DCI Network Management System

User Manual

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Content

1 Product Overview

DCI Network Management System (hereinafter referred to as DCI) is a unified management platform for OTN transmission network equipment of NewNets, LLC. By using it, users can not only complete the configuration and maintenance of a single network element, but also station from the perspective of network management, comprehensive management of network elements in the entire network is implemented, including topology management, configuration management, alarm management, performance management, and log management and so on.

Readership

This document is mainly applicable to the following engineers:

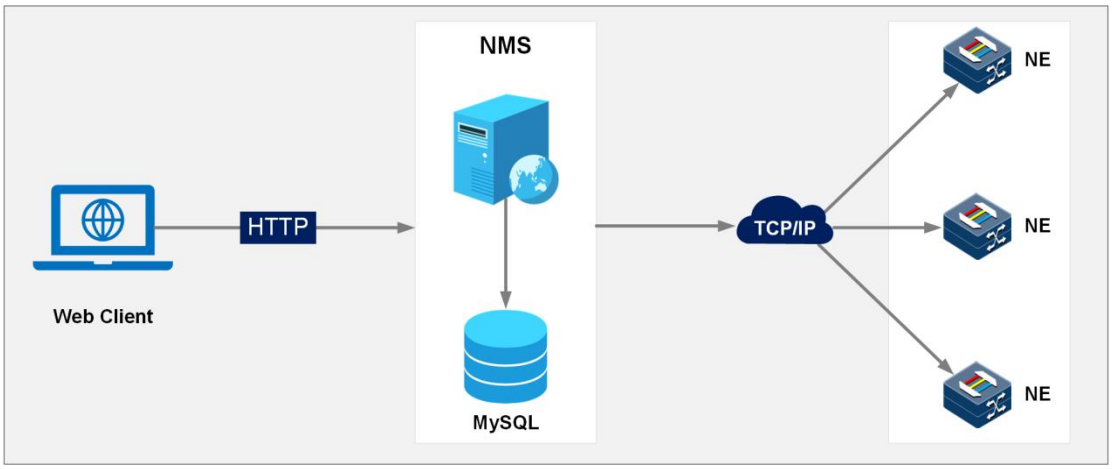
1) Network Planning Engineer
2) Test Engineer
3) Business Configuration Engineer
4) Field Maintenance Engineer
5) System Maintenance Engineer

Content Introduction

This document mainly introduces the general operation of the network management platform, including the installation and startup of the network management system, login, logout, password change, security management, configuration management of network elements, alarm management, performance management, daily maintenance of the network management system, common problems, etc..

2 Software Architecture

DCI is based on B/S (Browser/Server) architecture, and the TCP/IP protocol is used to communicate between each part, and its structure is shown in the following figure.



3 Operating Environment Requirements

The following runtime environment is our recommended base runtime environment, as shown in Table 1-1.

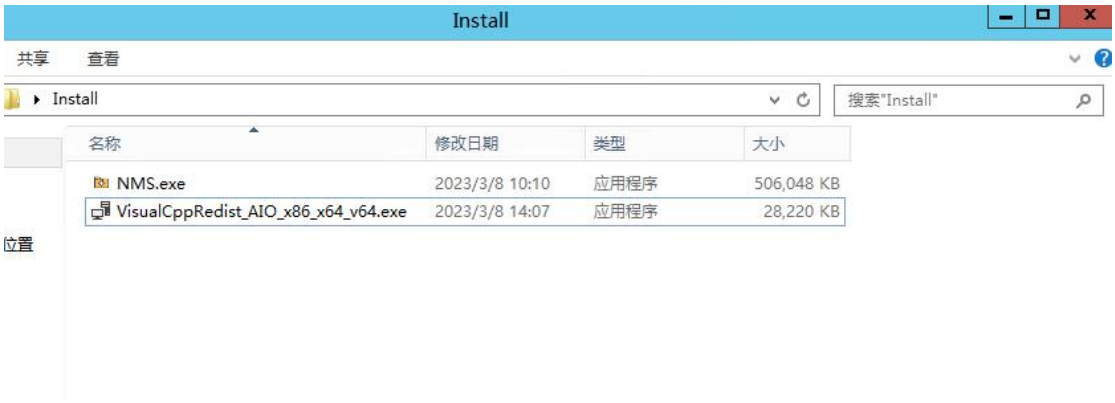
Server-side configuration	Client-side configuration (browser)
CPU: main frequency 2.4G and above Memory: 8G or more Hard disk: 500G or more OS: Windows Server 2016, Windows 10, Windows 11	Display resolution: 1920x1080 Browser: Google Chrome, Microsoft Edge, Firefox

Table 1-1 Operation environment configuration

4 Software Deployment

4.1 Software List

The Install folder contains the VisualCppRedist_AIO_x86_x64.exe plug-in and the "NMS" one-click installation package.



4.1.1 Software description

Figure 1

Figure 2

Description

Figure 1 - Microsoft environment runtime installation package, providing the necessary runtime environment to install the network management system.

Figure 2 - Network management system installation package, containing all the

programs needed to install network management.

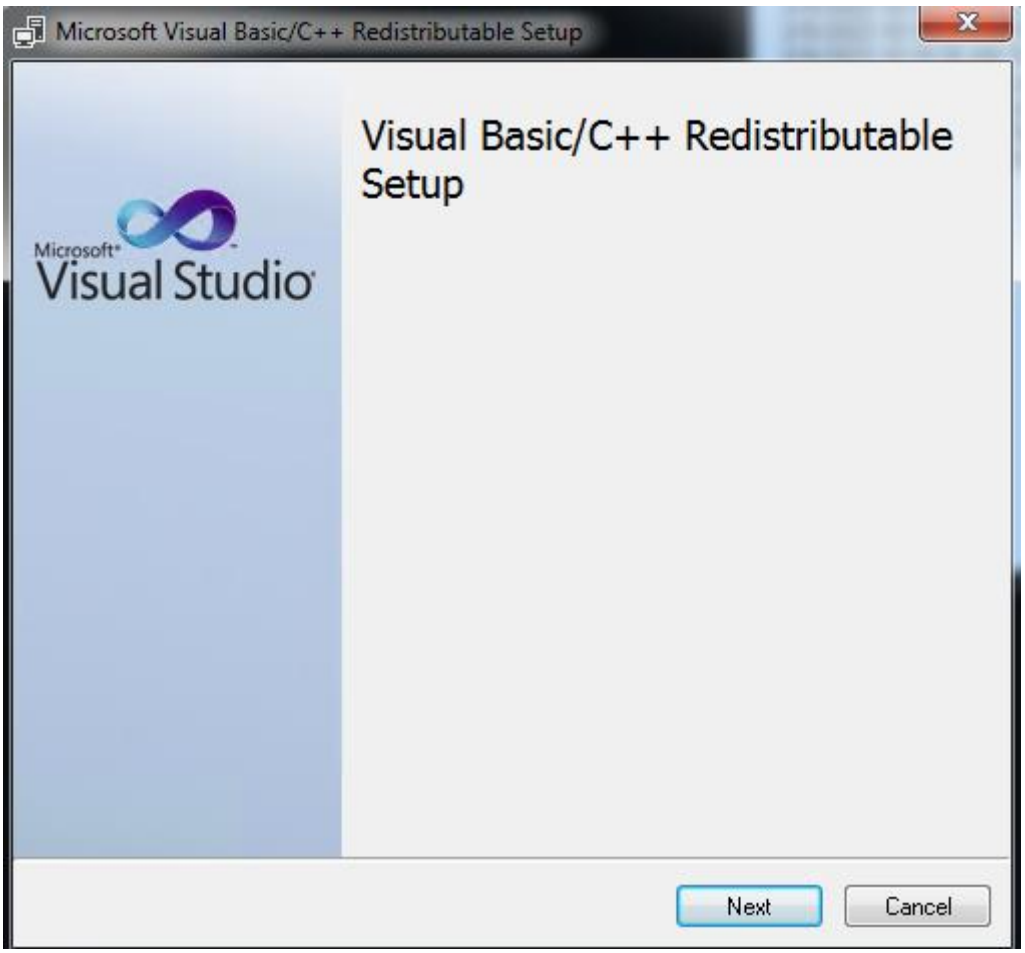
4.2 Program Installation

4.2.1 Installation environment

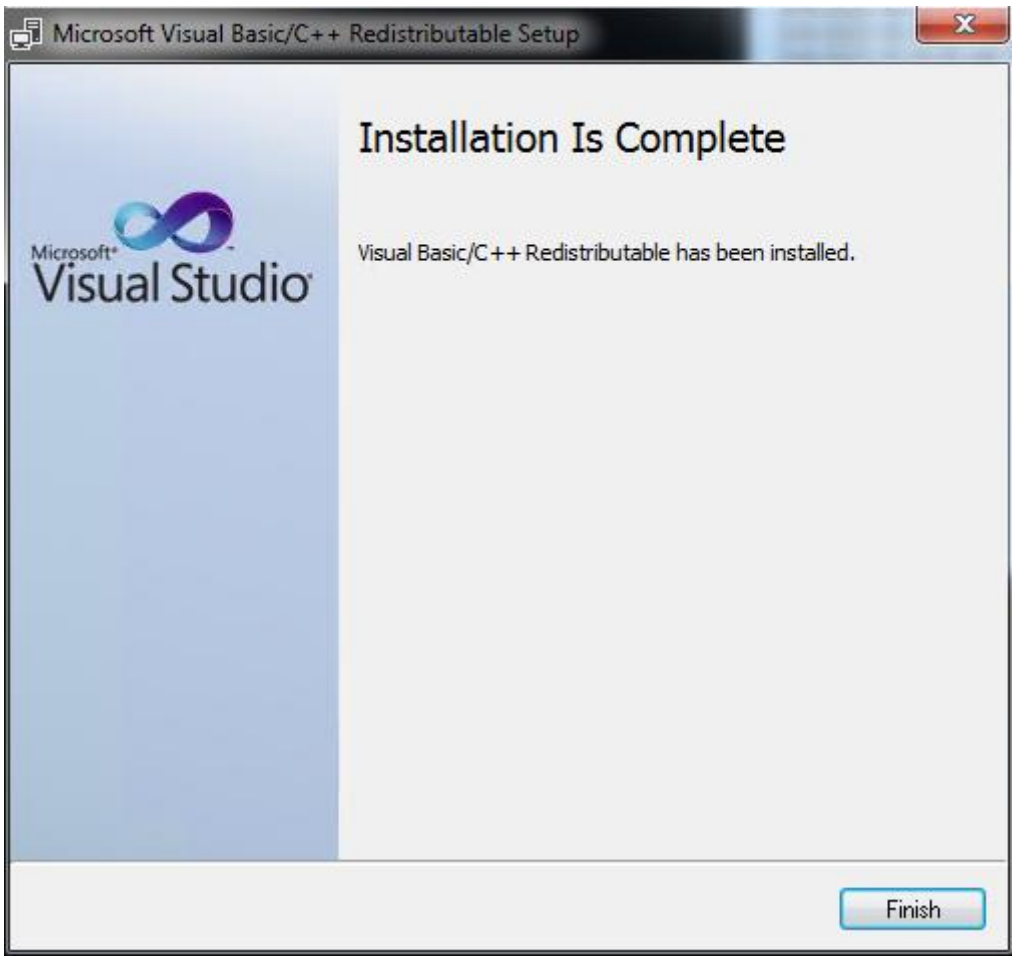
1. Install VisualCppRedist_AIO_x86_x64.exe, as follows:

(1) Double-click the VisualCppRedist_AIO_x86_x64.exe application.

(2) Click "Next".

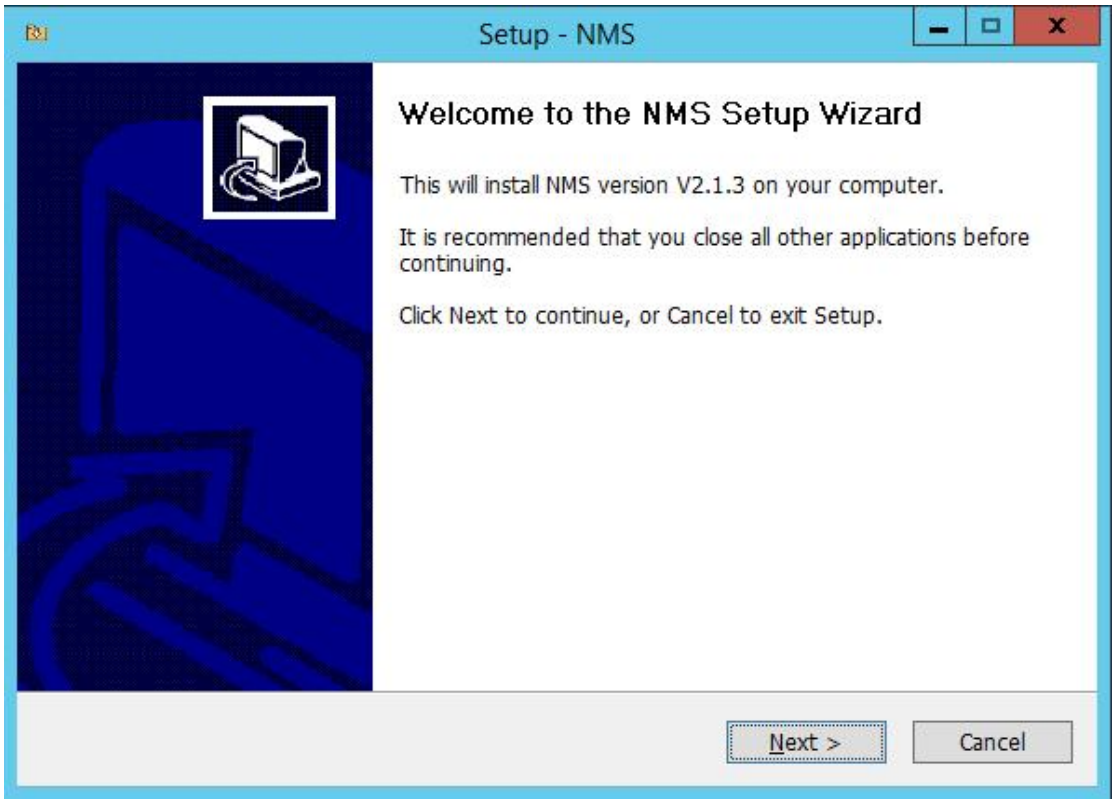


(3) Click "Finish".

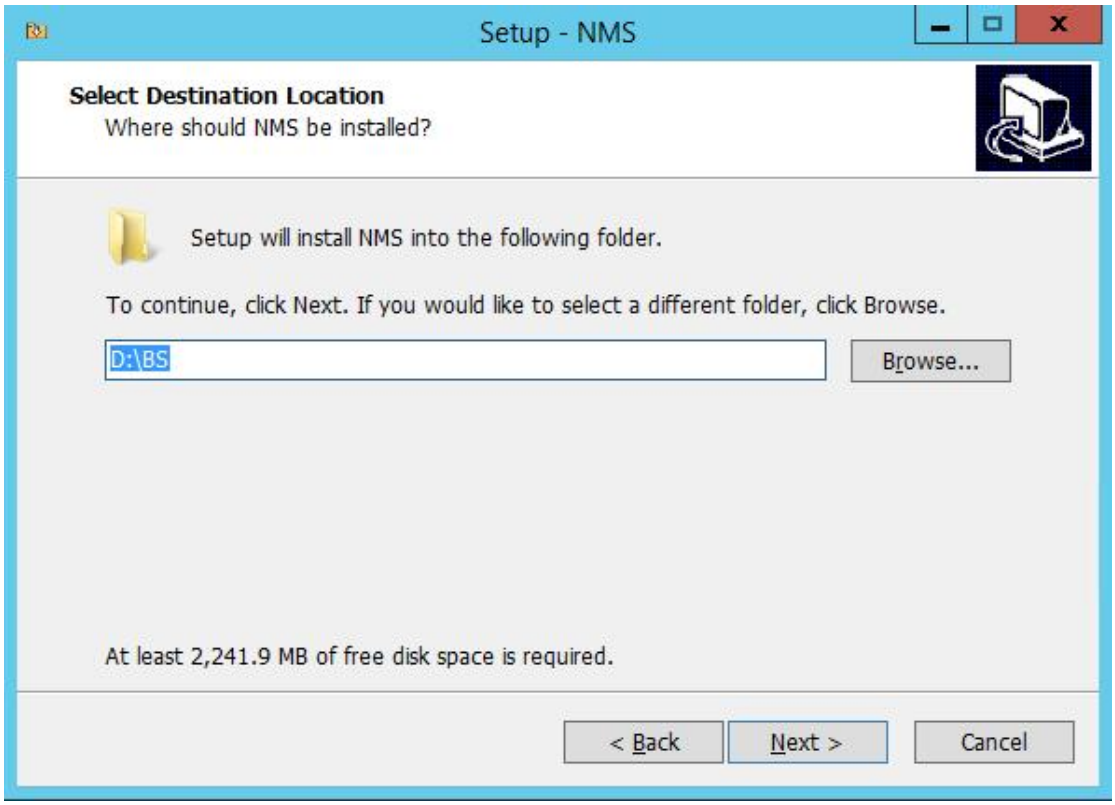


2. Install the network management system one-click installation package, as follows:

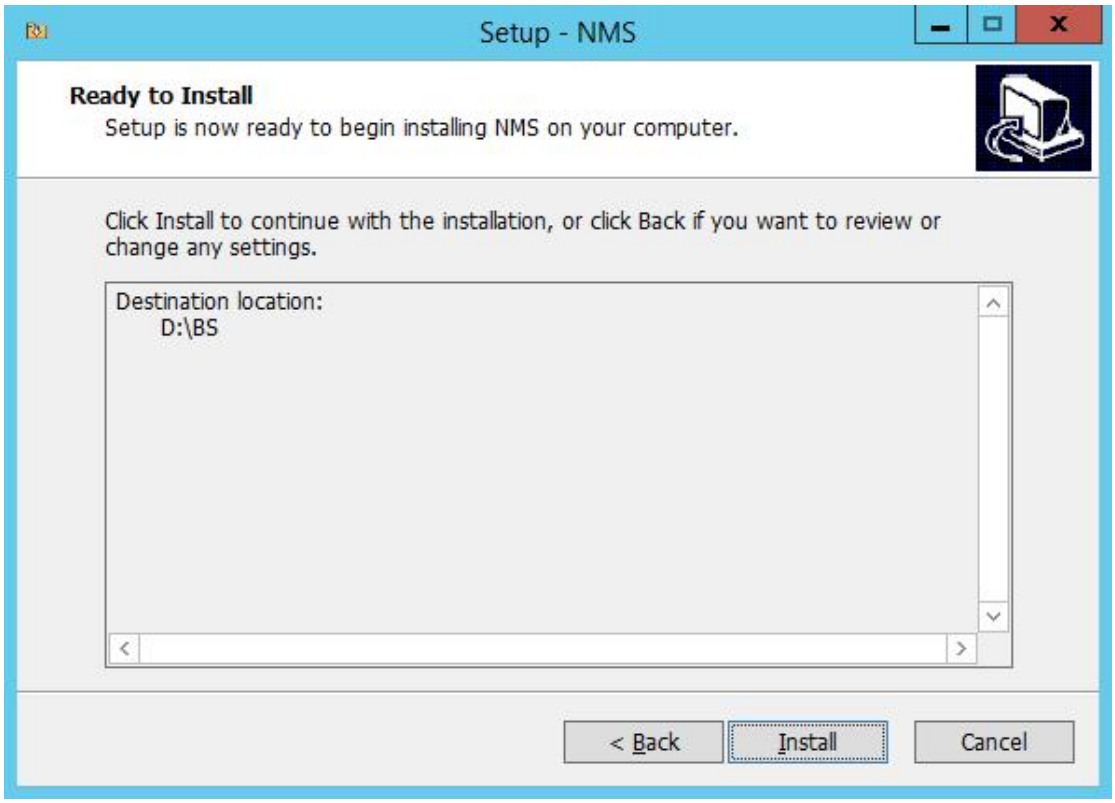
(1) Double-click the installation package to open the network management software installation program, click "Next".

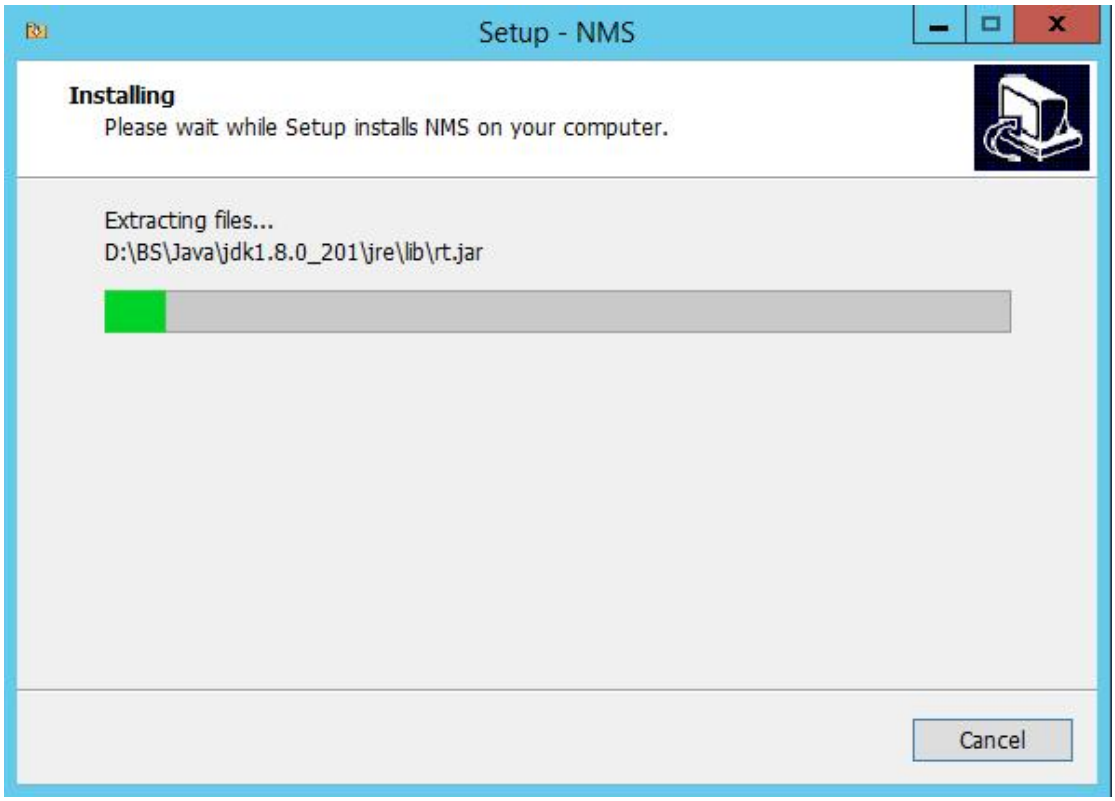


(2) Select the location where the network management software will be installed, and click "Next" after selection.

