

GPON OLT Basic Operations

www.huawei.com

Copyright © Huawei Technologies Co., Ltd. All rights reserved.





Objectives

- Upon completion of this course, you will be able to:
 - ▣ Set up a command line configuration environment.
 - ▣ Manage command line user accounts.
 - ▣ Operate and maintain boards.
 - ▣ Query the software and hardware status of the system
 - ▣ Configure the device management and maintenance address.



Contents

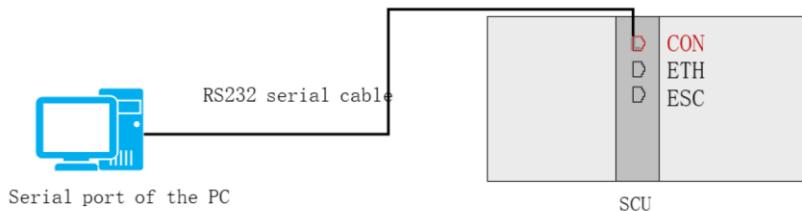
1. Device Connection
2. Introduction to Command Line Features
3. Basic System Operations
4. Management Environment Configuration

Device Maintenance Modes

- Classified by maintenance interface
 - Graphical user interface (GUI)
 - U2000/eSight
 - Command line interface (CLI)
 - Console
 - Telnet remote login
- Classified by maintenance port
 - Serial port maintenance
 - Console (CLI)
 - Network port maintenance
 - Out-band (CLI or GUI)
 - In-band (CLI or GUI)

- Serial port maintenance mode:
 - A maintenance terminal communicates with the console of the control board through a serial port to operate and maintain devices.
- Network port maintenance mode:
 - In-band mode: A maintenance terminal communicates with an NE through an upstream service Ethernet port of a device.
 - Advantages: The networking is flexible and no additional devices are required, saving the cost.
 - Disadvantages: When a service channel is faulty, maintenance cannot be performed.
 - Out-band mode: A maintenance terminal communicates with a device through the Ethernet maintenance port on the control board.
 - Advantages: Provides more reliable device management channels. If a managed device is faulty, the device on the network can be located in time.
 - Disadvantages: A separate network is required to provide maintenance channels irrelevant to service channels.

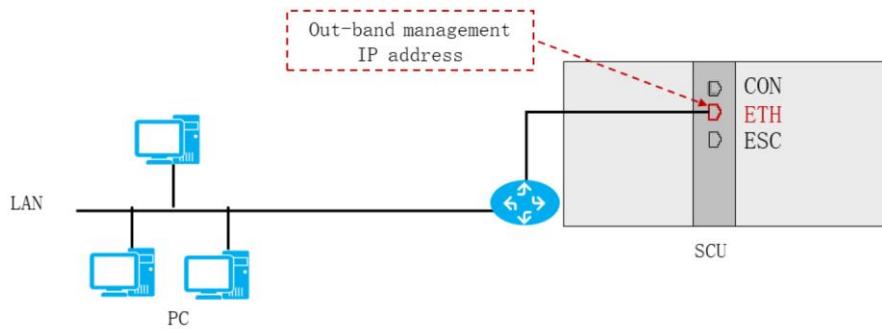
Serial Port Maintenance Mode



- Start the HyperTerminal of the computer.
 - Choose Start > Programs > Accessories > Communications > HyperTerminal. Click OK.
- Set HyperTerminal parameters.
 - Change the port settings to Restore to the default value (baud rate 9600 bit/s)

- The baud rate of the HyperTerminal must be the same as the baud rate of the serial port on the MA5680T. By default, the baud rate of the serial port is 9600 bps.
- If garbled characters are displayed after you log in to the HyperTerminal, the problem is probably caused by the baud rate difference between the HyperTerminal and the MA5680T. You can log in to the system using another baud rate. The system supports the following baud rates: 9600 bps, 19200 bps, 38400 bps, 57600 bps, and 115200 bps.
- By default, the default settings are used when you set up a connection between the HyperTerminal and a device.

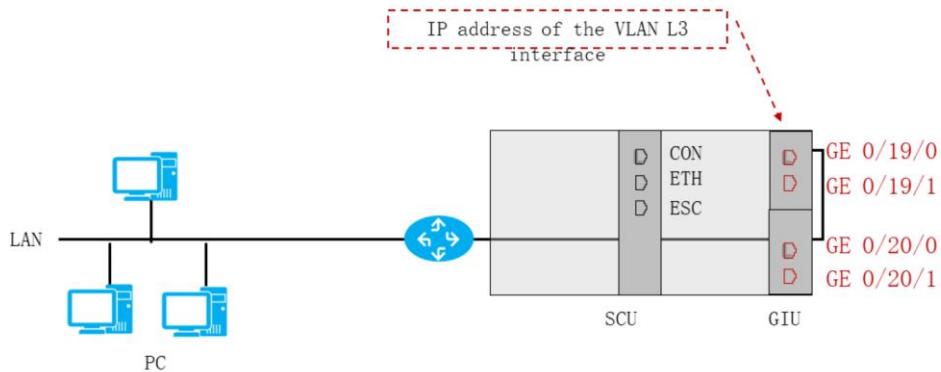
Out-band Maintenance by Network Port



- Log in to the OLT through the ETH maintenance port on the control board of the OLT and perform maintenance and management in Telnet or BMS mode.

- In out-band management mode, non-service channels are used to transmit management information so that management channels are separated from service channels. The out-band management mode provides more reliable device management channels than the in-band management mode. When an upstream link of the OLT is faulty, the device information can be quickly located and monitored in real time.
- The ETH port on the control board of an OLT is an auto-sensing port, and can automatically identify the direct or crossover cable when connected to a computer.

In-band Maintenance by Network Port



- Log in to the OLT through the upstream port on the upstream board of the OLT and perform maintenance and management in Telnet or SNMP mode.

- In in-band management mode, management interaction messages are transmitted through a service channel of a device, the networking is flexible, and no additional device is required. This saves the cost but makes maintenance inconvenient.
- In-band management communicates with a maintenance terminal or NMS through a VLAN L3 virtual interface address.

