Type: 802.1p + bridge
- Bridge ID: 1
- Uplink interface: 1
- Priority: 0
- UNI: eth_0/1

```
ZXAN(config)#pon-onu-mng gpon-onu_0/4/1:1
ZXAN(gpon-onu-mng)#interwork gemport Gemport1 dot1p-bridge
uplink_0/1/1 prio-list 0
ZXAN(gpon-onu-mng)#bridge-port uni-bind eth_0/1 bridge_0/1
```

This page is intentionally blank.

Chapter 3

GPON Protection Service Configuration

Table of Contents

Overview

ZXA10 C220 provides GPON port protection by main and backup GPON ports switching mechanism. When the main GPON link is break, the backup takes over the GPON service automatically.

ZXA10 C220 supports three types GPON port switch mechanisms:

- Force switch (high priority)
- Alarm-triggered switch (middle priority)
- Manual switch (low priority)

Configuring GPON Protection Service

Short Description

This section introduces an instance of configuring GPON protection service.

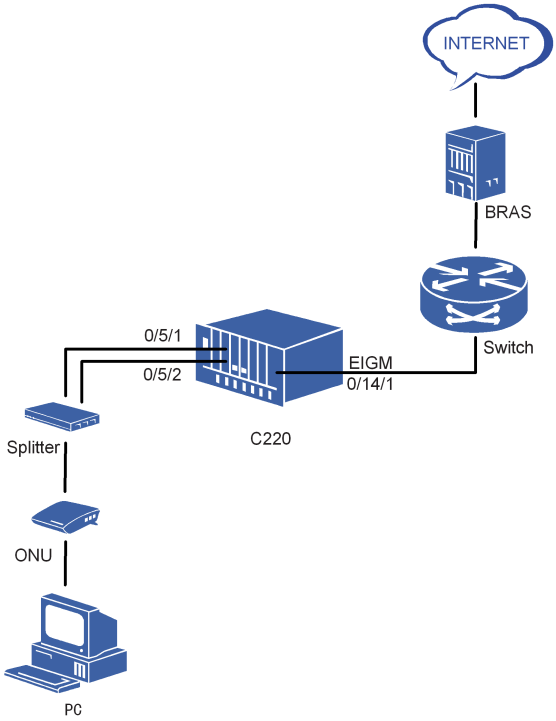
Prerequisites

- Make sure that network device works normally.
- Make sure that VLAN is configured properly on uplink equipment.
- Make sure that GPON data service is configured successfully.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Networking Diagram

Figure 13 shows the GPON protection service networking diagram.

FIGURE 13 GPON PROTECTION SERVICE NETWORKING DIAGRAM



Configuration Data

Table 9 describes the GPON protection service configuration data.

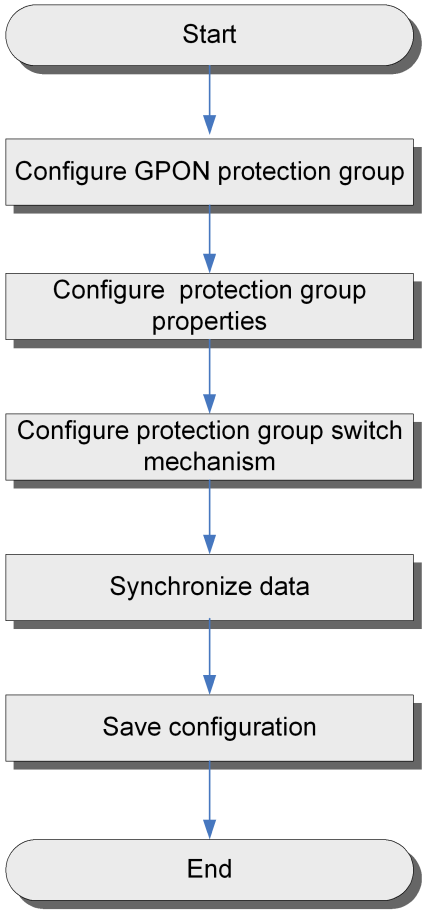
TABLE 9 GPON PROTECTION SERVICE CONFIGURATION DATA

Item	Data
Protection group	▪ Name: zte ▪ Protection mode: Revertible ▪ Waiting time to recovery: 120 sec
Working GPON port	0/5/1
Protective GPON port	0/5/2

Configuration Flow

Figure 14 shows the GPON protection service configuration flowchart.

FIGURE 14 GPON PROTECTION SERVICE CONFIGURATION FLOWCHART



Steps To configure the GPON protection service, perform the following steps:

1. Configure GPON protection group.

```
ZXAN(config)#protection group zte workpon gpon-olt_0/5/1 protectpon
gpon-olt_0/5/2 typeB
```

2. Configure protection group properties.

```
ZXAN(config)#protection prop group zte mode revertive wtr 120
```

3. Configure protection group switch mechanism.

```
ZXAN(config)#protection switch-command group zte force w2p
```

4. Synchronize data.

```
ZXAN(config)#exit
ZXAN#protection sync-data group zte
```

5. Save configuration data.

```
ZXAN#write
Building configuration...
..[OK]
ZXAN#
```

--End of Steps--

Result The GPON protection service is configured successfully.

This page is intentionally blank.

Chapter 4

Multicast Service Configuration

Table of Contents

Overview

Service Description

Multicast service is widely used in point to multiple-point data transmission applications, such as stream media, remote education, video conference and IPTV.

IPTV, also known as an interactive network TV, is a service based on broadband. It uses the IP network and integrates the Internet, multimedia, and communication technologies to provide interactive services such as live TV programs, VoD, and Internet access. The subscribers can use IPTV through a computer or STB + TV set.

Service Specification

ZXA10 C220 supports IGMP protocols and controllable multicast service.

The multicast service specifications of ZXA10 C220 are as below:

- Supports IGMP V1/V2/V3.
- Supports IGMP snooping, IGMP proxy and IGMP router.
- Supports maximum 1024 multicast groups.
- Supports CDR.
- Supports CAC.

Configuring IGMP Snooping Multicast Service

Short Description

This section introduces an instance of configuring IGMP snooping multicast service.

Prerequisites

- Make sure that network device works normally.
- Make sure that multicast source exits in the uplink network.
- Make sure that GPON card works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Background Information

When an ONU is registered on the ZXA10 C220, the OLT creates a multicast service connection automatically.

- Bridge_0/1
- GEM port ID: 1021
- Uplink_0/1/255

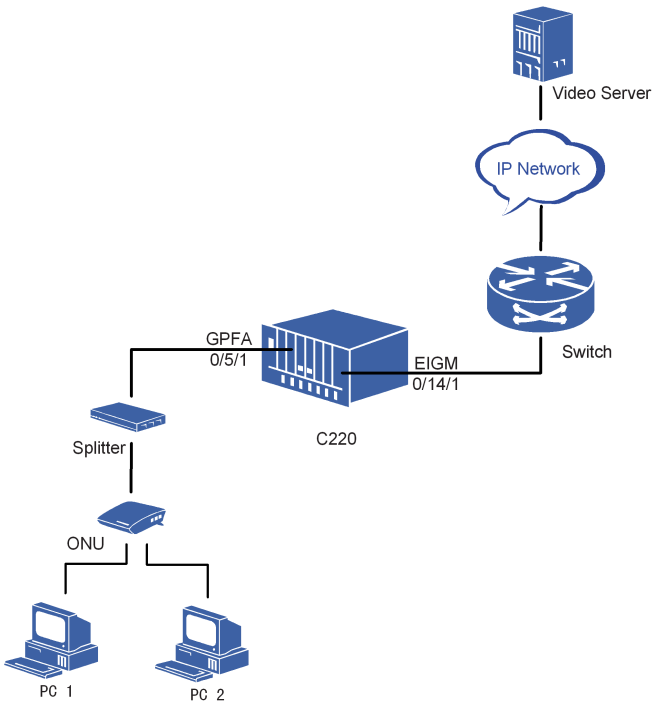
On the ONU, the multicast service connection transmits only multicast service packets and the multicast protocol packets are transmitted in the unicast service connection.

The F621 supports one MVLAN and 32 multicast groups.

Networking Diagram

Figure 15 shows the IGMP snooping multicast service networking diagram.

FIGURE 15 IGMP SNOOPING MULTICAST SERVICE NETWORKING DIAGRAM



Configuration Data

Table 10 describes the IGMP snooping multicast service configuration data.

TABLE 10 IGMP SNOOPING MULTICAST SERVICE CONFIGURATION DATA

Item	Data
Multicast service VLAN (MVLAN)	▪ VLAN ID: 500 ▪ Priority: 5
Uplink port	0/14/1
IPTV channel	The video server provides three channels with default preview profile: ▪ Channel1: 224.1.1.1 ▪ Channel2: 224.1.1.2 ▪ Channel3: 224.1.1.3
IPTV channel package	▪ Name: pkg1 ▪ Channel1: preview ▪ Channe2: watch ▪ Channe3: watch
GPON port	0/5/1
Bandwidth profile	Profile name: iptv–tcont
	Bandwidth type: Assured (Type 2)
	Bandwidth: 50 Mbps
T-CONT	▪ T-CONT index: 2 ▪ T-CONT name: iptvtcont ▪ Bandwidth profile: iptv–tcont ▪ Alloc ID: Auto-allocate
GEM port 1	▪ T-CONT index: 2 ▪ GEM Port index: 2 ▪ GEM Port name: Gemport1 ▪ Port ID: Auto-allocate
GEM port 3	▪ T-CONT index: 2 ▪ GEM Port index: 2 ▪ GEM Port name: Gemport2 ▪ Port ID: Auto-allocate
ONU	▪ ONU ID: 1 ▪ ONU Model: F621 ▪ ONU SN: ZTE_06120664
PC 1	▪ ONU port: eth_1 ▪ GEM port index: 1 ▪ User VLAN: 21 ▪ MVLAN ID: 500 ▪ Right: Pkg1
PC 2	▪ ONU port: eth_2 ▪ GEM port index: 2 ▪ User VLAN ID: 22 ▪ MVLAN ID: 500 ▪ Right: N/A

Item	Data
ONU unicast service connection 1	▪ GEM port name: Gemport1 ▪ UNI: eth_0/1 ▪ Bridge: 0/1 ▪ Uplink interface: 0/1/1 ▪ Connection type: 802.1p + bridge
ONU unicast service connection 2	▪ GEM port name: Gemport2 ▪ UNI: eth_0/2 ▪ Bridge: 0/1 ▪ Uplink interface: 0/1/2 ▪ Connection type: 802.1p + bridge

Note:

The ZXA10 C220 supports 8 service priorities (0 - 7), where 0 is the lowest priority and 7 is the highest priority.

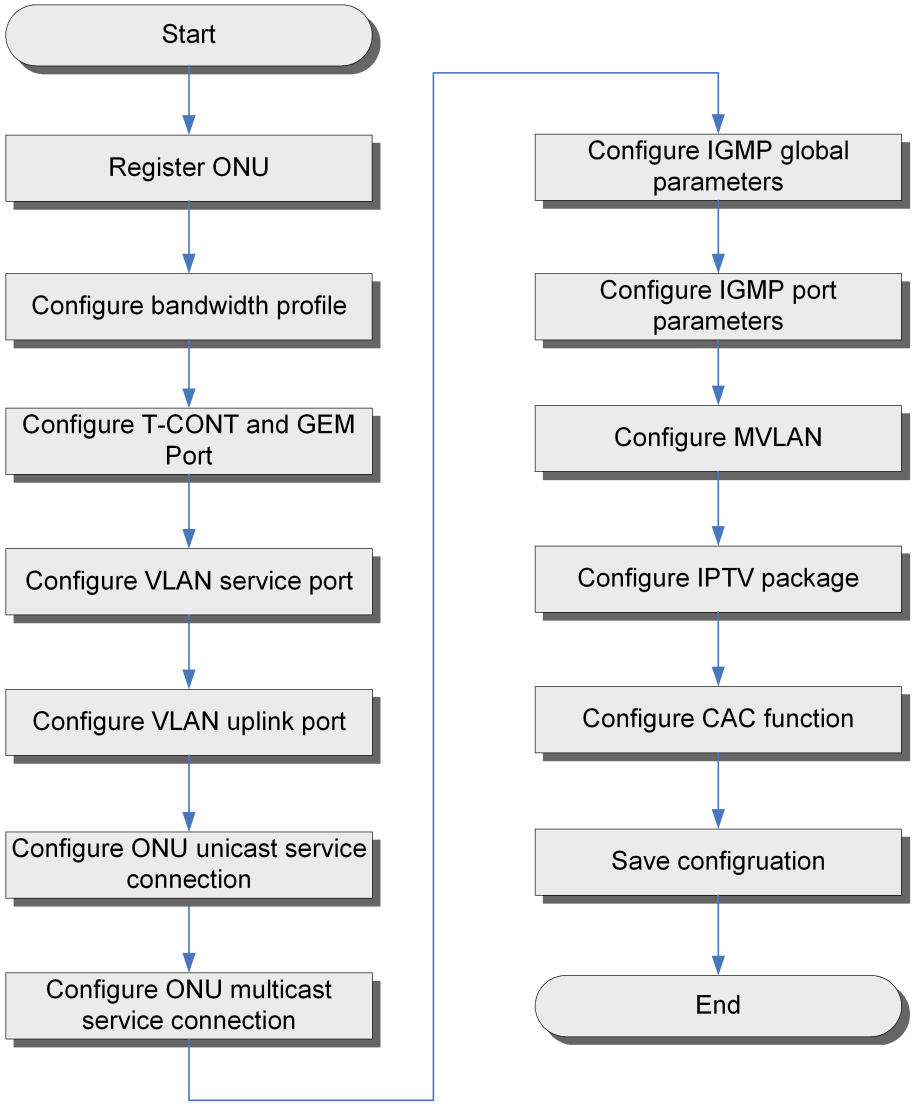
It is recommended to configure the service priority as follows:

- Priority of data service: 1
- Priority of IPTV service: 5
- Priority of VoIP service: 7
- Priority of CES service: 7

Configuration Flow

Figure 16 shows the IGMP snooping multicast service configuration flowchart.

FIGURE 16 IGMP SNOOPING MULTICAST SERVICE CONFIGURATION FLOWCHART



Steps To configure the IGMP snooping multicast service, perform the following steps:

1. Register ONU.
   i. Query unconfigured ONU on the GPON-OLT port.

```
ZXAN#show gpon onu uncfg gpon-olt_0/5/1
OnuIndex                 Sn                  State
-------------------------------------------------------------
gpon-onu_0/5/1:1         ZTE_06120664        unknown
```

   ii. Enter the global configuration mode.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#
```

   iii. Enter the GPON-OLT interface configuration mode.

```
ZXAN(config)#interface gpon-olt_0/5/1
ZXAN(config-if)#
```

iv. Register ONU.

```
ZXAN(config-if)#register 1 type ZTE-F621 ZTE_06120664 state
ready
```

v. Query ONU state.

```
ZXAN(config-if)#show gpon onu state gpon-olt_0/5/1
OnuIndex              Admin State  Omcc State   O7 State     Phase State
-------------------------------------------------------------------------
gpon-onu_0/5/1:1      enable       enable       operation    working
ZXAN(config-if)#exit
ZXAN(config)#
```

2. Configure bandwidth profile.

i. Enter the GPON configuration mode.

```
ZXAN(config)#gpon
ZXAN(config-gpon)#
```

ii. Configure bandwidth profile.

```
ZXAN(config-gpon)#bandwidth-profile iptv-tcont type 2 assured
50000
ZXAN(config-gpon)#exit
ZXAN(config)#
```

3. Configure T-CONT and GEM port.

- T-CONT (Transmission Container) is the minimum unit of upstream bandwidth scheduling which is identified by Alloc ID.
- GEM (GPON Encapsulation Method) port is the minimum unit of downstream traffic which is identified by port ID.

i. Enter the GPON-ONU interface configuration mode

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

ii. Create T-CONT.

```
ZXAN(config-if)#tcont 2 name iptvtcont traffic iptv-tcont
```

iii. Create GEM port.

```
ZXAN(config-if)#gemport 1 name Gemport1 unicast tcont 2
ZXAN(config-if)#gemport 2 name Gemport2 unicast tcont 2
ZXAN(config-if)#exit
ZXAN(config)#
```

4. Configure VLAN service port.

i. Enter the GPON-ONU interface configuration mode

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

ii. Configure port mode to hybrid.

```
ZXAN(config-if)#switchport mode hybrid vport 1
ZXAN(config-if)#switchport mode hybrid vport 2
```

iii. Add port to user VLAN and MVLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 500 tag vport 1
ZXAN(config-if)#switchport vlan 500 tag vport 2
ZXAN(config-if)#switchport vlan 21 tag vport 1
ZXAN(config-if)#switchport vlan 22 tag vport 2
ZXAN(config-if)#exit
ZXAN(config)#
```

Note:

When a port is added to a VLAN, the VLAN is added automatically.

5. Configure VLAN uplink port.
   i. Enter the OLT uplink port configuration mode.

```
ZXAN(config)#interface gei_0/14/1
```

   ii. Configure uplink port mode to hybrid.

```
ZXAN(config-if)#switchport mode hybrid
```

   iii. Add uplink port to MVLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 500 tag
ZXAN(config-if)#exit
ZXAN(config)#
```

6. Configure ONU unicast service connection.
   i. Enter the ONU remote management mode.

```
ZXAN(config)#pon-onu-mng gpon-onu_0/5/1:1
ZXAN(gpon-onu-mng)#
```

   ii. Configure the map between GEM port and uplink interface.

```
ZXAN(gpon-onu-mng)#interwork gemport Gemport1 dot1p-bridge up
link_0/1/1 prio-list 5
ZXAN(gpon-onu-mng)#interwork gemport Gemport2 dot1p-bridge up
link_0/1/2 prio-list 5
```

   iii. Bind the UNI to bridge interface.

```
ZXAN(gpon-onu-mng)#bridge-port uni-bind eth_0/1 bridge_0/1
ZXAN(gpon-onu-mng)#bridge-port uni-bind eth_0/2 bridge_0/1
```

   iv. Configure UNI VLAN and priority.

```
ZXAN(gpon-onu-mng)#vlan-tag uni eth_0/1 up-mode overwrite up-
prio 5 up-vid 21 down-mode untag
ZXAN(gpon-onu-mng)#vlan-tag uni eth_0/2 up-mode overwrite up-
prio 5 up-vid 22 down-mode untag
```

   v. Configure VLAN filter mode on UNI.

```
ZXAN(gpon-onu-mng)#vlan-filter-mode uni eth_0/1 tag-filter vid
-filter untag-filter transparent
ZXAN(gpon-onu-mng)#vlan-filter-mode uni eth_0/2 tag-filter vid
-filter untag-filter transparent
```

   vi. Configure VLAN filter entry on UNI.

```
ZXAN(gpon-onu-mng)#vlan-filter uni eth_0/1 priority 5 vid 21
ZXAN(gpon-onu-mng)#vlan-filter uni eth_0/2 priority 5 vid 22
```

   vii. Configure VLAN filter mode on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter-mode uplink uplink_0/1/1 tag-
filter vid-filter untag-filter discard
ZXAN(gpon-onu-mng)#vlan-filter-mode uplink uplink_0/1/2 tag-
filter vid-filter untag-filter discard
```

   viii. Configure VLAN filter entry on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/1 priority 5
vid 21
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/2 priority 5
vid 22
```

7. Configure ONU multicast service connection.

i. Configure VLAN filter mode on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter-mode uplink uplink_0/1/255 tag-
filter vid-filter untag-filter discard
```

ii. Configure VLAN filter entry on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/255 priority
5 vid 500
```

iii. Configure multicast group MAC addresses.

```
ZXAN(gpon-onu-mng)#mac-filter uplink uplink_0/1/255 0100.5e01.
0101 forward
ZXAN(gpon-onu-mng)#mac-filter uplink uplink_0/1/255 0100.5e01.
0102 forward
ZXAN(gpon-onu-mng)#mac-filter uplink uplink_0/1/255 0100.5e01.
0103 forward
ZXAN(gpon-onu-mng)#exit
ZXAN(config)#
```

Note:

According to IANA, mutlicast MAC addresses are 01:00:5E:00:00:00 – 01:00:5E:7F:FF:FF. As a 28–bit IP address is mapped to a 23–bit MAC address, 32 multicast IP addresses are mapped to one MAC address.

8. Configure IGMP global parameters.

   Enable global IGMP and IGMP span-VLAN functions.

```
ZXAN(config)#igmp enable
ZXAN(config)#igmp span-vlan enable
```

   This instance uses the default values for other IGMP global parameters. To configure IGMP global parameters, refer to Configuring IGMP Global Parameters.

Note:

When user VLAN is different from MVLAN, the span-VLAN function must be enabled.

9. Configure IGMP port parameters.

   Enable fast-leave function.

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#igmp fast-leave enable vport 1
ZXAN(config-if)#igmp fast-leave enable vport 2
ZXAN(config-if)#exit
```

   This instance uses the default values for other IGMP port parameters. To configure IGMP port parameters, refer to Configuring IGMP Port Parameters.

10. Configure MVLAN.

    i. Configure MVLAN.

```
ZXAN(config)#igmp mvlan 500
```

    ii. Configure MVLAN working mode.

```
ZXAN(config)#igmp mvlan 500 work-mode snooping
```

Note:

The default IGMP mode of the system is IGMP snooping.

iii. Configure multicast groups.

```
ZXAN(config)#igmp mvlan 500 group 224.1.1.1
ZXAN(config)#igmp mvlan 500 group 224.1.1.2
ZXAN(config)#igmp mvlan 500 group 224.1.1.3
```

Configure batch multicast groups (optional).

```
ZXAN(config)#igmp mvlan 500 group 224.3.4.1 to 224.3.4.10
```

iv. Configure source port.

```
ZXAN(config)#igmp mvlan 500 source-port gei_0/14/1
```

v. Configure receiving port.

```
ZXAN(config)#igmp mvlan 500 receive-port gpon-onu_0/5/1:1 vport 1
ZXAN(config)#igmp mvlan 500 receive-port gpon-onu_0/5/1:1 vport 2
```

11. Configure IPTV package.

i. Configure IPTV channel.

```
ZXAN(config)#iptv channel mvlan 500 group 224.1.1.1 name channel1
ZXAN(config)#iptv channel mvlan 500 group 224.1.1.2 name channel2
ZXAN(config)#iptv channel mvlan 500 group 224.1.1.3 name channel3
```

Configure batch IPTV channels (optional).

```
ZXAN(config)#iptv channel mvlan 500 group 224.3.4.1 to 224.3.4.10
prename xxtv
```

ii. Configure preview profile (optional).

```
ZXAN(config)#iptv view-profile test count 3 duration 120 blackout
60
```

iii. Apply preview profile to IPTV channel (optional).

```
ZXAN(config)#iptv channel channel1 view-profile test
```

Note:

The default view profile of IPTV channel is DEFVAL.PRF.

iv. Configure IPTV package.

```
ZXAN(config)#iptv package name pkg1
ZXAN(config)#iptv package pkg1 channel channel1 preview
ZXAN(config)#iptv package pkg1 channel channel2 watch
ZXAN(config)#iptv package pkg1 channel channel3 deny
```

12. Configure CAC.

i. Enable global CAC function.

```
ZXAN(config)#iptv cac enable
```

Note:

- When CAC is enabled, the user can watch channels only when he has purchased the IPTV package.
- When CAC is disabled, the user can watch channels when he is in the MVLAN receiving port
- CAC is disabled by default.

ii. Configure user port right.

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#iptv package pkg1 vport 1
```

13. Save configuration data.