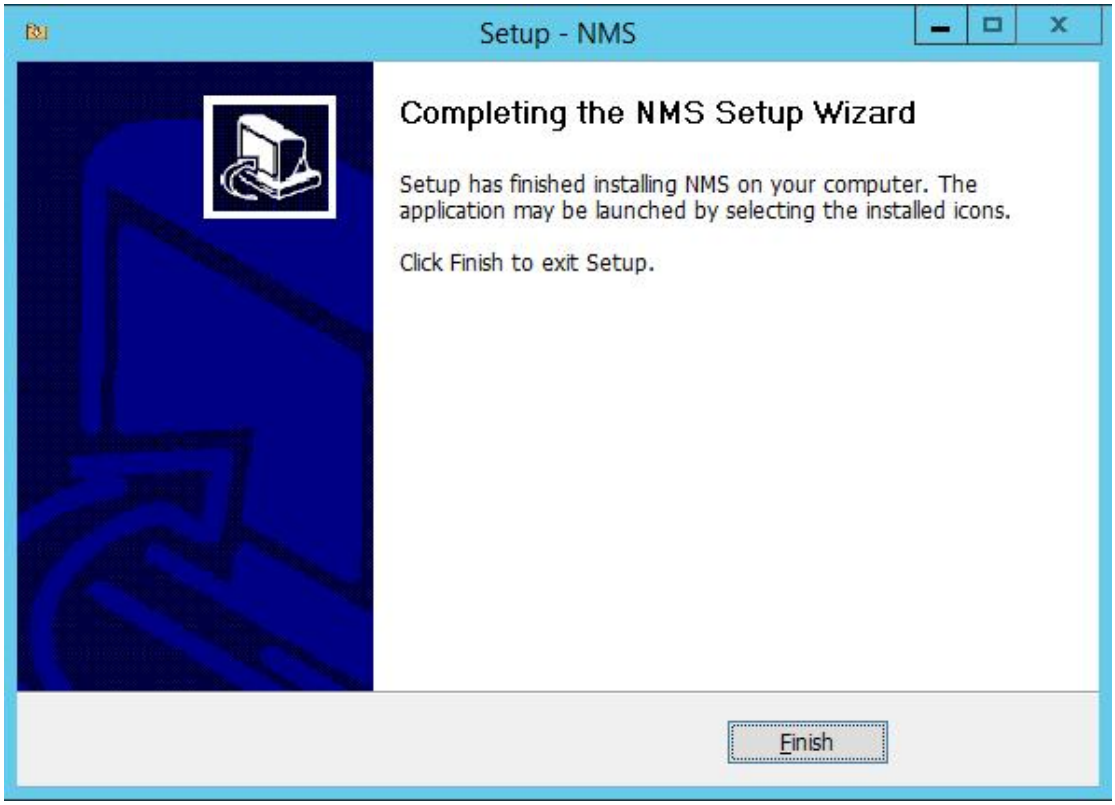


(3) Click "Install" to start the installation of the network management software.





(4) Click "Finish" to close the installation screen.



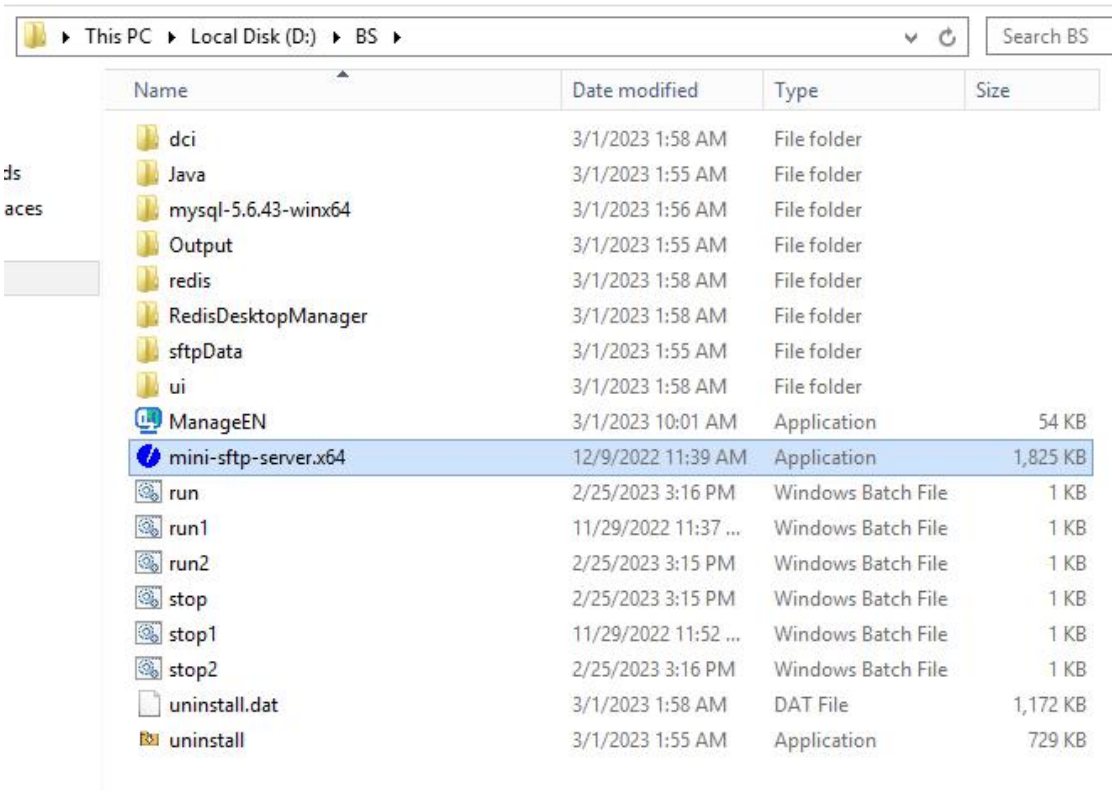
(5) After the installation is completed, the "Server" icon will appear on the desktop, which is used to open and close the network management service.

4.3 Software Operation

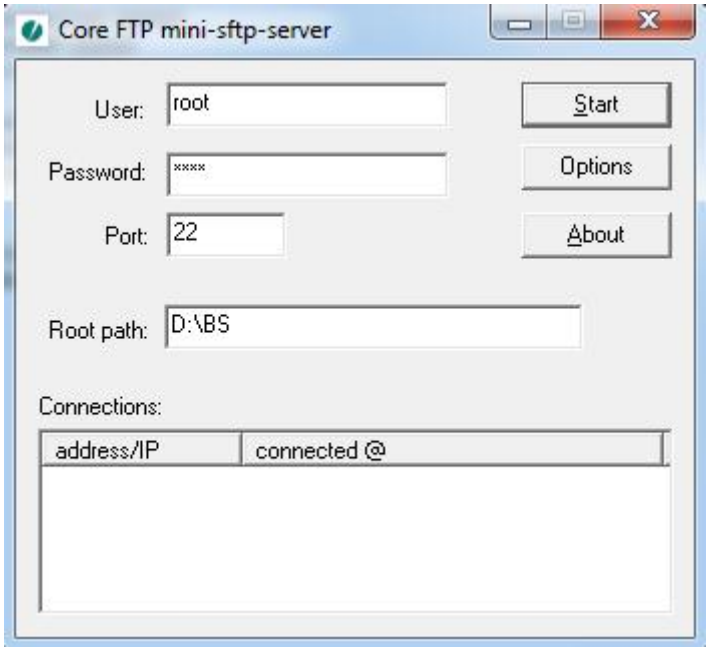
4.3.1 Start SFTP service

Operation steps

(1) In the network management software installation directory (such as D:\BS), find the mini-sftp-server_x64.exe application software, double-click the software.



(2) After the software is running, the User, Password and Port defaults to root, root, 22, the service storage root directory can be customized, it is recommended to set it to the network management software installation directory (such as D:\BS), click the "Start" button to start SFTP service.

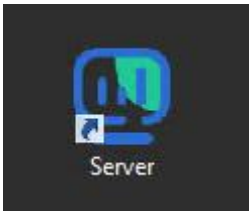


4.3.2 Start the network management system service end

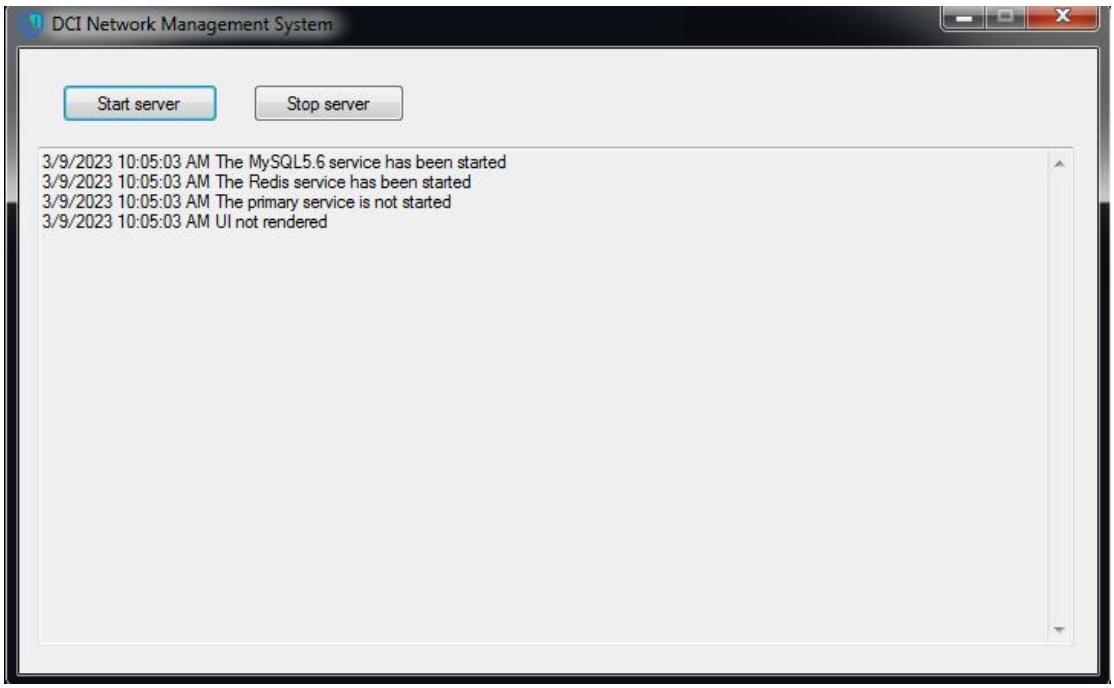
Operation steps

(1) Double-click the icon of "Server" to open the interface of Network Management

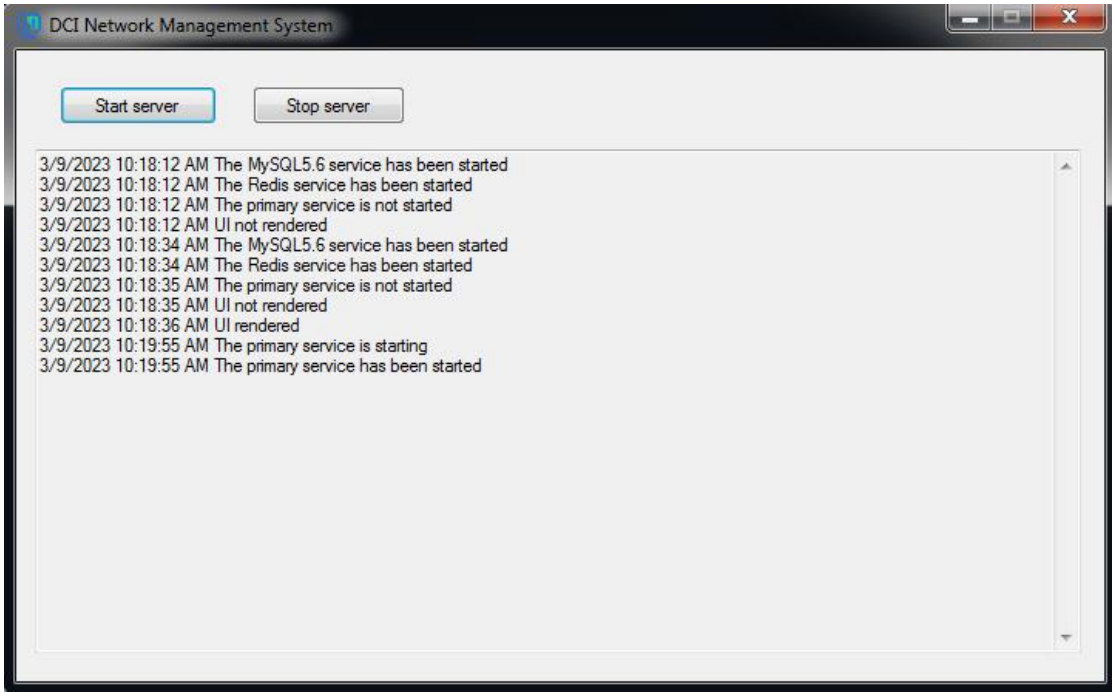
System Server.



(2) Click the "Start server" button to run the network management software.



3. It will take 5 minutes to start the network management system service, please wait patiently. When the operation interface of the network management system server shows that MySQL 5.6 service has been started, Redis service has been started, UI has been rendered and the server has been started, the network management system service is started and completed, as shown in the following figure.



5 Webmaster Introduction

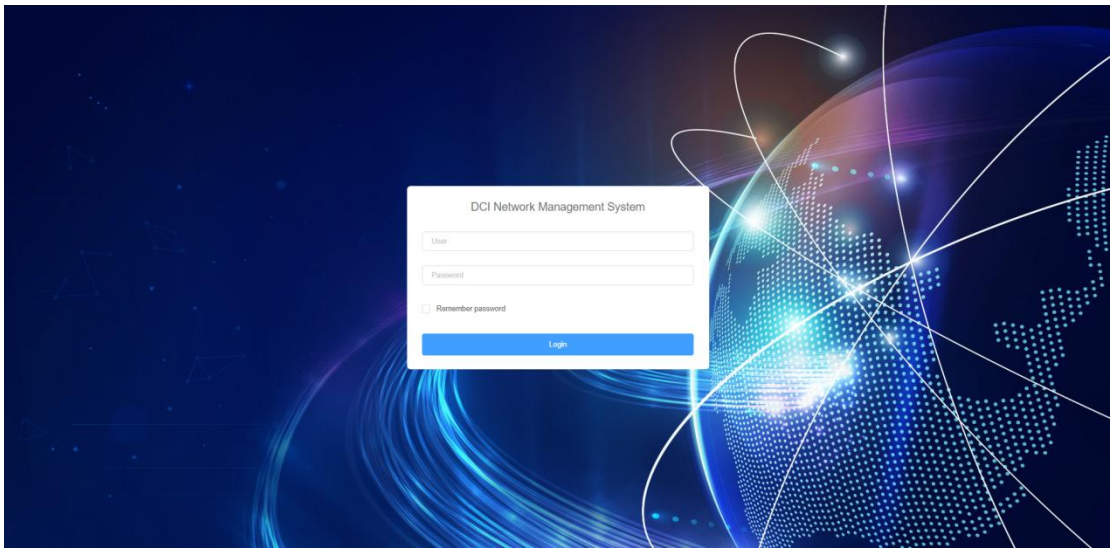
5.1 Logging in to the Webmaster

Operation Prerequisites

The server side of the network management system has been started and completed.

Operation steps

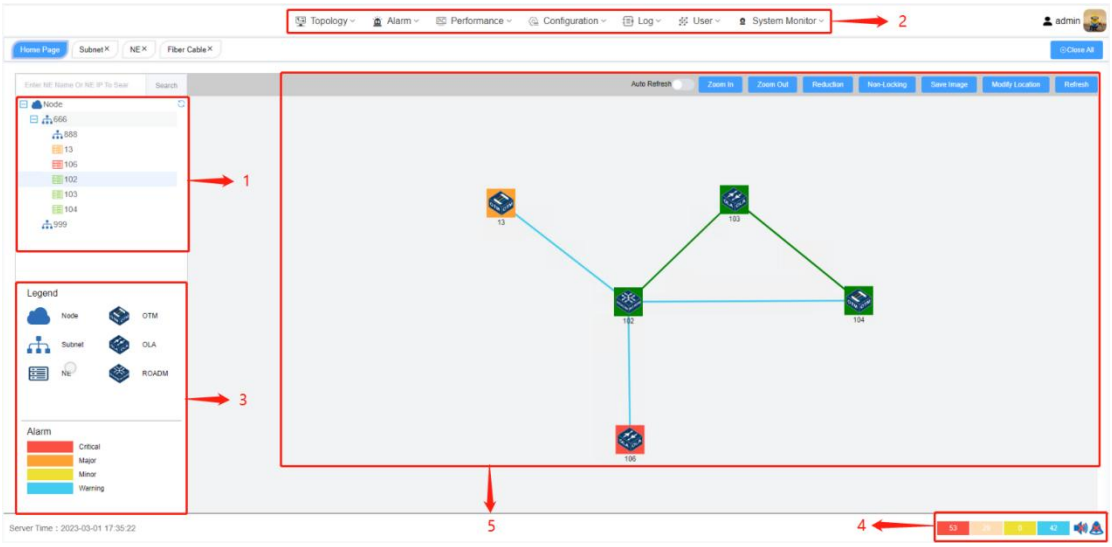
Open Google or Firefox browser, enter the server IP address and port number: xx.xx.xx.xx:81 to enter the network management system login interface. Enter user name and password to login. (The default login user name of super administrator is admin, password 123456).



5.2 Introduction of Network Management Interface

5.2.1 Main interface

The main interface of DCI network management system consists of main topology tree, menu bar, legend description, dynamic alarm statistics, etc.



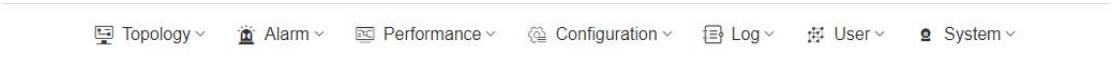
1 - Topology tree 2 - Menu bar 3 - Legend description 4 - Dynamic alarm statistics
5 - Topology diagram

Topology tree

Topology tree mainly shows root nodes, subnets, network elements and other objects in a tree-like structure. When you click on a topology tree element, the element will be centered in the topology diagram on the right.

Menu bar

The menu bar provides the main management function entrance of the network management system, including topology, alarm, performance, configuration, log, user, and system.



Legend description

The legend is used to explain the meaning of the different icons and colors.

Topology tree icon:

	Node

	Subnets
	NE(Network element): the icon will change according to the color corresponding to the alarm level

Net element icon:

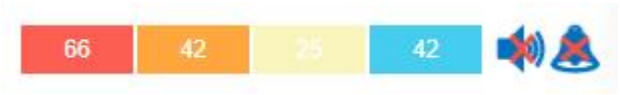
	Indicates that the site is configured as an optical terminal station
	Indicates that the site is configured as an optical relay station
	Indicates that the station is configured as a reconfigurable plug-and-play station

Alarm level color classification:

	Critical
	Major
	Minor
	Warning

Dynamic alarm statistics

Dynamic alarm statistics are used to present the current number of alarms of different alarm levels in real time. When a new alarm is generated, the color block count of the corresponding alarm level increases and flashes to indicate, and when the alarm is cleared, the color block count of the corresponding alarm level decreases.



Turn on/off alarm sound

Click the alarm sound icon at the bottom right corner of the network management interface to turn on or off the alarm sound, as shown in the following figure.

 : Alarm sound off

 : Alarm sound on

Enable/disable alarm pop-ups

Click the alarm popup icon at the bottom right corner of the network management interface to enable or disable the alarm pop-up window as shown in the following figure.

 : Alarm pop-up window closed

 : Alarm pop-up window open

Topology diagram

Provides intuitive and visual topology drawing, which graphically displays the distribution of network elements, the connection relationship between network elements and the current fault and performance status of network elements on the topology diagram.

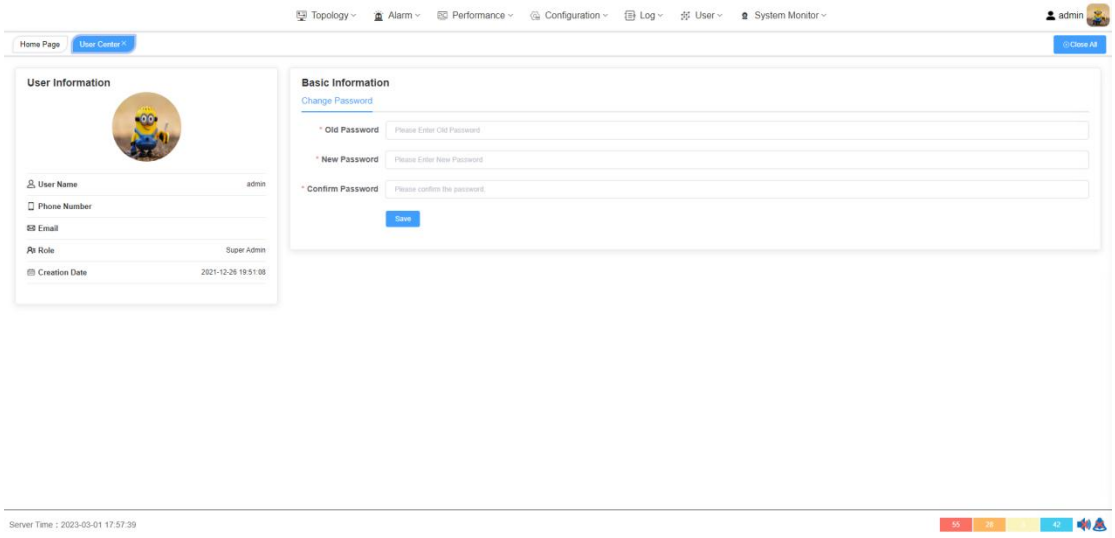
User center

Background Information

The user center consists of two parts, User Information and Basic Information. In the user Information shows the current user name, phone number, email, role and the creation date and other information. In the basic information, you can change the user login password. In the operation, you need to enter the old password to complete the change.