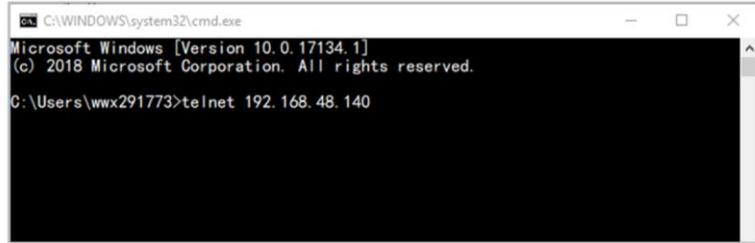


Contents

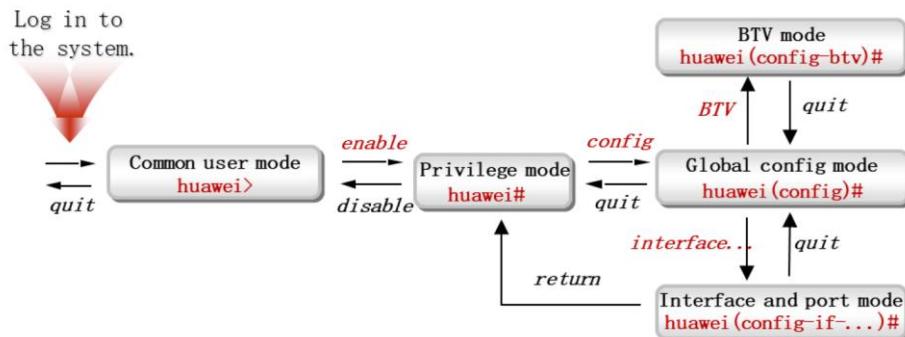
1. Device connection
2. **Introduction to Command Line Features**
3. Basic System Operations
4. Management Environment Configuration

Login Interface

- Windows HyperTerminal and CMD window
- Other third-party software, such as Secure CRT (telnet + serial port)

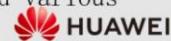


CLI Mode and Switching



- The system provides the multi-level command line mode to implement hierarchical management of command operation rights, thereby managing the permission of terminal operation users hierarchically.

• Note: The command line mode is applicable to the OLT and various
Copyright © Huawei Technologies Co., Ltd. All rights
reserved.
Page 10



- Command mode classification
 - The OLT provides multiple command modes to implement hierarchical protection and prevent unauthorized access.
- The command modes are as follows:
 - User mode
 - Privilege mode
 - Global config mode
 - Interface config mode
 - OSPF mode
 - MPLS-LDP mode
 - BTV mode
- Features of command modes
 - Downward compatibility: All commands in common user mode can be executed in privilege mode. All commands in common user mode and privilege mode can be executed in global config mode.
 - Hierarchical protection: This prevents unauthorized users from accessing the network. Users of different levels can enter different command modes. At the same time, the commands that can be executed by users of different levels are different even if they enter the same command mode.
 - To exit from the command mode level by level, run the **quit** command. Run the **return** command to quickly exit the privilege mode. To return to the common user mode from the privilege mode or global config mode, run the **disable** command.

CLI Features (1)

- Function of the command line help key “?”

- Displays the commands that available in the current

```
huawei(config)#?
```

- Displays possible command keywords based on the key

```
huawei(config)#in?
```

```
-----  
In config mode:  
-----
```

```
info-center Specify information output configuration information.  
interface < group >interface command group  
-----
```

```
Command in user mode:  
-----
```

```
interactive This command is used to set the confirmation  
interaction function for command execution.
```

- Comprehensive help

- In any command mode, type a question mark (?) to obtain all commands in the current command mode and brief command descriptions. Enter a command followed by a question mark (?) separated by a space to obtain all keywords and descriptions corresponding to the current position.
 - If the position is a parameter, the parameter name, parameter description, value range, default value, input format, and unit are listed.
 - If a command is complete and you can run the command without entering any information, <cr> is displayed, indicating that the command can be executed by pressing **Enter**.

CLI Features (2)

- ❑ Prompts the command keywords or parameters that can follow the current command keyword.

```
huawei(config)#interface ?  
-----  
In config mode:  
-----  
ETH enters the ETH command mode.  
giu Enter the GIU command mode.  
GPON enters the GPON command mode.  
meth MEth interface  
vlanif VLAN interface  
....
```

- Intelligent matching of the space key

```
huawei>ena <space>  
huawei>enable
```

- Press <TAB> to supplement the keyword.
 - ❑ Enter an incomplete keyword and press Tab. If there is a unique keyword that starts with the entered character, the system replaces the original input with the complete keyword and displays the keyword followed by a space and cursor in a new line.
- Press the space key to supplement the keyword.
 - ❑ Enter an incomplete keyword and press the space key. If the matching keyword is unique, the system uses the complete keyword followed by a cursor and space to replace the original input. If there are multiple matching keywords, the system waits for the user to enter more characters until a unique matching keyword is found, and then supplement the input with the complete keyword.

CLI Features (3)

- Press Enter to display the next available command one by one.

```
huawei(config)#interface <Enter>
{adsl<K>|emu<K>|GPON<K>|eth<K>|giu<K>|gpon<K>|loopback<K>|
meth<K>|null<K>|opf<K>|scu<K>|sh1 <K>|top-
stml<K>|top<K>|vdsl<K>|vlanif<K>}:gpon <Enter>
{frameid/slotid<S><Length 3-15>}:0/8 <Enter>
huawei(config-if-gpon-0/8)#+
```

- Interaction mode
 - When a user enters an incomplete command, the command line system provides the command line interaction mode by default, and displays the next command word that can be entered and the parameter type of the command word.

CLI Features (4)

- Query the command operation history.

```
huawei(config)#display history-command
-----
S/N  Command
-----
...
4    terminal
3    smart
2    interface
1    help
```



- Modify the size of the system cache command line.

```
huawei(config)#history-command
{ max-size<K> }:max-size
{ sizevalue<U><1,100> }:50
```

- Functions of the display history-command command

- This command is used to query the records of recently executed commands. After the command is executed successfully, the screen displays the records of the recently executed commands.
- In some Telnet terminals, you can press **↑** and **↓** to obtain the previous and next commands of the current command record, and press Enter to directly execute the selected command.
- The command records are valid only for the current user. After the user logs out, the command records are cleared.
- You can run the **history-command max-size** command to set the number of command records to be displayed. The value range is 1 - 100. By default, the system saves 10 commands.