```
ZXAN(config-if)#end
ZXAN#write
Building configuration...
..[OK]
ZXAN#
```

--End of Steps--

Result

- PC 1 can preview channel1, watch channel2 and channel3.
- PC 2 cannot watch channel1 - channel3.

Configuring IGMP Proxy Multicast Service

Short Description

This section introduces an instance of configuring IGMP proxy multicast service.

Prerequisites

- Make sure that the network device works normally.
- Make sure that multicast source exits in the uplink network.
- Make sure that the GPON card works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Background Information

When an ONU is registered on the ZXA10 C220, the OLT creates a multicast service connection automatically.

- Bridge_0/1
- GEM port ID: 1021
- Uplink_0/1/255

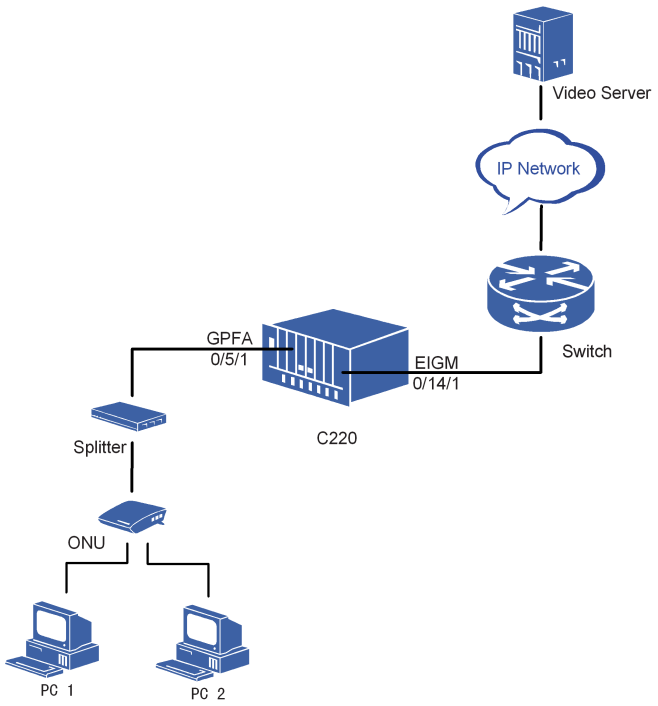
On the ONU, the multicast service connection transmits only multicast service packets and the multicast protocol packets are transmitted in the unicast service connection.

The F621 supports one MVLAN and 32 multicast groups.

Networking Diagram

Figure 17 shows the IGMP proxy multicast service networking diagram.

FIGURE 17 IGMP PROXY MULTICAST SERVICE NETWORKING DIAGRAM



Data Configuration

Table 11 describes the IGMP proxy multicast service data configuration.

TABLE 11 IGMP PROXY MULTICAST SERVICE DATA CONFIGURATION

Item	Data
Multicast service VLAN (MVLAN)	▪ VLAN ID: 500 ▪ Priority: 5
Uplink port	0/14/1
IPTV channel	The video server provides three channels with default preview profile: ▪ Channel1: 224.1.1.1 ▪ Channel2: 224.1.1.2 ▪ Channel3: 224.1.1.3
IPTV package	▪ Name: pkg1 ▪ Channel1: preview ▪ Channe2: watch ▪ Channe3: watch
IGMP proxy server	IP address: 10.1.1.1
GPON port	0/5/1
Bandwidth profile	Profile name: iptv–tcont
	Bandwidth type: Assured (Type 2)
	Bandwidth: 50 Mbps

T-CONT	▪ T-CONT index: 2 ▪ T-CONT name: iptvtcont ▪ T-CONT profile: iptv–tcont ▪ Alloc ID: Auto-allocate
GEM port 2	▪ T-CONT index: 2 ▪ GEM Port index: 1 ▪ GEM Port name: Gemport1 ▪ Port ID: Auto-allocate
GEM port 3	▪ T-CONT index: 2 ▪ GEM Port index: 2 ▪ GEM Port name: Gemport2 ▪ Port ID: Auto-allocate
ONU	▪ ONU ID: 1 ▪ Model: F621 ▪ SN: ZTE_06120664
PC 1	▪ ONU port: eth_1 ▪ GEM port index: 1 ▪ User VLAN: 21 ▪ MVLAN ID: 500 ▪ Right: Pkg1
PC 2	▪ ONU port: eth_2 ▪ GEM port index: 2 ▪ User VLAN ID: 22 ▪ MVLAN ID: 500 ▪ Right: N/A
ONU unicast service connection 1	▪ GEM port name: Gemport1 ▪ UNI: eth_0/1 ▪ Bridge: 0/1 ▪ Uplink interface: 0/1/1 ▪ Connection type: 802.1p + bridge
ONU unicast service connection 2	▪ GEM port name: Gemport2 ▪ UNI: eth_0/2 ▪ Bridge: 0/1 ▪ Uplink interface: 0/1/2 ▪ Connection type: 802.1p + bridge

Configuration Flow

The IGMP proxy service configuration is different from the IGMP snooping service configuration on the following items:

- Configuring IGMP port parameters
- Configuring MVLAN

Steps

To configure the IGMP proxy multicast service, perform the following steps:

1. Register ONU.
   i. Query unconfigured ONU on the GPON-OLT port.

```
ZXAN(config)#show gpon onu uncfg gpon-olt_0/5/1
OnuIndex                 Sn                  State
-------------------------------------------------------------
gpon-onu_0/5/1:1         ZTE_06120664        unknown
```

   ii. Enter the GPON-OLT interface configuration mode.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gpon-olt_0/5/1
ZXAN(config-if)#
```

iii. Register ONU.

```
ZXAN(config-if)#register 1 type ZTE-F621 ZTE_06120664 state ready
```

iv. Query ONU state.

```
ZXAN(config-if)#show gpon onu state gpon-olt_0/5/1
OnuIndex               Admin State  Omcc State   O7 State     Phase State
-------------------------------------------------------------------------------
gpon-onu_0/5/1:1       enable       enable       operation    working
ZXAN(config-if)#exit
ZXAN(config)#
```

2. Configure T-CONT profile.

i. Enter the GPON configuration mode.

```
ZXAN(config)#gpon
ZXAN(config-gpon)#
```

ii. Configure T-CONT profile.

```
ZXAN(config-gpon)#bandwidth-profile iptv-tcont type 2 assured
50000
ZXAN(config-gpon)#exit
ZXAN(config)#
```

3. Configure T-CONT and GEM Port

- T-CONT (Transmission Container) is the minimum unit of upstream bandwidth scheduling which is identified by Alloc ID.
- GEM (GPON Encapsulation Method) port is the minimum unit of downstream traffic which is identified by port ID.

i. Enter the GPON-ONU interface configuration mode.

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

ii. Create T-CONT.

```
ZXAN(config-if)#tcont 2 name iptvtcont traffic iptv-tcont
```

iii. Create GEM port.

```
ZXAN(config-if)#gemport 1 name Gemport2 unicast tcont 2
ZXAN(config-if)#gemport 2 name Gemport3 unicast tcont 2
ZXAN(config-if)#exit
ZXAN(config)#
```

4. Configure VLAN service port.

i. Enter the GPON-ONU interface configuration mode.

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

ii. Configure port mode to hybrid.

```
ZXAN(config-if)#switchport mode hybrid vport 1
ZXAN(config-if)#switchport mode hybrid vport 2
```

iii. Add port to user VLAN and MVLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 500 tag vport 1
ZXAN(config-if)#switchport vlan 500 tag vport 2
ZXAN(config-if)#switchport vlan 21 tag vport 1
ZXAN(config-if)#switchport vlan 22 tag vport 2
ZXAN(config-if)#exit
ZXAN(config)#
```

Note:

When a port is added to a VLAN, the VLAN is added automatically.

5. Configure VLAN uplink port.
   i. Enter the OLT uplink port configuration mode.

```
ZXAN(config)#interface gei_0/14/1
```

   ii. Configure uplink port mode to hybrid.

```
ZXAN(config-if)#switchport mode hybrid
```

   iii. Add uplink port to MVLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 500 tag
ZXAN(config-if)#exit
ZXAN(config)#
```

6. Configure ONU unicast service connection.
   i. Enter the ONU remote management mode.

```
ZXAN(config)#pon-onu-mng gpon-onu_0/5/1:1
ZXAN(gpon-onu-mng)#
```

   ii. Configure the map between GEM port and uplink interface.

```
ZXAN(gpon-onu-mng)#interwork gemport Gemport1 dot1p-bridge up
link_0/1/1 prio-list 5
ZXAN(gpon-onu-mng)#interwork gemport Gemport2 dot1p-bridge up
link_0/1/2 prio-list 5
```

   iii. Bind the UNI to bridge interface.

```
ZXAN(gpon-onu-mng)#bridge-port uni-bind eth_0/1 bridge_0/1
ZXAN(gpon-onu-mng)#bridge-port uni-bind eth_0/2 bridge_0/1
```

   iv. Configure UNI VLAN and priority.

```
ZXAN(gpon-onu-mng)#vlan-tag uni eth_0/1 up-mode overwrite up-
prio 5 up-vid 21 down-mode untag
ZXAN(gpon-onu-mng)#vlan-tag uni eth_0/2 up-mode overwrite up-
prio 5 up-vid 22 down-mode untag
```

   v. Configure VLAN filter mode on UNI.

```
ZXAN(gpon-onu-mng)#vlan-filter-mode uni eth_0/1 tag-filter vid
-filter untag-filter transparent
ZXAN(gpon-onu-mng)#vlan-filter-mode uni eth_0/2 tag-filter vid
-filter untag-filter transparent
```

   vi. Configure VLAN filter entry on UNI.

```
ZXAN(gpon-onu-mng)#vlan-filter uni eth_0/1 priority 5 vid 21
ZXAN(gpon-onu-mng)#vlan-filter uni eth_0/2 priority 5 vid 22
```

   vii. Configure VLAN filter mode on uplink interface.

```
ZXAN(gpon-onu-mng)# vlan-filter-mode uplink uplink_0/1/1 tag-
filter vid-filter untag-filter discard
ZXAN(gpon-onu-mng)# vlan-filter-mode uplink uplink_0/1/2 tag-
filter vid-filter untag-filter discard
```

   viii. Configure VLAN filter entry on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/1 priority 5
vid 21
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/2 priority 5
vid 22
```

7. Configure ONU multicast service connection.

i. Configure VLAN filter mode on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter-mode uplink uplink_0/1/255 tag-
filter vid-filter untag-filter discard
```

ii. Configure VLAN filter entry on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/255 priority
5 vid 500
```

iii. Configure multicast group MAC addresses.

```
ZXAN(gpon-onu-mng)#mac-filter uplink uplink_0/1/255 0100.5e01.
0101 forward
ZXAN(gpon-onu-mng)#mac-filter uplink uplink_0/1/255 0100.5e01.
0102 forward
ZXAN(gpon-onu-mng)#mac-filter uplink uplink_0/1/255 0100.5e01.
0103 forward
ZXAN(gpon-onu-mng)#exit
ZXAN(config)#
```

Note:

According to IANA, mutlicast MAC addresses are 01:00:5E:00:00:00 – 01:00:5E:7F:FF:FF. As a 28–bit IP address is mapped to a 23–bit MAC address, 32 multicast IP addresses are mapped to one MAC address.

8. Configure IGMP global parameters.

   Enable global IGMP and IGMP span-VLAN functions.

```
ZXAN(config)#igmp enable
ZXAN(config)#igmp span-vlan enable
```

   This instance uses the default values for other IGMP global parameters. To configure IGMP global parameters, refer to Configuring IGMP Global Parameters.

Note:

When user VLAN is different from MVLAN, the span-VLAN function must be enabled.

9. Configure IGMP port parameters.

   i. Enable IGMP fast-leave function.

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#igmp fast-leave enable vport 1
ZXAN(config-if)#igmp fast-leave enable vport 2
```

   This instance uses the default values for other IGMP port parameters. To configure IGMP port parameters, refer to Configuring IGMP Port Parameters.

   ii. Configure IGMP proxy IP address.

```
ZXAN(config-if)#igmp proxy-ip 10.1.1.1 vport 1
ZXAN(config-if)#igmp proxy-ip 10.1.1.1 vport 2
ZXAN(config-if)#exit
```

10. Configure MVLAN.

    i. Configure MVLAN.

```
ZXAN(config)#igmp mvlan 500
```

ii. Configure MVLAN working.

```
ZXAN(config)#igmp mvlan 500 work-mode proxy
```

Note:

The default IGMP mode of the system is IGMP snooping.

iii. Configure IGMP proxy host IP address.

```
ZXAN(config)#igmp mvlan 500 host-ip 10.1.1.1
```

iv. Configure multicast groups.

```
ZXAN(config)#igmp mvlan 500 group 224.1.1.1
ZXAN(config)#igmp mvlan 500 group 224.1.1.2
ZXAN(config)#igmp mvlan 500 group 224.1.1.3
```

Configure batch multicast groups (optional).

```
ZXAN(config)#igmp mvlan 500 group 224.3.4.1 to 224.3.4.10
```

v. Configure source port.

```
ZXAN(config)#igmp mvlan 500 source-port gei_0/14/1
```

vi. Configure receiving port.

```
ZXAN(config)#igmp mvlan 500 receive-port gpon-onu_0/5/1:1 vport 1
ZXAN(config)#igmp mvlan 500 receive-port gpon-onu_0/5/1:1 vport 2
```

11. Configure IPTV package.

i. Configure IPTV channel.

```
ZXAN(config)#iptv channel mvlan 500 group 224.1.1.1 name channel1
ZXAN(config)#iptv channel mvlan 500 group 224.1.1.2 name channel2
ZXAN(config)#iptv channel mvlan 500 group 224.1.1.3 name channel3
```

Configure batch IPTV channels (optional).

```
ZXAN(config)#iptv channel mvlan 500 group 224.3.4.1 to 224.3.4.10
prename xxtv
```

ii. Configure preview profile (optional).

```
ZXAN(config)#iptv view-profile test count 3 duration 120 blackout
60
```

iii. Apply preview profile to IPTV channel (optional).

```
ZXAN(config)#iptv channel channel1 view-profile test
```

Note:

The default view profile of IPTV channel is DEFVAL.PRF.

iv. Configure IPTV package.

```
ZXAN(config)#iptv package name pkg1
ZXAN(config)#iptv package pkg1 channel channel1 preview
ZXAN(config)#iptv package pkg1 channel channel2 watch
ZXAN(config)#iptv package pkg1 channel channel3 deny
```

12. Configure CAC.

i. Enable global CAC funciton.

```
ZXAN(config)#iptv cac enable
```

Note:

- When CAC is enabled, the user can watch channels only when he has purchased the IPTV package.
- When CAC is disabled, the user can watch channels when he is in the MVLAN receiving port
- CAC is disabled by default.

ii. Configure user port right.

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#iptv package pkg1 vport 2
```

13. Save configuration data.

```
ZXAN(config-if)#end
ZXAN#write
Building configuration...
..[OK]
ZXAN#
```

--End of Steps--

Result

- PC 1 can preview channel1, watch channel2 and channel3.
- PC 2 cannot watch channel1 - channel3.

Configuring F820 IGMP Snooping Multicast Service

Short Description

This section introduces an instance of configuring IGMP snooping multicast service (The ONU in this instance is F820).

Prerequisites

- Make sure that network device works normally.
- Make sure that multicast source exits in the uplink network.
- Make sure that GPON card works normally.
- Make sure that the in-band NM IP address of the ZXA10 C220 is configured.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Background Information

When an ONU is registered on the ZXA10 C220, the OLT creates a multicast service connection automatically.

- Bridge_0/1
- GEM port ID: 1021
- Uplink_0/1/255

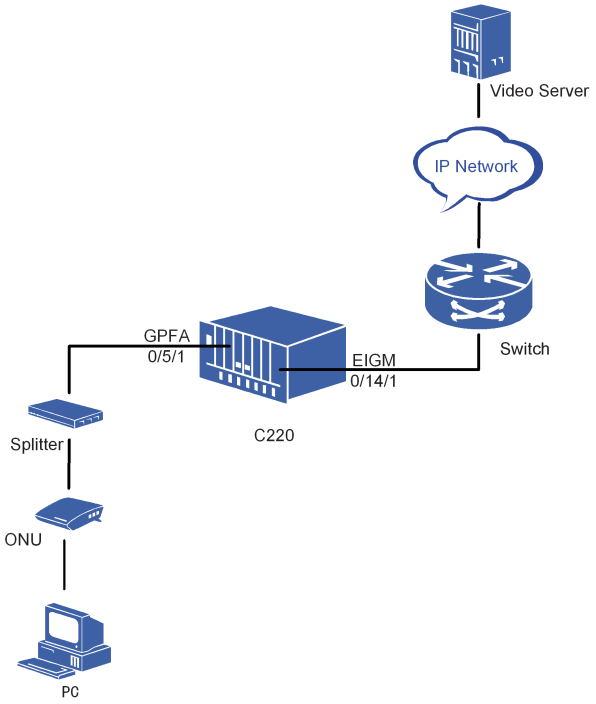
On the ONU, the multicast service connection transmits only multicast service packets and the multicast protocol packets are transmitted in the unicast service connection.

The F820 supports 12 MVLANs and 255 multicast groups.

Networking Diagram

Figure 18 shows the IGMP snooping multicast service networking diagram.

FIGURE 18 IGMP SNOOPING MULTICAST SERVICE NETWORKING DIAGRAM



Configuration Data

Table 12 describes the F820 IGMP snooping multicast service configuration data.

TABLE 12 IGMP SNOOPING MULTICAST SERVICE CONFIGURATION DATA

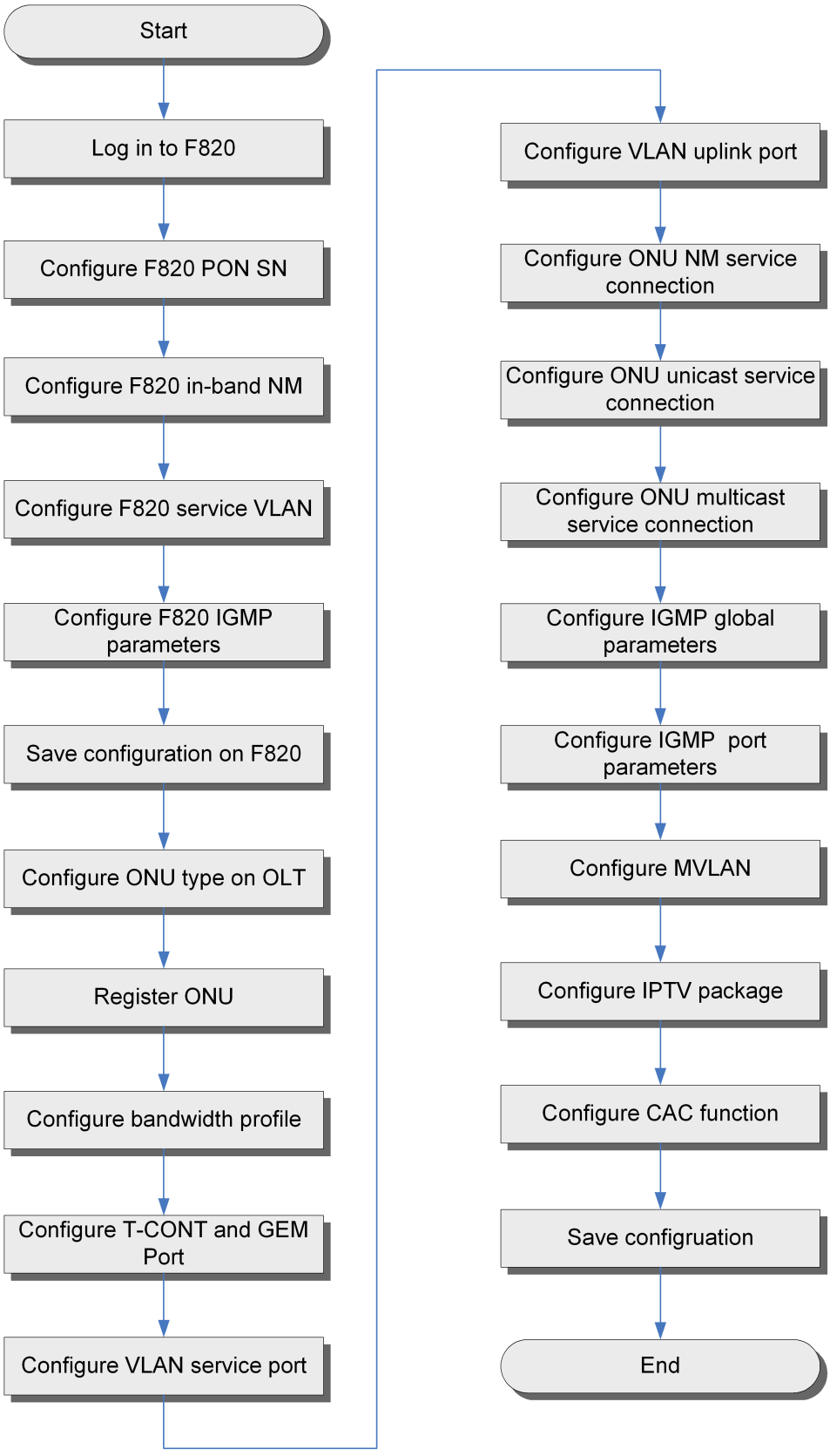
Item	Data
Multicast service VLAN (MVLAN)	▪ VLAN ID: 500 ▪ Priority: 5
Uplink port	0/14/1
IPTV channel	The video server provides three channels with default preview profile: ▪ Channel1: 224.1.1.1 ▪ Channel2: 224.1.1.2 ▪ Channel3: 224.1.1.3
IPTV package	▪ Name: pkg1 ▪ Channel1: preview ▪ Channe2: watch ▪ Channe3: watch
GPON port	0/5/1
Bandwidth profile	Profile name: iptv–tcont
	Bandwidth type: Assured (Type 2)
	Bandwidth: 100 Mbps

T-CONT	▪ T-CONT index: 2 ▪ T-CONT name: iptvtcont ▪ Bandwidth profile: iptv–tcont ▪ Alloc ID: Auto-allocate
GEM port 1	▪ T-CONT index: 2 ▪ GEM Port index: 1 ▪ GEM Port name: NMport ▪ Port ID: Auto-allocate
GEM port 2	▪ T-CONT index: 2 ▪ GEM Port index: 2 ▪ GEM Port name: iptvport ▪ Port ID: Auto-allocate
ONU	▪ ONU ID: 1 ▪ ONU type: F820 ▪ ONU SN: ZTEG9000002B
ONU in-band NM	▪ VLAN ID: 1000 ▪ Priority: 1 ▪ IP address: 10.67.1.11 ▪ Subnet mask: 255.255.255.0 ▪ Gateway: 10.67.1.254
PC	▪ ONU port: fei_0/1/1 ▪ GEM port index: 2 ▪ User VLAN: 21 ▪ MVLAN ID: 500 ▪ Right: Pkg1
ONU NM service connection	▪ GEM port name: NMport ▪ Bridge: 0/1 ▪ Uplink interface: 0/1/1 ▪ Connection type: 802.1p + bridge
ONU unicast service connection	▪ GEM port name: iptvport ▪ UNI: fei_0/1/1 ▪ Bridge: 0/1 ▪ Uplink interface: 0/1/2 ▪ Connection type: 802.1p + bridge

Configuration Flow

Figure 19 shows the F820 IGMP snooping multicast service configuration flowchart.

FIGURE 19 IGMP SNOOPING MULTICAST SERVICE CONFIGURATION FLOWCHART



Steps To configure the IGMP snooping multicast service, perform the following steps:

1. Log in to the F820 through HyperTeminal (username: zte, password: zxr10).
2. Configure GPON SN on the F820.
   i. Query card status.

```
ZXAN#show card
Rack Shelf Slot CfgType RealType Port  HardVer SoftVer         Status
------------------------------------------------------------------------------
0    0     1    MS8E    MS8E     8     V0      V1.0.0T8        INSERVICE
0    0     2    GPUA    GPUA     1                             INSERVICE
0    0     4    V16B    V16B     1                             INSERVICE
```

   ii. Enter global configuration mode and configure GPON SN.

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#pon sn ZTEG9000002B
ZXAN(config)#exit
ZXAN#
```

   iii. Reset GPON card (GPUA card) in slot 2 and wait for 1 minute.

```
ZXAN#reset-card slotno 2
Confirm to reset card?[yes/no]:y
```

3. Configure F820 in-band NM.
   i. Enter VLAN interface configuration mode, configure in-band NM IP address.

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#interface inband-vlan1000
ZXAN(config-if)#ip address 10.67.1.11 255.255.255.0
ZXAN(config-if)#exit
ZXAN(config)#
```

Note:

VLAN 1 – VLAN 4093 are created by default.

The in-band NM IP address should be in the same network segment with the ZXA10 C220.

   ii. Configure in-band NM route.

```
ZXAN(config)#ip route 0.0.0.0 0.0.0.0 10.67.1.254
```

4. Configure service VLAN.

   Configure VLAN service port.

```
ZXAN(config)#interface fei_0/1/1
ZXAN(config-if)#switchport default vlan 21
ZXAN(config-if)#exit
ZXAN(config)#
```

Note:

By default, VLAN 1 – VLAN 4093 exist in F820 and the uplink GPON port is each VLAN.

5. Configure IGMP parameters.
   i. Configure ONU IGMP mode.

```
ZXAN(config)#igmp onu-mode snooping
```

   ii. Configure port IGMP parameters.

```
ZXAN(config)#interface fei_0/1/1
ZXAN(config-if)#igmp mvlan 500
ZXAN(config-if)#igmp fast-leave enable
ZXAN(config-if)#igmp tag-stripe disable
ZXAN(config-if)#igmp mvlan-translate disable
ZXAN(config-if)#end
```

6. Save configuration data.

```
ZXAN#write
Building configuration...
..[OK]
```

7. Configure F820 ONU type on the ZXA10 C220.
   i. Enter the global configuration mode.

```
ZXAN#configure terminal
Enter the configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#
```

   ii. Enter PON configuration mode and configure ONU type.

```
ZXAN(config)#pon
ZXAN(config-pon)#onu-type ZTEG-F820 gpon
```

   iii. Configure ONU port type.

```
ZXAN(config-pon)#onu-type-if ZTEG-F820 eth_0/1-24
ZXAN(config-pon)#exit
ZXAN(config)#
```

8. Register ONU.
   i. Query unconfigured ONU on the GPON-OLT port.

```
ZXAN(config)#show gpon onu uncfg gpon-olt_0/5/1
OnuIndex                 Sn                  State
-------------------------------------------------------------
gpon-onu_0/5/1:1         ZTEG9000002B        unknown
```

   ii. Enter the GPON-OLT interface configuration mode.

```
ZXAN(config)#interface gpon-olt_0/5/1
ZXAN(config-if)#
```

   iii. Register ONU.

```
ZXAN(config-if)#register 1 type ZTEG-F820 ZTEG9000002B state
ready
```

   iv. Query ONU state.

```
ZXAN(config-if)#show gpon onu state gpon-olt_0/5/1
OnuIndex               Admin State  Omcc State   O7 State     Phase State
-------------------------------------------------------------------------
gpon-onu_0/5/1:1       enable       enable       operation    working
ZXAN(config-if)#exit
ZXAN(config)#
```

9. Configure bandwidth profile.
   i. Enter the GPON configuration mode.

```
ZXAN(config)#gpon
ZXAN(config-gpon)#
```

   ii. Configure bandwidth profile.