Operation steps

In the main interface, click on the user's avatar in the upper right corner and click on "User" to jump to the user center interface.



6 Topology Management

Topology management consists of subnets, network elements and fiber cables. In topology management, you can add and delete subnets, network elements and fiber cables; at the same time, you can also add and delete subnets, network elements and fiber cables on the physical topology map.

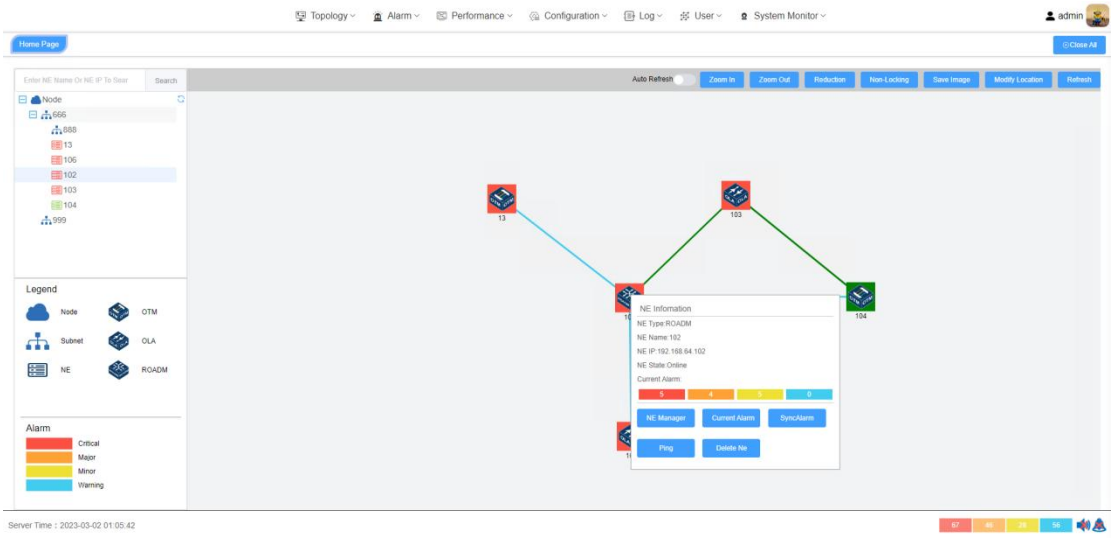
Introduction to Topology View

There is a row of auxiliary function buttons at the top right of the topology view interface, including: manual Refresh and Auto Refresh (every 10 seconds), topology map Zoom In and Zoom Out function, expansion slot ratio Reduction, net element Locking and Non-Locking function, and Modify Location of net element.

Zoom in and out function: Click "Zoom in" or "Zoom out" to zoom in or out the canvas and topology icons simultaneously.

Modify location function: In the topology view area, select the network element, you can freely drag the network element at a suitable position, and click the "Modify Location" button to fix the position of the network element.

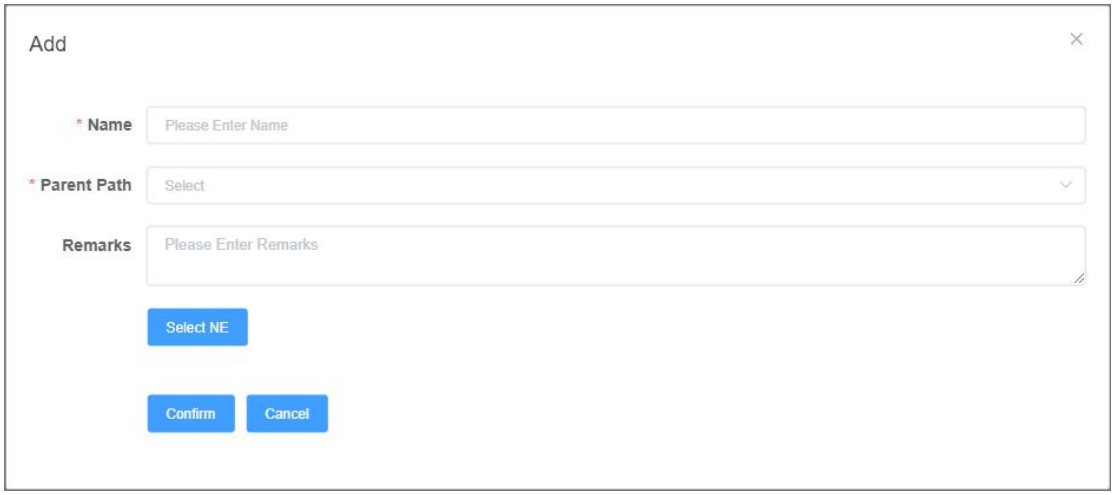
In the topology view area, right-click on the network element, a network element information pop-up window will appear with information about the type, name, and IP of the element, as well as related operation button functions.



6.1 Adding Subnets

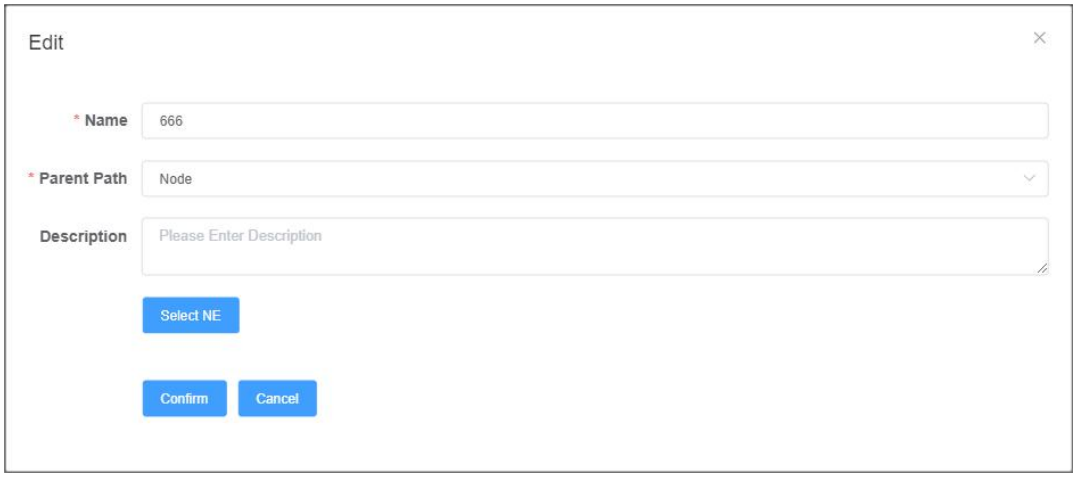
Method 1: Right click the "Create Subnet" button in the topology view, the "Add" pop-up window will appear, enter the corresponding information, the parent path can be selected in the drop-down, click " Confirm", add subnet successfully.

Method 2: Click the menu bar - "Topology" and select "Subnet" to enter the subnet interface, then click the "Add" button, enter the specified information according to the pop-up prompt and click " Confirm " to confirm.



When you finish adding a subnet, you can group the network elements and select the network elements to belong to this subnet.

Edit: Enter the subnet view interface, click the "Edit" button, the "Edit" dialog box pops up, you can edit the relevant information, click "Confirm" again to edit the subnet successfully.



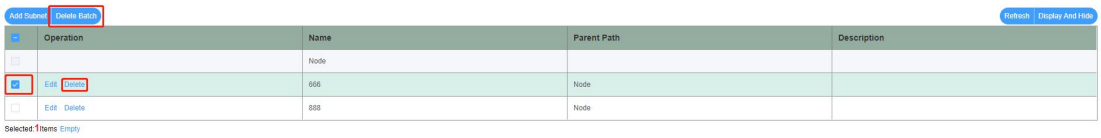
6.2 Deleting Subnets

Operation prerequisites

There are no network elements under the subnet.

Operation steps

Enter the subnet view interface, if only one subnet information is deleted, directly click the "Delete" button in the operation item, a system prompt will pop up, click "Confirm"; if multiple subnets are deleted, by checking the check box in front of the operation item, click if you want to delete multiple subnets, click "Delete Batch", the system prompt will pop up, click "Confirm", the operation interface will pop up, and the subnets will be deleted successfully.

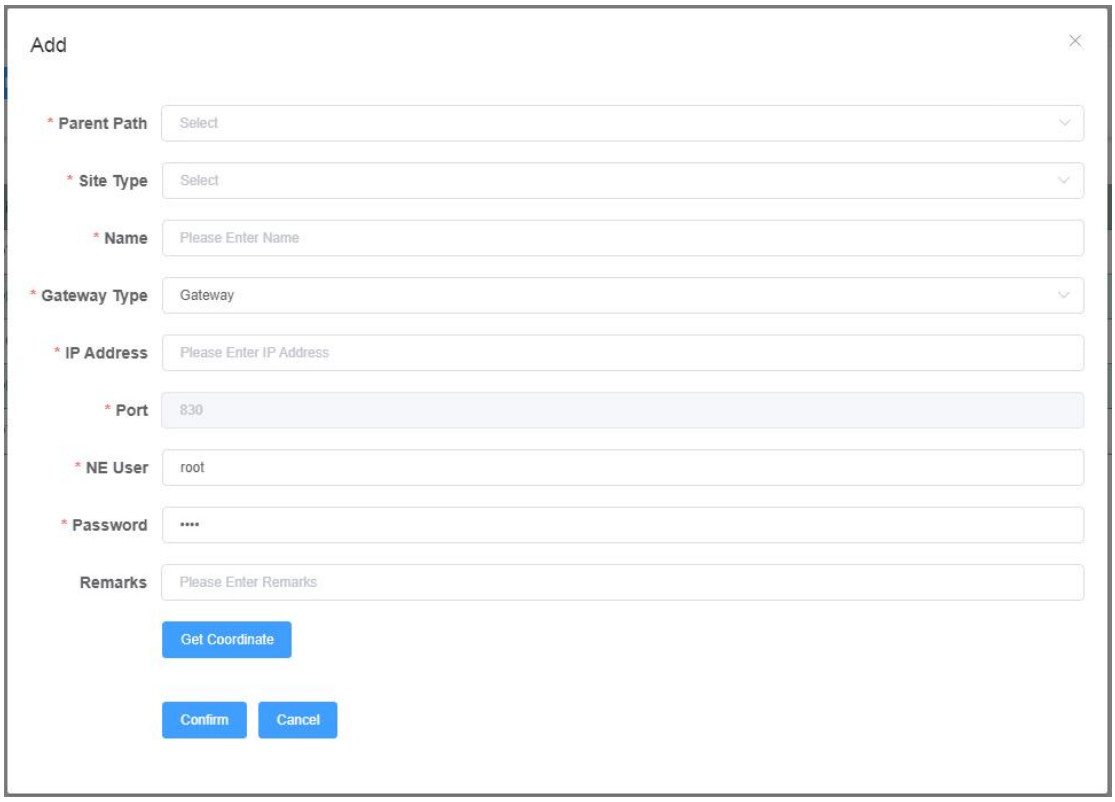


6.3 Adding Network Elements

Method 1: Right click the "Create NE" button in the topology view, the "Add" pop-up window will appear, enter the corresponding information and click "Confirm" to add the element successfully.

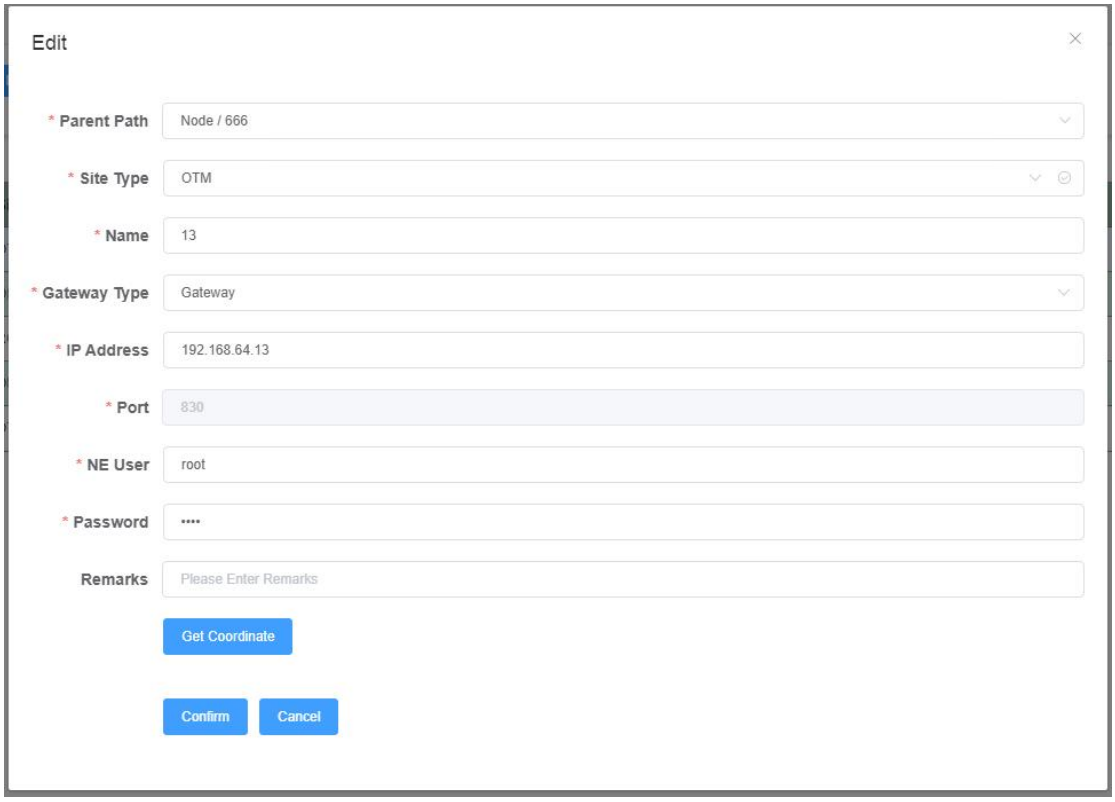
Method 2: Click the menu bar - "Topology" and select "NE" to enter the element interface, then click "Add", enter the specified information according to the pop-up window, and click " Confirm ".

When adding network elements, please note that the gateway type is "Gateway", the port is 830 by default, the account password is root by default, and modification is prohibited. The factory management IP of the network element: 192.168.126.111, subnet mask: 255.255.255.0



Edit: Enter the interface of the network element view, click the "Edit" button, and the "Edit" dialog box pops up, you can edit and modify the information of the network element name, site type and description, etc.. Click " Confirm " again to edit the network element

successfully.



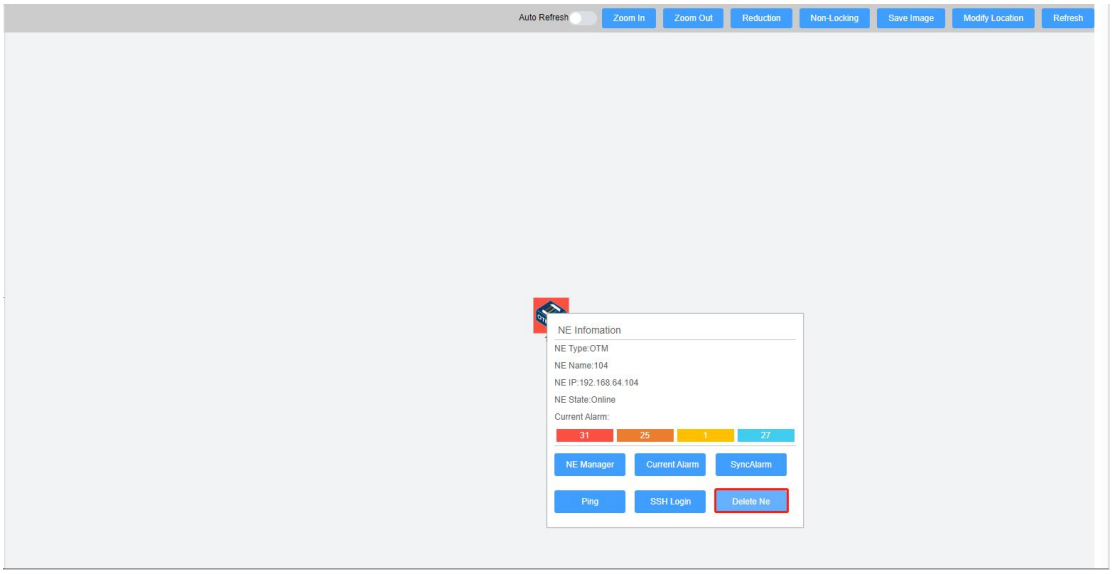
The colors of different network element icons represent that the element is in different states, as shown in Table 1-2.

Color Status	Color Definition
Green	Normal
Red	The highest level alarm is an emergency alarm
Orange	The highest level alarm is a main alarm
Yellow	The highest level alarm is a secondary alarm
Blue	The highest level alarm is a prompt alarm
Grey	Device offline

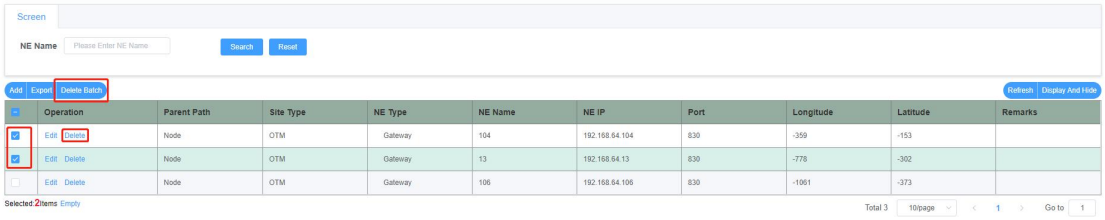
Table 1-2 Network element icon color definition

6.4 Deleting Network Elements

Method 1: Right-click the element in the topology view and click the "Delete NE" button to delete the element.



Method 2: Enter the network element view interface, select the network element to be deleted, if only one network element information is deleted, click the "Delete" button directly in the operation item, a system prompt will pop up, click "Confirm"; if multiple network elements information is deleted, by checking the check box in front of the operation item if you want to delete multiple network elements, click "Delete Batch" by checking the check box in front of the operation item, and then click " Confirm " to pop up the operation interface and delete the network elements successfully.



Note: After deleting a network element, all the topological connections of that element are deleted simultaneously.

6.5 Creating Fiber Cables

When creating a fiber cable, the network management will automatically determine whether the link has diagnostic functions after selecting the corresponding source and host network elements and ports according to the physical connection. Among them, the OTS layer fiber connection has diagnostic function, such as OLA, but the rest of the connection doesn’t have diagnostic function.

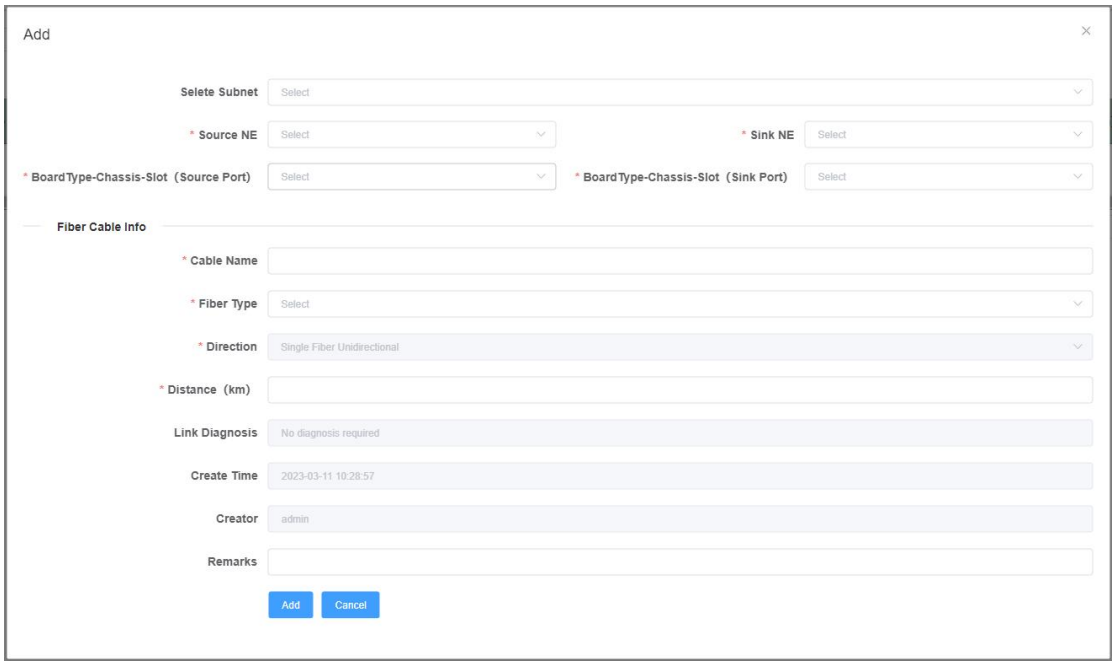
Operation prerequisites

Two or more network elements exist under the subnet.