Description of CLI Characters

Character	Meaning
<K>	Keyword type
<U>	ULONG type. The content in brackets is the value range.
<S>	Character string type. The content in brackets is the length range of the character string that can be entered by a user.
<I>	IP address type
<M>	Mask type, for example, mask of an IP address.
<P>	MAC address type
<H>	Hexadecimal value type. That is, you can enter 0x. By default, the value is a decimal number.
<D>	<yyyy-mm-dd> Date type.
<Cr>	Press Enter to end the command input and run a command.

Common Errors on the CLI

Error Name	Error Cause
Unknown command	The command is not found, the keyword is not found, or the parameter value or type is out of range.
Incomplete command	The input command is incomplete.
Too many parameters	There are too many input parameters.
Ambiguous command	The command is ambiguous.
Parameter error	Parameter error. The cursor will prompt the position where the error occurs.

Switching the CLI Language

- You can switch the language in any mode.

```
huawei(config)#switch language-mode  
Command:  
switch language-mode  
The current language has been switched to the local  
language.
```

Note: By default, the system language is English. You can switch to a local language as required.

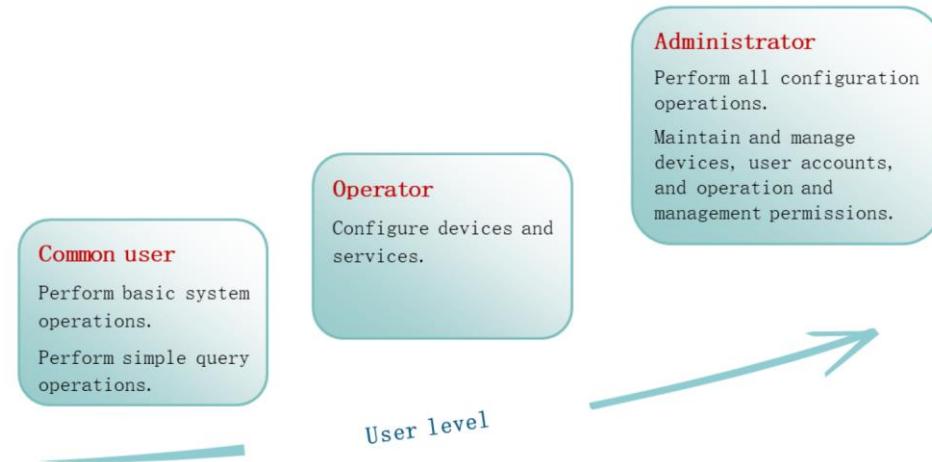
- switch language-mode user guide
 - The system supports multiple languages. Users can select one of the languages to display information.
 - By default, the system supports the common language resource file (English) and a local language resource file. If the local language is not displayed as default languages, you can load a new language resource file (using the load language command) to display information in the required language.
 - The language can be switched in all modes.



Contents

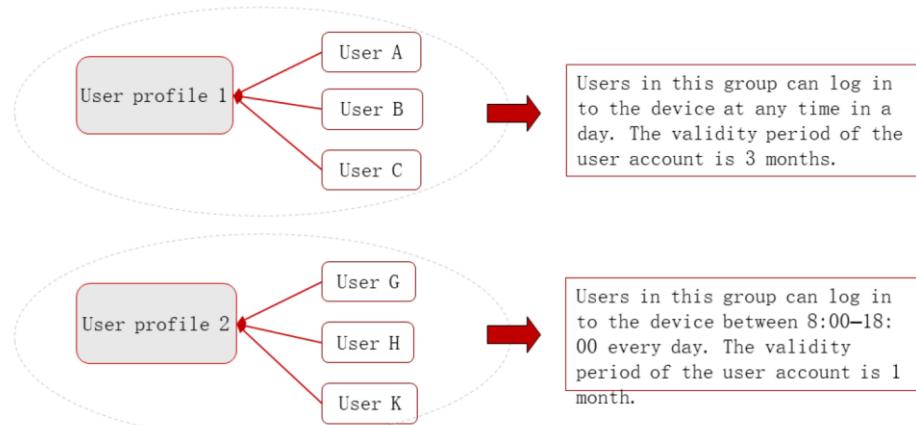
1. Device connection
2. Introduction to Command Line Features
3. Basic System Operations
 - Managing Operation Users
 - Basic System Configuration
 - Basic Hardware Operations
4. Management Environment Configuration

Maintaining User Levels and Rights



- Operation users are classified into the 3 levels: administrator, operator, and common user. Different user levels have different system operation rights.
 - Administrators can add users of lower levels. That is, administrators can add operators and common users.

User Profiles and Users



A user profile is a set of parameters. It controls the user name validity period, password validity period, login start time, and login end time of the same type of users. You can bind users to a user profile to control the accounts and login time.

Profile-based User Management

- The system provides 3 default profiles, which correspond to 3 user levels (administrator, operator, and common user).
 - A maximum of 12 user profiles can be added.
 - Attributes to be configured in a user profile include the profile name, user name validity period, password validity period, login start time, and login end time.