```
ZXAN(config-gpon)#bandwidth-profile iptv-tcont type 2 assured
100000
```

```
ZXAN(config-gpon)#exit
ZXAN(config)#
```

10. Configure T-CONT and GEM ports.
    - T-CONT (Transmission Container) is the minimum unit of upstream bandwidth scheduling which is identified by Alloc ID.
    - GEM (GPON Encapsulation Method) port is the minimum unit of downstream traffic which is identified by port ID.

    i. Enter the GPON-ONU interface configuration mode.

    ```
    ZXAN(config)#interface gpon-onu_0/5/1:1
    ZXAN(config-if)#
    ```

    ii. Create T-CONT.

    ```
    ZXAN(config-if)#tcont 2 name iptvtcont traffic iptv-tcont
    ```

    iii. Create GEM ports.

    ```
    ZXAN(config-if)#gemport 1 name NMport unicast tcont 2
    ZXAN(config-if)#gemport 2 name iptvport unicast tcont 2
    ZXAN(config-if)#exit
    ZXAN(config)#
    ```

11. Configure VLAN service port.

    i. Enter the GPON-ONU interface configuration mode.

    ```
    ZXAN(config)#interface gpon-onu_0/5/1:1
    ZXAN(config-if)#
    ```

    ii. Configure port mode to hybrid.

    ```
    ZXAN(config-if)#switchport mode hybrid vport 1
    ZXAN(config-if)#switchport mode hybrid vport 2
    ```

    Note:

    By default, one V-port corresponds to one GEM port.

    iii. Add port to NM VLAN, MVLAN and user VLAN in tag mode.

    ```
    ZXAN(config-if)#switchport vlan 1000 tag vport 1
    ZXAN(config-if)#switchport vlan 500 tag vport 2
    ZXAN(config-if)#switchport vlan 21 tag vport 2
    ZXAN(config-if)#exit
    ZXAN(config)#
    ```

    Note:

    When a port is added to a VLAN, the VLAN is added automatically.

12. Configure VLAN uplink port.

    i. Enter the OLT uplink port configuration mode.

    ```
    ZXAN(config)#interface gei_0/14/1
    ```

    ii. Configure uplink port mode to hybrid.

    ```
    ZXAN(config-if)#switchport mode hybrid
    ```

    iii. Add uplink port to MVLAN in tag mode.

    ```
    ZXAN(config-if)#switchport vlan 500 tag
    ```

```
ZXAN(config-if)#exit
ZXAN(config)#
```

13. Configure ONU NM service connection.
    i. Enter the ONU remote management mode.

```
ZXAN(config)#pon-onu-mng gpon-onu_0/5/1:1
ZXAN(gpon-onu-mng)#
```

    ii. Configure the map between GEM port and uplink interface.

```
ZXAN(gpon-onu-mng)#interwork gemport NMport dot1p-bridge uplink_
0/1/1 prio-list 1
```

    iii. Configure VLAN filter mode on uplink interface.

```
ZXAN(gpon-onu-mng)# vlan-filter-mode uplink uplink_0/1/1 tag-
filter vid-filter untag-filter discard
```

    iv. Configure VLAN filter entry on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/1 priority 1
vid 1000
```

14. Configure ONU unicast service connection.
    i. Configure the map between GEM port and uplink interface.

```
ZXAN(gpon-onu-mng)#interwork gemport iptvport dot1p-bridge up
link_0/1/2 prio-list 1
```

    ii. Configure VLAN filter mode on uplink interface.

```
ZXAN(gpon-onu-mng)# vlan-filter-mode uplink uplink_0/1/2 tag-
filter vid-filter untag-filter discard
```

    iii. Configure VLAN filter entry on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/2 priority 5
vid 21
```

15. Configure ONU multicast service connection.
    i. Configure VLAN filter mode on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter-mode uplink uplink_0/1/255 tag-
filter vid-filter untag-filter discard
```

    ii. Configure VLAN filter entry on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/255 priority
5 vid 50
```

16. Configure IGMP global parameters.

    Enable global IGMP and IGMP span-VLAN functions.

```
ZXAN(config)#igmp enable
ZXAN(config)#igmp span-vlan enable
```

    This instance uses the default values for other IGMP global parameters. To configure IGMP global parameters, refer to Configuring IGMP Global Parameters.

    Note:

    When user VLAN is different from MVLAN, the span-VLAN function must be enabled.

17. Configure IGMP port parameters.

    Enable fast-leave function.

```
ZXAN(config)#interface gpon-onu_0/5/1:1
```

```
ZXAN(config-if)#igmp fast-leave enable vport 2
ZXAN(config-if)#exit
```

This instance uses the default values for other IGMP port parameters. To configure IGMP port parameters, refer to Configuring IGMP Port Parameters.

18. Configure MVLAN.
    i. Configure MVLAN.

    ```
    ZXAN(config)#igmp mvlan 500
    ```

    ii. Configure MVLAN working mode.

    ```
    ZXAN(config)#igmp mvlan 500 work-mode snooping
    ```

    Note:

    The default IGMP mode of the system is IGMP snooping.

    iii. Configure multicast groups.

    ```
    ZXAN(config)#igmp mvlan 500 group 224.1.1.1
    ZXAN(config)#igmp mvlan 500 group 224.1.1.2
    ZXAN(config)#igmp mvlan 500 group 224.1.1.3
    ```

    Configure batch multicast groups (optional).

    ```
    ZXAN(config)#igmp mvlan 500 group 224.3.4.1 to 224.3.4.10
    ```

    iv. Configure source port.

    ```
    ZXAN(config)#igmp mvlan 500 source-port gei_0/14/1
    ```

    v. Configure receiving port.

    ```
    ZXAN(config)#igmp mvlan 500 receive-port gpon-onu_0/5/1:1 vport 2
    ```

19. Configure IPTV package.
    i. Configure IPTV channel.

    ```
    ZXAN(config)#iptv channel mvlan 500 group 224.1.1.1 name channel1
    ZXAN(config)#iptv channel mvlan 500 group 224.1.1.2 name channel2
    ZXAN(config)#iptv channel mvlan 500 group 224.1.1.3 name channel3
    ```

    Configure batch IPTV channels (optional).

    ```
    ZXAN(config)#iptv channel mvlan 500 group 224.3.4.1 to 224.3.4.10
    prename xxtv
    ```

    ii. Configure preview profile (optional).

    ```
    ZXAN(config)#iptv view-profile test count 3 duration 120 blackout
    60
    ```

    iii. Apply preview profile to IPTV channel (optional).

    ```
    ZXAN(config)#iptv channel channel1 view-profile test
    ```

    Note:

    The default view profile of IPTV channel is DEFVAL.PRF.

    iv. Configure IPTV package.

    ```
    ZXAN(config)#iptv package name pkg1
    ZXAN(config)#iptv package pkg1 channel channel1 preview
    ZXAN(config)#iptv package pkg1 channel channel2 watch
    ZXAN(config)#iptv package pkg1 channel channel3 deny
    ```

20. Configure CAC.

    i. Enable global CAC function.

```
ZXAN(config)#iptv cac enable
```

> **Note:**
> - When CAC is enabled, the user can watch channels only when he has purchased the IPTV package.
> - When CAC is disabled, the user can watch channels when he is in the MVLAN receiving port
> - CAC is disabled by default.

    ii. Configure user port right.

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#iptv package pkg1 vport 2
```

21. Save configuration data.

```
ZXAN(config-if)#end
ZXAN#write
Building configuration...
..[OK]
ZXAN#
```

--End of Steps--

Result The PC can preview channel1, watch channel2 and channel3.

Configuring IGMP Global Parameters

Short Description Perform this procedure to configure IGMP global parameters.

Prerequisites
- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context Table 13 describes ranges and default values of IGMP global parameters.

TABLE 13 IGMP GLOBAL PARAMETERS

Parameters	Ranges	Default values
IGMP protocol	Enable, disable	Enable
IGMP snooping aging time	30 - 3600, unit: sec	300
IGMP proxy general query interval	10 - 300, unit: sec	125
IGMP proxy maximum query response time	10 - 250, unit: 0.1 sec	100

Parameters	Ranges	Default values
IGMP proxy last member query interval	1 - 255, unit: 0.1 sec	10
IGMP proxy last member query counts	2 - 5	2
IGMP proxy unsolicited report interval	1 - 60, unit: sec	10
IGMP proxy robustness	1 - 5	2
Log function	Enable, disable	Disable
Host tracking function	Enable, disable	Disable
Bandwidth control function	Enable, disable	Disable
Span VLAN function	Enable , disable	Enable
CVLAN forward function	Enable, disable	Disable
Non-matched group process mode	Forward, drop	Forward
IGMP version mode	To accept/drop/ignore IGMP packets	Accept

To configure the IGMP global parameters, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **igmp enable** command to enable global IGMP protocol.
3. Use the **igmp snooping-aging-time** command to configure IGMP snooping aging time.
4. Use the **igmp query-interval** command to configure IGMP proxy general query interval.
5. Use the **igmp query-max-resp** command to configure IGMP proxy maximum query response time
6. Use the **igmp last-query-interval** command to configure IGMP proxy last member query interval.
7. Use the **igmp last-query-count** command to configure IGMP poxy last member query counts.
8. Use the **igmp unsolicited-report-interval** command to configure IGMP unsolicited report interval.
9. Use the **igmp robustness** command to configure IGMP proxy robustness.
10. Use the **igmp log enable** command to enable log function.
11. Use the **igmp host-tracking** command to enable host tracking function.
12. Use the **igmp bandwidth-control** command to enable bandwidth control function.

Note:

When bandwidth control is enabled, if the user multicast bandwidth exceeds the present left bandwidth, the user join request is turned down.

13. Use the **igmp span-vlan** command to enable span VLAN function.
14. Use the **igmp forward-cvlan** command to enable CVLAN forward function.
15. Use the **igmp non-match-group** command to configure unmatched group process mode.
16. Use the **igmp version-mode** command to configure the IGMP packets process mode in IGMP v1/v2/v3.
17. Use the **show igmp** command to query IGMP global configuration.

END OF STEPS

Example Configure and query IGMP global parameters.

- Snooping aging time: 100 seconds
- Bandwidth control: Enable
- Span VLAN: Enable
- Other parameters: Default values

```
ZXAN#configure terminal
Enter the configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#igmp enable
ZXAN(config)#igmp snooping-aging-time 100
ZZXAN(config)#igmp bandwidth-control enable
ZXAN(config)#igmp span-vlan enable
ZXAN(config)#igmp forward-cvlan enable
ZXAN(config)#igmp non-match-group drop
ZXR10(config)#show igmp
IGMP global parameters:
-------------------------------------------------
IGMP is globally enable.
IGMP v1 mode is accept.
IGMP v2 mode is accept.
IGMP v3 mode is accept.
IGMP log is enable.
Snooping aging time is 100 seconds.
Span vlan is enable.
Forward cvlan is enable.
Bandwidth control is enable.
Host tracking is enable.
Robustness variable is 2.
General query interval is 125(second).
Query max response time is 100(0.1second).
Last member query interval is 10(0.1second).
Last member query count is 4.
Unsolicited report interval is 10 seconds.
Non match group is drop.
```

Configuring IGMP Port Parameters

Short Description Perform this procedure to configure IGMP port parameters.

Prerequisites

- Make sure that the network device works normally.
- ONU is registered.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context Table 14 describes ranges and default values of IGMP port parameters.

TABLE 14 IGMP INTERFACE PARAMETERS

Parameters	Ranges	Default values
IGMP protocol	Enable , disable	Enable
IGMP fast-leave	Enable , disable	Disable
IGMP proxy general query interval	10 ~ 300, unit: sec	125
IGMP proxy maximum query response interval	10 ~ 250, unit: 0.1 sec	100
IGMP proxy last member query interval	1 ~ 255, unit: 0.1 sec	10
IGMP proxy last member query counts	2 ~ 5	2
IGMP proxy robustness	1 ~ 5	2
IGMP maximum group number	0 ~ 4096	512
IGMP version	v1v2v3	v2
IGMP proxy IP address	-	192.168.2.14

To configure the IGMP port parameters, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **interface** command to enter GPON-ONU interface configuration mode.
3. Use the **igmp enable** command to enable interface IGMP protocol.
4. Use the **igmp fast-leave** command to configure IGMP fast-leave function.
5. Use the **igmp query-interval** command to configure IGMP proxy general query interval.

6. Use the **igmp query-max-resp** command to configure IGMP proxy maximum query response time.
7. Use the **igmp last-query-interval** command to configure IGMP proxy last member query interval.
8. Use the **igmp last-query-count** command to configure IGMP proxy last member query count.
9. Use the **igmp max-groups** command to configure IGMP maximum group number.
10. Use the **igmp version** command to configure IGMP version.
11. Use the **show igmp interface** command to query IGMP interface configuration.

END OF STEPS

Example Configure and query IGMP port parameters.

- IGMP: Enable
- Fast–leave: Enable
- Maximum group number: 32
- Proxy IP address: 10.63.196.50
- Other parameters: Default values

```
ZXAN#configure terminal
Enter the configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#igmp enable
ZXAN(config-if)#igmp fast-leave enable
ZXAN(config-if)#igmp max-groups 32
ZXAN(config-if)#igmp proxy-ip 10.63.196.50
ZXAN(config-if)#show igmp interface gpon-onu_0/5/1:1
IGMP interface gpon-onu_0/5/1:1 vport 1 parameters:
----------------------------------------------------
IGMP status is enable.
IGMP version is v2.
Fast leave is enable.
Max concurrent group num is 32.
proxyip is 10.63.196.50.
Robustness variable is 2.
General query interval is 125(second).
Query max response time is 100(0.1second).
Last membership query interval is 10(0.1second).
Last membership query count is 2.
```

Configuring MVLAN

Short Description Perform this procedure to configure MVLAN parameters.

Prerequisites

- Make sure that the network device works normally.
- Make sure that the multicast source exits in the uplink network.
- Make sure that the data service is configured.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context To configure the MVLAN parameters, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **igmp mvlan** command to configure MVLAN
3. Configure MVLAN groups process mode.

   Use the **igmp mvlan enable** command to configure that the MVLAN processes multicast packets with IGMP protocol.

   Use the **igmp mvlan disable** command to configure that the MVLAN transparently transmits multicast packets.
4. Use the **igmp mvlan work-mode** command to configure MVLAN work mode.

   Note:

   In IGMP snooping mode, pre-join and static join functions are invalid.

5. Use the **igmp mvlan group** command to configure MVLAN group
6. Use the **igmp mvlan group-filter** command to configure MVLAN group management.

   Note:

   - When MVLAN group management is enabled, IGMP join packets must check whether the group is configured. The configured group is management group.
   - When MVLAN group management is disabled, IGMP join packets do not check whether the group is configured. The learned group is dynamic group.
   - When span-VLAN is enabled, MVLAN group-filter must be enabled.

7. Use the **igmp mvlan group bandwidth** command to configure multicast bandwidth.
8. Use the **igmp mvlan max-group** command to configure MVLAN maximum group number.
9. Use the **igmp mvlan group pre-join** command to configure pre-join function.
10. Use the **igmp mvlan source-port** command to configure MVLAN source port.
11. Use the **igmp mvlan receive-port** command to configure MVLAN receiving port.
12. Use the **igmp mvlan static-port** command to configure MVLAN static receiving port.
13. Use the **igmp mvlan host-ip** command configure MVLAN proxy IP address in IGMP proxy mode.

14. Use the **igmp mvlan group** command to query MVLAN configuration.

END OF STEPS

Example

Configure MVLAN 10.

- IGMP: Enable
- IGMP work mode: Proxy
- Group IP address: 224.1.1.1 - 224.1.1.10
- Group filter: Enable
- Maximum group number: 16
- Source port: 1/21/1
- Receiving port: 1/5/1:1
- Proxy host IP address: 10.63.196.50

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#igmp mvlan 10
ZXAN(config)#igmp mvlan 10 enable
ZXAN(config)#igmp mvlan 10 work-mode proxy
ZXAN(config)#igmp mvlan 10 group 224.1.1.1 to 224.1.1.10
ZXAN(config)#igmp mvlan 10 group-filter enable
ZXAN(config)#igmp mvlan 10 max-group 16
ZXAN(config)#igmp mvlan 10 source-port gei_1/21/1
ZXAN(config)#igmp mvlan 10 receive-port gpon-onu_1/5/1:1 vport 1
ZXAN(config)#igmp mvlan 10 host-ip 10.63.196.50
ZXAN(config)#show igmp mvlan 10
Protocol packet's priority is 0 (in proxy/router mode).
Source Port
----------------------------
gei_1/21/1

Receive Port
----------------------------
gpon-onu_1/5/1:1:1

Group
----------------------------
224.1.1.1 - 224.1.1.10
```

Configuring IPTV Package

Short Description

Perform this procedure to configure IPTV package.

Prerequisites

- Make sure that the network device works normally.
- Make sure that the multicast source exits in the uplink network.
- Make sure that the MVLAN is configured.
- Log in to ZXA10 C220 through HyperTerminal or Telnet.

Context

To configure the IPTV package, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **iptv channel mvlan group** command to configure IPTV channels.

3. Use the **iptv view-profile** command to configure preview profile

   Table 15 describes preview profile parameters.

TABLE 15 PREVIEW PROFILE PARAMETERS

Parameter	Range	Default value
Preview count (count)	1 - 100	3
Preview duration (duration)	1 - 6000, unit: sec	120
Preview interval (blackout)	1 - 7200, unit: sec	60

4. Use the **iptv channel view-profile** command to apply preview profile to channel.
5. Use the **iptv packgae name** command to create IPTV package.
6. Use the **iptv packgae channel** command to configure IPTV package channels.

END OF STEPS

Example Configure an IPTV package:

- Name: stv
- Channel: stv1 - stv10, IP address 224.1.1.1 - 224.1.1.10
- Preview profile
  - Name: abc
  - Preview count: 3
  - Preview duration: 120 seconds
  - Preview interval: 60 seconds
- Channel right
  - Preview: stv1 - stv4
  - Watch: stv6 - stv 9
  - Deny: stv10

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#iptv channel mvlan 10 group 224.1.1.1 to 224.1.1.10 pre
name stv
ZXAN(config)#iptv view-profile abc count 3 duration 120 blackout 60
ZXAN(config)#iptv channel stv1 view-profile abc
ZXAN(config)#iptv channel stv2 view-profile abc
ZXAN(config)#iptv channel stv3 view-profile abc
ZXAN(config)#iptv channel stv4 view-profile abc
ZXAN(config)#iptv channel stv5 view-profile abc
ZXAN(config)#iptv package name stv
ZXAN(config)#iptv package stv channel stv1 preview
ZXAN(config)#iptv package stv channel stv2 preview
ZXAN(config)#iptv package stv channel stv3 preview
ZXAN(config)#iptv package stv channel stv4 preview
ZXAN(config)#iptv package stv channel stv5 preview
ZXAN(config)#iptv package stv channel stv6 watch
```

```
ZXAN(config)#iptv package stv channel stv7 watch
ZXAN(config)#iptv package stv channel stv8 watch
ZXAN(config)#iptv package stv channel stv9 watch
ZXAN(config)#iptv package stv channel stv10 deny
```

Configuring CAC

Short Description

Perform this procedure to configure CAC.

Prerequisites

- Make sure that the network device works normally.
- Make sure that the data service is configured.
- Make sure that theIPTV package is configured.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

To configure the CAC, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **iptv cac** command to enable global CAC function.
3. Use the **interface** command to enter the GPON-ONU interface configuration mode.
4. Use the **iptv service start** command to start IPTV service on the interface.
5. Use the **iptv right-mode** command to enable or disable the authentication on the interface.

   Note:

   By default, the authentication enabled.

6. Use the **iptv-mode** command to configure interface right mode.

   Note:

   The default right mode is package.

7. Configure interface right.

   Use the **iptv channel** command to configure the interface channel.

   Use the **iptv package** command to configure the interface package.

Note:

The default right mode is package.

When a package is applied to an interface, the IPTV service is started automatically.

END OF STEPS

Example

Configure CAC parameters:

- GPON-ONU port: 0/5/1:1
- Global CAC function: Enable
- ONU CAC right mode: package
- ONU IPTV package: pkg1

```
ZXAN#configure terminal
Enter the configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#iptv cac enable
ZXAN(config)#interface epon-onu_0/5/1:1
ZXAN(config-if)#iptv right-mode package
ZXAN(config-if)#iptv package pkg1 vport 1
```

Configuring CDR Parameters

Short Description

Perform this procedure to configure CDR parameters.

Prerequisites

- Make sure network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

Table 16 describes ranges and default values of CDR global parameters.

TABLE 16 CDR GLOBAL PARAMETERS

Parameter	Range	Default Value
CDR	Enable, disable	Disable
CDR deny-right	Enable, disable	Disable
CDR prw-right	Enable, disable	Enable
CDR prw-over-count	Enable, disable	Disable
CDR create-period	0 - 1440, 0 for no CDR report, unit: min	1
Max-records	500 - 65535	1000

Report-interval	1 - 30, unit: min	1
Report-threshold	300 - 65535	300

To configure the CDR parameters, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **iptv cdr enable** command to enable global CDR function.
3. Use the **iptv cdr max-records** command to configure CDR maximum records.
4. Use the **iptv cdr report** command to report CDR manually.
5. Use the **iptv cdr report-interval** command to configure CDR automatic report interval.
6. Use the **iptv cdr report-threshold** command to configure CDR automatic report threshold.
7. Use the **iptv cdr create-period** command to configure CDR generating period.
8. Use the **iptv cdr deny-right** command to enable or disable CDR function when user right is deny.
9. Use the **iptv cdr prw-right** command to enable or disable CDR function when user right is preview.
10. Use the **iptv cdr prw-overcount** command to enable or disable CDR function when user preview count is over limit.
11. Use the **iptv cdr clear** command to clear CDR record.
12. Use the **show iptv cdr** command to query CDR configuration.

END OF STEPS

Example

Configure and query CDR parameters:

- Global CDR function: Enable
- Maximum records: 1000
- Report threshold: 300
- Other parameters: Default values

```
ZXAN#configure terminal
Enter the configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#iptv cdr enable
ZXAN(config)#iptv cdr max-records 1000
ZXAN(config)# iptv cdr report-threshold 300
ZXAN(config)#show iptv cdr
CDR                 : enable
CDR current-state   : idle
CDR socket-status   : close
CDR deny-right      : disable
CDR prw-right       : enable
CDR prw-over-count  : disable
CDR create-period   : 1(minute)
Max-records         : 1000
Report-interval     : 1(minute)
Report-threshold    : 300
Records in cache    : 0
```

Chapter 5

CES Service Configuration

Table of Contents

Overview

Service Description

CES implements circuit-switched service through Ethernet or the IP network.

At present, there are two implementation agreements supporting CES:

- MEF8: Circuit simulation through Ethernet
- PWE3: Circuit simulation through the IP network

Service Specification

ZXA10 C220 is uplink to TDM or SDH/SONET network with CE1B/CT1B or CL1A card respectively. The E1 user is connected to the system through an ONU.

ZXA10 C220 supports uplink modes:

- E1/T1: CE1B/CT1B card
- STM-1/OC-3: CL1A card

Configuring E1/T1 Uplink CES MEF8 Service

Short Description

This section introduces an instance of configuring E1/T1 uplink CES service based on Ethernet.

Prerequisites

- Make sure that the network device works normally.
- The GPON card and CE1B/CT1B card work normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Background Information

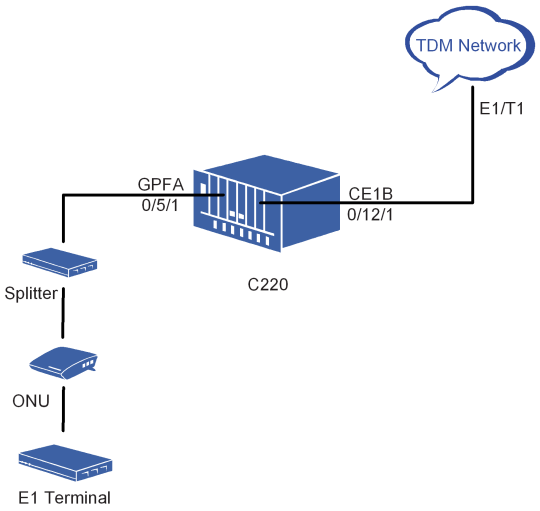
F820 supports both MEF8 CES service and PWE3 CES service.

F621 supports only MEF8 CES service.

Networking Diagram

Figure 20 shows the E1/T1 uplink CES service networking diagram.

FIGURE 20 MEF8 CES SERVICE NETWORKING DIAGRAM



Configuration Data

Table 17 describes the E1/T1 uplink MEF8 CES service configuration data.