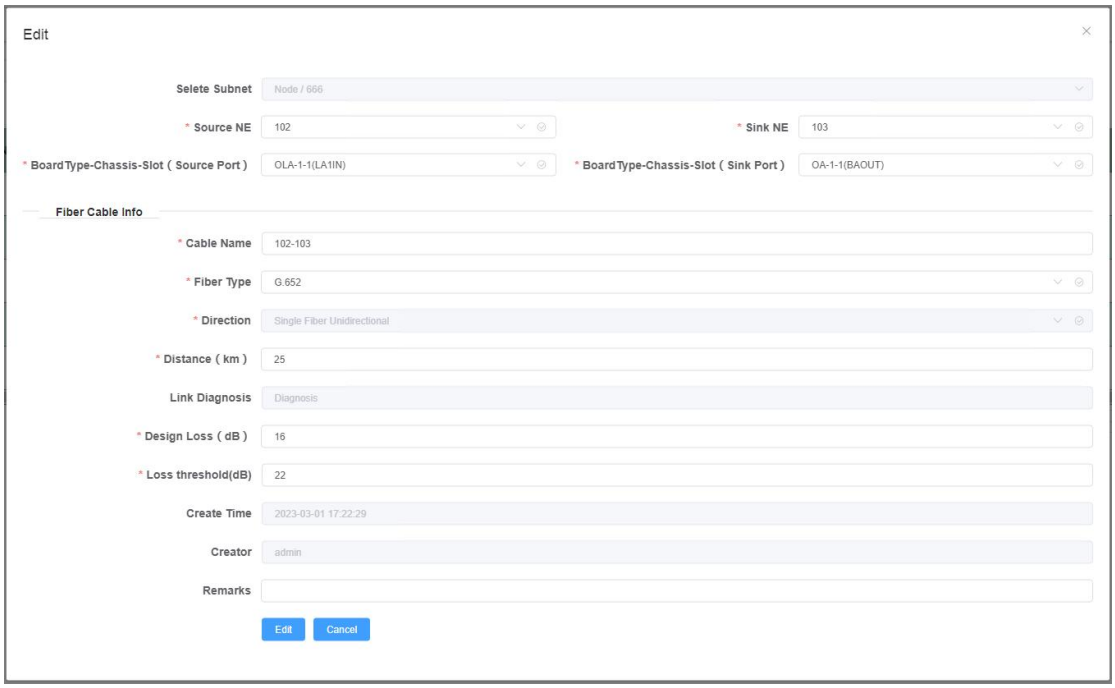
Operation method

Method 1: Right-click the blank space in the topology view area, click the "Create Fiber" button, the "Add" pop-up window will appear, enter the corresponding information, the fiber direction is "Single Fiber Unidirectional" by default. Click "Add" to add the fiber successfully.

Method 2: Click the menu bar - "Topology" and select "Fiber" to enter the fiber interface, then click "Add", according to the pop-up window prompts to enter relevant information and click "Add" to confirm.



Edit: Enter the cable view interface, click the "Edit" button, the "Edit" dialog box pops up, you can edit the relevant information of the cable, click "Edit" at the bottom of the pop-up window to bring up the operation interface and edit the fiber cable successfully.



The topology connection between different types of boards is also distinguished by the color of the fiber cable, which indicates whether the link has diagnostic functions and the current topology connection status. As shown in Table 1-3.

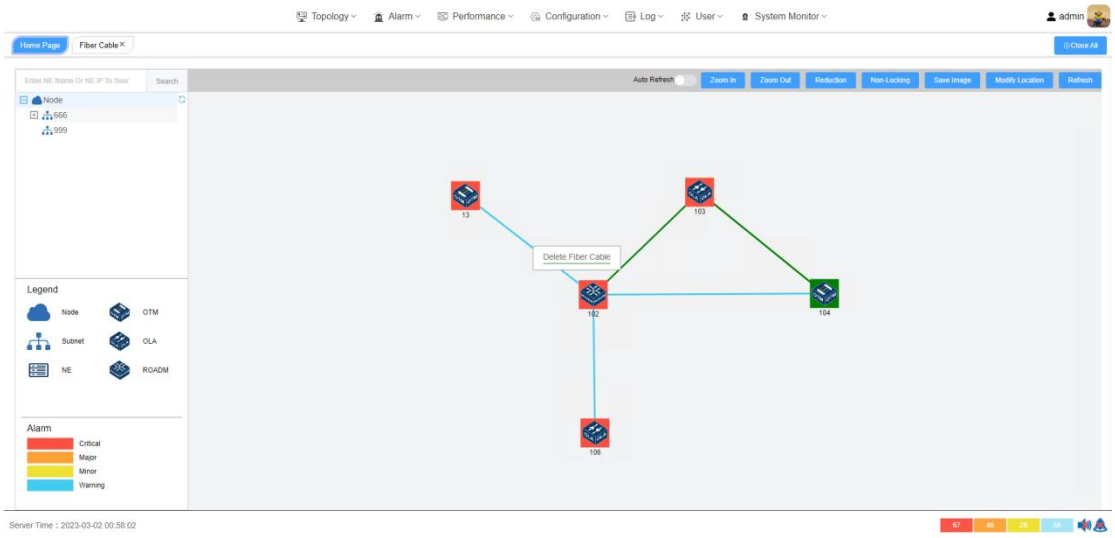
Color of fiber cable	Link diagnostics	Connection status
Blue	No diagnosis	Normal
Green	Diagnosis	Normal
Red	Diagnosis	Overstep the limit
Grey	Diagnosis	Offline

Table 1-3 Fiber cable color description

6.6 Deleting Fiber Cables

Method 1: Right-click the fiber cable in the topology view area, and then the "Delete Fiber Cable" button will pop up, click "Delete Fiber Cable" to delete the fiber cable.

Method 2: Enter the fiber view interface, click the "Delete Fiber Cable" button, the "System Prompt" pops up, click "Confirm", then pop-up the operation interface, delete the fiber successfully.



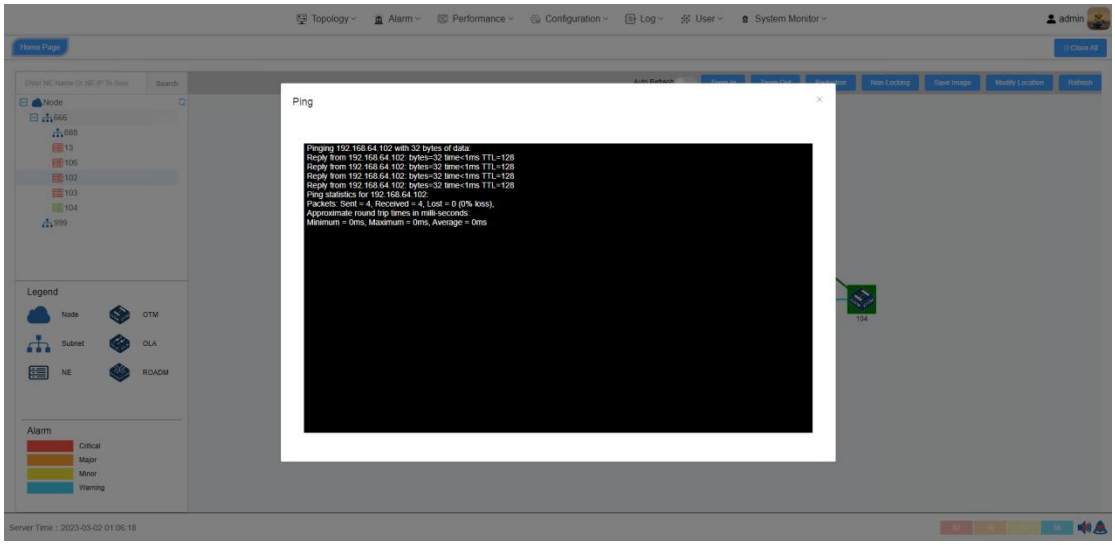
6.7 Network Element Connection Diagnosis

Background information

Diagnosis of the network element connection can be performed by ping test to check whether the specified network element network is reachable.

Operation steps

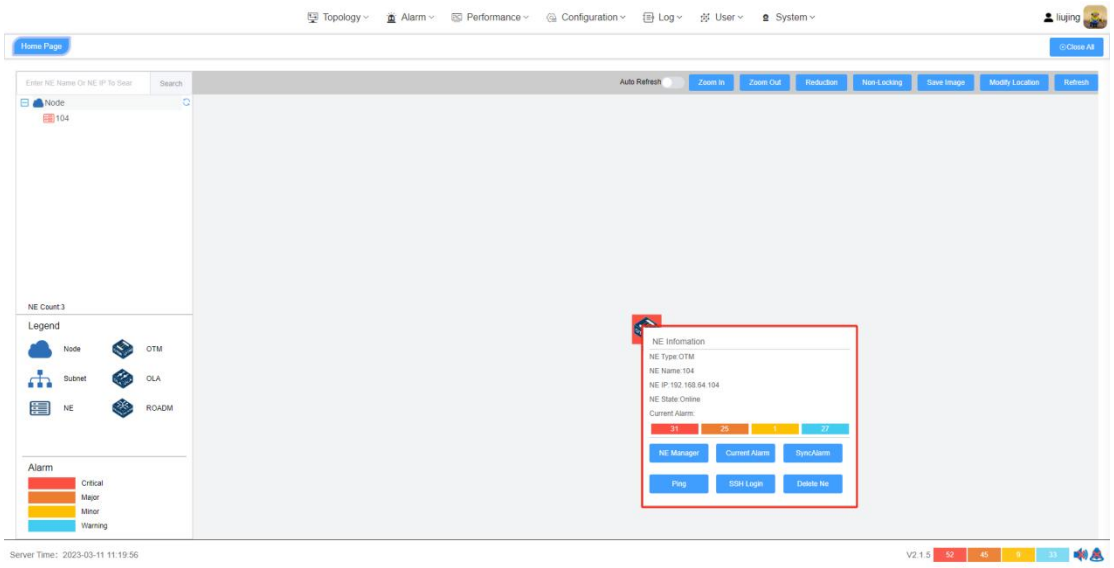
Right-click the network element in the topology view area, and click the "Ping Test" button in the "NE Submenu" to bring up the "Ping" pop-up window, which will automatically perform a ping connection on the network element.



6.8 Opening the Network Element Manager

Operation steps

Enter the topology view, right-click the element, and click the "NE Manager" button in the "Element Submenu" to open the NE manager interface of the element to view and configure the element, subrack, single board, port and other information.

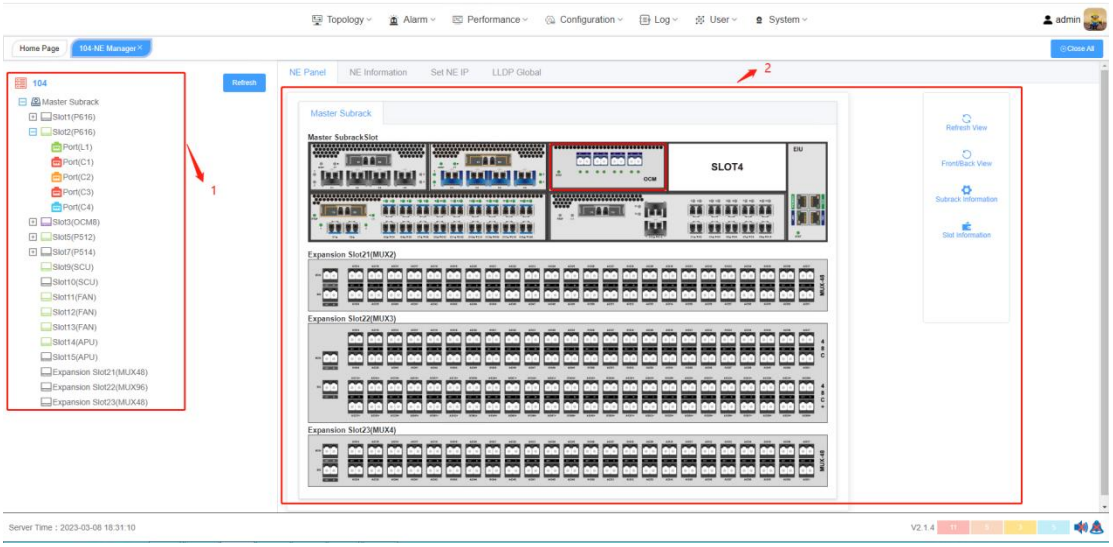


7 Network Element Manager

The Network Element Manager(NE Manager) is adopted as the main operation interface for managing network elements, and each element is used as the operation object for hierarchical configuration, management and maintenance for elements, subracks, single boards and ports respectively.

7.1 Network Element Information

7.1.1 Introduction to the network element view



1 - Network element tree 2 - Network element configuration interface

7.1.1.1 Introduction to the network element tree

Network element tree - board icon description

The left side of the NE Manager displays the Element-Subrack/Single Board/Port in a tree structure, where the single board and port icons dynamically change color to visually show the user their working status.

The board icon colors are defined as shown in Table 1-4.

Icon color	Physical board in place status	Physical and logical board models	Alarm status
Grey	Out of position	/	/
Purple	In position	Inconsistency	/
Green	In position	Consistent	No alarms

Table 1-4 Board icon color definition

Network element tree - port icon description

When the logical board is the same as the physical board model and the panel display is normal, the color of the port icon is the same as the color meaning of the network element icon, indicating the highest level of alarms currently present on the port.

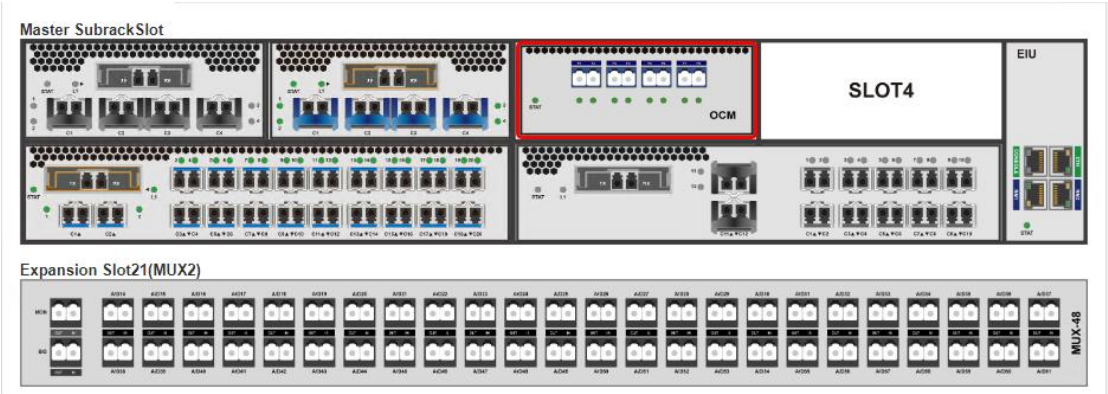
7.1.1.2 Network element panel view description

The network element panel is used to visualize the logical and physical board view of all slots of the network element.

- When the logical board is aligned with the physical board, displaying the logical board correspondence view (in sharp colors)

- When the logical board doesn't correspond to the physical board, displaying the corresponding view of the logical board (with a red frame around the periphery of the view)
- When a logical board has been configured and the physical board is not in place, the corresponding view of the logical board is displayed (grayed out color).
- When no logic board is configured, an empty panel is displayed.

As shown in the figure below.



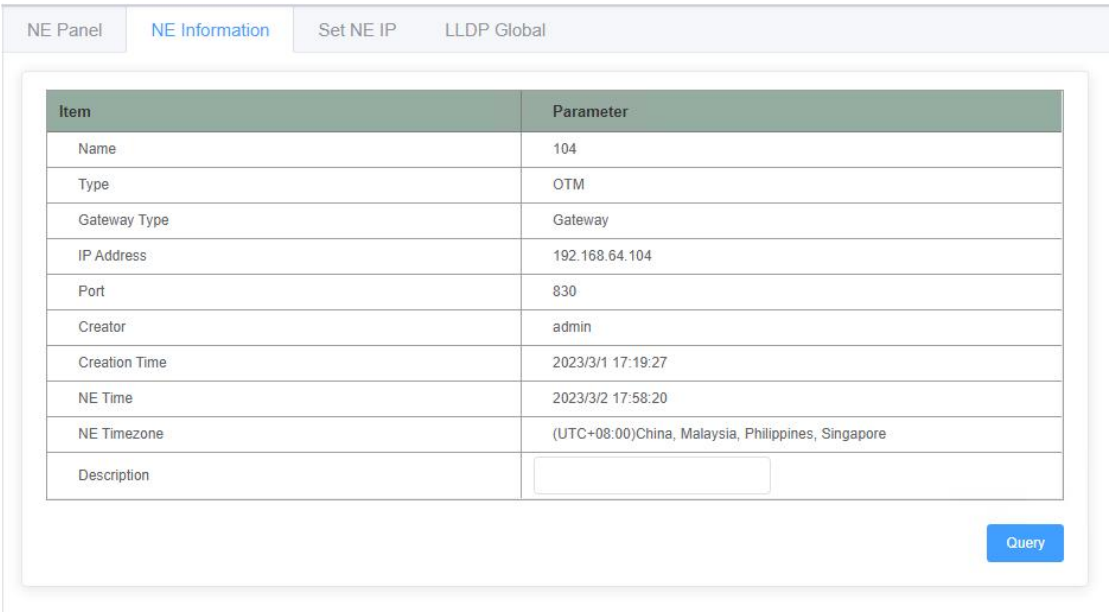
Description of the function buttons on the right side of the network element panel view

1) Click the "Refresh View" button to manually refresh the view and update the panel status in real time.

(2) Click the " Front/Back View" button, you can switch the view of the master subrack equipment before and after the view, you can view the back of the device's main control(SCU), power supply(PSU), fan panel(FAN) status.

7.1.2 Viewing network element information

Open the NE Manager, click the element name in the left element tree, and click "NE Information" in the right element configuration information interface submenu to switch to the element information page, where you can query the element name, site type, IP address, port number, current time of the element, and other data.



7.2 Network Element Base Configuration

7.2.1 Setting the network element IP

Operation steps

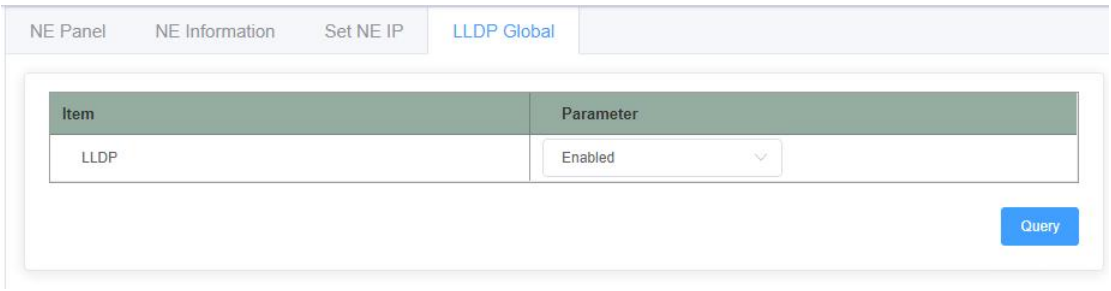
Open the NE Manager, click the element name in the left element tree, click "Set NE IP" in the right element configuration information interface submenu to switch to the Set Element IP page, enter the IP address, subnet mask and gateway address, and click "Confirm".

7.2.2 Global LLDP

Enable LLDP global function, default LLDP off.

Operation steps

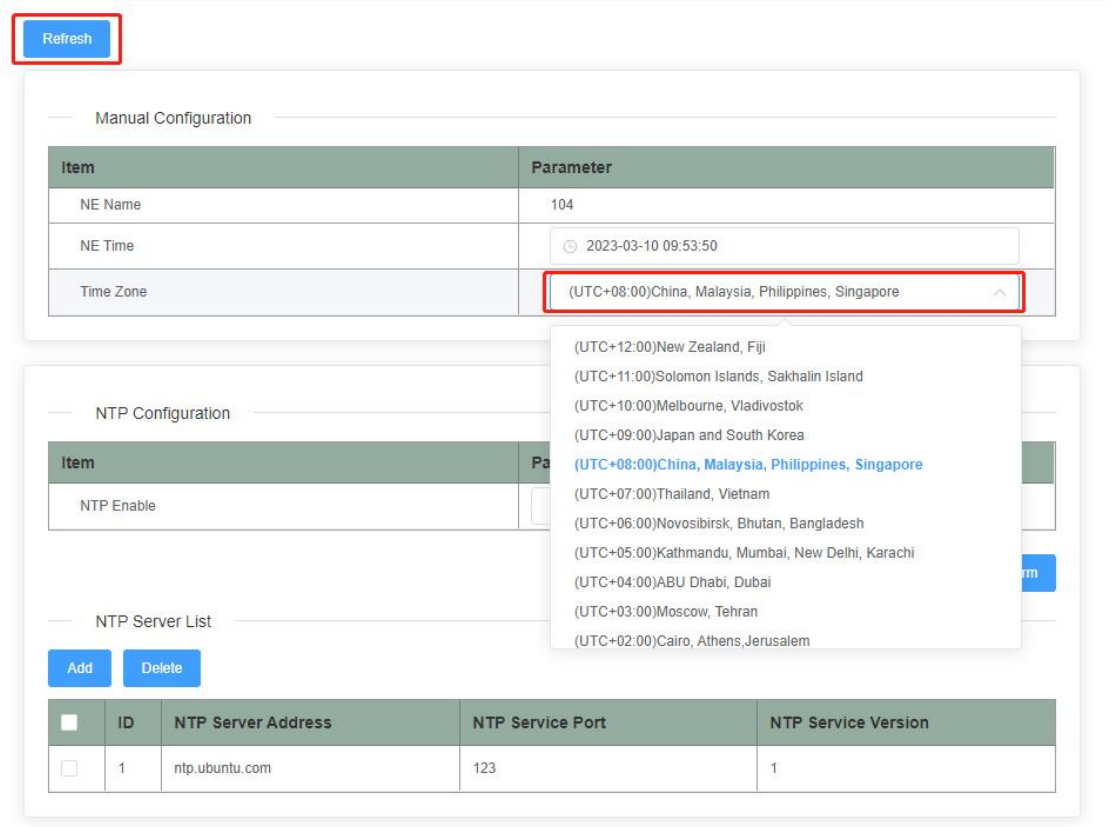
Open the NE Manager, click the element name in the left element tree, click " LLDP Global" in the right element configuration information interface submenu to switch to the global LLDP configuration page, select Enabled or Disabled as required, click "Confirm", wait for the operation success prompt to pop up and then click "Query", the current configuration is consistent with the set value that the operation is successful.



7.2.3 Setting the time zone of network elements

Operation steps

Click the menu bar - "Configuration", select the sub-menu "NE Time", enter the network element time interface, expand the network element tree on the left, select the network element, display the network element time details on the right, manually configure the information box at the "Time Zone" click "Confirm", wait for the successful operation prompt to pop up and then click "Refresh" button, the current configuration is consistent with the set value that is set successfully.