Configuring a Maintenance User Profile

- Add a maintenance user profile.
 - For example: The template name is Maint, the user name validity period is 30 days, the password validity period is 30 days, the login start time is 00:00, and the login end time is 05:00.

```
huawei(config)#terminal user-profile add
Profile name (<=15 bits): Maint
User name validity period(0--999 days) [0]: 30
Password validity period(0--999 days) [0]: 30
Login start time (hh: Mm) [00: 00]: 00:00
Login end time (hh: Mm) [00: 00]: 05:00
The profile is added successfully.
Repeat this operation? (y/n) [n]:
```

Configuring Maintenance User Accounts

- Add a maintenance user.
 - Add an operation user account as follows: The user name and password are both huawei1234. Bind the user to the Maint profile. Set the user level as common user, and set the concurrent login times to user name

```
huawei1234
Enter the user name (length <6, 15>): huawei1234
Enter the user password (length <6, 15>): *  
When a user
Confirm password (length <6, 15>): *  
enters a password,
Profile name (<= 15 bits) [root]: Maint  
the password is
Enter the user permission.  
not displayed on
1. Common user 2. Operator 3. Administrator: 2  
the terminal.
Enter the concurrent login times (0--4): 1
Enter additional information(<=30 digits): 13866995555
The user is added successfully.
Repeat this operation? (y/n) [n]:
```

- Command parameters
 - Number of concurrent logins: indicates the maximum number of terminals that can be used by a user to log in to the system at the same time.
 - Additional information about a user: indicates information such as the contact method and address of a user.
- Precautions
 - By default, the system has 3 profiles: admin, operator, and commonuser.
 - The user name of an operator user must be unique and cannot be all or online.
 - Multiple operator users can be added consecutively. A maximum of 127 operator users can be added in the system.
 - A maximum of 10 terminal users can be online at the same time.

Querying Maintenance Accounts

- Query all operator users in the system.

```
huawei(config)#display terminal user all
-----
 User name Permission Status Concurrent logins Profile
name Additional info
-----
 Huawei manager offline 4 admin -----
 huawei1234 Operator Offline 4 Maint 13866995555
-----
 Total number of records: 2
```

- Introduction to commands
 - Permission: There are 3 levels: User, Operator, and Admin.
 - User is a common user.
 - An operator can perform common configuration activities.
 - An Admin user is an administrator and can perform a series of management activities.
 - Status: indicates whether a user is online.
 - Number of concurrent logins: indicates the maximum number of terminals that can be used by a user to log in to the system at the same time.
 - Additional information: indicates information such as the contact method and address of a user.

Modifying a Maintenance Account

- Modify other attributes of a user.
 - Change the user level. (Users at a higher level can modify the level of users at a lower level.)

```
huawei(config)#terminal user level
```

- Change the password.

```
huawei(config)#terminal user password
```

- Change the number of concurrent login times.

```
huawei(config)#terminal user reenter
```

- Modify the description.

```
huawei(config)#terminal user apdinfo
```

- Functions of the terminal user level command
 - This command is used to modify the rights of a user. When you need to reduce or improve the operation rights of a user to ensure the system security, run this command. After the rights of a user are reset, the user can perform operations on the system according to the preset rights.
 - An administrator can change the operation rights of multiple users consecutively until confirming that the operation is complete.
 - Run the **display terminal user** command to obtain the user name, and then run the **terminal user level** command to modify the operation rights of the user.
 - Only an administrator can run this command to change the level of a user to common user or operator.
- Functions of the terminal user reenter command
 - This command is used to modify the number of terminals that can be used by a user to log in to the system concurrently. When an account needs to log in to the system on multiple terminals at the same time, run this command to set the maximum number of terminals.
 - Generally, to ensure device security, the maximum number of concurrent logins of a user account is set to 1.
 - Only administrators can run this command.
 - Run the **display terminal user** command to query the user name, and then run the **terminal user reenter** command to change the maximum number of concurrent logins.

Maintaining Online Users

- Force an online user to go offline.

- Query the ID of an online user.

```
huawei(config)#display client
-----
ID User name Domain name IP address Login time
-----
1 huawei1234 -- 10.11.117.55 2009-08-02 10:03:09
-----
```

- Force the user to go offline.

```
huawei(config)#client kickoff
{clientID<U><1,10>}:1
Are you sure you want to force the user offline? (y/n)
[n]: y
```

- display client
 - This command is used to query information such as the user ID, IP address, and login time of a user to facilitate security management.
- client kickoff
 - When you need to forcibly disconnect a terminal user or a type of terminal users, run this command. After a user is disconnected, the user cannot perform any operation on the system.

Deleting a Maintenance Account

- Deleting a Maintenance User

```
huawei(config)#undo terminal user name  
Enter the user name (<=15 bits): huawei1234  
Are you sure you want to delete the user? (y/n) [n]:
```

Precautions:

1. Only an administrator has the right to delete users at a lower level.
2. A user cannot delete the self.
3. Online users cannot be deleted. To delete an online user, you have to disconnect the user first.
4. ~~Multiple users can be deleted at a time.~~



Contents

1. Device connection
2. Introduction to Command Line Features
3. Basic System Operations
 - Managing Operation Users
 - Basic System Configuration
 - Basic Hardware Operations
4. Management Environment Configuration

Querying and Setting Basic System Information (1)

- Query the software version of the system host.

```
huawei(config)#display language
  Local language:
    Language name: Simplified Chinese (default language)
    Version: MA5600V800R008C01
  Common language:
    Language name: English (default language)
    Version: MA5600V800R008C01
```

Note: The NE and board software versions must meet the on-site deployment requirements.

If not, contact the Huawei technical support for help. If necessary, upgrade the host software.

Querying and Setting Basic System Information (2)

- Query the software version of the control board.

```
huawei(config)#display version 0/9

Main Board: H801SCUN
-----
PCB           Version: H801SCUN VER B
Base          BIOS Version: 112
Extended BIOS Version: 116
Software      Version: MA5600V800R008C01
Logic          Version: (U48)107
MAB            Version: 0002
VOIPSubBoard:
PCB           Version: H801FLBA VER A
FPGA          Version: (U6)118
```

- display version 0/9
 - 0/9: indicates the subrack ID and slot ID. When you need to query the version of the board in a specified slot, use this parameter.
- Parameter description
 - Version: version information
 - PRODUCT: product name
 - Uptime: running time

Querying and Setting Basic System Information (3)

- Query the software version of a service board.

```
huawei(config)#display version 0/2
Sending the board version query message succeeded.
Querying board ...
Main Board: H801GPBC
-----
Pcb    Version: H801GPBC VER B
Mab    Version: 0000
Logic Version: (U22)000(U23)115(U24)115(U5)013

Main CPU :
CPU    Version: (U35)MPC8349
APP    Version: 809(2010-10-15)
BIOS   Version: (U20)715
```

Querying and Setting Basic System Information (4)

- Query the system time.

```
huawei(config)#display time  
2018-2-12 15:37:45+08:00
```