TABLE 17 E1/T1 UPLINK MEF8 CES SERVICE CONFIGURATION DATA

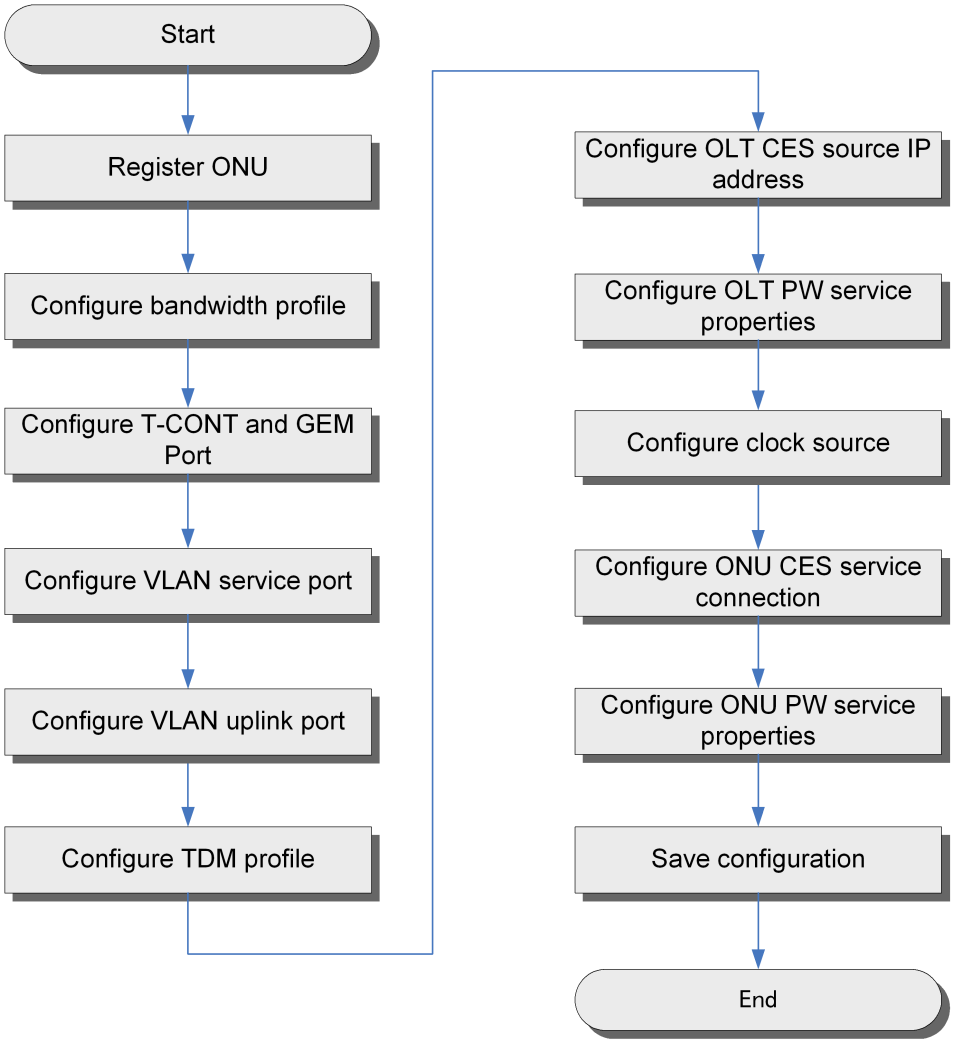
Item	Data
CES service VLAN	▪ VLAN ID: 4001 ▪ Priority: 7
Uplink port	0/12/1
GPON port	0/5/1
Bandwidth profile	Profile name: ces-tcont
	Bandwidth type: Fixed (Type 1)
	Bandwidth: 10 Mbps
T-CONT	▪ T-CONT index: 2 ▪ T-CONT name: cestcont ▪ Bandwidth profile: ces–tcont ▪ Alloc ID: Auto-allocate
GEM port	▪ T-CONT index: 2 ▪ GEM Port index: 1 ▪ GEM Port name: cesport ▪ Port ID: Auto-allocate

Item	Data
ONU	▪ ONU ID: 1 ▪ ONU authentication mode: SN ▪ ONU type: F621 ▪ ONU SN: ZTEG80000001
ONU CES service connection	▪ GEM port name: cesport ▪ Bridge: 0/1 ▪ Uplink interface: 0/1/1 ▪ Connection type: 802.1p + bridge
TDM profile	Default
OLT CES MAC address	0015.EB72.001A
ONU CES MAC address	0015.EB72.0001
PW service	▪ Type: e1Satop ▪ Transmit ECID: 0x1102 ▪ Receive ECID: 0x1102
Clock source	Adaptive (default)

Configuration Flow

Figure 21 shows the CES service configuration flowchart.

FIGURE 21 MEF8 CES SERVICE CONFIGURATION FLOWCHART



Steps

To configure the CES service, perform the following steps:

1. Register ONU.
   i. Query unconfigured ONU under GPON-OLT port.

```
ZXAN#show gpon onu uncfg gpon-olt_0/5/1
OnuIndex                  Sn                  State
-------------------------------------------------------------
gpon-onu_0/5/1:1          ZTEG80000001        unknown
```

   ii. Enter the GPON-OLT interface configuration mode.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gpon-olt_0/5/1
ZXAN(config-if)#
```

   iii. Register ONU.

```
ZXAN(config-if)#register 1 type ZTE-F621 ZTEG80000001 state ready
```

   iv. Query ONU state.

```
ZXAN(config-if)#show gpon onu state gpon-olt_0/5/1
```

```
OnuIndex               Admin State  Omcc State   O7 State     Phase State
-------------------------------------------------------------------------------
gpon-onu_0/5/1:1       enable       enable       operation    working
ZXAN(config-if)#exit
ZXAN(config)#
```

2. Configure bandwidth profile.
   i. Enter the GPON configuration mode.

```
ZXAN(config)#gpon
ZXAN(config-gpon)#
```

   ii. Configure bandwidth profile.

```
ZXAN(config-gpon)#bandwidth-profile ces-tcont type 1 fixed 10000
```

3. Configure T-CONT and GEM port.
   - T-CONT (Transmission Container) is the minimum unit of upstream bandwidth scheduling which is identified by Alloc ID.
   - GEM port is the minimum unit of downstream traffic which is identified by port ID.

   i. Enter the GPON-ONU interface configuration mode.

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

   ii. Create T-CONT.

```
ZXAN(config-if)#tcont 2 name cestcont traffic ces-tcont
```

   iii. Create GEM port.

```
ZXAN(config-if)#gemport 1 name cesport unicast tcont 2
ZXAN(config-if)#exit
ZXAN(config)#
```

4. Configure VLAN service port.
   i. Enter the GPON-ONU interface configuration mode

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

   ii. Configure port mode to hybrid.

```
ZXAN(config-if)#switchport mode hybrid vport 1
```

   iii. Add port to service VLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 4001 tag vport 1
```

> **Note:**
>
> When a port is added to a VLAN, the VLAN is added automatically.

5. Configure VLAN uplink port.
   i. Enter the TDM interface configuration mode.

```
ZXAN(config)#interface tdm-gei_0/12/1
ZXAN(config-if)
```

   ii. Configure port VLAN mode.

```
ZXAN(config-if)#switchport mode hybrid
```

   iii. Add port to VLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 4001 tag
```

```
ZXAN(config-if)#exit
ZXAN(config)#
```

6. Configure TDM profile.

   This instance uses the default TDM profile. To configure a TDM profile, use the **tdm-profile** command in the CES configuration mode.

7. Configure CES source MAC address.

   i. Enter the CES configuration mode.

   ```
   ZXAN(config)#ces
   ZXAN(config-ces)#
   ```

   ii. Configure CES source MAC address.

   ```
   ZXAN(config-ces)#mac-address 0015.eb72.001a 12/1
   ```

   iii. Query CES global properties.

   ```
   ZXAN(config-ces)#show ces global-prop
   slot/port      sourceMac           source IP
   ------------------------------------------------------
   12/1            0015.eb72.001a      192.192.192.2
   ```

8. Configure OLT PW service.

   i. Enter the PW configuration mode.

   ```
   ZXAN(config-ces)#pw pw_0/12/1
   ZXAN(config-ces-pw)#
   ```

   ii. Configure TDM properties of PW service.

   ```
   ZXAN(config-ces-pw)#tdm-service type e1Satop rate 32 tdm_0/12/1
   ```

   Note:

   - CE1B TDM service type: e1Satop
   - CT1B TDM service type: t1Satop

   iii. Configure PSN properties of PW service.

   ```
   ZXAN(config-ces-pw)#psn ethernet 0x1102 0x1102 dst-mac 0015.eb72.
   0001 vlan 4001 priority 7
   ```

   Note:

   The *in-ecid* and *out-ecid* must be consistent with the *out-eci* and *in-ecid* of the ONU.

   The *in-ecid* and *out-ecid* of each PW must be different.

   iv. Query PW service configuration.

   ```
   ZXAN(config-ces-pw)#show ces pw prop detail pw_0/12/1

   pw pw_0/12/1
   PwType :       e1Satop              PsnType :     ethernet
   InboundLable : 0x1102               OutboundLable :0x1102
   Admin-status : enable

   Service prop:
   Using tdm interface: tdm_0/12/1
   TDM-prop profile:    default
   ```

```
You can see detail profile info. by using corresponding 'show'
command.

Psn prop:
Destination Mac Address:   0015.EB72.0001
Vlan ID:                   4001    priority: 7

Card prop:
Card interface :    12/1
Source Mac Address: 0015.EB72.001A
Source IP Address : 192.192.192.24
```

9. Configure clock source mode.

   This instance use the default clock source mode.

10. Configure ONU CES service connection.

    i. Enter the ONU remote management mode.

    ```
    ZXAN(config)#pon-onu-mng gpon-onu_0/5/1:1
    ZXAN(gpon-onu-mng)#
    ```

    ii. Configure the map between GEM port and uplink interface.

    ```
    ZXAN(gpon-onu-mng)#interwork gemport cesport dot1p-bridge up
    link_0/1/1 prio-list 7
    ```

    iii. Configure VLAN filter mode on uplink interface.

    ```
    ZXAN(gpon-onu-mng)# vlan-filter-mode uplink uplink_0/1/1 tag-
    filter vid-filter untag-filter discard
    ```

    iv. Configure VLAN filter entry on uplink interface.

    ```
    ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/1 priority 7
    vid 4001
    ```

11. Configure ONU PW service.

    i. Configure PSN properties of PW service.

    ```
    ZXAN(gpon-onu-mng)#pw psn ethernet ces_0/1 bridge bridge_0/1
    dst-mac 0015.eb72.001a loopback disable tx-payload-ecid 0x1102
    tx-signalling-ecid 0x0 expected-payload-ecid 0x1102 expected-
    signalling-ecid 0x0 tag-policy tag prio 7 vid 4001
    ```

    ii. Configure RTP properties of PW service.

    ```
    ZXAN(gpon-onu-mng)#pw rtp ces_0/1 payload-ssrc 3 signalling-
    ssrc 0 payload-ptype 97 signalling-ptype 0 expected-payload-
    ssrc 3 expected-signalling-ssrc 0 expected-payload-ptype 97
    expected-signalling-ptype 0 clock-reference 1 rtp-ts-mode dif
    ferential
    ```

    Note:

    - **rtp**: RTP is enabled.
    - **rtp-ts-mode** corresponds to **timestamp mode** of the OLT.
    - It is recommended to use the default values for other parameters.

    iii. Configure TDM properties of PW service.

    ```
    ZXAN(gpon-onu-mng)#pw tdm ces_0/1 payloadsize 32 payload-delay
    2 timing-mode adaptive-timing
    ```

12. Save configuration data.

    ```
    ZXAN(gpon-onu-mng)#end
    ZXAN#write
    ```

```
Building configuration...
..[OK]
```

--End of Steps--

Result The CES service is configured successfully.

Configuring E1/T1 Uplink PWE3 CES Service

Short Description This section introduces an instance of configuring E1/T1 uplink CES service based on the IP network.

Prerequisites

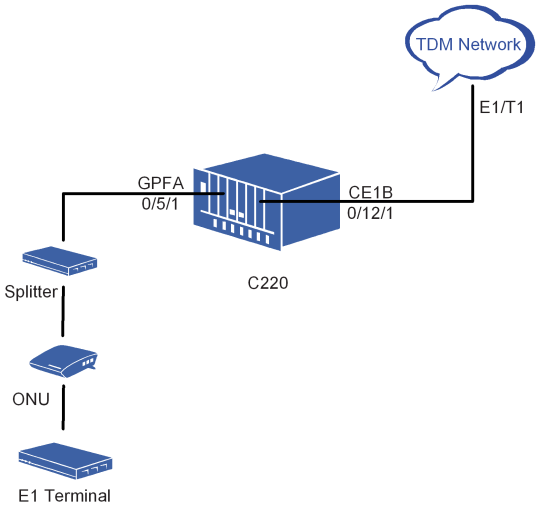
- Make sure that the network device works normally.
- Make sure that the GPON card and CE1B/CT1B card work normally.
- Make sure that the in-band NM IP address of the ZXA10 C220 is configured.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Background Information F820 supports both MEF8 CES service and PWE3 CES service.

F621 supports only MEF8 CES service.

Networking Diagram Figure 22 shows the E1/T1 uplink CES service networking diagram.

FIGURE 22 E1/T1 UPLINK CES SERVICE NETWORKING DIAGRAM



Configuration Data Table 18 describes the E1/T1 uplink PWE3 CES service configuration data.

TABLE 18 PWE3 CES SERVICE CONFIGURATION DATA

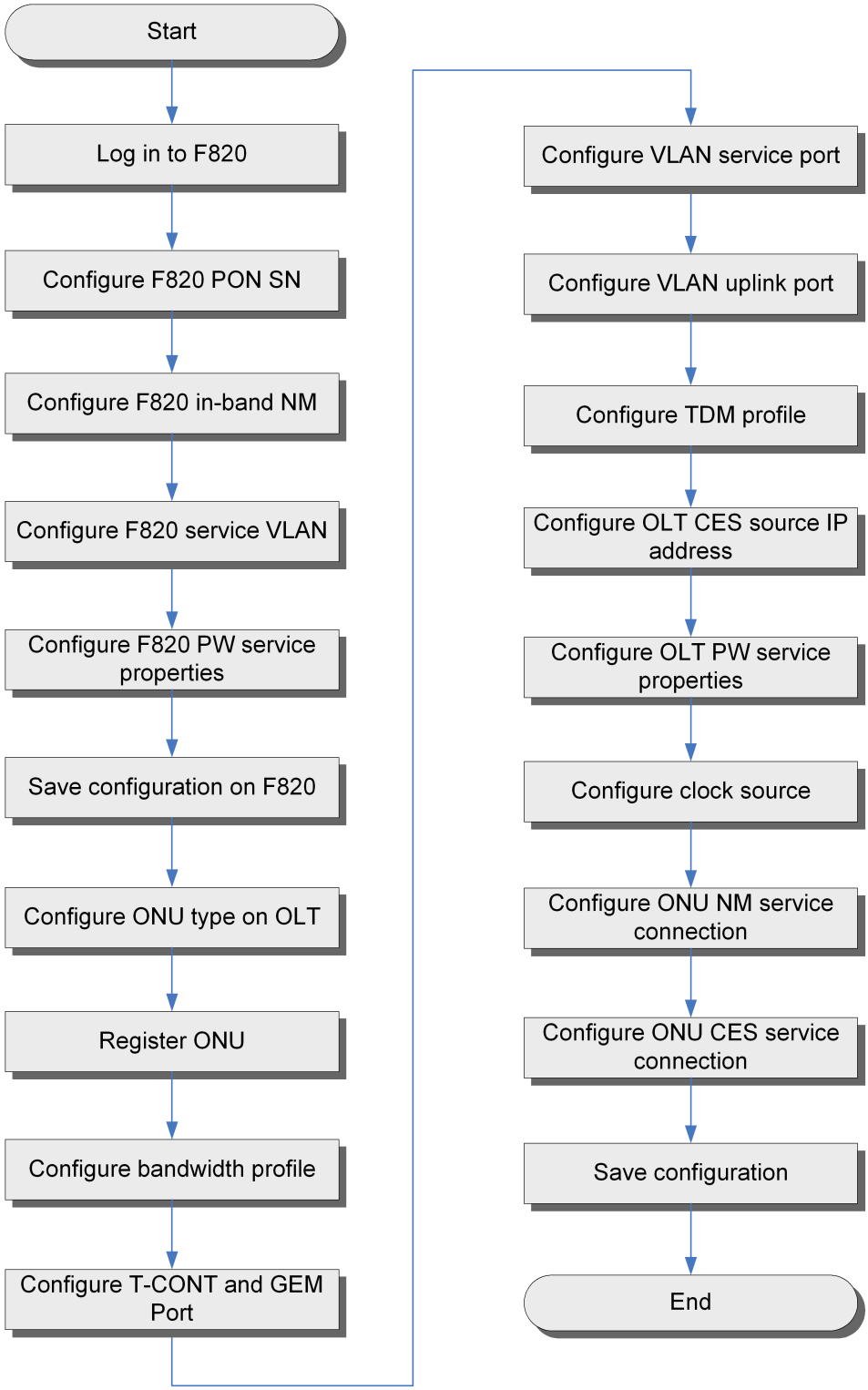
Item	Data
CES service VLAN	▪ VLAN ID: 4001 ▪ Priority: 7
Uplink port	0/12/1
GPON port	0/5/1
Bandwidth profile	Profile name: ces–tcont
	Bandwidth type: Fixed (Type 1)
	Bandwidth: 10 Mbps
T-CONT	▪ T-CONT index: 2 ▪ T-CONT name: cestcont ▪ Bandwidth profile: ces–tcont ▪ Alloc ID: Auto-allocate
GEM port 1	▪ T-CONT index: 2 ▪ GEM Port index: 1 ▪ GEM Port name: NMport ▪ Port ID: Auto-allocate
GEM port 2	▪ T-CONT index: 2 ▪ GEM Port index: 2 ▪ GEM Port name: cesport ▪ Port ID: Auto-allocate
ONU	▪ ONU ID: 1 ▪ ONU authentication mode: SN ▪ ONU type: F820 ▪ ONU SN: ZTEG9000002B
ONU in-band NM	▪ VLAN ID: 1000 ▪ Priority: 1 ▪ IP address: 10.67.1.11 ▪ Subnet mask: 255.255.255.0 ▪ Gateway: 10.67.1.254
ONU NM service connection	▪ GEM port name: NMport ▪ Bridge: 0/1 ▪ Uplink interface: 0/1/1 ▪ Connection type: 802.1p + bridge
ONU CES service connection	▪ GEM port name: cesport ▪ Bridge: 0/1 ▪ Uplink interface: 0/1/2 ▪ Connection type: 802.1p + bridge
TDM profile	Default
OLT CES IP address	120.1.1.1
OLT CES MAC address	0015.EB72.001A
ONU CES IP address	120.1.1.100

Item	Data
ONU CES MAC address	0015.EB72.0001
PW service	▪ PW ID: 0/12/1 ▪ Type: e1Satop ▪ Source UDP port: 1234 ▪ Destination UDP port: 1234
Clock source	Adaptive (default)

Configuration Flow

Figure 23 shows the E1/T1 uplink PWE3 CES service configuration flowchart.

FIGURE 23 PWE3 CES SERVICE CONFIGURATION FLOWCHART



Steps To configure the CES service, perform the following steps:

1. Log in to the F820 through HyperTeminal (username: zte, password: zxr10).
2. Configure GPON SN on the F820.

i. Query card status.

```
ZXAN#show card
Rack Shelf Slot CfgType RealType Port  HardVer SoftVer         Status
------------------------------------------------------------------------------
0    0     1    MS8E    MS8E     8     V0      V1.0.0T8        INSERVICE
0    0     2    GPUA    GPUA     1                             INSERVICE
0    0     4    ETC8    ETC8     1                             INSERVICE
```

ii. Enter global configuration mode and configure GPON SN.

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#pon sn ZTEG9000002B
ZXAN(config)#exit
ZXAN#
```

iii. Reset GPON card (GPUA card) in slot 2 and wait for 1 minute.

```
ZXAN#reset-card slotno 2
Confirm to reset card?[yes/no]:y
```

3. Configure F820 in-band NM.

i. Enter VLAN interface configuration mode, configure in-band NM IP address.

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#interface inband-vlan1000
ZXAN(config-if)#ip address 10.67.1.11 255.255.255.0
ZXAN(config-if)#exit
ZXAN(config)#
```

Note:

By default, VLAN 1 – VLAN 4093 exist in the F820 and the uplink GPON port is each VLAN.

The in-band NM IP address should be in the same network segment with the ZXA10 C220.

ii. Configure in-band NM route.

```
ZXAN(config)#ip route 0.0.0.0 0.0.0.0 10.67.1.254
```

4. Configure service VLAN.

Configure VLAN service port.

```
ZXAN(config)#interface tdm-fei_0/4/1
ZXAN(config-if)#switchport vlan 4001 tag
ZXAN(config-if)#exit
ZXAN(config)#
```

Note:

By default, VLAN 1 – VLAN 4093 exist in F820 and the uplink GPON port is each VLAN.

5. Configure PW service properties.

i. Enter CES configuration mode, configure source MAC address.

```
ZXAN(config)#ces
ZXAN(config-ces)#mac-address ipv4 120.1.1.100 4/1
```

ii. Configure PW service.

```
ZXAN(config-ces)#pw pw_0/4/1
ZXAN(config-ces-pw)#
```

iii. Configure TDM properties of the PW service.

```
ZXAN(config-ces-pw)#tdm-prop type e1satop rate 32 tdm_0/4/1
```

iv. Configure PSN properties of the PW service.

```
ZXAN(config-ces-pw)#psn ip 1234 1234 ipv4 120.1.1.1 dst-mac
0015.eb72.001a vlan 4001 priority 7
```

Note:

The source UDP port and destination UDP port must be consistent with configuration on the OLT.

The source UDP port and destination UDP port for each PW must be different.

6. Save configuration data.

```
ZXAN#write
Building configuration...
..[OK]
```

7. Configure F820 ONU type on the ZXA10 C220.

i. Enter the global configuration mode.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#
```

ii. Enter PON configuration mode and configure ONU type.

```
ZXAN(config)#pon
ZXAN(config-pon)#onu-type ZTEG-F820 gpon
```

iii. Configure ONU port type.

```
ZXAN(config-pon)#onu-type-if ZTEG-F820 e1_0/1-16
ZXAN(config-pon)#exit
ZXAN(config)#
```

8. Register ONU.

i. Query unconfigured ONU under GPON-OLT port.

```
ZXAN(config)#show gpon onu uncfg gpon-olt_0/5/1
OnuIndex                 Sn                  State
-------------------------------------------------------------
gpon-onu_0/5/1:1         ZTEG9000002B        unknown
```

ii. Enter the GPON-OLT interface configuration mode.

```
ZXAN(config)#interface gpon-olt_0/5/1
ZXAN(config-if)#
```

iii. Register ONU.

```
ZXAN(config-if)#register 1 type ZTEG-F820 ZTEG9000002B state ready
```

iv. Query ONU state.

```
ZXAN(config-if)#show gpon onu state gpon-olt_0/5/1
OnuIndex              Admin State  Omcc State   O7 State     Phase State
-------------------------------------------------------------------------
gpon-onu_0/5/1:1      enable       enable       operation    working
ZXAN(config-if)#exit
ZXAN(config)#
```

9. Configure bandwidth profile.

i. Enter the GPON configuration mode.

```
ZXAN(config)#gpon
ZXAN(config-gpon)#
```

ii. Configure bandwidth profile.

```
ZXAN(config-gpon)#bandwidth-profile ces-tcont type 1 fixed 10000
```

10. Configure T-CONT and GEM ports.

- T-CONT (Transmission Container) is the minimum unit of upstream bandwidth scheduling which is identified by Alloc ID.
- GEM port is the minimum unit of downstream traffic which is identified by port ID.

i. Enter the GPON-ONU interface configuration mode

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

ii. Create T-CONT.

```
ZXAN(config-if)#tcont 2 name cestcont traffic ces-tcont
```

iii. Create GEM ports.

```
ZXAN(config-if)#gemport 1 name NMport unicast tcont 2
ZXAN(config-if)#gemport 2 name cesport unicast tcont 2
ZXAN(config-if)#exit
ZXAN(config)#
```

11. Configure VLAN service port.

i. Enter the GPON-ONU interface configuration mode

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

ii. Configure port mode to hybrid.

```
ZXAN(config-if)#switchport mode hybrid vport 1
ZXAN(config-if)#switchport mode hybrid vport 2
```

iii. Add port to NM VLAN and CES service VLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 1000 tag vport 1
ZXAN(config-if)#switchport vlan 4001 tag vport 2
```

12. Configure VLAN uplink port.

i. Enter the TDM interface configuration mode.

```
ZXAN(config)#interface tdm-gei_0/12/1
ZXAN(config-if)
```

ii. Configure port VLAN mode.

```
ZXAN(config-if)#switchport mode hybrid
```

iii. Add port to VLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 4001 tag
ZXAN(config-if)#exit
ZXAN(config)#
```

13. Configure TDM profile.

This instance uses the default TDM profile. To configure a TDM profile, use the **tdm-profile** command in the CES configuration mode.

14. Configure CES source IP address.

i. Enter the CES configuration mode.

```
ZXAN(config)#ces
```

```
ZXAN(config-ces)#
```

ii. Configure CES source IP address.

```
ZXAN(config-ces)#ip-address ipv4 120.1.1.1 12/1
```

iii. Query CES global properties.

```
ZXAN(config-ces)#show ces global-prop
slot/port      sourceMac           source IP
-------------------------------------------------------
12/1            0015.eb72.001a      120.1.1.1
```

15. Configure OLT PW service properties.

i. Enter the PW configuration mode.

```
ZXAN(config-ces)#pw pw_0/12/1
ZXAN(config-ces-pw)#
```

ii. Configure TDM properties of PW service.

```
ZXAN(config-ces-pw)#tdm-service type e1Satop rate 32 tdm_0/12/1
```

Note:

- CE1B TDM service type: e1Satop
- CT1B TDM service type: t1Satop

iii. Configure PSN properties of PW service.

```
ZXAN(config-ces-pw)#psn ip 1234 1234 ipv4 120.1.1.100 dst-mac
0015.eb72.0001 vlan 4001 priority 7
```

Note:

The source UDP port and destination UDP port must be consistent with the ONU.