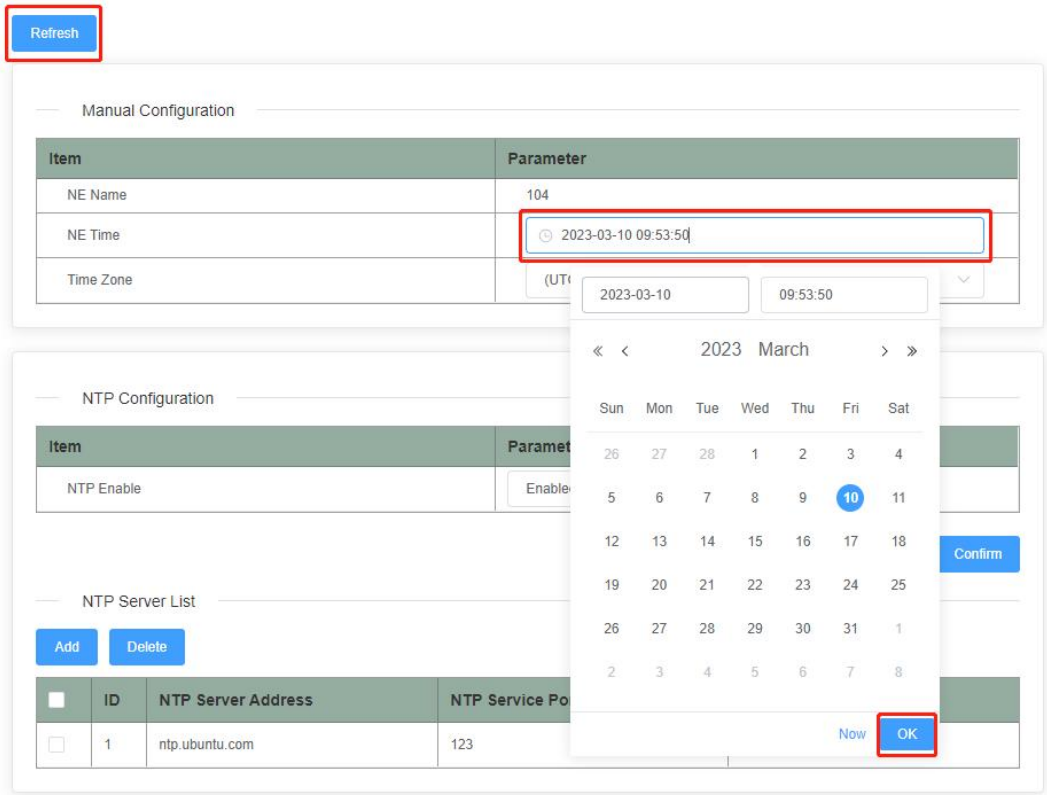


Note: After setting the time zone of the network element successfully, the time of the network element will be synchronized with the local time zone time.

7.2.4 Setting the network element time

Operation steps

Click the menu bar - "Configuration", select the submenu "NE Time", enter the network element time interface, expand the network element tree on the left, select the network element, the right side shows the network element time details, manually configure the information box at the "NE Time" to enter the setting values, click "Confirm", wait for the successful operation prompt to pop up and then click the "Refresh" button, the current configuration is consistent with the setting value that is set successfully.



7.2.5 SCU reversal

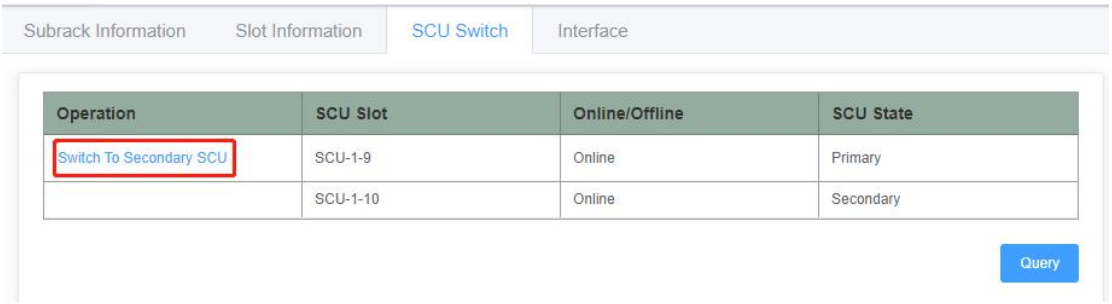
DCI devices support automatic and manual SCU reversal. Users can query the SCU status, the current active SCU and manually reverse to the backup SCU through NMS.

Operation prerequisites

The network element is currently in a dual SCU state.

Operation steps

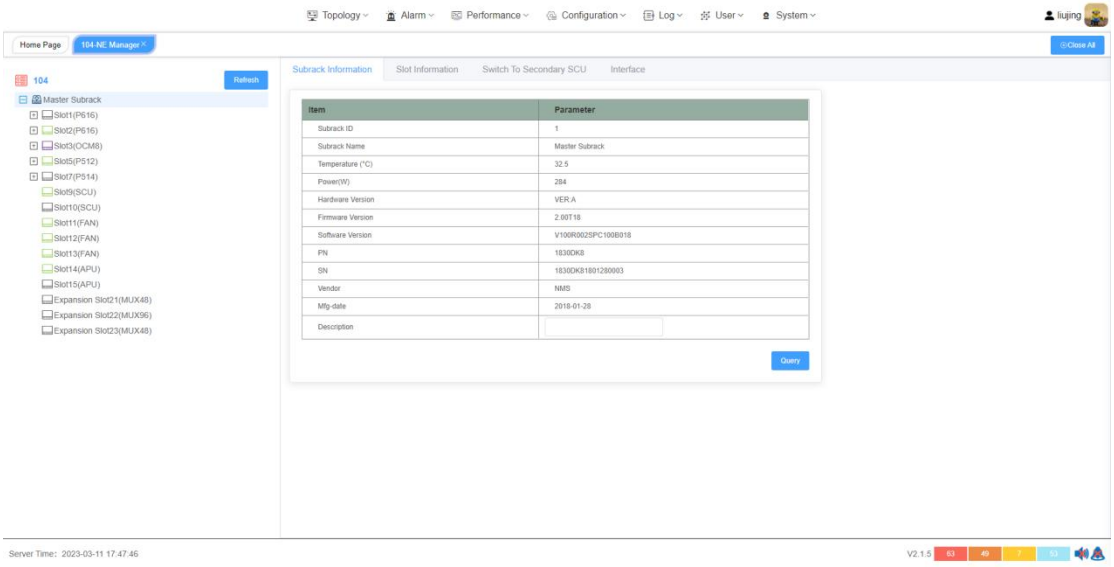
Enter the NE manager, select the subrack, choose the "SCU Switching" submenu, click the "Switch To Standby SCU" button in the operation item, wait for the successful operation prompt to pop up and click "Query". If the SCU status is the same as the setting, the switch is successful.



7.3 Viewing Subrack Information

Operation steps

Open the NE Manager, click the subrack name in the left element tree, and the subrack details will be displayed in the right element configuration information screen, including subrack ID, subrack name, current subrack temperature and power, subrack version, PN, SN and other data.



7.4 Slot Information Operation Instructions

Background information

The physical board is the actual in-place board inserted on the current subrack; while the logical board is the single board at the configuration level created on the NMS. If the logical board is created and the corresponding physical board is in place, the service can be configured normally.

Open the NE Manager, click the name of the subrack in the element tree on the left, and click "Slot Information" in the submenu of the element configuration information interface on the right to switch to the slot information page, where you can view the type, status, description and other information of all the slots of the current subrack, and add, edit and delete slot boards on this page. In this page, you can also add, edit and delete slot boards.

7.4.1 Adding a logic board

Operation prerequisites

The logical board is not configured, and the physical board is in place or not in place.

Operation steps

Click the "Edit" button to add a logic board.

Editor

Operation prerequisites

The logical board is configured and the physical board is in place.

Operation steps

Click the "Edit" button to modify the current slot description information.

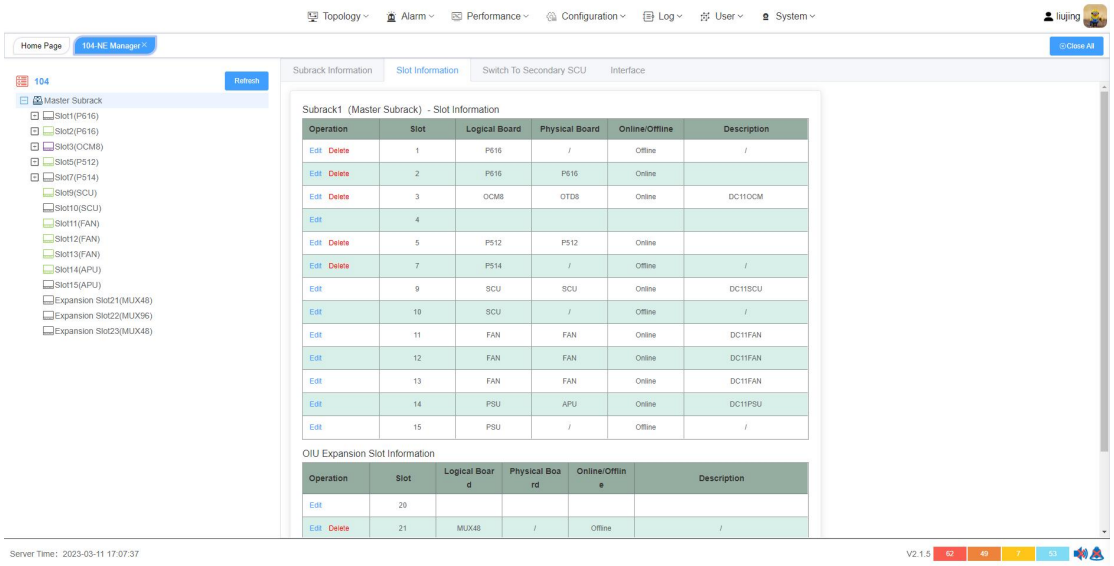
7.4.2 Deleting logical boards

Operation prerequisites

The logical board is configured, the physical board is not in place.

Operation steps

Click the "Delete" button, a system prompt will pop up, click "Confirm" to delete successfully.



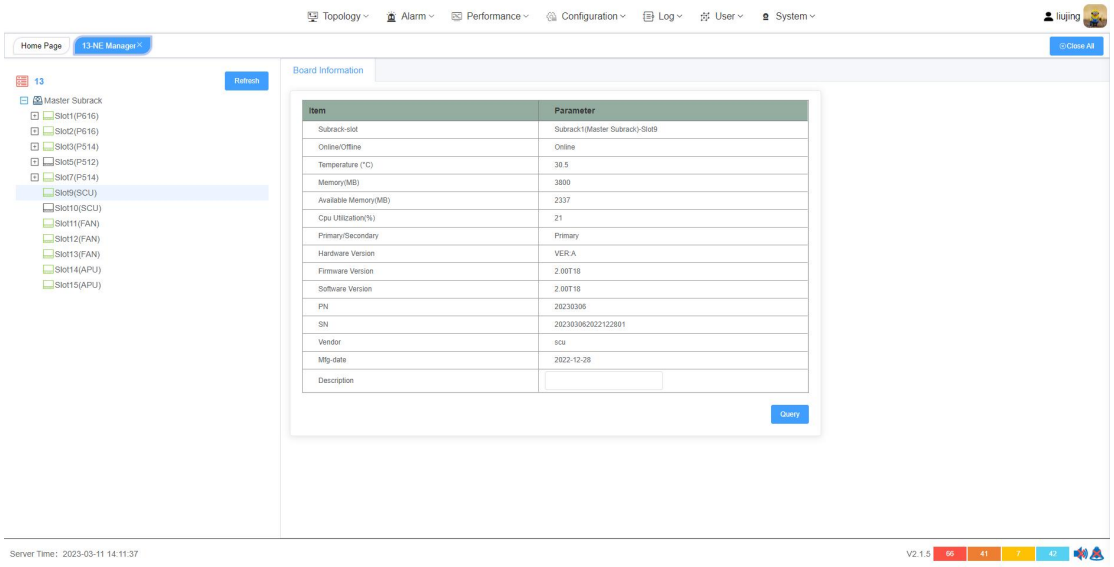
Warning: Deleting a logical board will delete the single board configuration information at the same time.

7.5 View SCU Operation Information

The SCU board submenu includes in-position status, temperature, memory capacity, currently available memory, current CPU occupancy, SCU version model, etc. Board descriptions can be added as needed.

Operation steps

Open the NE Manager, expand the element tree on the left and select the SCU slot, switch the interface to the SCU submenu, and click "Query" to view the latest relevant data.



7.6 Configuring Fan Mode and Speed

The fan board submenu contains information such as in-position status, temperature, fan speed regulation mode, and current fan speed.

Configure fan mode

Operation steps

Open the NE Manager, expand the Element Tree on the left and select the fan slot, select the option parameter (AUTO/MANUAL) in the "Fan Mode" column of the Fan Single Board submenu, click "OK", wait for the successful operation prompt and then click "Query", the current mode is the same as the set value, which means the setting is successful.

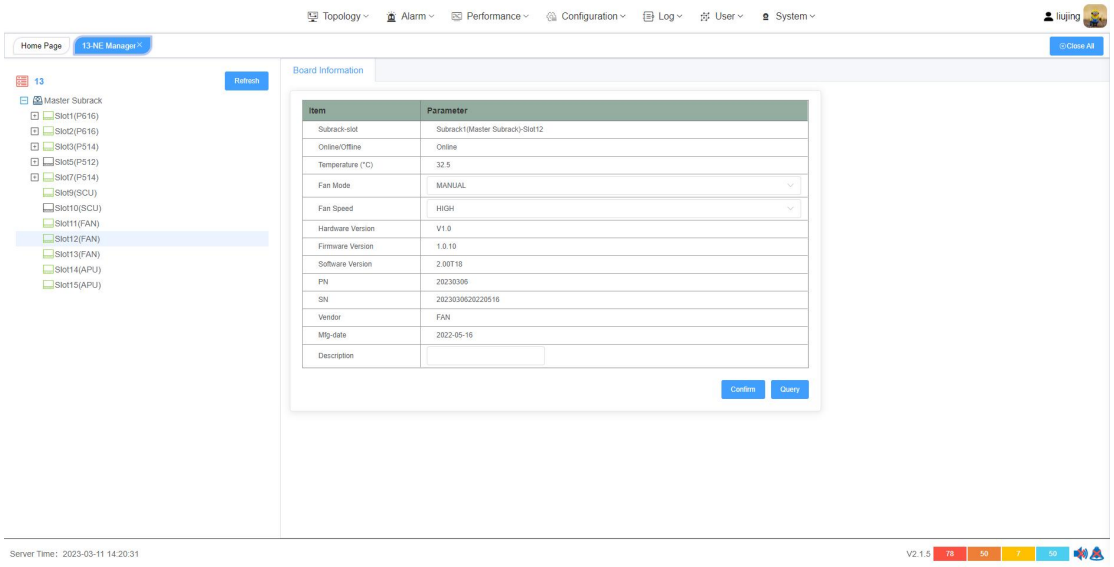
Configure fan speed

Operation prerequisites

The current fan single board speed control mode is MANUAL.

Operation steps

Open the NE Manager, expand the element tree on the left and select the fan slot, select the option parameter (HIGH/MIDDLE/LOW) in the "Fan Speed" column of the fan board submenu, click "Confirm", wait for the successful operation prompt and click "Query", the current speed is the same as the set value, which means the setting is successful.



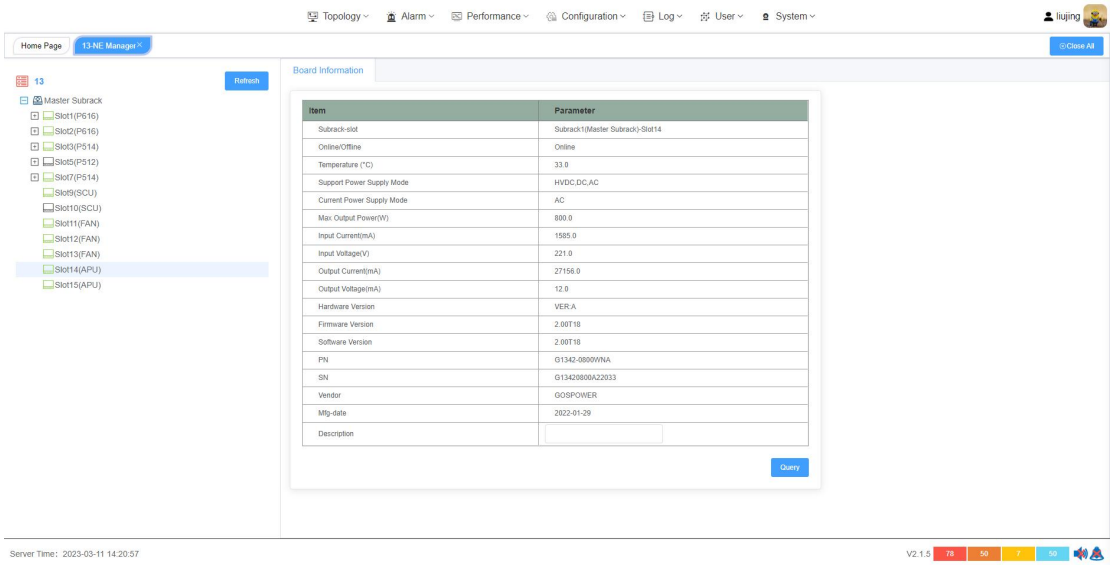
Note: If the chassis is fully equipped with electrical layer boards, it is recommended to adjust the fan speed to above MIDDLE level when the fan speed regulation mode is Manual.

7.7 Checking the power consumption of the power supply board

The Power sub-menu shows the in-position status of the power supply, the supported power supply methods, the device power supply supports HVDC\DC\AC power supply methods, the current input current voltage, the output current voltage, the power supply version model and other information.

Operating steps

Open the NE Manager, expand the NE tree on the left and select the power supply slot, the interface switches to the power supply sub-menu and click on "Query" to view the latest relevant data.

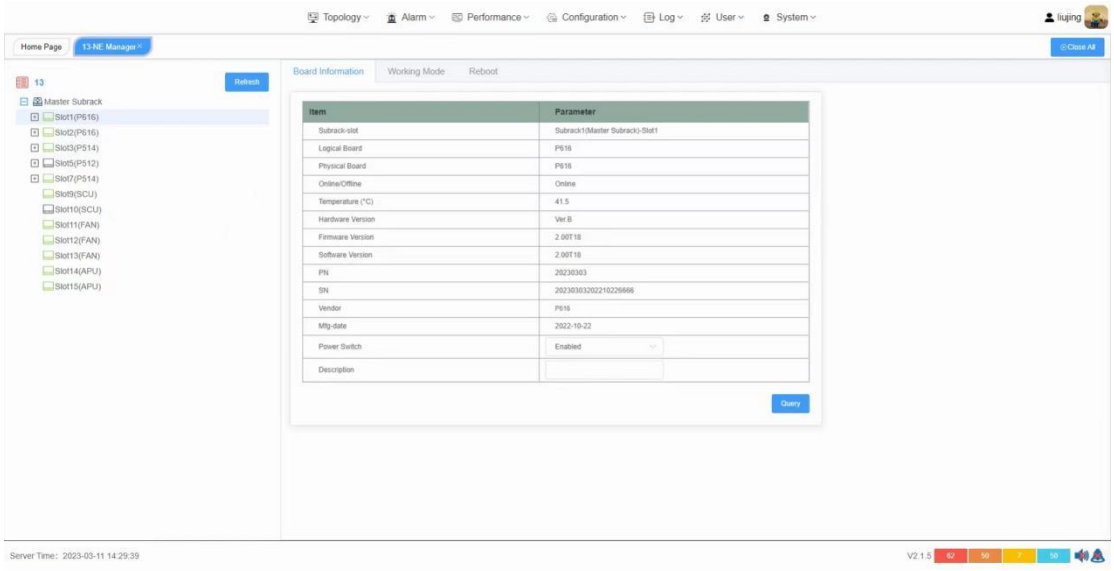


7.8 Viewing electrical layer board information

The single board sub-menu shows data such as sub-rack-slot ID, logical board, physical board type name, board in-position status, board current temperature, board current version model and factory time, and supports comments on the board. Power management can be selected as enabled and disabled, the default is enabled.

Operating steps

Open the NE Manager, expand the NE tree on the left and select the electrical layer board slot, the interface switches to the single board sub-menu and click "Query" to view the latest relevant data.

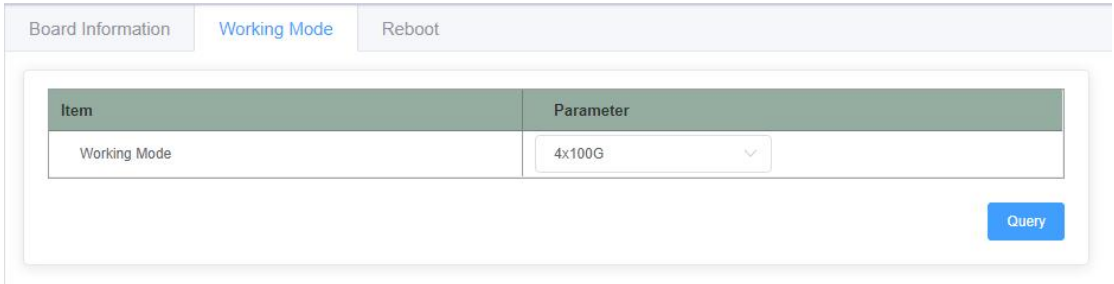


7.9 Setting electrical layer board working mode

The working mode is the type of service configuration that can be supported by the single board .