- Set the local time of the system.

```
huawei(config)#time 9:30:59 2018-2-13
```

- Configure the network time.

```
huawei(config)#ntp-service unicast-server 10.11.1.1  
source-interface meth 0
```

- Change the system name.

```
huawei(config)#sysname OLT_Hangzhou  
OLT_Hangzhou(config) #
```

- The Network Time Protocol (NTP) is an application layer protocol in the TCP/IP protocol. It is used for clock synchronization between a distributed time server and client. Network devices that support the NTP can exchange NTP packets to synchronize clocks between them. In this manner, various service applications (such as the network management system and network charging system) are implemented based on a unified time.
- NTP supports 4 working modes: client/server mode, peer mode, broadcast mode, and multicast mode.
 - A client and server must have L3 interfaces and IP addresses that can communicate with each other.
 - In client/server mode, you only need to configure the NTP client. On the NTP server, only the NTP master clock needs to be configured.
 - In client/server mode, time can be synchronized only from the NTP server to an NTP client, not otherwise.
 - The clock stratum of the synchronizing device must be smaller than that of the synchronized device. Otherwise, the clock synchronization cannot be performed.
 - A device that runs NTP can receive synchronization from other clock sources or synchronize time to other devices. Devices can synchronize time with each other. When a device works in client mode, you do not

need to set the system time, and the device automatically synchronizes the system time from a remote server.



Contents

1. Device connection
2. Introduction to Command Line Features
3. Basic System Operations
 - Managing Operation Users
 - Basic System Configuration
 - Basic Hardware Operations
4. Management Environment Configuration

Board Running Status

Board	Status	
Control board	Active: Normal	
	Standby: Normal	
Service board	Automatic discovery	1. When a board is inserted into a subrack, the system automatically discovers the board. In this state, a board cannot provide services.
	Configuring	2. After a board is confirmed and configured, the board status changes to normal.
	Normal	
	Fault	3. The board is faulty.
	Disable	4. The board is disabled and services are interrupted.

Subrack Operations

- Set the description of the subrack for easy

```
I huawei(config)#frame set
{frameid<U><0,32>}:0
{desc<K>}:desc
{description<S><1,32>}:Hangzhou-OLT-1
```

- Get the subrack information

```
C huawei(config)#display frame info 0
-----
Subrack type: H801MABC
Subrack status: Normal
Subrack description: Hangzhou-OLT-1
The EMU ID: 0 Subnode:30 State: communication normal.
The EMU ID: 1 Subnode:1 State: communication normal.
-----
```

- Command functions
 - The **frame set** command is used to set the description of a subrack. When you need to identify a subrack by the subrack description, run this command. After the setting is successful, you can query the subrack number by the subrack description, and then perform other operations on devices based on the subrack number.
 - The **undo frame desc** command is used to delete existing subrack descriptions from the system. When you need to clear the description of a subrack, run this command.
- User guide
 - After the description of a subrack is set successfully, if you run the **frame set** command to reset the description of the subrack, the description of the subrack is modified.
 - After the description of a subrack is set successfully, if you run the **undo frame desc** command, the description is cleared.
 - If the subrack description contains spaces, use "" to enclose the characters.

Query all Boards in a Subrack

- Query all boards in a subrack.

```
huawei(config)#display board 0
-----
Slot No. Board Name Status Daughter board 0 Daughter board 1 Online Status
-----
0
1 H801GPBC Normal
...
7 H801EPBA Normal
8
9 H801SCUL Active normal
...
19 H801GICG Normal
20 H801GICG Normal
-----
```

- Command functions
 - This command is used to query the information about all boards in a subrack or board in a specified slot. When you need to query the slot number, name, status, daughter board information, port information, or online status of a board after performing an operation on the board, run this command.
- User guide
 - If you specify only the subrack number, the system queries the information about all boards in the entire subrack. The following information can be queried: slot number, board name, board status, daughter board name, and online status of the board
 - If you specify the subrack ID and slot ID, the system queries the detailed information about the board with the specified subrack ID and slot ID. The following information can be queried: board name, board status, and port information of the board
 - When querying the activation information about service boards and ports, you can query the total number of activated and inactive ports.

Querying a Specified Board

- Query the information about a board in a specified

```
huawei(config)#display board 0/8
-----
Board name: H801GPBC
Board status: Normal
-----
Subrack/Slot/Port ONT SN Control flag Running flag Configuration
status Matching status DBA mode
-----
0/8/0 0 323031312E396341 Active Online Configuring Initial NSR
0/8/0 1 323031312E396A41 Active Online Configuring Initial NSR
0/8/0 2 3230313192E95441 Active Online Normal Match SR
-----
ONTs connected to port 0: 3
ONTs connected to port 1: 0
ONTs connected to port 2: 0
ONTs connected to port 3: 0
```

- Command functions
 - This command is used to query the information about all boards in a subrack or board in a specified slot. When you need to query the slot number, name, status, daughter board information, port information, or online status of a board after performing an operation on the board, run this command.
- User guide
 - If you specify only the subrack number, the system queries the information about all boards in the entire subrack. The following information can be queried: slot number, board name, board status, daughter board name, and online status of the board
 - If you specify the subrack ID and slot ID, the system queries the detailed information about the board with the specified subrack ID and slot ID. The following information can be queried: board name, board status, and port information of the board
 - When querying the activation information about service boards and ports, you can query the total number of activated and inactive ports.

Adding and Confirming Boards

- Add a board offline.

```
huawei(config)#board add
{frameid/slotid<S><1,15>} :0/4
{H801MFGA<K>|H801ETHA<K>|H801X1CA<K>|H801GPBC<K>|H801X2CA<
K>|H801GICF<K>|H801GI
CG<K>|H801EPBA<K>|H801MCUB<K>|ADI<K>|ADL<K>|
SHD<K>|H801AIUG<K>|H801OPFA<K>|H801C
ITA<K>|H801PRTA<K>|VDS<K>|VDT<K>}:H801GPBC
{<cr>|sub1<K>}:
```

- Confirm a board that is automatically discovered.

```
Huawei (config) #board confirm 0 // Confirm all boards.
Huawei (config) #board confirm 0/4 // Confirm a specified
board.
```

- You can add a board in either of the following ways:
 - Add a board offline. That is, run the **board add** command to add a board in an empty slot. The system reports an alarm indicating that the board is faulty. Then, manually insert the board into the corresponding slot. If the type of the inserted board is the same as the type of the board added offline, the system reports a board fault recovery alarm (alarm ID: 0x02310000). If the types are inconsistent, an alarm with ID 0x02300082 is reported.
 - Automatically discover the board. Insert the board into an idle slot. The system displays a message indicating that the board is automatically discovered. In this case, you need to run the **board confirm** command to confirm the automatically discovered board.