The source UDP port and destination UDP port for each PW must be different.

iv. Query PW service configuration.

```
ZXAN(config-ces-pw)#show ces pw prop detail pw_0/12/1

pw pw_0/12/1
PwType :       e1Satop              PsnType :     ip
Admin-status : enable               InboundLable :0x1102
OutboundLable :0x1102               Destination IP Address 120.1.1.100.

Service prop:
Using tdm interface: tdm_0/12/1
TDM-prop profile:    default
You can see detail profile info. by using corresponding 'show' command.

Psn prop:
Destination Mac Address:   0015.EB72.0001
Vlan ID:                   4001    priority: 7

Card prop:
Card interface :    12/1
Source Mac Address: 0015.EB72.001A
Source IP Address : 120.1.1.1
```

16. Configure clock source mode.

This instance use the default clock source mode.

17. Configure ONU NM service connection.
    i. Enter the ONU remote management mode.

```
ZXAN(config)#pon-onu-mng gpon-onu_0/5/1:1
ZXAN(gpon-onu-mng)#
```

    ii. Configure the map between GEM port and uplink interface.

```
ZXAN(gpon-onu-mng)#interwork gemport NMport dot1p-bridge up
link_0/1/1 prio-list 1
```

    iii. Configure VLAN filter mode on uplink interface.

```
ZXAN(gpon-onu-mng)# vlan-filter-mode uplink uplink_0/1/1 tag-
filter
vid-filter untag-filter discard
```

    iv. Configure VLAN filter entry on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/1 priority 1
vid 1000
```

18. Configure ONU CES service connection.
    i. Configure the map between GEM port and uplink interface.

```
ZXAN(gpon-onu-mng)#interwork gemport cesport dot1p-bridge up
link_0/1/2 prio-list 7
```

    ii. Configure VLAN filter mode on uplink interface.

```
ZXAN(gpon-onu-mng)# vlan-filter-mode uplink uplink_0/1/2 tag-
filter vid-filter untag-filter discard
```

    iii. Configure VLAN filter entry on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/2 priority 7
vid 4001
```

19. Save configuration data.

```
ZXAN(gpon-onu-mng)#end
ZXAN#write
Building configuration...
..[OK]
```

--End of Steps--

Result The PWE3 CES service is configured successfully.

Configuring STM-1/OC-3 Uplink MEF8 CES Service

Short Description This section introduces an instance of configuring STM-1/OC-3 uplink CES service based on the Ethernet.

Prerequisites

- Make sure that network device works normally.
- Make sure that GPON card and CL1A card work normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Background Information A CL1A card provides one STM–1/OC–3 interface.

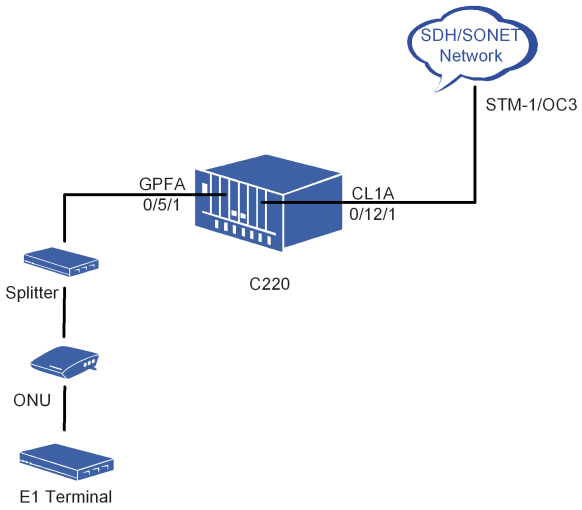
F820 supports both MEF8 CES service and PWE3 CES service.

F621 supports only MEF8 CES service.

Networking Diagram

Figure 24 shows the STM-1/OC-3 uplink CES service networking diagram.

FIGURE 24 STM-1/STM–4 UPLINK CES SERVICE NETWORKING DIAGRAM



Configuration Data

Table 19 describes the STM-1/4/OC-3/12 uplink MEF8 CES service configuration data.

TABLE 19 STM-1/OC-3 UPLINK MEF8 CES SERVICE CONFIGURATION DATA

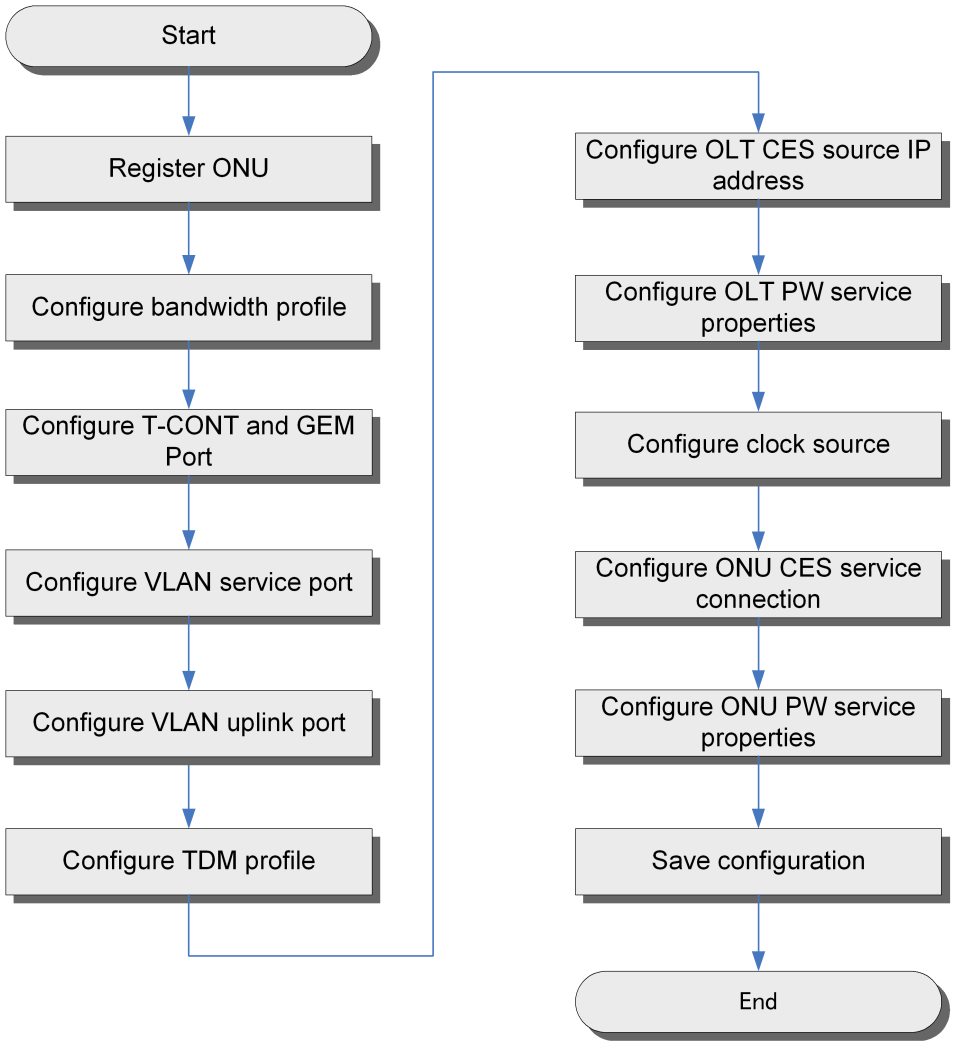
Items	Data
CES service VLAN	▪ VLAN ID: 4001 ▪ Priority: 7
Uplink port	0/12/1
GPON port	0/5/1
Bandwidth profile	Profile name: ces-tcont
	Bandwidth type: Fixed (Type 1)
	Bandwidth: 10 Mbps
T-CONT	▪ T-CONT index: 2 ▪ T-CONT name: cestcont ▪ Bandwidth profile: ces–tcont ▪ Alloc ID: Auto-allocate
GEM port	▪ T-CONT index: 2 ▪ GEM Port index: 1 ▪ GEM Port name: cesport ▪ Port ID: Auto-allocate
ONU	▪ ONU ID: 1 ▪ ONU authentication mode: SN ▪ ONU type: F621 ▪ SN: ZTEG80000001

Items	Data
ONU CES service connection	▪ GEM port name: cesport ▪ Bridge: 0/1 ▪ Uplink interface: 0/1/1 ▪ Connection type: 802.1p + bridge
TDM profile	Default
OLT CES MAC address	0015.EB72.001A, 0015.EB72.0010
ONU CES MAC address	0015.EB72.0001
PW service	▪ Type: e1Satop ▪ Transmit ECID: 0x1102 ▪ Receive ECID: 0x1102
Clock source	Adaptive (default)

Configuration Flow

Figure 25 shows the STM-1/OC-3 uplink MEF8 CES service configuration flowchart.

FIGURE 25 STM-1/4/OC-3/12 UPLINK CES SERVICE CONFIGURATION FLOWCHART



Steps To configure the CES service, perform the following steps:

1. Register ONU.
   i. Query unconfigured ONU under GPON-OLT port.

```
ZXAN#show gpon onu uncfg gpon-olt_0/5/1
OnuIndex                 Sn                  State
-------------------------------------------------------------
gpon-onu_0/5/1:1         ZTEG80000001        unknown
```

   ii. Enter the GPON-OLT interface configuration mode.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gpon-olt_0/5/1
ZXAN(config-if)#
```

   iii. Register ONU.

```
ZXAN(config-if)#onu 1 type ZTE-F621 sn ZTEG80000001
```

   iv. Query ONU state.

```
ZXAN(config-if)#show gpon onu state gpon-olt_0/5/1
OnuIndex              Admin State  Omcc State   O7 State     Phase State
-------------------------------------------------------------------------
```

```
gpon-onu_0/5/1:1       enable       enable       operation    working
ZXAN(config-if)#exit
ZXAN(config)#
```

2. Configure bandwidth profile.
   i. Enter the GPON configuration mode.

```
ZXAN(config)#gpon
ZXAN(config-gpon)#
```

   ii. Configure bandwidth profile.

```
ZXAN(config-gpon)#bandwidth-profile ces-tcont type 1 fixed 10000
```

3. Configure T-CONT and GEM port.
   - T-CONT (Transmission Container) is the minimum unit of upstream bandwidth scheduling which is identified by Alloc ID.
   - GEM port is the minimum unit of downstream traffic which is identified by port ID.

   i. Enter the GPON-ONU interface configuration mode.

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

   ii. Create T-CONT.

```
ZXAN(config-if)#tcont 2 name cestcont traffic ces-tcont
```

   iii. Create GEM port.

```
ZXAN(config-if)#gemport 1 name cesport unicast tcont 2
ZXAN(config-if)#exit
ZXAN(config)#
```

4. Configure VLAN service port.
   i. Enter the GPON-ONU interface configuration mode.

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

   ii. Configure port mode to hybrid.

```
ZXAN(config-if)#switchport mode hybrid vport 1
```

   iii. Add port to service VLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 4001 tag vport 1
```

   Note:

   When a port is added to a VLAN, the VLAN is added automatically.

5. Configure VLAN uplink port.
   i. Enter the TDM interface configuration mode.

```
ZXAN(config)#interface tdm-gei_0/12/1
ZXAN(config-if)
```

   ii. Configure port VLAN mode.

```
ZXAN(config-if)#switchport mode hybrid
```

   iii. Add port to VLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 4001 tag
ZXAN(config-if)#exit
ZXAN(config)#
```

6. Configure TDM profile.

   This instance uses the default TDM profile. To configure a TDM profile, use the **tdm-profile** command in the CES configuration mode.

7. Configure CES source MAC address.

   i. Enter the CES configuration mode.

   ```
   ZXAN(config)#ces
   ZXAN(config-ces)#
   ```

   ii. Configure CES source MAC address.

   ```
   ZXAN(config-ces)#mac-address 0015.eb72.001a 12/1
   ZXAN(config-ces)#mac-address 0015.eb72.0010 12/2
   ```

   Note:

   A CL1A card supports 63 E1 channels. The first MAC address is for the first 32 channels, the second MAC address is for the other 31 channels.

   iii. Query CES global properties.

   ```
   ZXAN(config-ces)#show ces global-prop
   slot/port      sourceMac           source IP
   ------------------------------------------------------
   12/1           0015.eb72.001a      192.192.192.2
   12/2           0015.eb72.0010      192.192.192.3
   ```

8. Configure OLT PW service.

   i. Enter the PW configuration mode.

   ```
   ZXAN(config-ces)#pw pw_0/12/1
   ZXAN(config-ces-pw)#
   ```

   ii. Configure TDM properties of PW service.

   ```
   ZXAN(config-ces-pw)#tdm-service type e1Satop rate 32 tdm_0/12/1.
   1/1/1/1/1
   ```

   Note:

   CL1A TDM interface format:

   tdm_shelf/slot/port.augno/1/tug3/tug2/e1

   - Both *port*,*augno* can only be 1.
   - Value ranges for *tug-3*, *tug-2* and *e1* are [1.1.1, 3.7.3].

   There are 63 E1 channels and parameters of each E1 channel must be different.

   iii. Configure PSN properties of PW service.

   ```
   ZXAN(config-ces-pw)#psn ethernet 0x1102 0x1102 dst-mac 0015.
   eb72.0001 vlan 4001 priority 7
   ```

Note:

The *in-ecid* and *out-ecid* must be consistent with the *out-eci* and *in-ecid* of the ONU.

The *in-ecid* and *out-ecid* of each PW must be different.

iv. Query PW service configuration.

```
ZXAN(config-ces-pw)#show ces pw prop detail pw_0/12/1

pw pw_0/12/1
PwType :       e1Satop              PsnType :     ethernet
Admin-status : enable               InboundLable :0x1102
OutboundLable :0x1102

Service prop:
Using tdm interface: tdm_0/12/1.1/1/1/1/1
TDM-prop profile:    default
You can see detail profile info. by using corresponding 'show'

command.

Psn prop:
Destination Mac Address:   0015.EB72.0001
Vlan ID:                   4001    priority: 7

Card prop:
Card interface :    12/1
Source Mac Address: 0015.EB72.001A
Source IP Address : 192.192.192.2
```

9. Configure clock source mode.

   This instance use the default clock source mode.

10. Configure ONU CES service connection.

    i. Enter the ONU remote management mode.

    ```
    ZXAN(config)#pon-onu-mng gpon-onu_0/5/1:1
    ZXAN(gpon-onu-mng)#
    ```

    ii. Configure the map between GEM port and uplink interface.

    ```
    ZXAN(gpon-onu-mng)#interwork gemport cesport dot1p-bridge up
    link_0/1/1 prio-list 7
    ```

    iii. Configure VLAN filter mode on uplink interface.

    ```
    ZXAN(gpon-onu-mng)# vlan-filter-mode uplink uplink_0/1/1 tag-
    filter vid-filter untag-filter discard
    ```

    iv. Configure VLAN filter entry on uplink interface.

    ```
    ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/1 priority 7
    vid 4001
    ```

11. Configure ONU PW service.

    i. Configure PSN properties of PW service.

    ```
    ZXAN(gpon-onu-mng)#pw psn ethernet ces_0/1 bridge bridge_0/1
    dst-mac 0015.eb72.001a loopback disable tx-payload-ecid 0x1102
    tx-signalling-ecid 0x0 expected-payload-ecid 0x1102 expected-
    signalling-ecid 0x0 tag-policy tag prio 7 vid 4001
    ```

    ii. Configure RTP properties of PW service.

    ```
    ZXAN(gpon-onu-mng)#pw rtp ces_0/1 payload-ssrc 3 signalling-
    ssrc 0 payload-ptype 97 signalling-ptype 0 expected-payload-
    ssrc 3 expected-signalling-ssrc 0 expected-payload-ptype 97
    expected-signalling-ptype 0 clock-reference 1 rtp-ts-mode dif
    ferential
    ```

Note:

- **rtp**: RTP is enabled.
- **rtp-ts-mode** corresponds to **timestamp mode** of the OLT.
- It is recommended to use the default values for other parameters.

iii. Configure TDM properties of PW service.

```
ZXAN(gpon-onu-mng)#pw tdm ces_0/1 payloadsize 32 payload-delay
2 timing-mode adaptive-timing
```

12. Save configuration data.

```
ZXAN(gpon-onu-mng)#end
ZXAN#write
Building configuration...
..[OK]
```

--End of Steps--

Result The CES service is configured successfully.

Configuring CES TDM Profile

Short Description Perform this procedure to configure CES TDM profile.

Prerequisites

- The network device works normally.
- The CES card works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context Table 20 describes ranges and default values of TDM profile parameters.

TABLE 20 TDM PROFILE PARAMETERS

Parameters	Ranges	Default values
Profiel name (profile-name)	1 - 63 characters	Default
Payload size (payload-size)	32 - 1500, unit: byte	32
Recoder (reorder)	enable, disable	enable
Use RTP head (rtpHdr)	enable, disable	used (enable)
RTP packet (ssrcval)	1 - 42949672955	–

Parameters	Ranges	Default values
Jigger buffer (jtrBfr)	1 - 4294967295, unit: ms	2000
Payload suppression (payloadSuppression)	enabledisable	disable
Number of continuously received frames to exit LOP (inSyncPkts)	1 - 4294967295	2
Number of continuously lost frames to enter LOP (outSyncPkts)	1 - 4294967295	10
Packet replace policy (pktReplacePolicy)	AIS, customed	AIS
Alarm report threshold (almThreshold)	1 - 4294967295, unit: ms	2500
Alarm clear threshold (clrAlmThreshold)	1 - 4294967295, unit: ms	10000
Time stamp mode (timestamp-mode)	▪ NotApplicable ▪ Absolute ▪ Differential	Differential
Queue size (queuesizePower)	▪ Recodcer enabled: 1 - 7 ▪ Other: 1 - 10	5

To configure the CES TDM profile, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **ces** command to enter CES configuration mode.
3. Use the **tdm-profile** command to configure TDM profile.

Note:

- A TDM profile must be configured before it is applied to a PW.
- When a TMD profile is applied to a PW, it can not be modified or deleted.
- RTP values of each TDM profile applied to the same CES card must be same.

4. Use the **show ces tdm-profile** command to query TDM profile.

END OF STEPS

Example Configure a TDM profile and query configuration.

- Name: zte
- Payload size: 1024
- Recorder: Enabled
- RTP header: Enabled
- Jitter buffer: 1000 ms
- Other parameters: Default values

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config-ces)#tdm-profile zte 1024 reorder enable rtpHdr enable
jtrBfr 1000 payloadSuppression disable inSyncPkts 2 outSyncPkts 10 pktReplace
Policy AIS almThreshold 2500 clrAlmThreshold 10000 timestamp-mode differen
tial 3
ZXAN(config-ces)#show ces tdm-profile zte

Profile name :          zte
Payload size(bytes) :   1024            Reorder:             enable
RtpHdr :                used            Ssrcval:             32
JtrBfr :                3000            Payload suppression: disable
ConsecPktsInSynch :     2               PktsOutSync :        10
PacketReplacePolicy :   AIS             AlarmThreshold(ms):  2500
ClearAlarmThreshold(ms):10000           TimeStampMode:       differential
QueueSize(bytes):       5
```

Configuring PW Service

Short Description Perform this procedure to configure PW service.

Prerequisites

- The network device works normally.
- The CES card works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context To configure the PW service, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **ces** command to enter CES configuration mode.
3. Use the **pw** command to create PW service.
4. Use the **admin-status** command to configure PW administration status.
5. Use the **psn** command to configure PSN properties of PW service.
6. Use the **tdm-service type** command to configure TDM properties of PW service.
7. Use the **show ces pw prop detail** command to query PW service.

END OF STEPS

Example Configure a PW service:

- PW ID: 0/12/1
- VLAN ID: 1024

- Priority: 7
- Inbound/outbound label: 0x1102
- Destination MAC address: 0015.EB72.000F
- TDM profile: zte
- TDM service type: e1Satop
- TDM service rate: 32

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#ces
ZXAN(config-ces)#pw pw_0/12/1
ZXAN(config-ces-pw)#admin-status enable
ZXAN(config-ces-pw)#psn ethernet 0x1102 0x1102 dst-mac 0015.eb72.000f
vlan 1024 priority 7
ZXAN(config-ces-pw)#tdm-service type e1Satop rate 32 tdm_0/12/1 tdm-pro
file-name zte
ZXAN(config-ces-pw)#show ces pw prop detail pw_0/12/1
pw pw_0/12/1
PwType :       e1Satop              PsnType :     ethernet
Admin-status : enable               InboundLable :0x1102
OutboundLable :0x1102

Service prop:
Using tdm interface: tdm_0/12/1
TDM-prop profile:    zte
You can see detail profile info. by using corresponding 'show' command.

Psn prop:
Destination Mac Address:   0015.eb72.000f
SVlan ID:                  1024
CVlan ID:                  568
priority:                  7

Card prop:
Card interface :    12/1
Source Mac Address: 0015.eb72.001a
Source IP Address : 120.1.1.1
```

Configuring CES Source Address

Short Description

Perform this procedure to configure CES source address.

Prerequisites

- The network device works normally.
- The CES card works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

To configure CES source address, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **ces** command to enter CES configuration mode.
3. Use the **mac-address** command to configure CES source MAC address.
4. Use the **ip-address** command to configure CES source IP address.

5. Use the **show ces global-prop** command to query CES source address.

END OF STEPS

Example Configure and query CES source MAC/IP address.

- TDM interface: 12/1
- MAC address: 0015.EB72.0014
- IP adderss: 192.192.192.10

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#ces
ZXAN(config-ces)#mac-address 0015.EB72.0014 12/1
ZXAN(config-ces)#ip-address 192.192.192.10 12/1
ZXAN(config-ces)#show ces global-prop
Slot/Port      SourceMAC           Source IP
------------------------------------------------------------
12/1           0015.eb72.0014      192.192.192.10
```

Configuring CES Clock Source

Short Description Perform this procedure to configure CES clock source.

Prerequisites

- The network device works normally.
- The CES card works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context The default clock source mode is adaptive.

To configure CES source address, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **interface** command to enter TDM interface configuration mode.
3. Use the **clock-source** command to configure CES clock source.
4. Use the **show ces interface** command to query CES clock source.

END OF STEPS

Example Configure and query CES clock source:

- TDM interface: 0/12/1
- Clock source: Enhanced-adaptive

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface tdm_0/12/1
ZXAN(config-if)#clock-source enhanced-adaptive
ZXAN(config-if)#show ces interface tdm_0/12/1

Interface :tdm_0/12/1
```

```
Line type :    e1                        Line coding :  HDB3
Admin status : enable                    Opr status :   N/A
Clock source : enhanced-adaptive         Clock status : FREERUN
noLoop
```

Chapter 6

VoIP Service Configuration

Table of Contents

Overview

Service Description

In the VoIP service, voice signals are compressed and packed and then transmitted on the IP packet-switched network.

Service Specification

ZXA10 C220 provides access of VoIP service through GPON service card. The VoIP service is implemented on the ONU.

Configure SIP VoIP Service

Short Description

This section introduces an instance of configuring VoIP service based on SIP protocol.

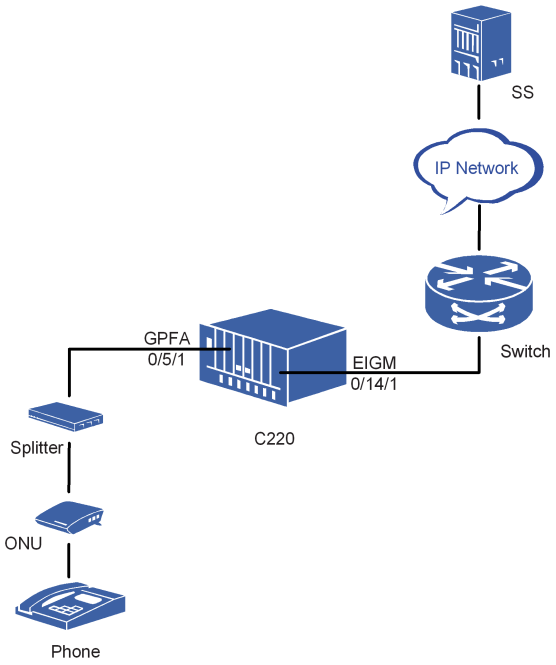
Prerequisites

- Make sure that the network device works normally.
- Make sure that the GPON card works normally.
- The corresponding VoIP resource data is configured on the SIP server.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Networking Diagram

Figure 26 shows the SIP VoIP service networking diagram.

FIGURE 26 VOIP SERVICE NETWORKING DIAGRAM



Configuration Data

Table 21 describes the SIP VoIP service configuration data.

TABLE 21 SIP VOIP SERVICE CONFIGURATION DATA

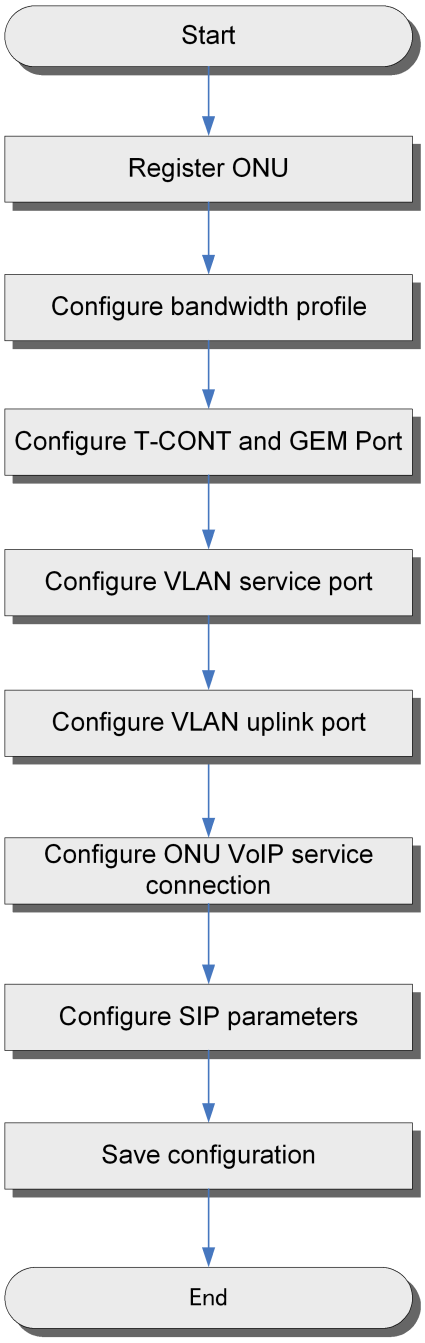
Item	Data
VoIP service VLAN	▪ VLAN ID: 400 ▪ Priority: 7
Uplink port	0/14/1
GPON port	0/5/1
Bandwidth profile	Profile name: sip-tcont
	Bandwidth type: Fixed (Type 1)
	Bandwidth: 10 Mbps
T-CONT	▪ T-CONT index: 1 ▪ T-CONT name: siptcont ▪ Bandwidth profile: sip–tcont ▪ Alloc ID: Auto-allocate
GEM port	▪ T-CONT index: 1 ▪ GEM port index: 1 ▪ GEM port name: Gemport1 ▪ Port ID: Auto-allocate
ONU	▪ ONU ID: 1 ▪ Model: F622 ▪ SN: ZTEG80000003

Item	Data
ONU VoIP service connection	■ GEM port name: Gemport1 ■ UNI: pots_0/1 ■ Bridge: 0/1 ■ Uplink interface: 0/1/1 ■ Connection type: bridge
ONU IP host	■ IP address: 10.61.98.191 ■ Subnet mask: 255.255.255.0 ■ Gateway: 10.61.98.254
VoIP resource	■ Protocol: SIP ■ SIP server IP address: 10.61.98.102 ■ User ID: 6662112 ■ Port: pots_0/1

Configuration Flow

Figure 27 describes the VoIP service configuration flowchart.

FIGURE 27 SIP VOIP SERVICE CONFIGURATION FLOWCHART



Steps

To configure the SIP VoIP service, perform the following steps:

1. Register ONU.
   i. Query unconfigured ONU under GPON-OLT port.