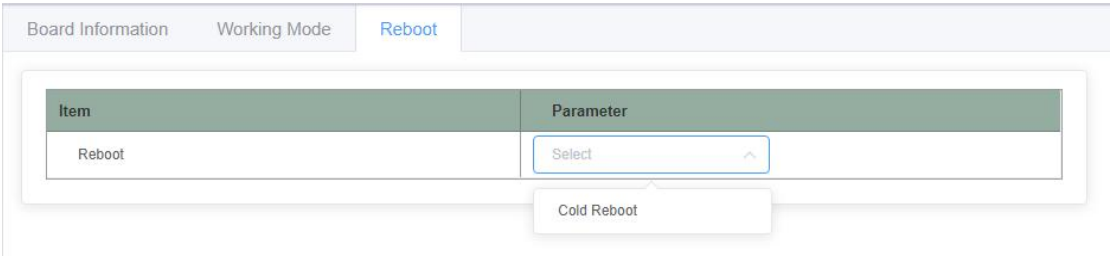
Operating steps

Open the NE Manager, expand the NE Tree on the left and select the electrical layer board slot, click "Working Mode" to switch to the Working Mode sub-menu, pull down the "Working Mode" column to select the option parameters, click "confirm" "Wait for the successful operation prompt to pop up and click "Query", the current configuration is the same as the set value, then the operation is successful.



7.10 Single board reset

In the NE Manager interface, click on an existing electrical layer board in the left NE tree, select the "Reboot" view, drop down and select the parameter "Cold Reboot", select it and a pop-up window will appear, click "confirm" to perform a cold reboot of the board.



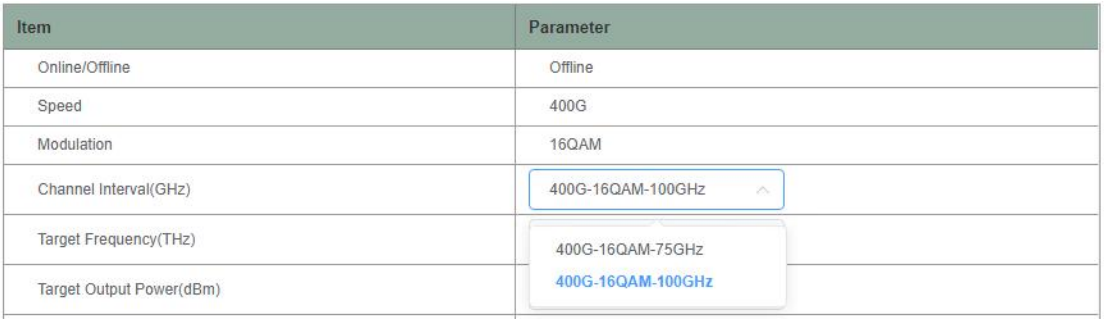
7.11 Setting line side port

7.11.1 Setting the optical channel frequency

Operating steps

The CFP2 module information configuration operation is the same for each rate line side.

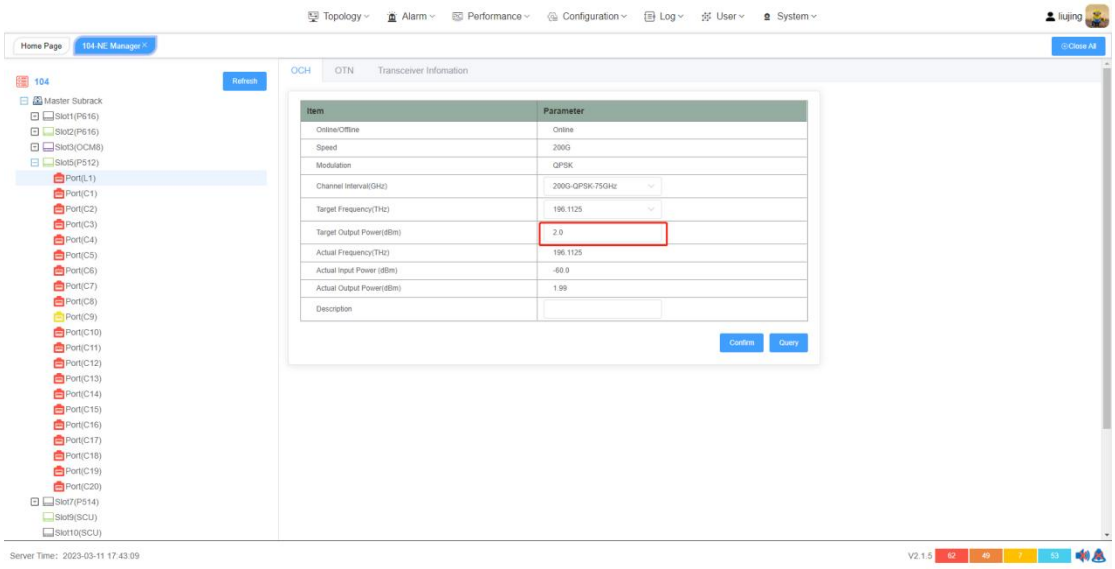
Enter the NE manager, expand the electrical layer board on the left side of the NE tree, select the configuration port, switch to the optical channel sub-menu, select the option parameter in the "channel interval" column, the configuration optical channel frequency will display the frequency supported by the current channel interval, drop down to select the parameter, click "confirm" ", wait for the operation success prompt pop-up and click "query", the current configuration and the set value is the same that the operation is successful.



7.11.2 Setting the transmitting optical power

Operating steps

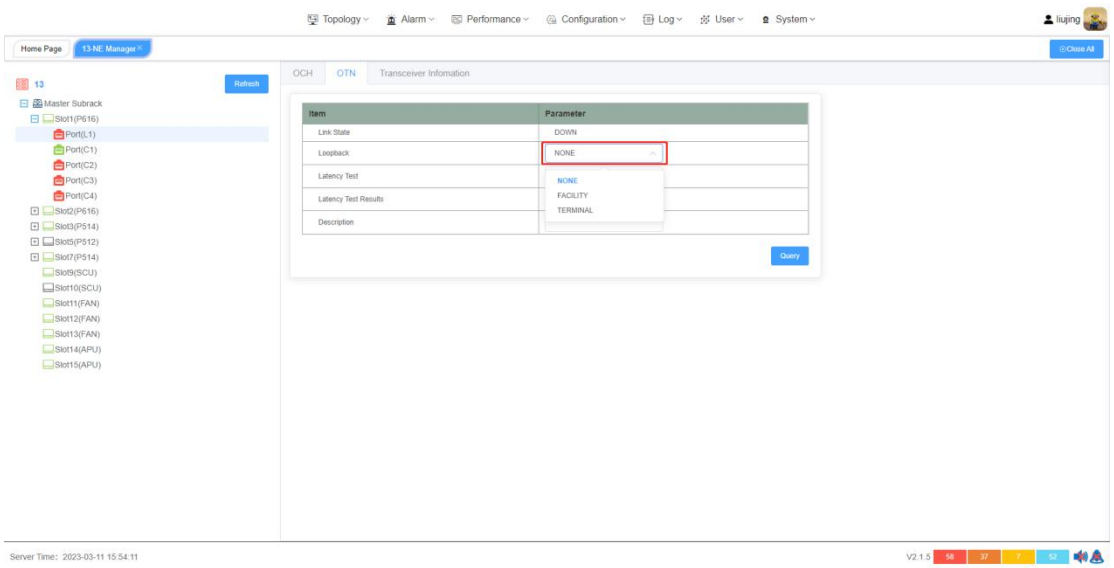
Enter the NE manager, expand the electrical layer board on the left side of the NE tree, select the configuration port, switch to the optical channel sub-menu, enter the configuration value in the "Target output power" column, click "confirm"", wait for the successful operation prompt to pop up and click "The actual transmitting optical power is the same as the configured value, which means the setting is successful.



7.11.3 Setting line-side port loop-back

Operating steps

Open the NE Manager, expand the electrical layer board on the left side of the NE Tree, select the configuration port, enter the OTN sub-menu, pull down the " Loop back" column and select the option parameter, click "confirm"", wait for the successful operation prompt to pop up and click Click "Query", the current configuration is consistent with the set value that is set successfully.



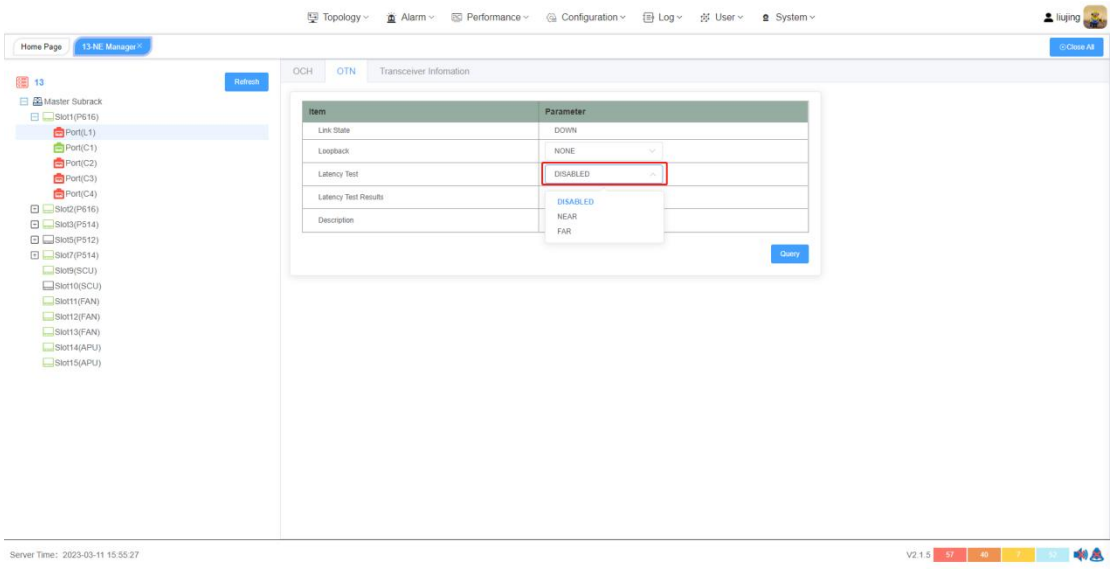
7.11.4 Setting line side port Latency Test

Latency Test status

Operating steps

Open the NE Manager, expand the electrical layer board on the left side of the NE tree, select the configuration port, enter the OTN sub-menu, pull down the "Latency Test "

column and select the option parameters (DISABLED/NEAR/FAR), click "confirm"" and wait for the operation After the success prompt pops up, click "Query", the current configuration is consistent with the set value, then the setting is successful.



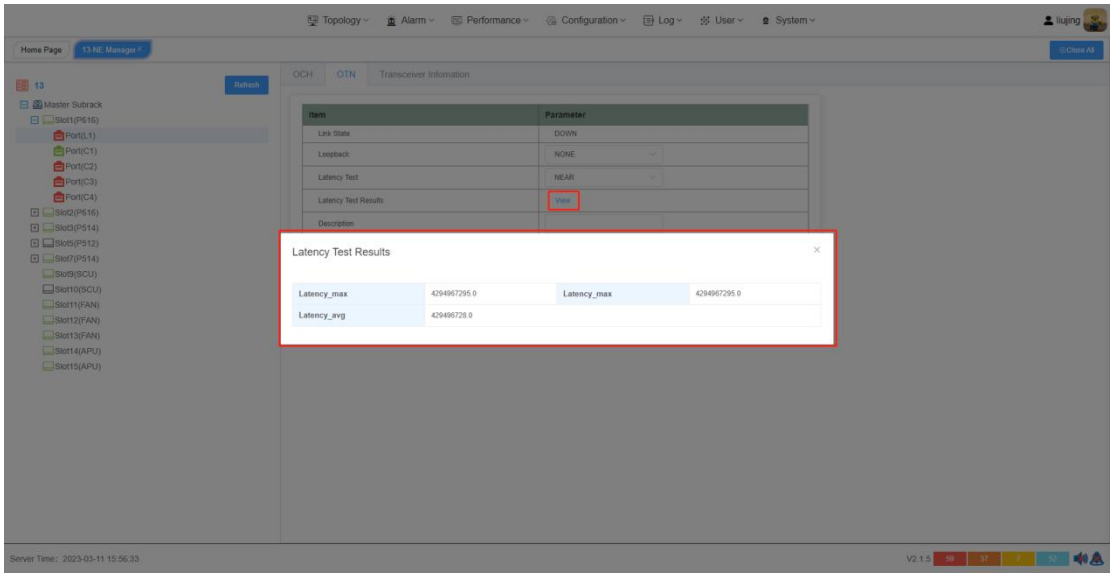
View Latency Test results

Prerequisites for operation

The boards at both ends are successfully interconnected, with NEAR configured at end A and FAR at end B. Check the measurement results at end A.

Operating steps

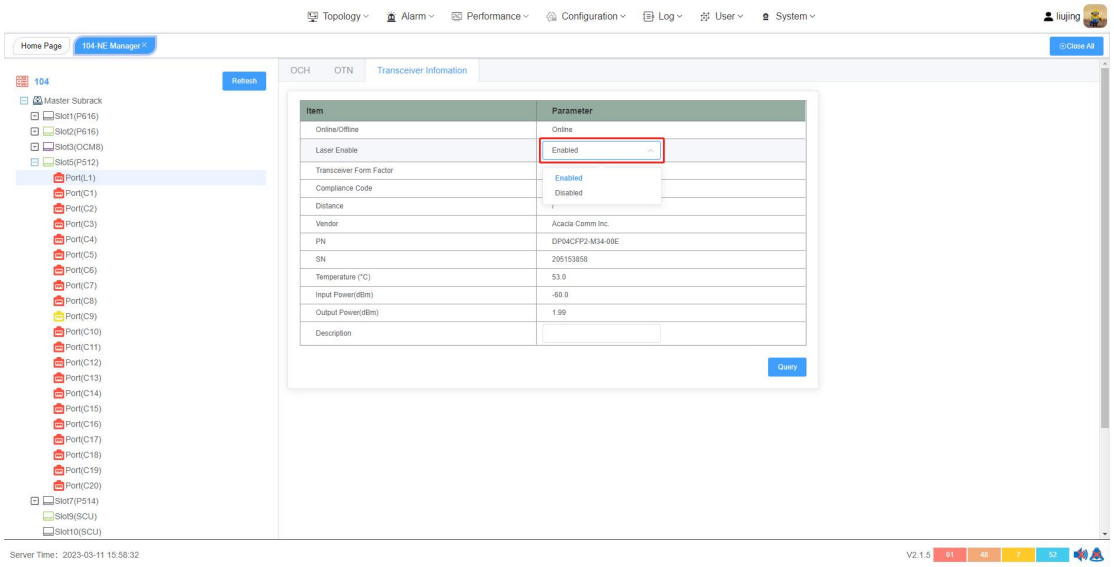
Open the NE Manager, expand the electrical layer board in the left NE tree, select the configuration port, go to the OTN sub-menu, click the "View" button in the "Latency Test Results" column, and the Latency test results data box will pop up to view.



7.11.5 Setting line side optical module laser Enable

Operating steps

Open the NE manager, expand the electrical layer board on the left side of the NE tree, select the configuration port, enter the optical module sub-menu, select the option parameter in the "Laser Enable" column, click "confirm"", wait for the successful operation prompt to pop up and then click "The current configuration is the same as the set value, which means the setting is successful.

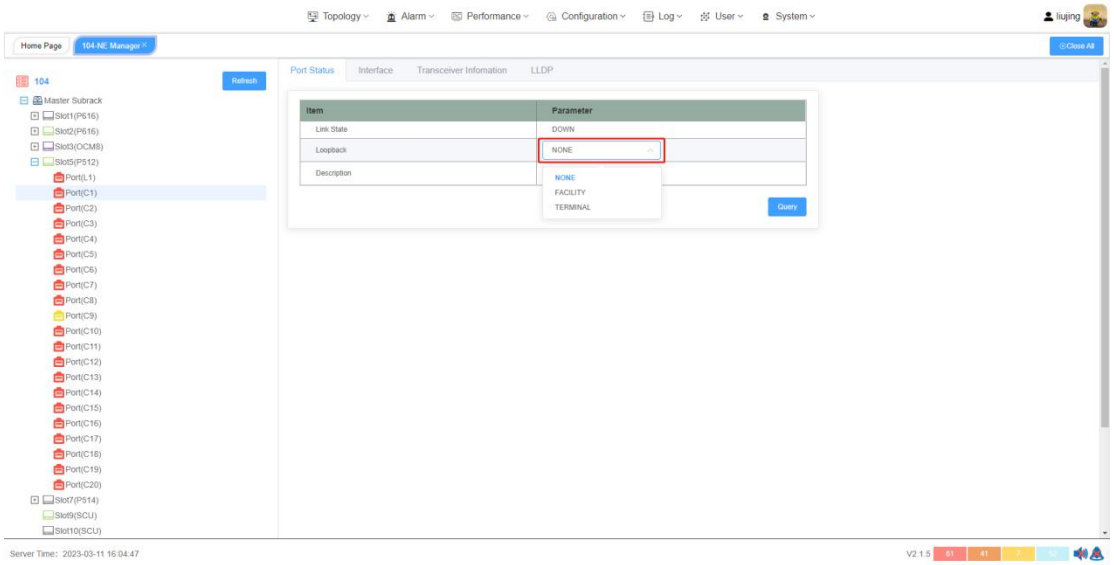


7.12 Setting client-side port

7.12.1 Setting up a client-side port loop-back

Operating steps

Open the NE Manager, click to expand the electrical layer board, select the configuration port, enter the port status sub-menu, select the option parameter in the "Loopback" column, click "confirm"", wait for the successful operation prompt to pop up and click " Query", the current configuration is the same as the set value, which means the setting is successful.



7.12.2 Setting the port service type

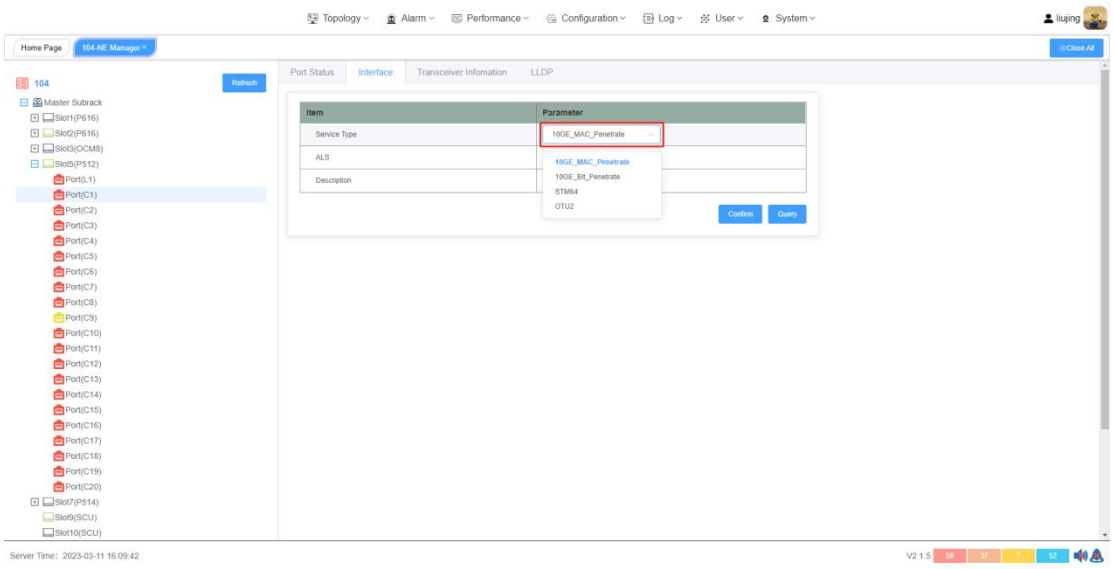
Port service type setting rules, as shown in Table 1-5.

Board name	Working mode	Support service type
P616	4X100G	Support 100GE, 100GE_FlexE, OTU4 service mode and synchronous C1 configuration for ports C2~C4
P514	2X100G	Supports 100GE, 100GE_FlexE, OTU4 service modes and synchronous of C12 ports with C11 configuration
	1X100G+10X10G	Ports C1~C10: 10GE_MAC_Penetrate, 10_Bit_Penetrate, STM64, OTU2 service modes supported Port C11: 100GE, 100GE_FlexE, OTU4 service modes supported
P512	20X10G	Supports 10GE_MAC_Penetrate, 10_Bit_Penetrate, STM64, OTU2 service modes

Table 1-5 Port support service types

Operating steps

Open the NE manager, click to expand the electrical layer board, select the configuration port, enter the interface sub-menu, select the option parameter in the "Service Type" column, click "confirm"", wait for the operation success prompt to pop up and click " Query", the current configuration is consistent with the set value that is set successfully.



7.12.3 Setting client-side FEC

The FEC setting rules are shown in Table 1-6.

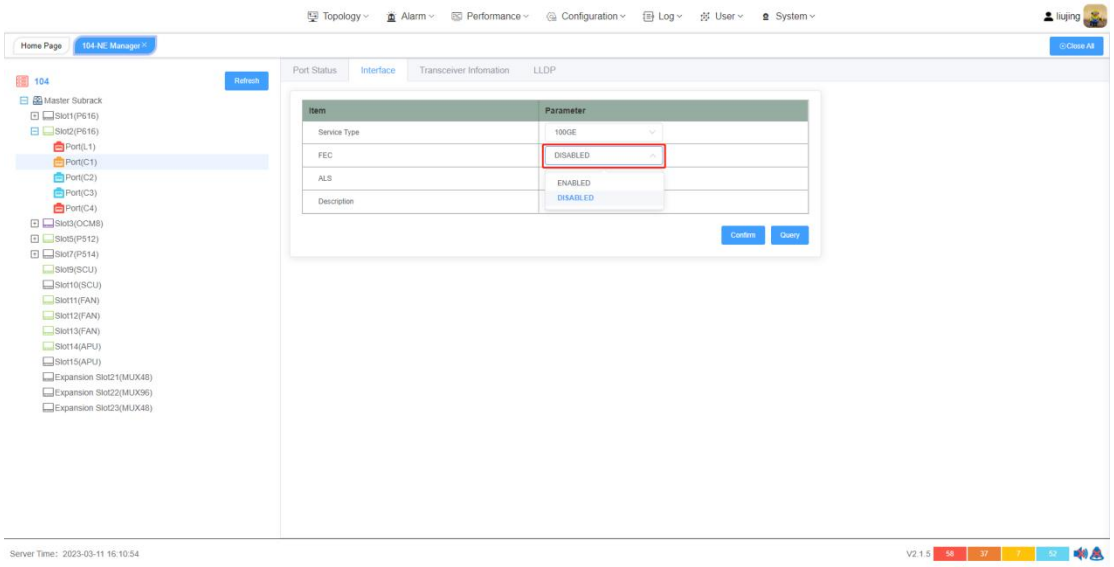
Board Type	Port Type	Service type	FEC function
P616	100G	100GE	Support
		100GE_FlexE, OTU4	Not support
P514	100G	100GE	Support
		100GE_FlexE, OTU4	Not support
	10G	10GE_MAC_Penetrate, 10_Bit_Penetrate, STM64, OTU2	/
P512	10G	10GE_MAC_Penetrate, 10_Bit_Penetrate, STM64, OTU2	/

Table 1-6 FEC function settings

Operating steps

Open the NE Manager, click to expand the electrical layer board, select the configuration port, enter the interface sub-menu, select the option parameter in the "FEC"

column, click "confirm"", wait for the successful operation prompt pop-up and click "Query" The current configuration is consistent with the set value, that is, the setting is successful.