Maintaining Boards

- Delete a board.

```
huawei(config)#board delete
```

- Reset a board.

```
huawei(config)#board reset
```

- Disable or enable a board.

```
huawei(config)#board prohibit  
huawei(config)#undo board prohibit
```

- **board delete**
 - This command is used to delete a board from a subrack. Run this command to set a slot to the idle state if the board in the slot is faulty and removed, and no other board is registered in the slot. After the board is deleted successfully, you can add a new board in the idle slot.
- **board reset**
 - This command is used to reset a board in a specified subrack or slot. Run this command when locating a fault or when a service is faulty and cannot be recovered by resetting the chipset on the board. For example, if you need to set the value of some performance statistics to 0, the setting takes effect only after the board is reset. After a board is reset successfully, all the data configured on the board is reset to 0.
 - Note: Exercise caution when running this command. Do not reset the board unless necessary. Otherwise, services may be affected.
 - To reset the control board or the system, run the **reboot** command instead of the **board reset** command.
- **board prohibit**
 - The **board prohibit** command is used to disable a board. Run this command when you need to locate, diagnose, and rectify a faulty service board. After a board is disabled, services on the board are interrupted until the board is enabled.
 - Note: Disabling a board interrupts services. Exercise caution when running this command.
 - The **undo board prohibit** command is used to enable a board that has been

disabled. After a board is enabled, the services on the board are restored.

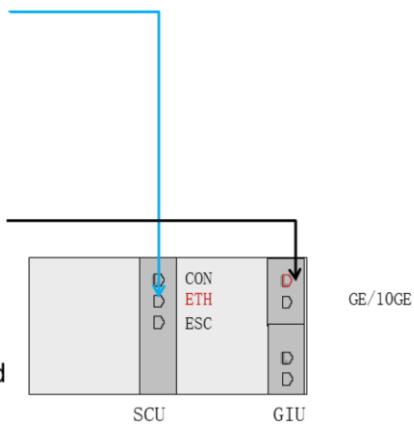


Contents

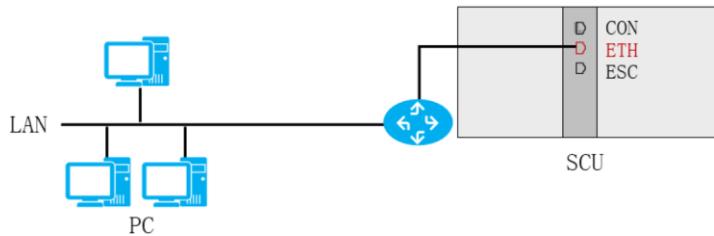
1. Device connection
2. Introduction to Command Line Features
3. Basic System Operations
4. Management Environment Configuration

Overview of the Management and Maintenance Environment

- Management interface configuration
 - Out-band management channel
 - IP address of the ETH maintenance network port on the control board
 - In-band management channel
 - IP address of the GE/10GE upstream port on a service board



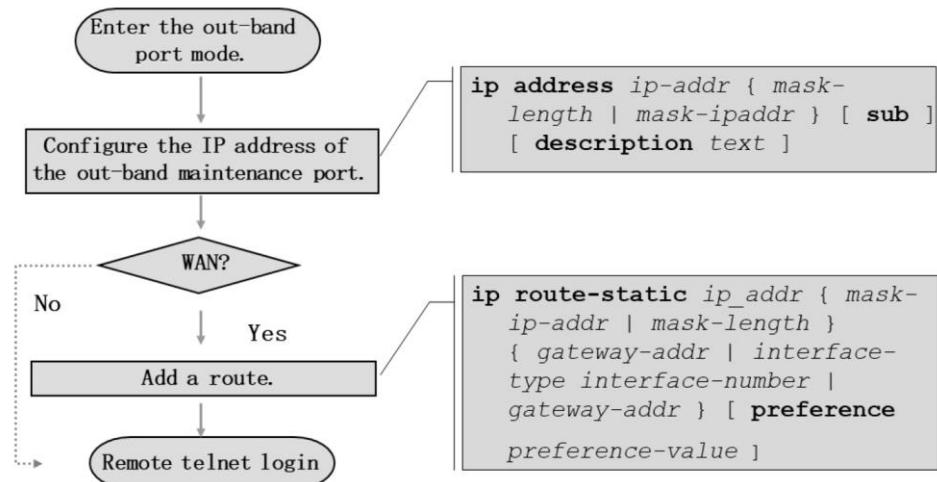
Example of Out-band Network Port Maintenance



Configuration Item	Data Planning
IP address of a remote terminal	10.10.21.1/24 to 10.10.21.3/24
Interface address of the upper-layer router	10.10.20.254/24
Out-band management address of the OLT	10.10.20.1

- In out-band management mode, non-service channels are used to transmit management information so that management channels are separated from service channels. The out-band management mode provides more reliable device management channels than the in-band management mode. When an MA5680T is faulty, the device information can be quickly located and monitored in real time.
- The MA5680T is connected to a LAN through a straight-through cable. The IP address of the maintenance network port of the MA5680T must be in the same network segment as the IP address of the operation console. Note: You can directly connect the network port of the operation console to the maintenance network port of the MA5680T control board for out-band management using a crossover cable.