```
ZXAN#show gpon onu uncfg gpon-olt_0/5/1
OnuIndex                  Sn                  State
------------------------------------------------------------
gpon-onu_0/5/1:1          ZTE_06120664        unknown
```

   ii. Enter the GPON-OLT interface configuration mode.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gpon-olt_0/5/1
ZXAN(config-if)#
```

iii. Register ONU.

```
ZXAN(config-if)#register 1 type ZTE-F622 ZTEG80000003 state ready
```

iv. Query ONU state.

```
ZXAN(config-if)#show gpon onu state gpon-olt_0/5/1
OnuIndex               Admin State  Omcc State   O7 State     Phase State
------------------------------------------------------------------------
gpon-onu_0/5/1:1       enable       enable       operation    working
ZXAN(config-if)#exit
ZXAN(config)#
```

2. Configure bandwidth profile.

i. Enter the GPON configuration mode.

```
ZXAN(config)#gpon
ZXAN(config-gpon)#
```

ii. Configure bandwidth profile.

```
ZXAN(config-gpon)#bandwidth-profile sip-tcont type 1 fixed 10000
```

3. Configure T-CONT and GEM Port

- T-CONT (Transmission Container) is the minimum unit of upstream bandwidth scheduling which is identified by Alloc ID.
- GEM port is the minimum unit of downstream traffic which is identified by port ID.

i. Enter the GPON-ONU interface configuration mode

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

ii. Create T-CONT.

```
ZXAN(config-if)#tcont 1 name siptcont traffic sip-tcont
```

iii. Create GEM port.

```
ZXAN(config-if)#gemport 1 name Gemport1 unicast tcont 1
ZXAN(config-if)#exit
ZXAN(config)#
```

4. Configure VLAN service port.

i. Enter the GPON-ONU interface configuration mode

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

ii. Configure port mode to hybrid.

```
ZXAN(config-if)#switchport mode hybrid vport 1
```

iii. Add port to service VLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 400 tag vport 1
ZXAN(config-if)#exit
ZXAN(config)#
```

Note:

When a port is added to a VLAN, the VLAN is added automatically.

5. Configure VLAN uplink port.
   i. Enter the OLT uplink port configuration mode.

   ```
   ZXAN(config)#interface gei_0/14/1
   ```

   ii. Configure uplink port mode to hybrid.

   ```
   ZXAN(config-if)#switchport mode hybrid
   ```

   iii. Add uplink port to service VLAN in tag mode.

   ```
   ZXAN(config-if)#switchport vlan 400 tag
   ZXAN(config-if)#exit
   ZXAN(config)#
   ```

6. Configure ONU VoIP service flow.
   i. Enter the ONU remote management mode.

   ```
   ZXAN(config)#pon-onu-mng gpon-onu_0/5/1:1
   ZXAN(gpon-onu-mng)#
   ```

   ii. Configure the map between GEM port and uplink interface.

   ```
   ZXAN(gpon-onu-mng)#interwork gemport Gemport1 bridge uplink_
   0/1/1
   ```

   iii. Bind the IP host to bridge interface.

   ```
   ZXAN(gpon-onu-mng)#bridge-port host-bind 1 bridge_0/1
   ```

   iv. Configure UNI VLAN and priority.

   ```
   ZXAN(gpon-onu-mng)#vlan-tag ip-host 1 up-prio 7 up-vid 400 up-
   mode overwrite down-mode untag
   ```

   v. Configure VLAN filter mode on IP host.

   ```
   ZXAN(gpon-onu-mng)#vlan-filter-mode ip-host 1 tag-filter vid-
   filter untag-filter transparent
   ```

   vi. Configure VLAN filter entry on IP host.

   ```
   ZXAN(gpon-onu-mng)#vlan-filter ip-host 1 priority 7 vid 400
   ```

   vii. Configure VLAN filter mode on uplink interface.

   ```
   ZXAN(gpon-onu-mng)# vlan-filter-mode uplink uplink_0/1/1 tag-
   filter vid-filter untag-filter discard
   ```

   viii. Configure VLAN filter entry on uplink interface.

   ```
   ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/1 priority 7
   vid 400
   ```

7. Configure ONU SIP parameters.
   i. Configure host IP address and gateway.

   ```
   ZXAN(gpon-onu-mng)#ip-host 1 ip 10.61.98.191 mask 255.255.255.0
   gateway 10.61.98.254
   ```

   ii. Configure SIP server IP address.

   ```
   ZXAN(gpon-onu-mng)#sip-agent 1 proxy-server 10.61.98.102 prima
   ry-dns 0.0.0.0 tcpudp-port 5060 host 1
   ```

   Note:

   The default port for the SIP protocol is 5060.

   iii. Configure port, username and password of the SIP user.

   ```
   ZXAN(gpon-onu-mng)#sip-user pots_0/1 sip-agent 1 user-aor 6662
   112 username 6662112 password 6662
   ```

iv. Configure VoIP CTP.

```
ZXAN(gpon-onu-mng)#voip-ctp pots_0/1
```

8. Save configuration data.

```
ZXAN#write
Building configuration...
..[OK]
```

--End of Steps--

Result The VoIP service is configured successfully.

Configuring H.248 VoIP Service

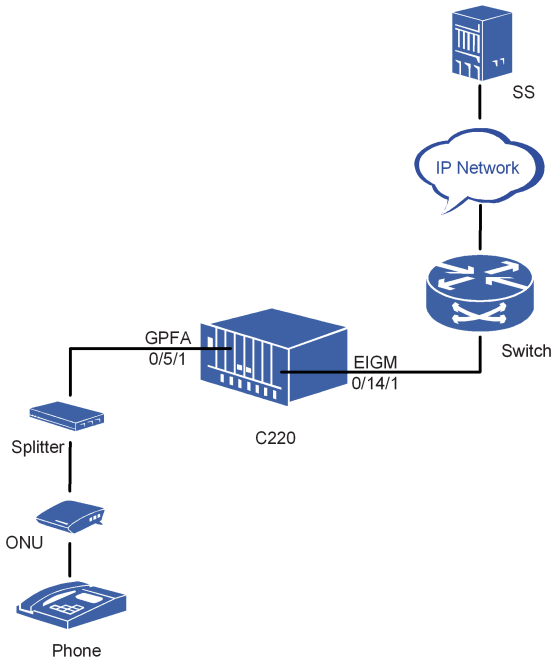
Short Description This section introduces an instance of configuring VoIP service based on H.248 protocol.

Prerequisites

- Make sure that the network device works normally.
- The GPON card works normally.
- The corresponding VoIP resource data is configured on the SS.
- The in-band NM IP address of the ZXA10 C220 is configured.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Networking Diagram Figure 28 shows the H.248 VoIP service networking diagram.

FIGURE 28 VOIP SERVICE NETWORKING DIAGRAM



Data Configuration

Table 22 describes the H.248 VoIP service data configuration.

TABLE 22 H.248 VOIP SERVICE DATA CONFIGURATION

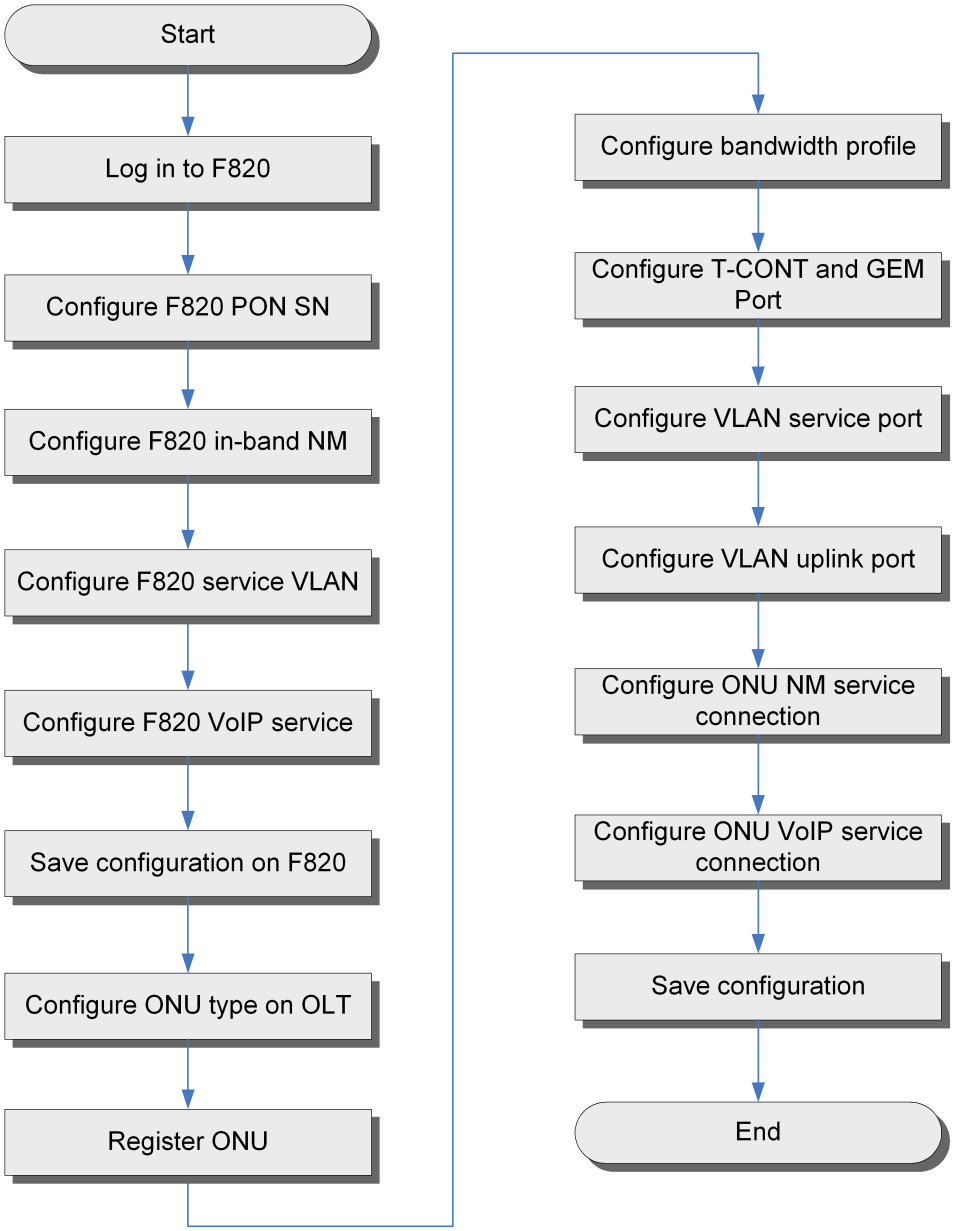
Item	Data
VoIP service VLAN	▪ VLAN ID: 200 ▪ Priority: 7
Uplink port	0/14/1
GPON port	0/5/1
Bandwidth profile	Profile name: voip-tcont
	Bandwidth type: Fixed (Type 1)
	Bandwidth: 50 Mbps
T-CONT	▪ T-CONT index: 1 ▪ T-CONT name: voiptcont ▪ Bandwidth profile: voip–tcont ▪ Alloc ID: Auto-allocate
GEM port 1	▪ T-CONT index: 1 ▪ GEM port index: 1 ▪ GEM port name: NMport ▪ Port ID: Auto-allocate
GEM port 2	▪ T-CONT index: 1 ▪ GEM Port index: 2 ▪ GEM port name: voipport ▪ Port ID: Auto-allocate
ONU	▪ ONU ID: 1 ▪ ONU authentication mode: SN ▪ ONU type: F820 ▪ SN: ZTEG9000002B
ONU in-band NM	▪ VLAN ID: 1000 ▪ Priority: 1 ▪ IP address: 10.67.1.11 ▪ Subnet mask: 255.255.255.0 ▪ Gateway: 10.67.1.254
ONU NM service connection	▪ GEM port name: NMport ▪ Bridge: 0/1 ▪ Uplink interface: 0/1/1 ▪ Connection type: 802.1p + bridge

Item	Data
ONU VoIP service connection	■ GEM port name: Gemport2 ■ Bridge: 0/1 ■ Uplink interface: 0/1/2 ■ Connection type: 802.1p + bridge
VoIP resource	■ IP address: 10.63.198.173 ■ Subnet mask: 255.255.255.0 ■ Gateway: 10.63.198.254 ■ Protocol: H.248 ■ Registration mode: IPV4 ■ SS IP address: 10.66.22.1 ■ TID: AG58900–AG58915 ■ RTP: 00000–00015

Configuration Flow

Figure 29 describes the H.248 VoIP service configuration flowchart.

FIGURE 29 H.248 VOIP SERVICE CONFIGURATION FLOWCHART



Steps

To configure the H.248 VoIP service, perform the following steps:

1. Log in to the F820 through HyperTeminal (username: zte, password: zxr10).
2. Configure GPON SN on the F820.
   i. Query card status.

```
ZXAN#show card
Rack Shelf Slot CfgType RealType Port  HardVer SoftVer         Status
------------------------------------------------------------------------------
0    0     1    MS8E    MS8E     8     V0      V1.0.0T8        INSERVICE
0    0     2    GPUA    GPUA     1                             INSERVICE
0    0     4    V16B    V16B     1                             INSERVICE
```

ii. Enter global configuration mode and configure GPON SN.

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#pon sn ZTEG9000002B
ZXAN(config)#exit
ZXAN#
```

iii. Reset GPON card (GPUA card) in slot 2 and wait for 1 minute.

```
ZXAN#reset-card slotno 2
Confirm to reset card?[yes/no]:y
```

3. Configure F820 in-band NM.

i. Enter VLAN interface configuration mode, configure in-band NM IP address.

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#interface inband-vlan1000
ZXAN(config-if)#ip address 10.67.1.11 255.255.255.0
ZXAN(config-if)#exit
ZXAN(config)#
```

Note:

VLAN 1 – VLAN 4093 are created by default.

The in-band NM IP address should be in the same network segment with the ZXA10 C220.

ii. Configure in-band NM route.

```
ZXAN(config)#ip route 0.0.0.0 0.0.0.0 10.67.1.254
```

4. Configure service VLAN.

Configure VLAN service port.

```
ZXAN(config)#interface fei_0/4/1
ZXAN(config-if)#switchport vlan 200 tag
```

Note:

By default, VLAN 1 – VLAN 4093 exist in F820 and the uplink GPON port is each VLAN.

5. Configure VoIP service on the F820.

i.

ii. Configure MG.

```
ZXAN(config)#voip 4
ZXAN(config-voip)#mg add 1 1 mid-flag 0 port 2944
ZXAN(config-voip)#mg net 1 mode 0 ip-address 10.63.198.173 mask
255.255.255.0 gateway 10.63.198.254 vlan-option 1 vlan-id 201
vlan-priority 7
```

iii. Configure MGC.

```
ZXAN(config-voip)#mgc add 1 ip-address 10.66.22.1 port 2944
```

iv. Configure user TID and RTP resource TID.

```
ZXAN(config-voip)#mgc h248tid user-tid-prefix AG58900-AG58915
```

```
//user TID
ZXAN(config-voip)#mgc h248tid rtp-tid-prefix RTP/00000-RTP/00015
//RTP resource TID
ZXAN(config-voip)#end
ZXAN#
```

Note:

User TID and RTP resource TID must be consistent with configuration on the SS.

There is default VoIP configuration in the F820.

- MGC IP address: 10.40.123.100
- MGCID: 1
- SLC TERMID: AG58900AG58915
- RTP TERMID: RTP/00000–RTP/00015

6. Save configuration data.

```
ZXAN#write
Building configuration...
..[OK]
```

7. Configure F820 ONU type on the ZXA10 C220.
   i. Enter the global configuration mode.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#
```

   ii. Enter PON configuration mode and configure ONU type.

```
ZXAN(config)#pon
ZXAN(config-pon)#onu-type ZTEG-F820 gpon
```

   iii. Configure ONU port type.

```
ZXAN(config-pon)#onu-type-if ZTEG-F820 pots_0/1-32
ZXAN(config-pon)#exit
ZXAN(config)#
```

8. Register ONU.
   i. Query unconfigured ONU under GPON-OLT port.

```
ZXAN(config)#show gpon onu uncfg gpon-olt_0/5/1
OnuIndex                  Sn                  State
-------------------------------------------------------------
gpon-onu_0/5/1:1          ZTEG9000002B        unknown
```

   ii. Enter the GPON-OLT interface configuration mode.

```
ZXAN(config)#interface gpon-olt_0/5/1
ZXAN(config-if)#
```

   iii. Register ONU.

```
ZXAN(config-if)#register 1 type ZTEG-F820 ZTEG9000002B state ready
```

   iv. Query ONU state.

```
ZXAN(config-if)#show gpon onu state gpon-olt_0/5/1
OnuIndex              Admin State  Omcc State   O7 State     Phase State
-------------------------------------------------------------------------
gpon-onu_0/5/1:1      enable       enable       operation    working
ZXAN(config-if)#exit
ZXAN(config)#
```

9. Configure bandwidth profile.

i. Enter the GPON configuration mode.

```
ZXAN(config)#gpon
ZXAN(config-gpon)#
```

ii. Configure bandwidth profile.

```
ZXAN(config-gpon)#bandwidth-profile voip-tcont type 1 fixed 50000
ZXAN(config-gpon)#exit
ZXAN(config)#
```

10. Configure T-CONT and GEM ports.

- T-CONT (Transmission Container) is the minimum unit of upstream bandwidth scheduling which is identified by Alloc ID.
- GEM port is the minimum unit of downstream traffic which is identified by port ID.

i. Enter the GPON-ONU interface configuration mode

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

ii. Create T-CONT.

```
ZXAN(config-if)#tcont 1 name voiptcont traffic voip-tcont
```

iii. Create GEM ports.

```
ZXAN(config-if)#gemport 1 name NMport unicast tcont 1
ZXAN(config-if)#gemport 2 name voipport unicast tcont 1
ZXAN(config-if)#exit
ZXAN(config)#
```

11. Configure VLAN service port.

i. Enter the GPON-ONU interface configuration mode

```
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#
```

ii. Configure port mode to hybrid.

```
ZXAN(config-if)#switchport mode hybrid vport 1
ZXAN(config-if)#switchport mode hybrid vport 2
```

iii. Add port to in-band NM VLAN and VoIP service VLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 1000 tag vport 1
ZXAN(config-if)#switchport vlan 200 tag vport 2
ZXAN(config-if)#exit
ZXAN(config)#
```

Note:

When a port is added to a VLAN, the VLAN is added automatically.

12. Configure VLAN uplink port.

i. Enter the OLT uplink port configuration mode.

```
ZXAN(config)#interface gei_0/14/1
```

ii. Configure uplink port mode to hybrid.

```
ZXAN(config-if)#switchport mode hybrid
```

iii. Add uplink port to service VLAN in tag mode.

```
ZXAN(config-if)#switchport vlan 200 tag
```

```
ZXAN(config-if)#exit
ZXAN(config)#
```

13. Configure ONU NM service connection.
    i. Enter the ONU remote management mode.

```
ZXAN(config)#pon-onu-mng gpon-onu_0/5/1:1
ZXAN(gpon-onu-mng)#
```

    ii. Configure the map between GEM port and uplink interface.

```
ZXAN(gpon-onu-mng)#interwork gemport NMport dot1p-bridge upli
nk_0/1/1 prio-list 1
```

    iii. Configure VLAN filter mode on uplink interface.

```
ZXAN(gpon-onu-mng)# vlan-filter-mode uplink uplink_0/1/1 tag-
filter vid-filter untag-filter discard
```

    iv. Configure VLAN filter entry on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/1 priority 1
vid 1000
```

14. Configure ONU VoIP service connection.
    i. Configure the map between GEM port and uplink interface.

```
ZXAN(gpon-onu-mng)#interwork gemport voipport dot1p-bridge up
link_0/1/2 prio-list 7
```

    ii. Configure VLAN filter mode on uplink interface.

```
ZXAN(gpon-onu-mng)# vlan-filter-mode uplink uplink_0/1/2 tag-
filter vid-filter untag-filter discard
```

    iii. Configure VLAN filter entry on uplink interface.

```
ZXAN(gpon-onu-mng)#vlan-filter uplink uplink_0/1/2 priority 7
vid 200
```

15. Save configuration data.

```
ZXAN#write
Building configuration...
..[OK]
```

--End of Steps--

Result The VoIP service is configured successfully.

Chapter 7

VLAN Configuration

Table of Contents

Overview

Service Description

A VLAN is a group of hosts that communicate as if they were in the same broadcast domain, regardless of their physical location. A VLAN has the same attributes as a physical LAN, but it allows for end stations to be grouped together even if they are not located on the same network switch.

Service Specification

ZXA10 C220 supports the following VLAN applications:

- VLAN
- VLAN QinQ
- VLAN stacking
- VLAN translate

Adding VLAN

Short Description

Perform this procedure to add VLAN.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

VLAN is used to isolate ports on a device by dividing ports to different network segment logically.

To add the VLAN, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.

2. Use the **vlan** command to add single VLAN.
3. Use the **vlan database** command to enter VLAN batch configuration mode.
4. Use the **vlan** command to add multiple VLANs.
5. Use the **show vlan** command to query VLAN configuration.

END OF STEPS

Example

- Add VLAN 2.

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#vlan 2
ZXAN(config-vlan)#end
ZXAN#show vlan 2
id:              2
name:           VLAN0101
description:      N/A
transparent:      disable
multicast-packet: flood-unknown
port(untagged):

port(tagged):
```

- Add VLANs in batch: VLAN ID 1000 - 1100.

```
ZXAN#vlan database
ZXAN(vlan)#vlan 1000-1100
ZXAN(vlan)#end
ZXAN#show vlan summary
All created vlan num: 102
Details are following:
1,1000-1100
```

Configuring Port VLAN Mode

Short Description Perform this procedure to configure port VLAN mode.

Prerequisites

- Make sure that the network device works normally.
- The ONU is registered.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context ZXA10 C220 ports support the following VLAN modes:

- Access mode: Accepts untag packets only and can be added to only one VLANs in utag mode.
- Trunk mode: Accepts tag packets only and can be added to multiple VLANs in tag mode.
- Hybrid mode: Accepts both tag or untag packets and can be added to multiple VLANs in either tag or untag mode.
- Transparent mode: Accepts all tag packets.

To configure the port VLAN mode, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.

2. Use the **interface** command to enter interface configuration mode.
3. Use the **switchport mode** command to configure port VLAN mode.

> **Note:**
> The default port mode is hybrid.

4. Use the **show vlan port** command to query port VLAN configuration.

END OF STEPS

Example Configure ports VLAN mode:

- Uplink port 0/14/1: Hybrid
- GPON-ONU port 0/5/1:1: Trunk

```
ZXAN#configure terminal
Enter the configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gei_0/14/1
ZXAN(config-if)#switchport mode hybrid
ZXAN(config-if)#exit
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#switchport mode trunk
```

Configuring VLAN Uplink Port

Short Description Perform this procedure to configure VLAN uplink port.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context To configure the VLAN uplink port, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **interface** to enter the uplink interface configuration mode.
3. Use the **switchport vlan** command to configure VLAN uplink port.

> **Note:**
> When a port is added to a VLAN, the VLAN is added automatically.

4. Use the **show vlan port** command to query port VLAN configuration.

END OF STEPS

Example Configure VLAN uplink port:

- Uplink port: 0/14/1
- VLAN ID: 100

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gei_0/14/1
ZXAN(config-if)#switch vlan 100 tag
ZXAN(config-if)#show vlan port gei_1/21/1
Mode   Pvid CPvid Tpid   ProtEn  PrioEn  TLSEn   TLSVlan UntagVlan TagVlan
------------------------------------------------------------------------------

hybrid 1    0     0x8100 disable disable disable 0       1         100
```

Configuring VLAN Service Port

Short Description Perform this procedure to configure VLAN service port.