7.12.4 Setting laser to switch off automatically (ALS)

The ALS setting rules are shown in Table 1-7.

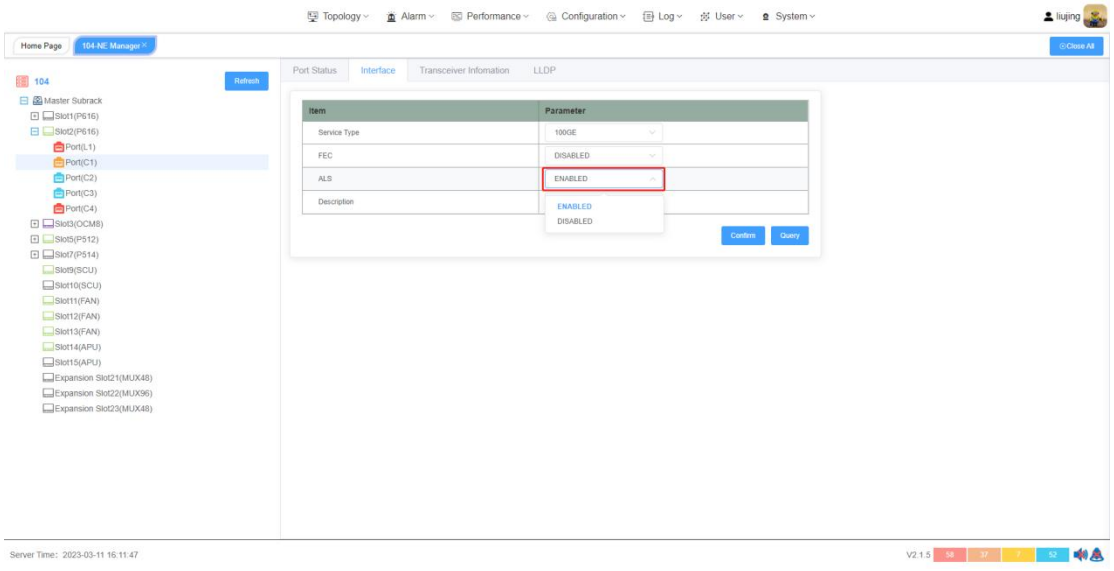
Board Type	Port Type	Service type	ALS function
P616	100G	100GE, 100GE_FlexE	Support
		OTU4	Not support
P514	100G	100GE, 100GE_FlexE	Support
		OTU4	Not support
	10G	10GE_MAC_Penetrate, 10_Bit_Penetrate	Support
		STM64, OTU2	Not support
P512	10G	10GE_MAC_Penetrate, 10_Bit_Penetrate	Support
		STM64, OTU2	Not

			support

Table 1-7 ALS function settings

Operating steps

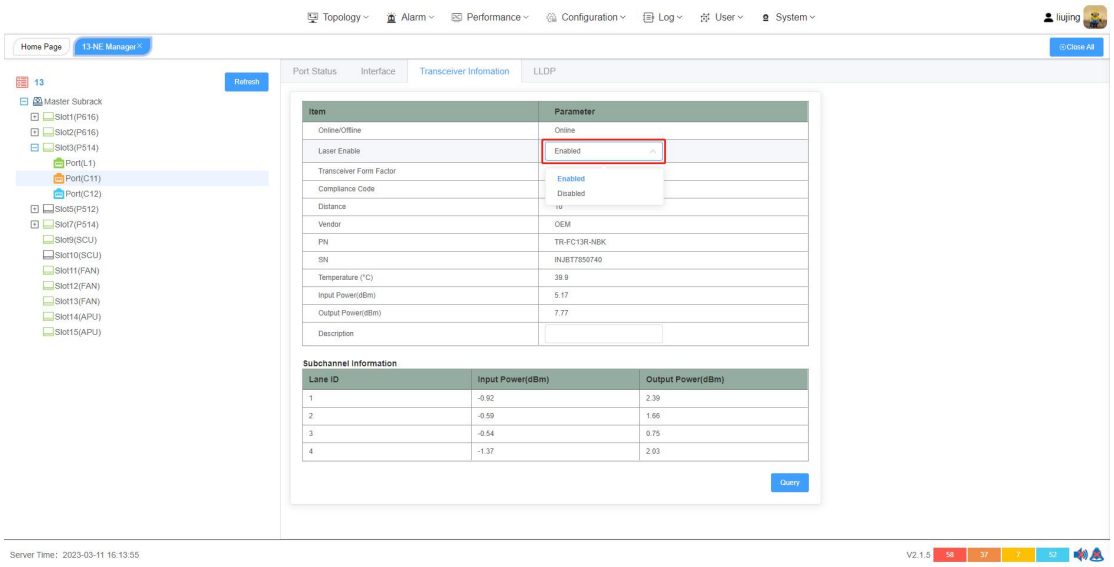
Open the NE manager, click to expand the electrical layer board, select the configuration port, enter the interface sub-menu, select the option parameter in the "ALS" column, click "confirm"", wait for the successful operation prompt pop-up and click "Query" The current configuration is consistent with the set value, that is, the setting is successful.



7.12.5 Setting client side module laser Enable

Operating steps

Enter the client side of the optical module sub-menu, "laser Enable" column, select the option parameters, the system prompt, click "confirm"", wait for the successful operation prompt pop-up and click "Query " The current configuration is the same as the set value, that is the setting is successful.

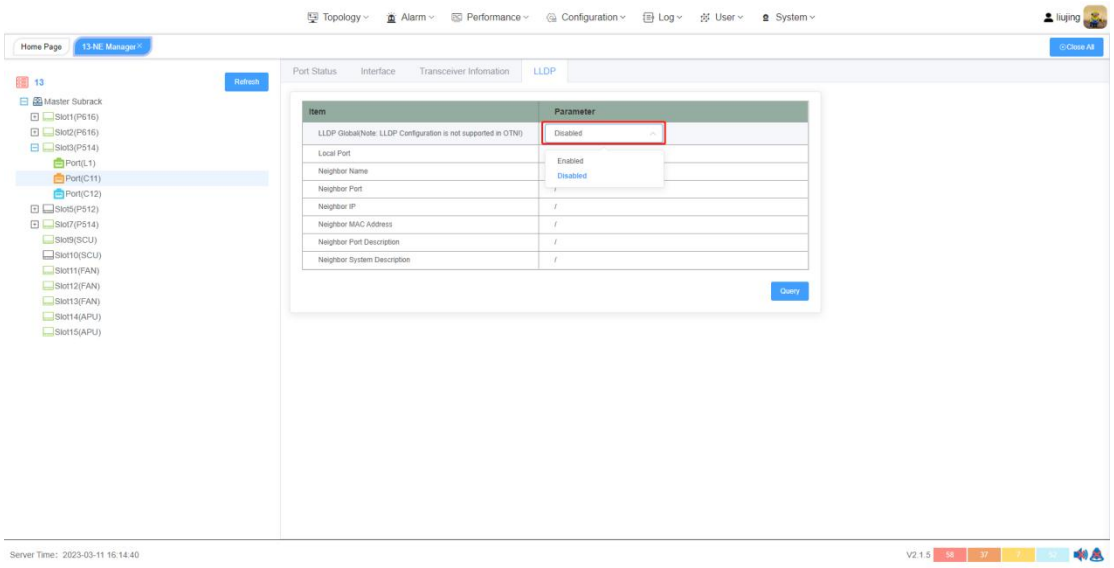


7.12.6 Ethernet client-side LLDP Global

Configuring LLDP

Operating steps

Enter the LLDP sub menu, select the "LLDP Global" option parameter, click "confirm"", wait for the successful operation prompt to pop up and click "Query", the current configuration and the set value The current configuration is consistent with the set value, which means the setting is successful.



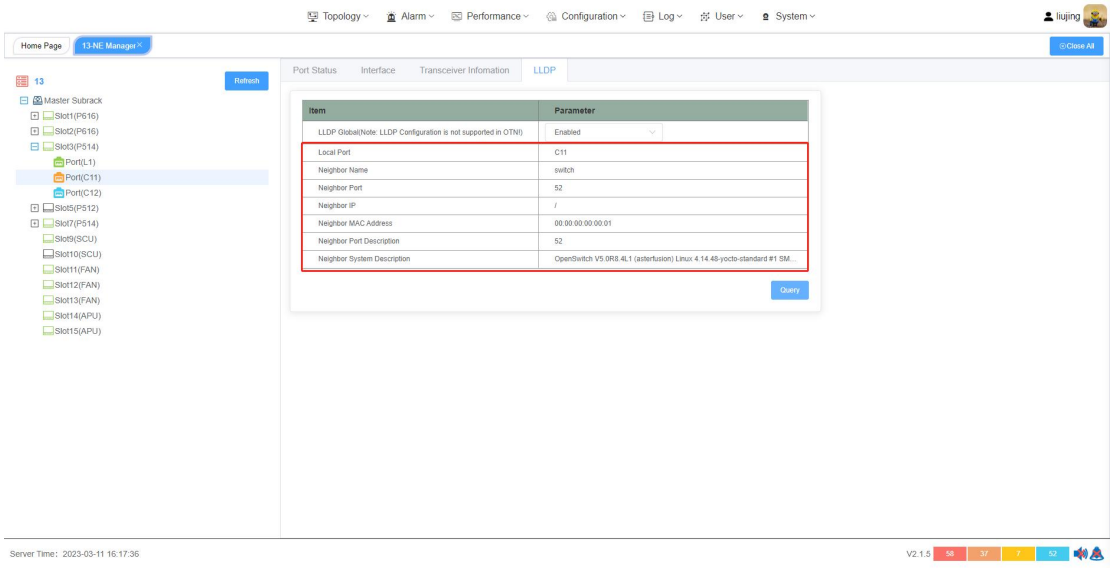
View LLDP

Prerequisites for operation

Only when the global LLDP mode is enabled, and then the client side port LLDP is enabled, the client side port will report LLDP information normally. The port docked to a switch or other device port also needs to be LLDP enabled.

Operating steps

Enter the LLDP submenu, turn on LLDP global enable and wait 1-2 minutes to query data related to LLDP neighbour information.



Note: When the port service type is OTN, the LLDP function is not available.

8 Alarm management

The alarm management function is a functional group for managing the faults of various network devices managed by the network management system during the operation of the system. It is capable of unified alarm management for the whole network equipment, providing alarm collection and display as well as querying the current and historical alarms of network elements, alarm shield, alarm email forwarding and other functions to improve the accuracy and efficiency of alarm processing.

The nature of alarms is divided into two categories: fault alarms and event alarms.

Fault alarms: are alarms generated by the failure of a hardware device or the failure of some important function.

Event alarms: are alarms that are suggestive or where the fault does not correspond to the recovery.

8.1 Current alarms

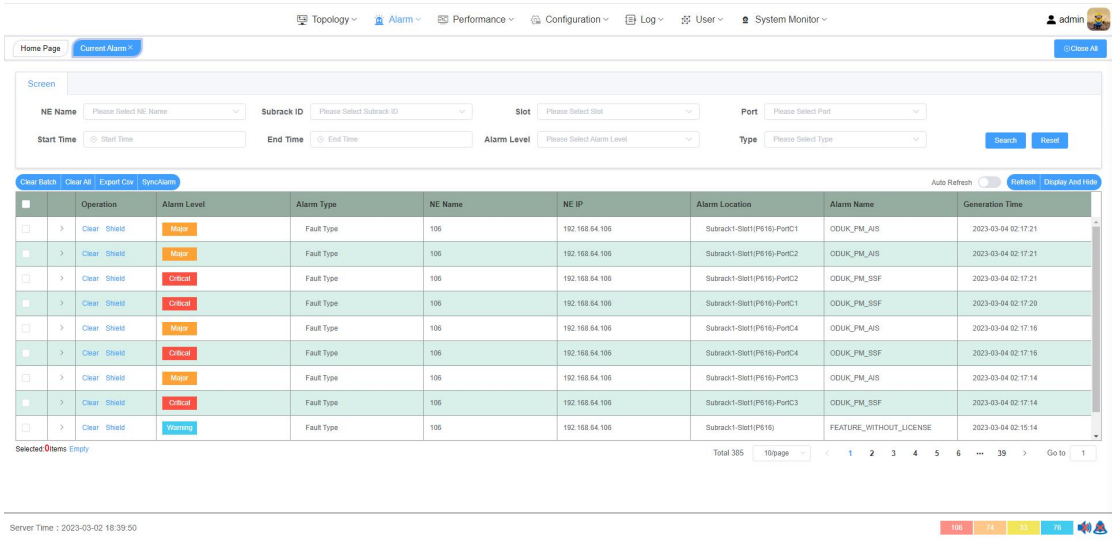
8.1.1 view current alarm

There are two ways to view current alarm.

Way 1: Right-click the NE in the topology view area, and click the "view Current Alarm" button in the "NE Information Box" to jump to the current alarm interface of the network element and view all the current alarm information of the NE, which is convenient for users to browse directly.

Way 2: Click on the menu bar - "Alarm", click on the sub-menu "Current Alarm" to jump to the current alarms page and view all the alarms generated by the current network elements.

In the current alarm screen, the "Auto Refresh" button is a left and right moving button (when clicked, it will switch from refresh to off or from off to refresh), in the refresh state the current page is refreshed every 10 seconds, in the off state the current page is not refreshed.



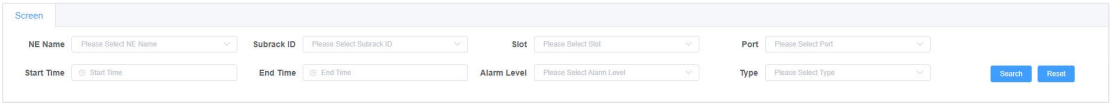
In the filter criteria box, you can select filter criteria to view and operate on the specified alarms according to your needs, either by using a single filter criterion or by combining several filter criteria. The scope of the filter varies according to the object to be filtered.

1）When a NE is selected and the rest are empty, all alarms for that NE are filtered out.

2）When a NE slot is selected and the rest are empty, all alarms under that NE slot are filtered out.

3）When the NE port is selected, all alarms under this port are filtered.

Click on the 'Search' button to perform a filter, click on the 'Reset' button to clear the filter and display all alarms. The filtering operation allows the user to quickly find and accurately locate a specific alarm.



8.1.2 Clear Current alarm

In the alarm data table of the current alarm screen, check the check boxes in front of the action items and click on "Clear Batch" to clear the alarms in bulk . Click on "Clear All" without checking the check boxes, then click on "confirm" to clear all the data for the current alarm. When working on only one alarm, simply click on the "Clear" button in the data line to clear the alarm data. After the clear operation, the corresponding alarm data will be moved to the historical alarm list.

Auto Clear: when the fault is recovered, the alarm will be automatically cleared and transferred to the historical alarm, the operator will be displayed as Auto and the clearing time will be the time when the fault is recovered.

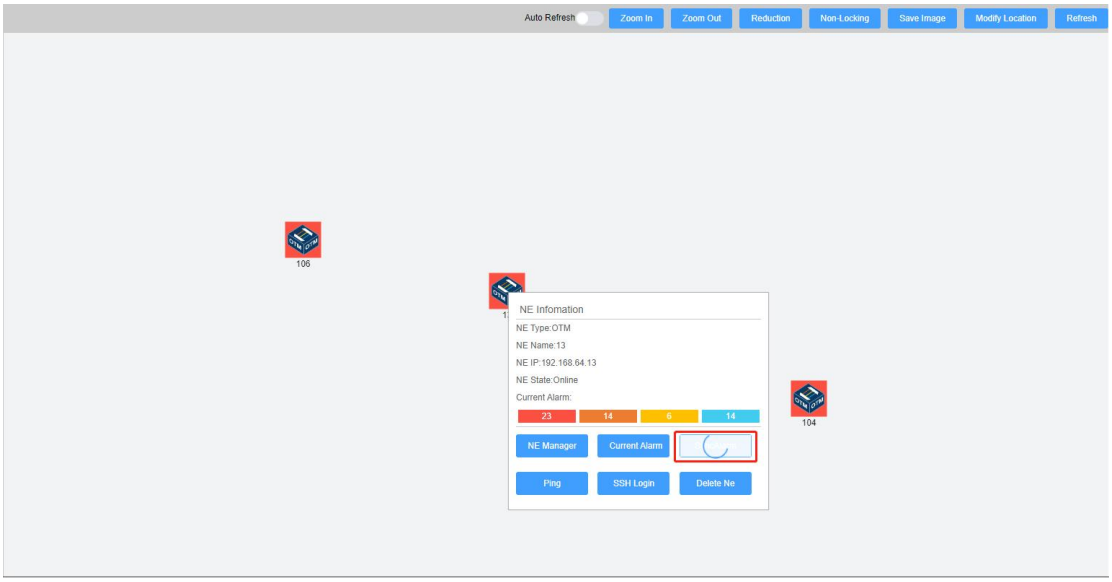
Manual clear: clear alarm are not received due to communication interruptions, at this point they need to be cleared manually, after clearing they are transferred to historical

alarms, the operator clears the user name manually, the clearing time is the time the operation is cleared manually.

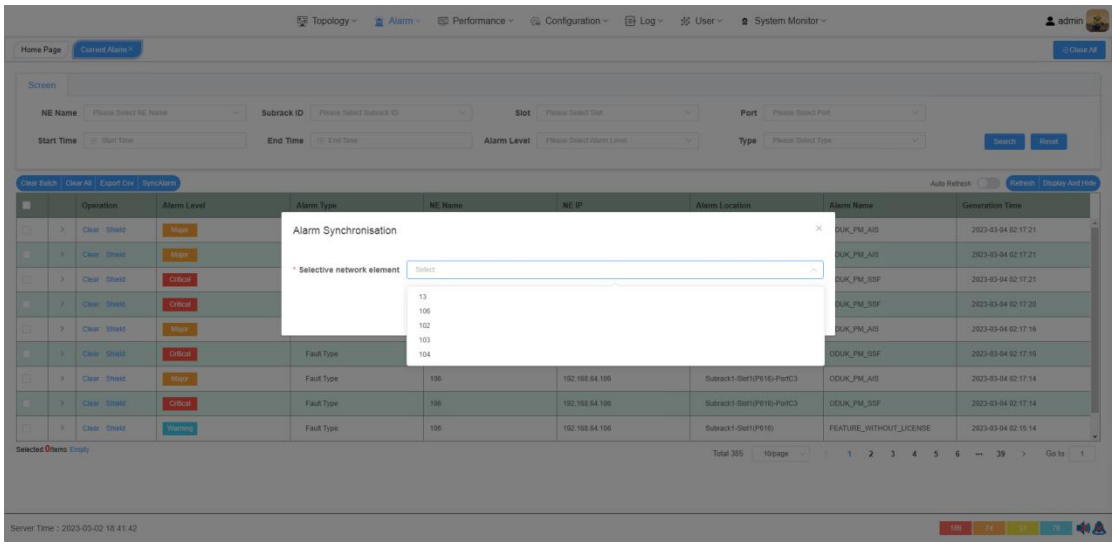
8.1.3 Synchronization Current alarms

Mode of operation

Way 1: Right-click on the NE in the topology view area and click on the "Current Alarm" button in the "NE Information Box" to synchronization all the alarms of this network element in real time, so that the data can be updated and the accuracy of the data can be improved.



Way 2: Click on the menu bar - "Alarm", select the sub-menu "Current Alarm" to enter the current alarm interface. Click the "Alarm Synchronization" button, a dialog box will pop up, select the network element that needs to be synchronized, and click "confirm"" to synchronize all the current alarms of that network element.



8.1.4 Exporting current alarm

The "Export Csv" button allows you to select the alarms that need to be exported according to your needs, and export the alarm information to excel format for storage. Click on "Export Csv" and you will be prompted, click on "confirm"" to export.

8.2 History alarm

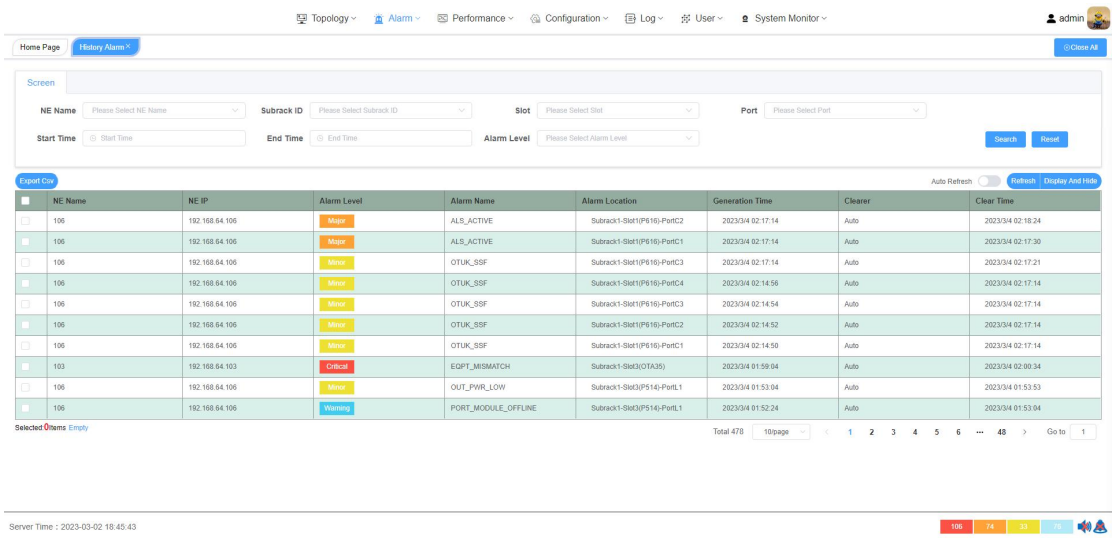
8.2.1 view history alarm

Operating steps

Click on the menu bar - "Alarm", then click on the sub-menu "History Alarm" to jump to the History Alarm page, where you can view all cleared alarms, their location, details of when they were cleared and who cleared them.