Out-band Configuration Process



Out-band Management Procedure

- Step 1: Enter the maintenance network port mode.

```
huawei(config)#interface meth 0
```

- Step 2: Set the IP address of the maintenance network

```
| huawei(config-if-meth0)#ip address 10.10.20.1  
| 255.255.255.0  
| huawei(config-if-meth0)#quit
```

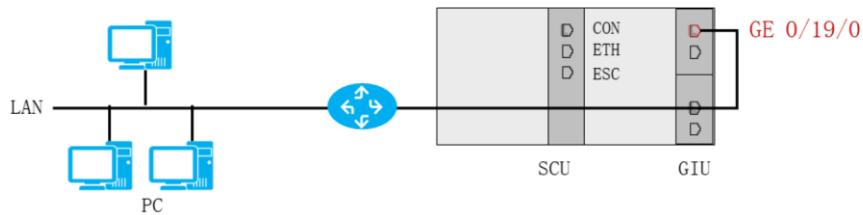
- Step 3: Add an out-band management route

```
| huawei(config)#ip route-static 10.10.21.0 24 10.10.20.254
```

- interface meth
 - This command is used to enter Meth mode from global config mode. Run this command when you need to configure the parameters such as the IP protocol, firewall, and duplex status of the maintenance network port.
- ip route-static
 - The **ip route-static** command is used to configure a static unicast route. If the network structure is simple, you only need to configure static routes to ensure the normal operation of the network. After static routes are created, network devices can communicate with each other at Layer 3.
 - The **undo ip route-static** command is used to delete a static unicast route. If a fault occurs on the network or the topology changes, the static routes do not change automatically, and you need to run this command to delete the static routes.
- ip route-static user guide
 - If the destination IP address and mask are both 0.0.0.0, the configured route is the default route. If the route matching fails, the default route is used for packet forwarding.
 - Different priorities can be configured to implement different routing management policies. For example, if multiple routes are configured for the same destination with the same priority, route load balancing is

implemented. If different priorities are specified, route backup is implemented.

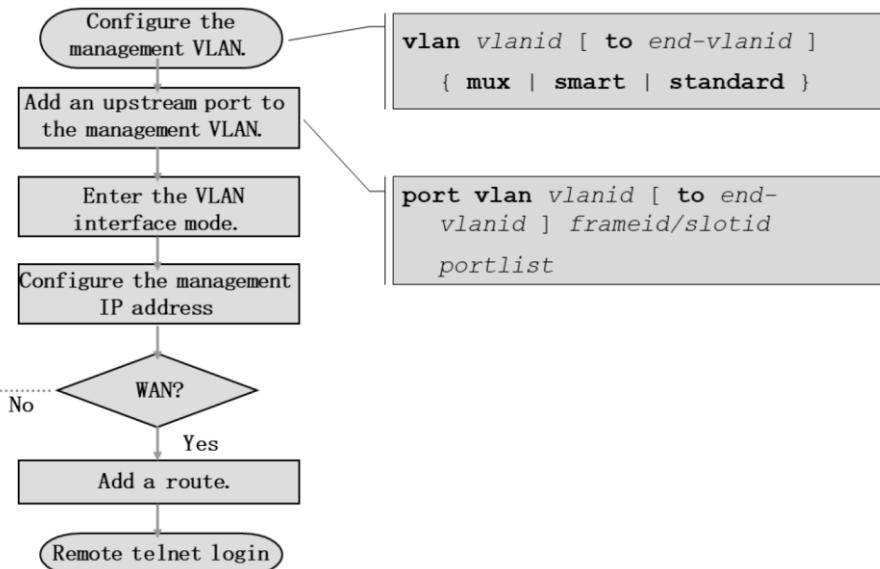
Example of In-band Network Port Maintenance



Configuration Item	Data Planning
IP address of a remote terminal	10.10.21.1/24 to 10.10.21.3/24
Interface address of the upper-layer router	10.10.30.254/24
Upstream port of the device	0/19/0
In-band management VLAN	4000
In-band management address of the device	10.10.30.1/24

- In in-band management mode, management interaction messages are transmitted through a service channel of a device, the networking is flexible, and no additional device is required. This saves the cost but makes maintenance inconvenient.

In-band Management Configuration Process



In-band Management Procedure

- Step 1: Create a management VLAN.

```
huawei(config)#vlan 4000 smart
```

- Step 2: Add an upstream port.

```
huawei(config)#port vlan 4000 0/19 0
```

- Step 3: Enter the NMS VLAN interface.

```
huawei(config)#interface vlanif 4000
```

- Step 4: Set the IP address of the management VLAN

```
huawei(config-if-vlanif4000)#ip address 10.10.30.1  
255.255.255.0  
huawei(config-if-vlanif4000)#quit
```

- huawei(config)#ip route-static 0.0.0.0 0.0.0.0
10.10.30.254

- Standard VLAN: One Standard VLAN contains only multiple upstream ports. Ethernet ports in a VLAN can communicate with each other, and Ethernet ports in different VLANs are isolated from each other.
- The **interface vlanif** command is used to create a VLAN interface in global config mode and enter the VLAN interface mode. When you need to configure the virtual L3 interface in VLANIF mode, run this command.
 - In VLANIF mode, you can configure the DHCP command group, firewall, IP command group, MPLS command group, DHCP server group, and ARP command group of a VLAN interface.
 - You can create a VLAN interface or enter the corresponding VLAN interface mode only after the VLAN is created.
 - The system supports a maximum of 32 VLAN L3 interfaces.
- VLANs in the system must be unique. An existing VLAN cannot be created again.
- Before deleting a VLAN, you need to delete the L3 interfaces, upstream ports, and service ports of the VLAN. If the MPLS function is enabled in the VLAN, you must disable the MPLS function before deleting the VLAN.
 - Run the **undo port vlan** command to delete upstream ports.
 - Run the **undo service-port vlan** command to delete service ports.
 - Run the **undo interface vlanif** command to delete L3 interfaces.
 - Run the **undo mpls** command to disable the MPLS function.
- The system supports a maximum of 4000 VLANs. The default VLAN ID is 1 and cannot be created or deleted.

Querying Related Configurations (1)

- Check the IP addresses of devices.
 - Check the IP addresses of all devices.

```
huawei(config)#display ip interface brief
Interface IP Address Physical Protocol Description
meth0      10.10.20.1 up      up  HUAWEI, SmartAX
vlanif4000 10.10.30.1 up      up  HUAWEI, SmartAX
```

- Check the IP address of a specified device.

```
huawei(config)#display ip interface meth 0
huawei(config)#display ip interface vlanif 4000
```

- Functions of the display ip interface command
 - This command is used to query the IP configuration and statistics of an interface. Run this command when you need to query the number of packets, bytes, and multicast packets received and sent by an interface, and the number of broadcast packets received, sent, forwarded, and discarded by the interface.