Prerequisites

- Make sure that the network device works normally.
- The ONU is registered.
- Log in to ZXA10 C220 through HyperTerminal or Telnet.

Context Service port provides service access to user through ONU.

To configure the VLAN service port, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **interface** to enter the GPON-ONU interface configuration mode.
3. Use the **switchport vlan** command to configure VLAN service port.

> **Note:**
>
> When a port is added to a VLAN, the VLAN is added automatically.

4. Use the **show vlan port** command to query port VLAN configuration.

END OF STEPS

Example Configure VLAN service port:

- VLAN ID: 20
- GPON-ONU port 0/5/1:1

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#switch vlan 20 tag
ZXAN(config-if)#show vlan port gpon-onu_0/5/1:1
Mode    Pvid CPvid Tpid    ProtEn  PrioEn  TLSEn   TLSVlan UntagVlan TagVlan
------------------------------------------------------------------------------

hybrid 1     0     0x8100 disable disable disable 0       1         20
```

Configuring VLAN QinQ

Short Description

Perform this procedure to configure VLAN QinQ.

Prerequisites

- Make sure that the network device works normally.
- The ONU is registered.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

According to VLAN QinQ rules, when the ZXA10 C220 receives upstream tag packets on the GPON-ONU port, it adds SVLAN tags to the packets. When the packets arrive at the port on the opposite end, the packets are sent to the user according to the user VLAN tags after the SVLAN tags are removed.

To configure the VLAN QinQ, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **interface** command to enter the GPON-ONU configuration mode.
3. Use the **switchport mode** command to configure port VLAN mode.
4. Use the **switchport qinq** command to configure VLAN QinQ rule.

Note:

- In a VLAN, VLAN QinQ and VLAN translate can not be configured simultaneously.
- CVLAN ID and SVLAN ID must be different.

END OF STEPS

Example

Configure a VLAN QinQ rule:

- User VLAN (CVLAN) ID: 100
- SVLAN ID: 1000
- Uplink port: 0/14/1
- GPON-ONU port: 0/5/1:1

```
ZXAN#configure terminal
Enter the configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gei_0/14/1
ZXAN(config-if)#switchport vlan 1000 tag
```

```
ZXAN(config-if)#exit
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#switchport mode hybrid vport 1
ZXAN(config-if)#switchport vlan 100 tag vport 1
ZXAN(config-if)#switchport vlan 1000 tag vport 1
ZXAN(config-if)#switchport qinq vlan 100 svlan 1000 vport 1
```

Configuring VLAN Translate

Short Description

Perform this procedure to configure VLAN translate.

Prerequisites

- Make sure that the network device works normally.
- The ONU is registered.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

According to VLAN translate rules, when the ZXA10 C220 receives upstream tag packets on the GPON-ONU port, it modifies the user VLAN tags to CVLAN tags and adds SVLAN tags to the packet. When the packets arrive at the port on the opposite end, the packets are sent to the user according to the CVLAN tags after the SVLAN tags are removed.

To configure the VLAN translate, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **interface** command to enter the GPON-ONU configuration mode.
3. Use the **switchport mode** command to configure port VLAN mode.
4. Use the **switchport translate** command to configure VLAN translate rule.

Note:

- In a VLAN, VLAN QinQ and VLAN translate can not be configured simultaneously.
- User VLAN ID and SVLAN ID must be different.

END OF STEPS

Example

Configure VLAN translate rule:

- User VLAN ID: 100
- CVLAN ID: 200
- SVLAN ID: 1000
- Uplink port: 0/14/1
- GPON-ONU port: 0/5/1:1

```
ZXAN#configure terminal
Enter the configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gei_0/14/1
```

```
ZXAN(config)#switchport vlan 1000 tag
ZXAN(config-if)#exit
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#switchport mode hybrid vport 1
ZXAN(config-if)#switchport vlan 100 tag vport 1
ZXAN(config-if)#switchport translate vlan 100 cvlan 200 svlan 1000 vport 1
```

Configuring VLAN Stacking

Short Description Perform this procedure to configure VLAN stacking.

Prerequisites

- Make sure that the network device works normally.
- The ONU is registered.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context In VLAN stacking application, when the ZXA10 C220 receives an upstream untag packet on the GPON-ONU port, it adds both PVID and CPVID (CVLAN PVID) to the packet.

To configure the VLAN stacking, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **interface** command to enter the GPON-ONU configuration mode.
3. Use the **switchport default vlan** command to configure port PVID.
4. Use the **switchport default cvlan** command to configure port CPVID.

END OF STEPS

Example Configure VLAN stacking:

- Uplink port: 0/14/1
- GPON-ONU port: 0/5/1:1
- PVID: 100
- CPVID: 10

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#interface gei_0/14/1
ZXAN(config-if)#switchport vlan 100 tag
ZXAN(config)#exit
ZXAN(config)#interface gpon-onu_1/5/1:1
ZXAN(config-if)#switchport default vlan 100 vport 1
ZXAN(config-if)#switchport default cvlan 10 vport 1
ZXAN(config-if)#show vlan port gpon-onu_0/5/1:1
PortMode    Pvid  CPvid Tpid    TLSStatus TLSVlan UntaggedVlan  TaggedVlan
-------------------------------------------------------------------------
access      100   10    0x8100  disable   0       100
```

This page is intentionally blank.

Chapter 8

User Security Configuration

Table of Contents

Overview

Service Description

User security configuration provides port information of users to a BRAS. The BRAS binds user accounts with user ports to avoid illegal access of the user accounts.

Service Specification

ZXA10 C220 supports the port location for user security management.

Port Location Configuration

ZXA10 C220 provides port location mechanism to improve user security and prevent user accounts from being stolen.

ZXA10 C220 supports the following port location methods:

- DHCP Option82
- PPPoE+

Configuring DHCP Option82

Short Description

Perform this procedure to configure DHCP option82 port location.

Prerequisites

- Make sure network device works normally.
- ONU is registered.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

To configure the DHCP option82 port location, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **dhcp-option82 enable** command to enable global DHCP option82 function.
3. Use the **port-location access-node-identifier** command to configure access node identifier.
4. Use the **port-location hostname** command to configure port location host name.
5. Use the **interface** command to enter the GPON-ONU interface configuration mode.
6. Use the **port-location format** command to configure port sub-option format.
7. Use the **port-location sub-option remote-id enable** command to enable port remote ID function.
8. Use the **port-location sub-option remote-id name** command to configure port remote ID.
9. Use the **dhcp-option82 enable** command to enable port DHCP option82 function.
10. Use the **dhcp-option82 trust** command to configure port trust attribute and corresponding policy.

Note:

If the port is trust port, keep or replace policy is available. If the port is untrust port, discard or add policy is available.

- Keep: Keep the option82 field in the DHCP request packet.
- Replace: Replace the option82 field in the DHCP request packet.
- Discard: Discard the option82 field in the DHCP request packet.
- Add: Add the option82 field to the DHCP request packet.

The policy effects only when there is DHCP option82 field in the upstream packet.

11. Use the **show dhcp-option82** command to query DHCP option82 configuration.

END OF STEPS

Example

Configure DHCP option82 port location:

- GPON-ONU port: 0/5/1:1
- Format: China-Telecom
- Access-node-identifier: Inband MAC address
- Remote-ID name: ZTE123

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#dhcp-option82 enable
ZXAN(config)#port-location access-node-identifier inband-mac
ZXAN(config)#interface gpon-onu_0/5/1:1
```

```
ZXAN(config-if)#port-location format china-telecom vport 1
ZXAN(config-if)#port-location sub-option remote-id enable vport 1
ZXAN(config-if)#port-location sub-option remote-id name ZTE123 vport 1
ZXAN(config-if)#dhcp-option82 enable vport 1
ZXAN(config-if)#dhcp-option82 trust true keep vport 1
```

Configuring PPPoE+

Short Description

Perform this procedure to configure PPPoE+ port location.

Prerequisites

- Make sure network device works normally.
- ONU is registered.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

To configure the PPPoE+ port location, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **pppoe-plus enable** command to enable global PPPoE+ functions.
3. Use the **port-location access-node-identifier** command to configure access node identifier.
4. Use the **port-location hostname** command to configure port location host name.
5. Use the **interface** command to enter the GPON-ONU interface configuration mode.
6. Use the **port-location format** command to configure port sub–option format.
7. Use the **port-location sub-option remote-id enable** command to enable port remote ID function.
8. Use the **port-location sub-option remote-id name** command to configure port remote ID.
9. Use the **pppoe-plus enable** command to enable port PPPoE+ function.
10. Use the **show pppoe-plus** query PPPoE+ function.

END OF STEPS

Example

Configure PPPoE+ port location:

- GPON-ONU port: 0/5/1:1
- Format: China-Telecom
- Access-node-identifier: Inband MAC address
- Remote-ID name: ZTE123

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#pppoe-plus enable
ZXAN(config)#port-location access-node-identifier inband-mac
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#port-location format china-telecom vport 1
ZXAN(config-if)#port-location sub-option remote-id enable vport 1
ZXAN(config-if)#port-location sub-option remote-id name ZTE123 vport 1
ZXAN(config-if)#pppoe-plus enable vport 1
```

This page is intentionally blank.

Chapter 9

System Security Configuration

Table of Contents

Overview

Service Description

The system security configuration protects the system from illegal packet attacking from either network side or user side.

Service Specification

ZXA10 C220 supports the following system security techniques:

- Protocol packet limit
- Anti-DoS attack
- SSH
- Management ACL
- Administrator authentication

Configuring Protocol Packet Limit

Short Description

Perform this procedure to configure protocol packet limit function.

Prerequisites

- Make sure that the network device works normally.
- Log in to ZXA10 C220 through HyperTerminal or Telnet.

Context

To configure the protocol packet limit function, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.

2. Use the **control-panel** command to enter control–panel configuration mode.
3. Use the **packet-limit** command to configure protocol packet threshold.
4. Use the **show packet-limit statistics** command to query protocol packet limit statistics.

END OF STEPS

Example Configure all protocol packet limits to 100 pps.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#control-panel
ZXAN(control-panel)#packet-limit all 100
ZXAN(config-if)#show packet-limit statistics
------------------------------------------------------------------------
inband            pktNumTotal      pktNumProcessed        pktNumDropped
all                     42842                    -                    -
arp                         0                    0                    0
icmp                        0                    0                    0
igmp                        0                    0                    0
bpdu                        0                    0                    0
dhcp                        0                    0                    0
vbas                        0                    0                    0
pppoe                       0                    0                    0
snmp                        0                    0                    0
------------------------------------------------------------------------
outband           pktNumTotal      pktNumProcessed        pktNumDropped
all                         0                    0                    0
arp                         0                    0                    0
icmp                        0                    0                    0
------------------------------------------------------------------------
```

Configuring Anti-DoS Attack

Short Description Perform this procedure to configure anti-DoS attack function.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context With anti-DoS attack function, the CPU of ZXA10 C220 is free from too many packets from certain user MAC address.

To configure the anti-DoS attack function, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **control-panel** command to enter control–panel configuration mode.
3. Use the **anti-dos enable** command to enable anti-DoS attack function.
4. Use the **anti-dos limit-num** command to configure anti-DoS attack limit threshold.

Note:

When the control switching card receives more than 5**value* packets from a MAC address in 5 seconds, the MAC address is sent to the black name list.

5. Use the **anti-dos drop enable** command to enable anti-DoS attack packet drop function.

Note:

If a MAC address is in the black name list, the system discards packets from the MAC address.

6. Use the **anti-dos blocking–time** command to configure anti-DoS attack blocking time.
7. Use the **show anti-dos black-table** command to query anti-DoS attack black name list.

END OF STEPS

Example Configure anti-DoS attack function.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#control-panel
ZXAN(control-panel)#anti-dos enable
ZXAN(control-panel)#anti-dos limit-num 10
ZXAN(control-panel)#anti-dos drop enable
ZXAN(control-panel)#anti-dos blocking-time 60
ZXAN(control-panel)#show anti-dos black-table
--------------------------------------------------------------------------------
mac-address       vlan    port                pktNumTotal  pktNumDropped
--------------------------------------------------------------------------------
```

Configuring SSH

Short Description Perform this procedure to configure SSH.

Prerequisites

- Make sure that the network device works normally.
- Log in to ZXA10 C220 through HyperTerminal or Telnet.

Context SSH is a replacement of Telnet. With SSH protocol, user data is transmitted after encryption and compression.

The ZXA10 C220 works as SSH server.

To configure the SSH, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **ssh server version** command to configure SSH version.

3. Use the **ssh server authentication type** command to configure SSH authentication type.
4. Use the **ssh server authentication mode** command to configure SSH authentication mode.

Note:

This command is invalid when the authentication type is local.

5. Use the **ssh server authentication ispgroup** command to configure SSH authentication RADIUS group.
6. Use the **ssh server generate-key** command to generate key.

Note:

This command is invalid when the SSH version is 2.

7. Use the **ssh server enable** command to enable SSH function.
8. Use the **ssh server only** command to configure that only SSH access is permitted.
9. Use the **show ssh** command to query SSH configuration.

END OF STEPS

Example Configure SSH.

- SSH version: 2
- Authentication mode: RADIUS
- Authentication type: PAP
- SSH only: enable
- RADIUS server: 192.168.1.1
- RADIUS key: zte

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#ssh server enable
ZXAN(config)#ssh server only
ZXAN(config)#ssh server authentication mode radius
ZXAN(config)#ssh server authentication type pap
ZXAN(config)#ssh server version 2
ZXAN(config)#ssh server authentication ispgroup 2
ZXAN(config)#radius authentication-group 2
ZXAN(config-authgrp-2)#server 1 192.168.1.1 key zte
ZXAN(config)#show ssh
SSH configuration:
  SSH enable-flag configuration : enable
  SSH version                   : ver2.0
  SSH only configuration        : enable
  SSH init server key           : disable
  SSH auth radius isp-groupid   : 2
  SSH auth mode                 : radius
  SSH auth type                 : pap
```

Administrator Authentication Configuration

ZXA10 C220 supports the following administrator authentication modes:

- RADIUS
- TACACS+

Configuring RADIUS

Short Description Perform this procedure to configure RADIUS.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context RADIUS is a standard AAA protocol.

The ZXA10 C220 supports RADIUS authentication for Telnet user.

To configure the RADIUS, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **radius authentication-group** command to configure RADIUS authentication group.
3. Use the **server** command to configure RADIUS server.
4. Use the **algorithm** command to configure RADIUS algorithm.
5. Use the **timeout** command to configure RADIUS time-out time.
6. Use the **deadtime** command to configure RADIUS invalid time.
7. Use the **max-retries** command to configure RADIUS maximum retry times.

END OF STEPS

Example Configure RADIUS:

- Authentication group: 1
- Server IP address: 10.61.225.14
- Key: zte
- Algorithm: round-robin
- Invalid time: 60 minute
- Max retry times: 3

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#radius authentication-group 1
ZXAN(config-authgrp-1)#server 1 10.61.225.14 key zte
ZXAN(config-authgrp-1)#timeout 120
ZXAN(config-authgrp-1)#algorithm round-robin
```

```
ZXAN(config-authgrp-1)#deadtime 60
ZXAN(config-authgrp-1)#max-retries 3
```

Configuring TACACS+

Short Description

Perform this procedure to configure TACACS+.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

TACACS+ is an AAA protocol. TACACS+ supports independent AAA functions, allowing different TACACS+ security servers to work as the authentication, authorization, and accounting servers.

To configure the TACACS+, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **tacacs enable** command to enable TACACS+ function.
3. Use the **tacacs-server host** command to configure TACACS+ server.
4. Use the **tacacs-server key** command to configure TACACS+ shared encryption key.
5. Use the **tacacs-server packet** command to configure TACACS+ packet size.
6. Use the **tacacs-server timeout** command to configure TACACS+ time-out period.
7. Use the **aaa group-server tacacs+** command to configure TACACS+ AAA server group.
8. Use the **server** command to configure TACACS+ server IP address in the AAA server group.
9. Use the **aaa accounting** command to configure AAA accounting method.
10. Use the **aaa authentication** command to configure AAA authentication method.
11. Use the **aaa authorization** command to configure AAA authorization method.

END OF STEPS

Example

Configure TACACS+:

- TACACS+ server IP address: 10.63.198.84
- TACACS+ server key: zte
- TACACS+ server packet size: 2048 byte
- TACACS+ server time-out: 10 second
- TACACS+ AAA server group: abc

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#tacacs enable
ZXAN(config)#tacacs-server host 10.63.198.84 key zte
```

```
ZXAN(config)#tacacs-server packet 2048
ZXAN(config)#tacacs-server timeout 10
ZXAN(config)#aaa group-server tacacs+ abc
ZXAN(config-sg)#server 10.63.198.84
ZXAN(config-sg)#exit
ZXAN(config)#aaa authentication login default group abc
ZXAN(config)#aaa authorization exec default group abc
ZXAN(config)#aaa accounting commands 2 default stop-only group abc
```

Configuring Management ACL

Short Description

Perform this procedure to configure management ACL.

Prerequisites

- Make sure network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

The management ACL limits Telnet or SNMP access to the ZXA10 C220. The ZXA10 C220 supports various ACL types. This procedure takes the standard ACL as an example.

To configure the management ACL, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **acl standard** command to configure standard ACL.
3. Use the **rule** command to configure ACL rule.
4. Use the **line telnet access-class** command apply ACL to Telnet access.
5. Use the **snmp-server access-list** command apply ACL to SNMP access.

END OF STEPS

Example

Configure a management ACL:

The Telnet access from network segment 192.168.1.0/24 is permitted except the IP address 192.168.1.100.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#acl standard number 10
ZXAN(config-std-acl)#rule 1 deny 192.168.1.100 0.0.0.0
ZXAN(config-std-acl)#rule 2 permit 192.168.1.0 0.0.0.255
ZXAN(config-std-acl)#exit
ZXAN(config)#line telnet access-class 10
```

This page is intentionally blank.

Chapter 10

DHCP Configuration

Table of Contents

Overview

Service Description

DHCP enables a host on the network to obtain an IP address ensuring its normal communication and relevant configuration information from a DHCP server.

Service Specification

ZXA10 C220 supports the following DHCP applications:

- DHCP snooping
- DHCP source guard
- DHCP server
- DHCP relay

ZXA10 C220 uses DHCP snooping to prevent unauthorized DHCP server from accessing the network. A trusted port needs to be configured for the proper DHCP server.

ZXA10 C220 can either works as DHCP server or DHCP relay. Both of the applications, however, cannot be used simultaneously on the same VLAN interface.

Configuring DHCP Snooping

Short Description

Perform this procedure to configure DHCP snooping function.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

To configure the DHCP snooping function, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.

2. Use the **ip dhcp snooping enable** command to enable global DHCP snooping function.
3. Use the **ip dhcp snooping vlan** command to enable VLAN DHCP snooping function.
4. Use the **ip dhcp snooping trust** command to configure DHCP server trust interface.
5. Use the **interface** command to enter GPON-ONU interface configuration mode.
6. Use the **ip dhcp snooping enable** command to enable ONU interface DHCP Snooping function.
7. Use the **ip dhcp snooping quota** command to configure ONU interface DHCP session quota.
8. Use the **show ip dhcp snooping configure** command to query DHCP snooping configuration.
9. Use the **show ip dhcp snooping trust** command to query DHCP snooping trust port.
10. Use the **show ip dhcp snooping vlan** command to query DHCP snooping vlan.

END OF STEPS

Example Configure DHCP snooping function:

- The legal DHCP server 1 is connected to uplink port 0/14/1.
- The illegal DHCP server 2 is connected to uplink port 0/14/2.
- Both uplink ports 0/14/1 and 0/14/2 are in VLAN 100.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gei_0/14/1
ZXAN(config-if)#switchport vlan 100 tag
ZXAN(config)#interface gei_0/14/2
ZXAN(config-if)#switchport vlan 100 tag
ZXAN(config-if)#exit
ZXAN(config)#ip dhcp snooping enable
ZXAN(config)#ip dhcp snooping vlan 100
ZXAN(config)#ip dhcp snooping trust gei_0/14/1
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#ip dhcp snooping enable vport 1
ZXAN(config-if)#switchport vlan 100 tag vport 1
ZXAN(config-if)#show ip dhcp snooping configure
DHCP snooping configure information
   DHCP snooping globally state :enable(running)
ZXAN(config-if)#show ip dhcp snooping trust
Interface                        State
-----------------------------------------
gei_0/14/1                      Trusted
ZXAN(config-if)#show ip dhcp snooping vlan
DHCP snooping state on vlans
Vlan     State
------------------------------
100      enable
```

Configuring DHCP Source Guard

Short Description Perform this procedure to configure DHCP source guard function.

Prerequisites
- Make sure that the network device works normally.
- DHCP snooping configuration is completed.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context When IP source guard function is enabled on a port, all uplink packets are discarded except DHCP packets before the user obtains IP address through DHCP. When the user obtains the IP address, the DHCP snooping module bind the IP address with the user port and the user can access network with the IP address normally.

To configure the DHCP source guard function, perform the following steps:

Steps
1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **ip source-guard** command to enable global DHCP source guard function.
3. Use the **interface** command to enter GPON-ONU interface configuration mode.
4. Use the **ip source-guard** command to enable ONU port DHCP source guard function.
5. Use the **show ip dhcp source-guard** command to query DHCP source-guard configuration.

END OF STEPS

Example Enable global and port DHCP source guard function.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#ip source-guard enable
ZXAN(config)#interface gpon-onu_0/5/1:1
ZXAN(config-if)#ip source-guard enable
ZXAN(config-if)#show ip source-guard global
ip source-guard status : enable
```

Configuring DHCP Server

Short Description Perform this procedure to configure DHCP server.

Prerequisites
- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context To configure the DHCP server, perform the following steps:

Steps
1. Use the **configure terminal** command to enter global configuration mode.

2. Use the **ip dhcp enable** command to enable global DHCP function.
3. Use the **ip local pool** command to configure IP address pool.
4. Use the **ip dhcp server leasetime** command to configure DHCP server lease time.
5. Use the **ip dhcp server dns** command to configure DHCP server DNS address.
6. Use the **ip dhcp server update arp** command to configure DHCP server to update ARP entry of DHCP binding.
7. Use the **interface vlan** command to enter VLAN interface configuration mode.
8. Use the **ip dhcp mode server** command to enable DHCP server on VLAN interface.
9. Use the **ip adderss** command to configure DHCP server IP address.
10. Use the **ip dhcp server gateway** command to configure DHCP server gateway IP address.
11. Use the **peer default ip pool** command to configure DHCP server IP pool.
12. Use the **show ip dhcp server user vlan** command to query DHCP server user information.

END OF STEPS

Example Configure DHCP server:

- DHCP VLAN: 10
- IP address: 10.10.1.1
- Default gateway: 10.10.1.1
- DNS IP address: 10.10.2.2
- IP address lease time: 900 seconds
- DHCP user quota: 100

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#vlan 10
ZXAN(config-vlan)#exit
ZXAN(config)#ip dhcp enable
ZXAN(config)#ip dhcp server dns 10.10.2.2
ZXAN(config)#ip dhcp server leasetime 900
ZXAN(config)#ip local pool dhcp 10.10.1.3 10.10.1.254 255.255.255.0
ZXAN(config)#interface vlan 10
ZXAN(config-if)#ip dhcp mode server
ZXAN(config-if)#ip address 10.10.1.1 255.255.255.0
ZXAN(config-if)#ip dhcp server gateway 10.10.1.1
ZXAN(config-if)#peer default ip pool dhcp
ZXAN(config-if)#ip dhcp user quota 100
ZXAN(config-if)#show ip dhcp server user vlan 10
Current online users are 0.
Index MAC addr       IP addr         State    Expiration
```

Configure DHCP Relay

Short Description Perform this procedure to configure DHCP relay.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context To configure the DHCP relay, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **ip dhcp enable** command to enable global DHCP function.
3. Use the **interface vlan** command to enter VLAN interface configuration mode.
4. Use the **ip dhcp mode relay** command to enable DHCP relay on VLAN interface.
5. Use the **ip dhcp relay agent** command to configure DHCP relay IP address.
6. Use the **ip dhcp relay server** command to configure DHCP server IP address.
7. Use the **show ip dhcp relay user vlan** command to query DHCP relay user information.

END OF STEPS

Example Configure DHCP relay:

- DHCP VLAN: 10
- DHCP relay agent IP address: 10.10.1.1
- DHCP server IP address: 10.10.2.2

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#vlan 10
ZXAN(config-vlan)#exit
ZXAN(config)#ip dhcp enable
ZXAN(config)#interface vlan 10
ZXAN(config-if)#ip dhcp mode relay
ZXAN(config-if)#ip address 10.10.1.1 255.255.255.0
ZXAN(config-if)#ip dhcp relay agent 10.10.1.1
ZXAN(config-if)#ip dhcp relay server 10.10.2.2
ZXAN(config-if)#show ip dhcp relay user vlan 10
Current online users are 0.
Index MAC addr       IP addr         State    Expiration
```

This page is intentionally blank.

Chapter 11

ACL Configuration

Table of Contents

Overview

Service Description

ACL is used to identify and restrict traffic. A series of matching rules are used to identify and filter the packets. Packets are identified (according to a predefined policy) before being permitted or denied.

Service Specifications

ZXA10 C220 supports four types of ACL.

- Standard ACL
- Extended ACL
- Link layer ACL
- Hybrid ACL

Configuring Standard ACL

Short Description

Perform this procedure to configure standard ACL and apply it to port.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

In a standard ACL, rules are defined on the basis of source IP address only.

To configure the standard ACL, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **time-range** command to configure ACL time range.
3. Use the **acl standard** command to configure standard ACL.

Note:

The standard ACL number range: 1 – 99.

4. Use the **rule** command to configure ACL rule.

Note:

- Each standard ACL supports maximum 127 rules.
- The time range must be configured before it is applied in a rule. If time-range is not configured, the rule always takes effect.

5. Use the **interface** command to enter interface configuration mode.
6. Use the **ip access-group** command to apply ACL to port.

END OF STEPS

Example

Configure a standard ACL on uplink port 0/14/1.

- Time range: 9:00 - 17:00, working day.
- Deny packets from source IP address: 168.1.1.1 0.0.0.255.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#time-range worktime 09:00:00 to 17:00:00 working-day
ZXAN(config)#acl standard number 3
ZXAN(config-std-acl)#rule 1 deny 168.1.1.1 0.0.0.255 time-range worktime
ZXAN(config-std-acl)#rule 2 permit any
ZXAN(config-std-acl)#exit
ZXAN(config)#interface gei_0/14/1
ZXAN(config-if)#ip access-group 3 in
```

Configuring Extended ACL

Short Description

Perform this procedure to configure extended ACL and apply it to port.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

In an extended ACL, rules are defined on the basis of the following:

- Source IP address
- Destination IP address
- IP protocol type
- Source TCP port number
- Destination TCP port number
- Source UDP port number

- Destination UDP port number
- ICMP types
- DSCP
- ICMP code
- ToS precedence

To configure the extended ACL, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **time-range** command to configure ACL time range.
3. Use the **acl extended** command to configure extended ACL.

Note:

The extended ACL number range: 100 – 199.

4. Use the **rule** command to configure ACL rule.

Note:

- Each extended ACL supports maximum 127 rules.
- The time range must be configured before it is applied in a rule. If time-range is not configured, the rule always takes effect.

5. Use the **interface** command to enter interface configuration mode.
6. Use the **ip access-group** command to apply ACL to port.

END OF STEPS

Example

Configure an extended ACL on uplink port 0/14/1:

Deny TCP packets from source IP address 168.1.1.1 0.0.0.255 and source port 23 (Telnet).

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#acl extend number 101
ZXAN(config-ext-acl)#rule 1 deny tcp 192.168.1.0 0.0.0.255 eq telnet any
ZXAN(config-ext-acl)#rule 2 permit any
ZXAN(config-ext-acl)#exit
XAN(config)#interface gei_0/14/1
ZXAN(config-if)#ip access-group 101 in
```

Configuring Link Layer ACL

Short Description

Perform this procedure to configure link layer ACL and apply it to port.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

In a link layer ACL, rules are defined on the basis of the following:

- Source MAC address
- Destination MAC address
- Source VLAN ID
- Layer-2 Ethernet protocol type
- 802.1p priority

To configure the link layer ACL, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **time-range** command to configure ACL time range.
3. Use the **acl link** command to configure link layer ACL.

   Note:

   The link layer ACL number range: 200 – 299.

4. Use the **rule** command to configure ACL rule.

   Note:

   - Each link layer ACL supports maximum 127 rules.
   - The time range must be configured before it is applied in a rule. If time-range is not configured, the rule always takes effect.

5. Use the **interface** command to enter interface configuration mode.
6. Use the **ip access-group** command to apply ACL to port.

END OF STEPS

Example

Configure a link layer ACL on uplink port 0/14/1:

Deny packets from source MAC address 0000.0000.0001 and VLAN ID 4091.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#acl link number 200
ZXAN(config-link-acl)#rule 1 permit any in 4091 0000.0000.0001 0000.00
00.0000 egress any
ZXAN(config-link-acl)#rule 2 permit any
ZXAN(config-link-acl)#exit
ZXAN(config)#interface gei_0/14/1
ZXAN(config-if)#ip access-group 200 in
```

Configuring Hybrid ACL

Short Description

Perform this procedure to configure hybrid ACL and apply it to port.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

In a hybrid ACL, rules are defined on the basis of criteria in previously mentioned three types, which include:

- Source MAC address
- Destination MAC address
- Source VLAN ID
- Source IP address
- Destination IP address
- Source TCP port number
- Destination TCP port number
- Source UDP port number
- Destination UDP port number

To configure the hybrid ACL, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **time-range** command to configure ACL time range.
3. Use the **acl hybrid** command to configure hybrid ACL.

   Note:

   The hybrid ACL number range: 300 – 399.

4. Use the **rule** command to configure ACL rule.

   Note:

   - Each hybrid ACL supports maximum 127 rules.
   - The time range must be configured before it is applied in a rule. If time-range is not configured, the rule always takes effect.

5. Use the **interface** command to enter interface configuration mode.
6. Use the **ip access-group** command to apply ACL to port.

END OF STEPS

Example

Configure a hybrid ACL on uplink port 0/14/1:

- Deny ARP packets.

- Deny IP packets of destination IP address 192.168.1.0/24 and destination MAC address 0000.0000.0001.

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#acl link number 300
ZXAN(config-hybd-acl)#rule 1 deny any any any arp
ZXAN(config-hybd-acl)#rule 2 deny any any 192.168.1.0 0.0.0.255 ip egr
ess 0000.0000.0001 0000.0000.0000
ZXAN(config-hybd-acl)#rul 3 permit any any any any
ZXAN(config-hybd-acl)#exit
ZXAN(config)#interface gei_0/14/1
ZXAN(config-if)#ip access-group 300 in
```

Chapter 12

QoS Configuration

Table of Contents

Overview

Service Description

QoS is the ability to provide different priority to different applications, users, or data flows, or to guarantee a certain level of performance to a data flow. For example, a required bit rate, delay, jitter, packet dropping probability and/or bit error rate may be guaranteed.

QoS guarantees are important if the network capacity is insufficient, especially for real-time streaming multimedia applications such as VoIP, online games and IPTV, since these often require fixed bit rate and are delay sensitive, and in networks where the capacity is a limited resource, for example in cellular data communication.

Service Specification

ZXA10 C220 supports the following QoS features:

- Traffic classification
- Traffic limiting
- Traffic shaping
- Priority mark
- Queue scheduling
- Redirection
- Traffic mirroring
- Traffic statistics

Configuring Traffic Limit

Short Description Perform this procedure to configure traffic limit.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context Traffic limit restrains bandwidth limit of certain service traffic. When the service bandwidth exceeds the limit, the optional actions are as follows:

- Discard or forward the packets.
- Modify DSCP of the packets.
- Modify drop precedence of the packets.

To configure the traffic limit, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **acl** command to configure ACL.
3. Use the **rule** command to configure ACL rule.
4. Use the **traffic-limit in** command to configure traffic limit.
5. Use the **interface** command to enter interface configuration mode.
6. Use the **ip access-group** command to apply the ACL to port.

END OF STEPS

Example Configure traffic limit on uplink port 0/14/1:

- Destination IP address: 168.2.5.5
- Bandwidth limit
  - CIR: 5000 kbps
  - CBS: 2000 KB
  - PIR: 10000 kbps
  - PBS: 2000 KB
  - Meter color mode: Blind

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#acl extended number 100
ZXAN(config-ext-acl)#rule 1 permit 168.2.5.5 0.0.0.0
ZXAN(config-ext-acl)#exit
ZXAN(config)#traffic-limit in 100 rule-id 1 cir 5000 cbs 2000 pir 10000
pbs 2000 mode blind
ZXAN(config)#interface gei_0/14/1
ZXAN(config-if)#ip access-group 100 in
```

Configuring Traffic Shaping

Short Description Perform this procedure to configure traffic shaping.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

Traffic shaping controls the speed rate of the output packets so that the packets are sent at a constant speed. Traffic shaping is used to match the packet speed rate to that of the receiving device, to avoid congestion or packet discarding.

Traffic shaping caches packets which exceed rate limit, to ensure that the packets are sent at a constant speed. Traffic shaping may cause delay.

To configure the traffic shaping, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **interface** command to enter the interface configuration mode.
3. Use the **qos traffic-shape** command to configure traffic shaping.

END OF STEPS

Example

Configure traffic shaping on uplink port 0/14/1:

- Rate limit: 10000 kbps
- Bucket size: 10000 KB

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#interface gei_0/14/1
ZXAN(config-if)#traffic-shape rate-limit 10000 bucket-size 10000
```

Configuring Priority Mark

Short Description

Perform this procedure to configure priority mark.

Prerequisites

- Make sure network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

Priority mark is used to allocate priority to certain packets according to traffic classification. It supports the following operations:

- Modify CoS queue and 802.1p value.
- Modify CoS queue but not 802.1p value.
- Modify DSCP value.
- Modify drop precedence.

To configure the priority mark, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **acl** command to configure ACL.
3. Use the **rule** command to configure ACL rule.
4. Use the **priority-mark in** command to configure priority mark.

5. Use the **interface** command to enter interface configuration mode.
6. Use the **ip access-group** command to apply ACL to port.

END OF STEPS

Example Configure priority mark on uplink port 0/14/1:

- Source IP address: 168.2.5.5
- DSCP precedence: 34
- CoS priority: 4
- Drop precedence: High

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#acl standard number 10
ZXAN(config-std-acl)#rule 1 permit 168.2.5.5
ZXAN(config-std-acl)#rule 2 permit any
ZXAN(config-std-acl)#exit
ZXAN(config)#priority-mark in 10 rule-id 1 dscp 34 cos 4 drop-precedence high
ZXAN(config)#interface gei_0/14/1
ZXAN(config-if)#ip access-group 10 in
```

Configuring Queue Scheduling

Short Description Perform this procedure to configure queue scheduling.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context Each physical port of the ZXA10 C220 supports eight (0 – 7) output queues, which are called CoS queues. The device performs operations on the output queues on the entry port according to the CoS queues corresponding to the packet 802.1p. When congestion occurs on the network, multiple packets may compete for one resource. Queue scheduling can solve this problem.

On the network side, the ZXA10 C220 supports three queue scheduling modes:

- Fair–queue
- SP
- WRR

To configure the queue scheduling, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **queue-mode** command to configure network side queue schedule mode.

END OF STEPS

Example Configure queue scheduling on uplink ports.

- Port 0/14/1: SP
- Port 0/14/2: WRR, queue 0 – 7 weight 10, 5, 8, 10, 5, 8, 9, 10.

```
ZXAN(config)#interface gei_0/14/1
ZXAN(config-if)#queue-mode strict-priority
ZXAN(config-if)#exit
ZXAN(config)#interface gei_0/14/2
ZXAN(config-if)#queue-mode wrr 0 10 1 5 2 8 3 10 4 5 5 8 6 9 7 10
```

Configuring Redirection

Short Description Perform this procedure to configure redirection.

Prerequisites

- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context Redirection modifies egress direction of packet according to traffic classification. The direction may be next hop, CPU or interface.

To configure the redirection, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **acl** command to configure ACL.
3. Use the **rule** command to configure ACL rule.
4. Use the **redirect in** command to configure redirection.
5. Use the **interface** command to enter interface configuration mode.
6. Use the **ip access-group** command to apply the ACL to port.

END OF STEPS

Example Configure redirection on uplink port 0/14/4:

- Redirection port for packets from source IP address 168.2.5.5: 0/14/3
- Next hop for packets from source IP address 66.100.5.6: 166.88.96.56

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#acl extend number 100
ZXAN(config-ext-acl)#rule 1 permit ip 168.2.5.5 0.0.0.0 any
ZXAN(config-ext-acl)#rule 2 permit ip any 66.100.5.6 0.0.0.0
ZXAN(config-std-acl)#rule 3 permit any
ZXAN(config-ext-acl)#exit
ZXAN(config)#redirect in 100 rule-id 1 interface gei_0/14/3
ZXAN(config)#redirect in 100 rule-id 2 next-hop 166.88.96.56
ZXAN(config)#interface gei_0/14/4
ZXAN(config-if)#ip access-group 100 in
```

Configuring Traffic Mirroring

Short Description Perform this procedure to configure traffic mirroring.

Prerequisites
- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context Traffic mirroring is to mirror traffic to assigned CPU or port in order to analyze and monitor packets.

To configure the traffic mirroring, perform the following steps:

Steps
1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **acl** command to configure ACL.
3. Use the **rule** command to configure ACL rule.
4. Use the **traffic-mirror in** command to configure traffic mirroring.
5. Use the **interface** command to enter interface configuration mode.
6. Use the **ip access-group** command to apply the ACL to port.

END OF STEPS

Example Configuring traffic mirroring on uplink port 0/14/1:
- Mirror port: 0/14/2
- Mirror traffic: packets from source IP address 168.2.5.6

```
ZXAN(config)#acl standard number 10
ZXAN(config-std-acl)#rule 1 permit 168.2.5.5
ZXAN(config-std-acl)#rule 2 permit 168.2.5.6
ZXAN(config-std-acl)#rule 3 permit any
ZXAN(config-std-acl)#exit
ZXAN(config)#traffic-mirror in 10 rule-id 2 interface gei_0/14/2
ZXAN(config)#interface gei_0/14/1
ZXAN(config-if)#ip access-group 10 in
```

Configuring Traffic Statistics

Short Description Perform this procedure to configure traffic statistics.

Prerequisites
- Make sure that the network device works normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context Traffic statistics is used to collect statistics on the packets of specific service flows. It counts quality and bytes of the packets arrived at the ingress port.

To configure the traffic statistics, perform the following steps:

Steps
1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **acl** command to configure ACL.
3. Use the **rule** command to configure ACL rule.

4. Use the **traffic-statistics in** command to configure traffic statistics.
5. Use the **interface** command to enter interface configuration mode.
6. Use the **ip access-group** command to apply the ACL to port.

END OF STEPS

Example Configure traffic statistics on uplink port 0/14/2:

- Destination IP address: 67.100.88.0/24
- Unit: byte

```
ZXAN(config)#acl extend number 100
ZXAN(config-ext-acl)#rule 1 permit ip 168.2.5.5 0.0.0.0 any
ZXAN(config-ext-acl)#rule 2 permit ip any 67.100.88.0 0.0.0.255
ZXAN(config-std-acl)#rule 3 permit any
ZXAN(config-ext-acl)#exit
ZXAN(config)#traffic-statistics in 100 rule-id 2 pkt-type all statis
tics-type byte
ZXAN(config)#traffic-statistics in 100 rule-id 2 pkt-type all statis
tics-type packet
ZXAN(config)#interface gei_0/14/2
ZXAN(config-if)#ip access-group 100 in
```

This page is intentionally blank.

Chapter 13

Uplink Protection Configuration

Table of Contents

Overview

Service Description

ZXA10 C220 provides stable service with main/backup uplink mechanism. The main/backup uplink mechanism ensures that when the main uplink connection is break, the backup link takes over the service automatically.

Service Specification

ZXA10 C220 supports three types of uplink protection.

- Link aggregation
- UAPS
- CL1A 1+1 protection

Configuring Link Aggregation

Short Description

Perform this procedure to configure link aggregation.

Prerequisites

- Make sure that the network device works normally.
- Uplink ports work normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

LACP is a method to control the bundling of several physical ports together to form a single logical channel. LACP allows a network device to negotiate an automatic bundling of links by sending LACP packets to the peer (directly connected device that also implements LACP).

The logical channel on the ZXA10 C220 is called smartgroup, which has the same VLAN properties as Ethernet port.

To configure the link aggregation, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **interface smartgroup** command to configure smartgroup.
3. Use the **smartgroup load-balance** command to configure load-balance mode.

Note:

The ZXA10 C220 supports six types of load-balance:

- Based on source IP address
- Based on destination IP address
- Based on source and destination IP addresses
- Based on source MAC address
- Based on destination MAC address
- Based on source and destination MAC addresses

The default mode is based on source and destination MAC addresses.

4. Use the **interface** command to configure interface configuration mode.
5. Use the **smartgroup mode** command to configure smartgroup port and mode.

Note:

- On: The port runs static trunk. Both end of the aggregated link should be set to the on mode.
- Active: The port runs LACP in active negotiation mode.
- Passive: The port runs LACP in passive negotiation mode.
- It is recommended to set one end to active mode and the other end to passive, or set both ends to active.
- The VLAN attribues of a member port should be consistent with that of the smartgroup. Otherwise, the port cannot be added to the smartgroup.

6. Use the **show lacp internal** command to query smartgroup configuration.

END OF STEPS

Example

Configure link aggregation:

- Smartgroup ID: 1

- Port list: 0/14/1 - 0/14/2
- Smartgroup mode: Active
- Load-balance mode: Source IP
- VLAN ID: 10

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#interface smartgroup1
ZXAN(config-if)#switchport mode trunk
ZXAN(config-if)#switchport vlan 10 tag
ZXAN(config-if)#smartgroup load-balance src-ip
ZXAN(config-if)#exit
ZXAN(config)#interface gei_0/14/1
ZXAN(config-if)#switchport mode trunk
ZXAN(config-if)#switchport vlan 10 tag
ZXAN(config-if)#smartgroup 1 mode active
ZXAN(config-if)#exit
ZXAN(config)#interface gei_0/14/2
ZXAN(config-if)#switchport mode trunk
ZXAN(config-if)#switchport vlan 10 tag
ZXAN(config-if)#smartgroup 1 mode active
ZXAN(config-if)#show lacp internal
Smartgroup:1
Flag *--LOOP is TRUE
Actor       Agg        LACPDUs  Port     Oper   Port  RX            Mux
Port        State      Interval Priority Key    State Machine       Machine
--------------------------------------------------------------------------------
gei_0/14/1  unselected 30       32768    0x104  0x45  port-disabled defaulted
gei_0/14/2  unselected 30       32768    0x104  0x45  port-disabled defaulted
```

Configuring UAPS

Short Description

Perform this procedure to configure UAPS.

Prerequisites

- Make sure that the network device works normally.
- Uplink ports work normally.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

ZXA10 C220 supports UAPS. When the working uplink port is faulty, the service is switched to the backup uplink port automatically.

To configure the UAPS, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **uaps-group** command to configure UAPS group.
3. Use the **port** command to configure main and backup ports of UAPS group.
4. Use the **revertive enable** command to enable UAPS auto-recovery function.
5. Use the **swap** command to swap UAPS master and slave ports by force.
6. Use the **switch** command to configure UAPS group properties.
7. Use the **next-hop** command to configure UAPS next hop IP address of link detection.

8. Use the **retry-link-detect** command to configure UAPS retry times of link detection.
9. Use the **interval-link-detect** command to configure UAPS interval of link detection.
10. Use the **show uaps groupid** command to query UAPS configuration.

END OF STEPS

Example

Configure a UAPS group:

- Group ID: 1
- Master port: gei_0/14/1
- Salve port: gei_0/14/2
- Next hop IP address: 10.63.10.1
- Protect-time: 300s
- Switch-type: common port
- Revertive control: enble

```
ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#uaps-group 1
ZXAN(cfg-uaps-1)#port master-port gei_0/14/1 slave-port gei_0/14/2
ZXAN(cfg-uaps-1)#revertive enable
ZXAN(cfg-uaps-1)#next-hop 10.63.10.1
ZXAN(cfg-uaps-1)#show uaps groupid 1
Revertive control         :   enble
Protect-time              :   300s
Next-hop                  :   10.63.10.1
Link-type                 :   normal
Link-detect-retry         :   5
Link-detect-interval      :   3
Link status               :   failed
Switch-type               :   common port
Master ports status       :   forwarding
                              gei_0/14/1 : down

Slave ports status        :   block
                              gei_0/14/2 : down
```

Configuring CL1A 1+1 Protection

Short Description

Perform this procedure to configure CL1A 1+1 uplink protection.

Prerequisites

- Make sure that the network device works normally.
- Both CL1A cards work normally.
- The source CES addresses of two CL1A cards are identical.
- Log in to the ZXA10 C220 through HyperTerminal or Telnet.

Context

ZXA10 C220 supports CL1A 1+1 protection. When the working CL1A card is faulty, the service is switched to the backup CL1A card automatically.

To configure the CL1A 1+1 protection, perform the following steps:

Steps

1. Use the **configure terminal** command to enter global configuration mode.
2. Use the **ces** command to enter the CES configuration mode.
3. Use the **sdhprot group** command to configure protection group.
4. Use the **sdhprot prop** command to configure properties of the protection group.
5. Use the **sdhprot switch-command** command to configure swtich command.

Note:

- Force: Switch over by force.

  After forced switch-over, the current working card responds to neither other switch-over commands nor switch-over alarms until this command is deleted.
- Manual: Switch over manually.

  Other switch-over commands can take effect. When there is a switch-over alarm , the working card is switched over to the protection card. When the alarm disappears, the protection card is automatically switched back to the working card.
- W2P: Switch over from the working card to the protection card.
- P2W: Switch over from the protection card to the working card.
- LockoutProtection: Lock the protection.

6. Use the **show sdh protection group prop** command to query protection group configuration.

END OF STEPS

Example

Configure CL1A 1+1 protection:

- Group name: aaa
- Working port: tdm_0/3/1
- Working port: tdm_0/4/1

```
ZXAN#configure terminal
Enter configuration commands, one per line.  End with CTRL/Z.
ZXAN(config)#ces
ZXAN(config-ces)#sdhprot group aaa worksdhport tdm_0/3/1 protectsdhport
tdm_0/4/1 1plus1
ZXAN(config-ces)#sdhprot prop group aaa mode non-revertive wtr 0
ZXAN(config-ces)#sdhprot switch-command group aaa force w2p
ZXAN(config-ces)#show ces sdhprot group prop aaa

Name :                aaa
Protect interface:    tdm_0/4/1
Work interface :      tdm_0/3/1
Active interface:     protect-channel
Type :                1+1
Mode:                 non-revertive
Holdoff:              0
Wtr:                  0
```

This page is intentionally blank.

Figures

Tables

This page is intentionally blank.

Index

T

U

V

Glossary

AAA
- Authentication, Authorization and Accounting

ACL
- Access Control List

BGP
- Border Gateway Protocol

BRAS
- Broadband Remote Access Server

CAC
- Channel Access Control

CBS
- Committed Burst Size

CDR
- Call Detail Record

CES
- Circuit Emulation Services

CIR
- Committed Information Rate

CTP
- Connection Termination Point

CVLAN
- Customer Virtual Local Area Network

CoS
- Class of Service

DHCP
- Dynamic Host Configuration Protocol

DNS
- Domain Name Server

DSCP
- Differentiated Services Code Point

DSLAM
- Digital Subscriber Line Access Multiplexer

EPON
- Ethernet Passive Optical Network

FE
- Fast Ethernet

FTTB
- Fiber to the Building

FTTC
- Fiber to the Curb

FTTH
- Fiber to the Home

GE
- Gigabit Ethernet

GEM
- GPON Encapsulation Method

GPON
- Gigabit Passive Optical Network

GUI
- Graphical User Interface

ICMP
- Internet Control Message Protocol

IGMP
- Internet Group Management Protocol

IP
- Internet Protocol

IPTV
- Internet Protocol Television

LACP
- Link Aggregation Control Protocol

LAN
- Local Area Network

MAC
- Medium Access Control

MEF
- Metro Ethernet Forum

MIB
- Management Information Base

MVLAN
- Multicast Virtual Local Area Network

NM
- Network Management

NMS
- Network Management System

NTP
- Network Time Protocol

OLT
- Optical Line Terminal

ONT
- Optical Network Terminal

ONU
- Optical Network Unit

OSPF
- Open Shortest Path First

PBS
- Peak Burst Size

PC
- Personal Computer

PIR
- Peak Information Rate

PON
- Passive Optical Network

PPPoE
- Point to Point Protocol over Ethernet

PSN
- Packet Switched Network

PVID
- Port VLAN ID

PW
- Pseudo Wire

PWE3
- Pseudo Wire Emulation Edge-to-Edge

QoS
- Quality of Service

RADIUS
- Remote Authentication Dial In User Service

RMON
- Remote Monitoring

RTP
- Real-time Transport Protocol

SDH
- Synchronous Digital Hierarchy

SIP
- Session Initiation Protocol

SNMP
- Simple Network Management Protocol

SOHO
- Small Office/Home Office

SONET
- Synchronous Optical NETwork

SP
- Strict Priority

SS
- Soft Switch

SSH
- Secure Shell

STB
- Set Top Box

STM
- Synchronous Transport Module

SVLAN
- Service Virtual Local Area Network

TACACS+
- Terminal Access Controller Access-Control System Plus

TCP
- Transfer Control Protocol

TDM
- Time Division Multiplexing

ToS
- Type Of Service

UAPS
- Uplink Auto Protection Switching

UDP
- User Datagram Protocol

VLAN
- Virtual Local Area Network

VPN
- Virtual Private Network

VoIP
- Voice over Internet Protocol

WRR
- Weighted Round Robin