Querying Related Configurations (2)

- Check the out-band management address.

```
huawei(config)#display interface meth 0
Current status of the meth0: Up
Current status of link layer protocol: Up
Description: HUAWEI, SmartAX Series, meth0 Interface
Maximum transmission unit: 1500 bytes
Interface address: 10.10.20.1/25
Frame format of IP packets: PKTFMT_ETHNT_2, hardware
address: 0018-82d0-d104.
Auto-duplex(Full), Auto-speed(100M)
5-minute input rate: 39 bytes/second, 0 packets/second
5-minute output rate: 36 bytes/second, 0 packets/second
Received packets: 606629, bytes: 44990194
Sent packets: 28431, byte: 1972007
```

Querying Related Configurations (3)

- Check the in-band management IP address.

```
huawei(config)#display interface vlanif 4000
Current status of vlanif4000: Up
Current status of link layer protocol: Up
Description: HUAWEI, SmartAX Series, vlanif4000 Interface
Maximum transmission unit: 1500 bytes
Interface address: 10.10.30.1/24
Frame format of IP packets: PKTFMT_ETHNT_2, hardware
address: 0018-82d0-d105
```

Device Management Security

- How to prevent unauthorized users from logging in to the device?
 - Enable the firewall.
 - Set an access control list (ACL).
 - Set the forwarding policy based on the source and destination addresses in IP packets.
 - Configure the access mode and access network segment.

- There are multiple methods to prevent unauthorized users from logging in to the device. For example, you can set an access control list or configure the access mode and network segment. You can also enable multiple modes at the same time.
- Configure the system firewall to control the packets that access the management interface of the device to prevent unauthorized users from accessing the system in in-band or out-band mode.

Configuring a Security Policy

- Enable the firewall. By default, the firewall is

```
* huawei(config)#firewall enable
```

- Add an ACL.

- Allow remote management terminals in the 10.10.21.0/24

```
huawei(config)#acl 3000
network segment to access the device.
huawei(config-acl-adv-3000)#rule 5 permit ip
source 10.10.21.0 0.0.0.255 destination 10.10.20.1 0
huawei(config-acl-adv-3000)#
rule 10 deny ip source 10.10.21.1 0
Forbid terminals with other IP addresses to access the
device.
```

Wildcard mask

- Wildcard mask: 0 indicates strict matching, and 1 indicates random matching. In the **permit ip source 10.10.21.0 0.0.0.255** example, terminals whose IP addresses are in the 10.10.21.0 - 255 range can access the system.

Applying a Security Policy

- Enable the ACL in the inbound direction of an interface.

```
huawei(config)#interface vlanif4000  
huawei(config-if-vlanif4000)#firewall packet-  
filter 3000 inbound
```

Packet receiving
direction

Enables the ACL on the outbound interface

```
huawei(config)#interface meth 0  
huawei(config-if-meth0)#firewall packet-filter 3000  
inbound
```

Configuring the Telnet Security Policy

- Add a network segment that is allowed to access the device by Telnet.

```
huawei(config)#sysman ip-access
{protocol-type<E><telnet,ssh,snmp>}:telnet
{start-ipaddress<I><X.X.X.X>}:10.10.21.1
{end-ipaddress<I><X.X.X.X>}: 10.10.21.2

huawei(config)#display sysman ip-access telnet
Allowed list
-----
S/N Start IP address End IP address
-----
1      10.10.21.1      10.10.21.2
-----
```

- Functions of the sysman ip-access command
 - This parameter specifies the IP address segment that is allowed to access the device over a specified protocol. Run this command when you need to set a firewall for users who access the device to prevent unauthorized users from logging in to the device. After the configuration succeeds, the users who do not meet the address and access protocol requirements will be denied access to the device.

Quiz

1. What are the advantages and disadvantages of in-band and out-band maintenance modes?
2. What are the common methods for configuring device access policies?
3. Which maintenance modes are supported by a device?

- Reference answers:

1. The advantages and disadvantages are as follows:

- In-band mode: A maintenance terminal communicates with the host through the upstream service Ethernet port of the device.

Advantages: The networking is flexible and no additional devices are required, saving the cost.

Disadvantages: When a service channel is faulty, maintenance cannot be performed.

- Out-band mode: A maintenance terminal communicates with a device through the Ethernet maintenance port on the control board.

Advantages: Provides more reliable device management channels. If a managed device is faulty, the information about the device on the network can be located in time.

Disadvantages: A separate network is required to provide maintenance channels irrelevant to service channels.

2. Apply an ACL to the in-band (out-band) interface. Use **sysman ip-access** to filter addresses and accessed services.

3. Common maintenance methods are classified as follows:

- By maintenance interface:

GUI mode: U2000/eSight NMS

CLI mode: Console/Telnet remote login

- By maintenance port

Serial port maintenance mode: Console (CLI)

Network port maintenance mode: Out-band (CLI or GUI) and in-band

(CLI or GUI)



Summary

- OLT maintenance mode: CLI (serial port, out-band network port, and in-band network port) and GUI (out-band and in-band network ports) management modes.
- Summary of CLI features:
 - Use the space key to automatically match commands.
 - Press Enter to display the next command.
 - Enter a question mark (?) to obtain help information.
- Adding/configuring a service and deleting/canceling configurations
 - terminal user name -> undo terminal user name
 - board add -> board delete



Summary

- OLT system maintenance account: There are 3 user levels. The operation scopes of users at different levels are different. The user levels with rights from high to low are administrators, operators, and common users.
- An OLT board has the following states: Active Normal, Standby Normal, Standby Fault, Auto Discovery, Configuration, Normal, Fault, and Disabled.
- Configure the IP address of the maintenance Ethernet port in the out-band management channel of the device. Configure the L3 interface address of the management VLAN in the in-band management channel to allow an upstream port to pass through the management VLAN.

Thank You

www.huawei.com