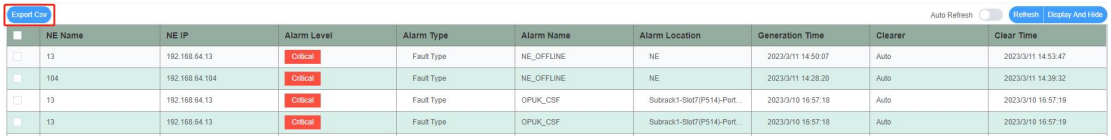
The "Search" and "Reset" buttons function in the same way as in the current alarm.

Note: Historical alarm data cannot be deleted, it can only be dumped and the old data is no longer retained by the network administrator after dumping.



8.2.2 Exporting history alarm

The "Export Csv" button has the same function as in the current alarm.



8.3 Alarm shield

8.3.1 New add alarm shield

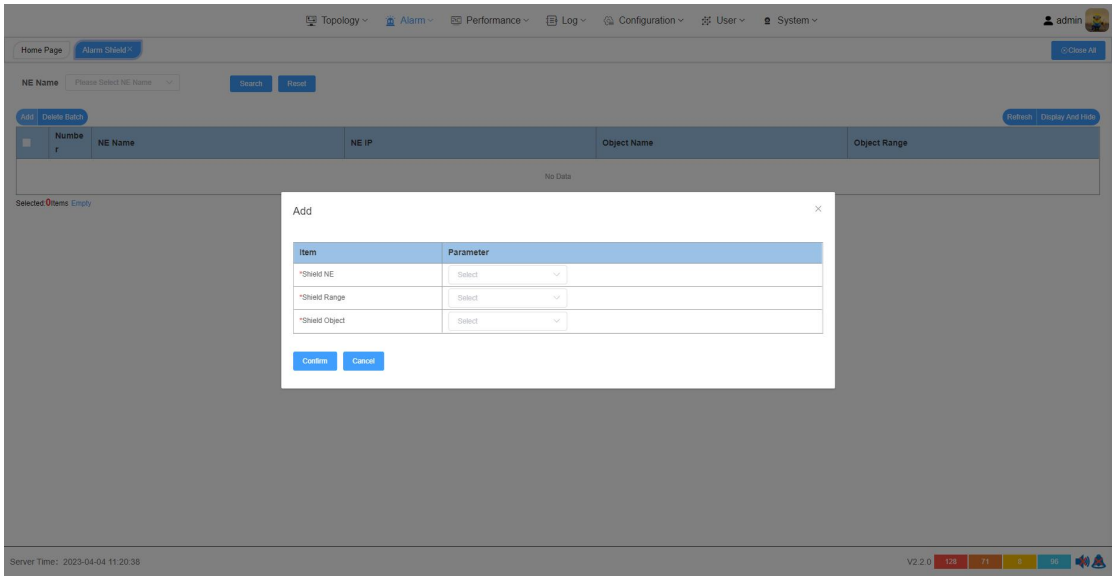
Click on the menu bar - "Alarm", click on the sub-menu "Alarm shield", open the alarm shield view, click "Add", in the new pop-up window, select the shield NE, shield range,shield object in the Add pop-up window,and then click "confirm"" to add the alarm shield successfully.

Description of the shield rules.

1）When a network element is selected as the shield target, all alarms under that element are shielded.

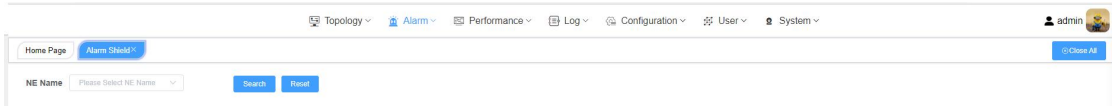
2）When a single board is selected for shield, all alarms under that single board are shielded.

3）When a port is selected as the shield target, all alarms under that port are shielded.



8.3.2 Query alarm shield

Enter the name of the network element to be queried and click "Search" to view all alarm shield information for that element.

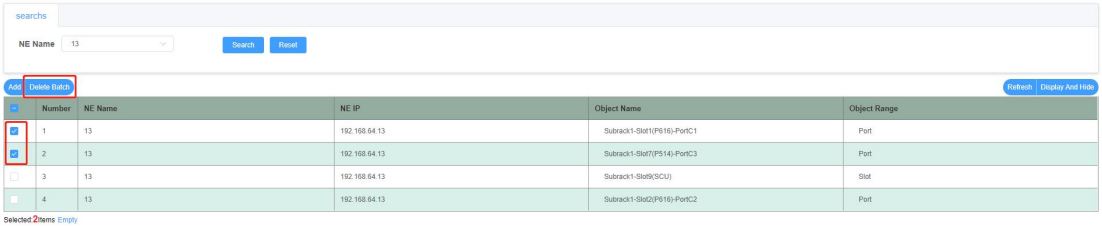


8.3.3 Deleting alarm shield

In the alarm shield screen, delete the searched alarm shield data.

Operating steps

Tick the checkbox in front of the serial number. Click on "Delete Batch" to delete the alarm shield.



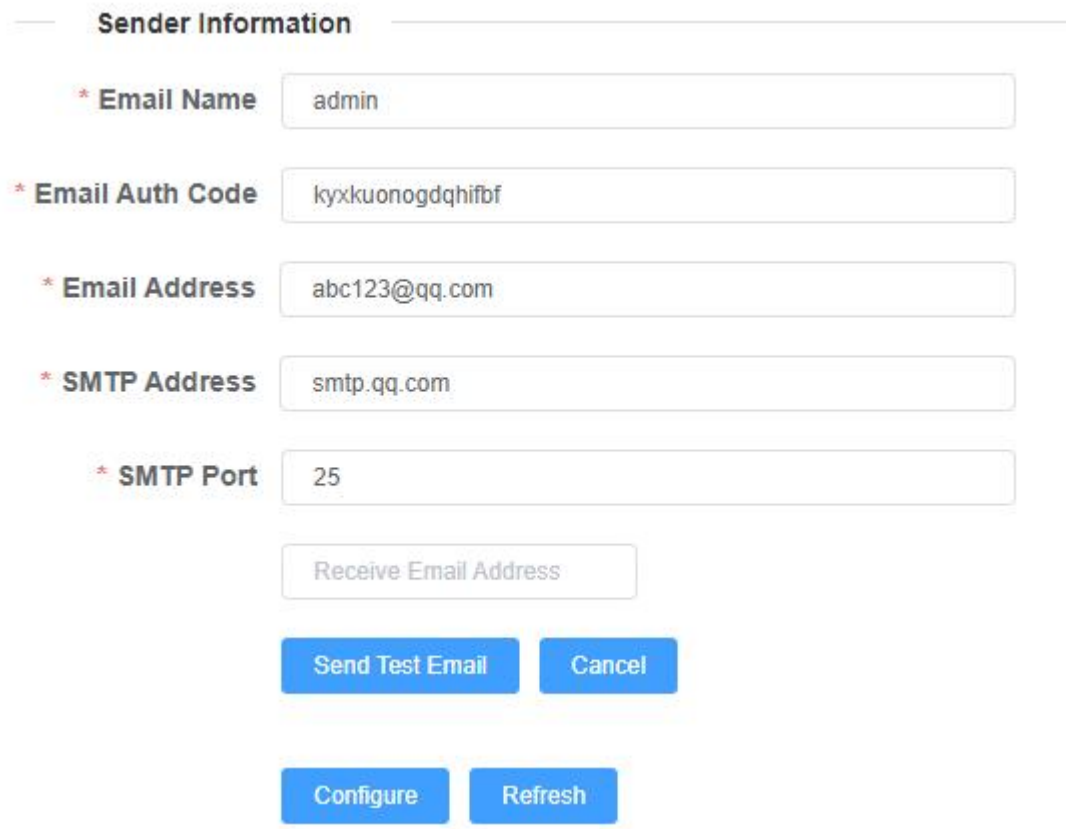
8.4 Alarm Forwarding

8.4.1 Configuring alarm forwarding E-mail information

Menu bar - "Alarm", click on the sub-menu "Alarm Forwarding" to enter the alarm forwarding view interface. The first step is to complete the alarm e-mail server configuration, fill in the sender e-mail information correctly, different types of e-mail, SMTP address and port number are not the same, please check to confirm the server type and

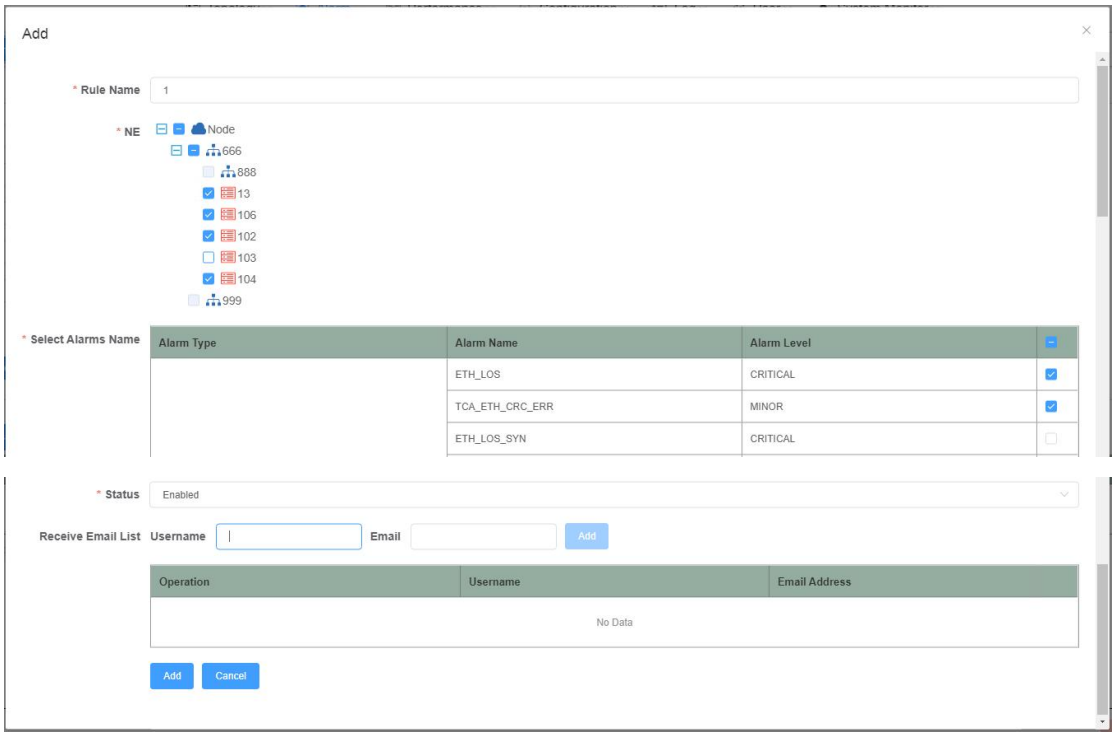
SMTP information to be used before configuring the server e-mail. The e-mail types supported by network management are: QQ, Netease, Sohu, Google and Microsoft.

"Send test email" button function, used to verify whether the e-mail configuration is successful, click to enter the recipient's email address, click "Send test email" again, pop-up prompt "test passed " means the configuration is successful.



8.4.2 Configuring alarm forwarding rules

In the menu bar - "Alarm", select the sub-menu "Alarm Forwarding" to enter the alarm forwarding view interface. Click the "Add Rule" button and the "Add" pop-up window will appear. In the pop-up window, enter the rule name, select the specified network element or all network elements, check the desired alarm name and select the rule status. At the receiving email list, fill in the receiving email user name and address information and click the "Add" button on the right side, the receiving email information will be added successfully, and finally click "Add" at the bottom, after the rule is added successfully, when the corresponding network element generates the checked alarm, it will After the rule is successfully added, when the corresponding network element generates the selected alarm, the corresponding notification will be sent to the receiving email synchronously.



Rule Status

The "Refresh" button function is used to update the rule data and status.

The "Enable Batch" button function enables the alarm notification rule, which is enabled by default.

The "Disable Batch" button function turns alarm notification rules off. At least one rule must be ticked in front of the action item for the operation to be successful.

8.4.3 Deleting alarm forwarding rules

In the menu bar - "Alarm", select the sub-menu "Alarm Forwarding" to enter the alarm forwarding view. Check the check boxes in front of the action items. Click on "Delete Batch" to delete the alarm notification rule. To delete a single alarm notification rule, click on the "Delete" button; you can also edit a single alarm notification rule by clicking on the "Edit" button and selecting the information you want to edit or view.

9 Performance Management

Periodically collects various performance data of network elements to form statistics for monitoring, providing maintenance personnel with a means of evaluation and analysis.

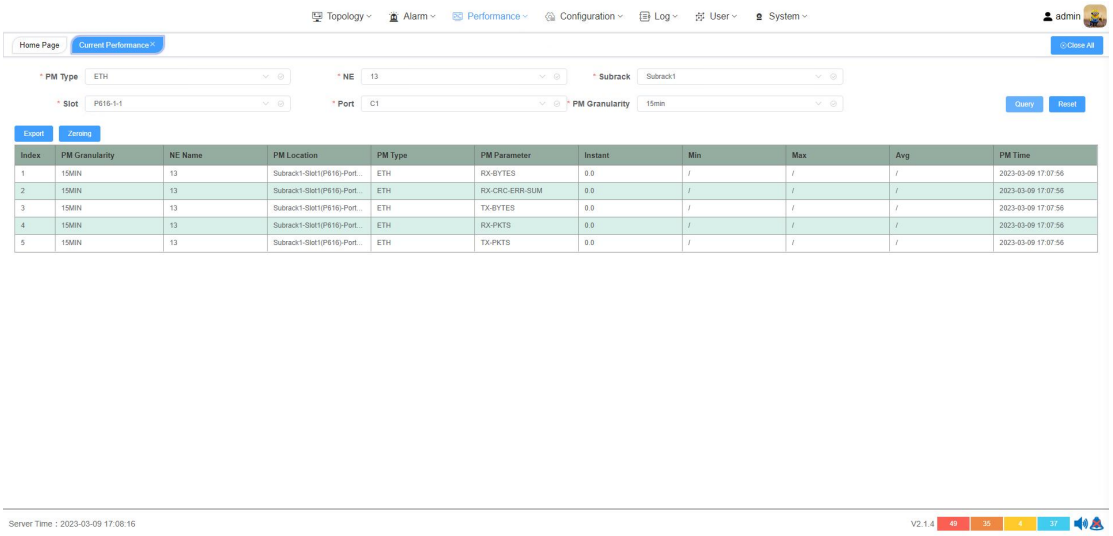
The ability to query performance against performance object types enables efficient collection of valid performance, improves processing efficiency and reduces the need for network administrators to process large amounts of redundant performance data. The display focuses mainly on key performance, reducing the amount of data and improving calculation efficiency.

9.1 Current performance

9.1.1 View current performance

Operating steps

Click on the menu bar "Performance" to enter the current performance interface, select the performance type, NE, etc., as shown in the figure, you can query the real-time performance data of the corresponding network element according to the performance type.



Performance types and corresponding performance parameters, as shown in Tables 1-8 below.

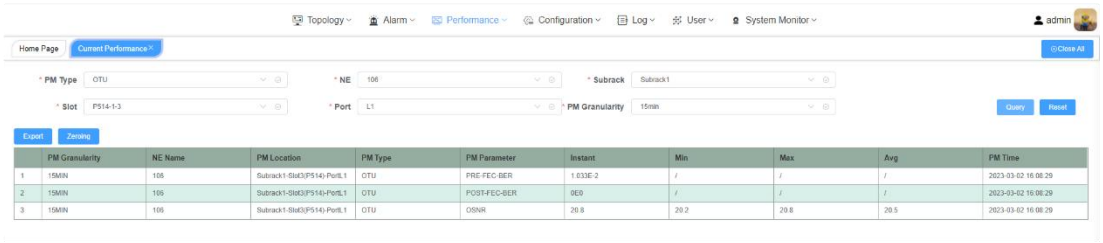
Performance type	Performance parameters
OTU	Signal to Noise Ratio OSNR, SM Background Block BER, SM BER sec ES, SM Severe BER sec SES, SM Unavailable sec UAS, Pre-FEC BER, Post-FEC BER POST-BER
ETH	Total packets received RX-PKTS, total packets sent TX-PKTS, total bytes received RX-BYTES, total bytes sent TX-BYTES, CRC error packets received RX-CRC-ERR-SUM
Transceiver	input optical power INPUT-POWER, output optical power OUTPUT-POWER, bias current LASER-BIAS-CURRENT, module temperature TEMPERATURE
card	Temperature TEMPERATURE

Table 1-8 Performance type parameters

9.1.1.1 View the OTU Performance

Operating steps

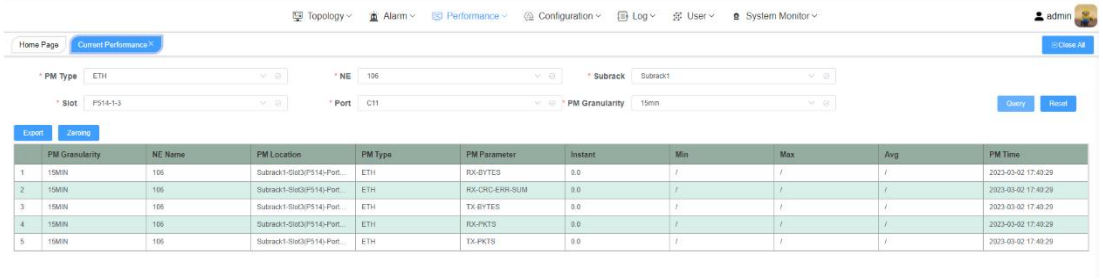
Click on the menu bar "Performance > Current Performance" to enter the current performance interface, select the performance type "OTU", then select NE, subrack, slot, port, PM Granularity and click query, the query results will be displayed in the table below The data includes each performance parameter under the performance type, current value and PM Granularity, and the FEC BER before error correction and FEC BER after error correction supports querying current value, maximum value, minimum value, average value and PM time.



9.1.1.2 View ETH performance

Operating steps

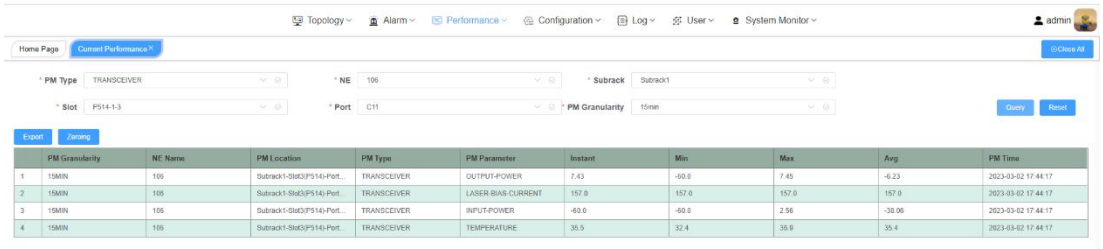
Click on the menu bar "Performance > Current Performance" to enter the current performance interface, select the performance type as "ETH ", then select the corresponding NE, subrack, slot, port, PM Granularity and click on query, the query result will be shown in the table below .The data includes each performance parameter under the performance type, the current value and the PM time.



9.1.1.3 View transceiver performance

Operating steps

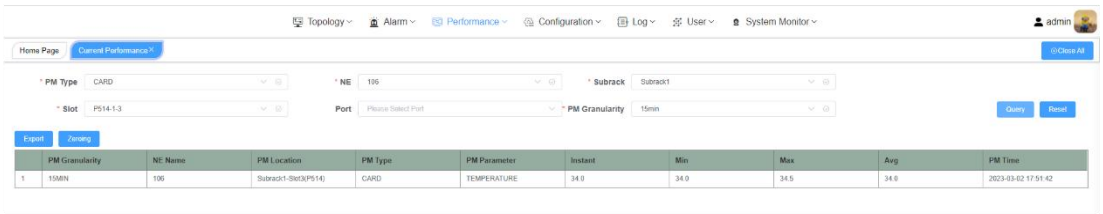
Click on the menu bar "Performance > Current Performance" to enter the current performance interface, select the performance type "Transceiver, then select NE, subrack, slot, port, PM Granularity and click on query, the query results will be displayed in the table below. The data includes each performance parameter under the performance type, current value, maximum value, minimum value, average value and PM time.



9.1.1.4 View card performance

Operating steps

Click on the menu bar "Performance > Current Performance" to enter the current performance interface, select the performance type "CARD", then select select NE, subrack, slot, port, PM Granularity and click on the query, the query results will be displayed in the table below.The data includes each performance parameter under the performance type, current value, maximum value, minimum value, average value and PM time.

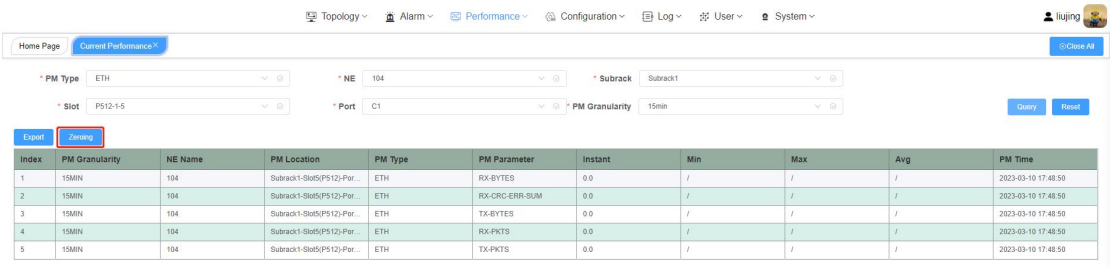


9.1.2 Performance zeroing

If you want to zeroing the current performance monitoring data, you can do the same for 15 minutes and 24 hours when you want to zeroing the current performance type monitoring data as a result of the current performance query and start monitoring again

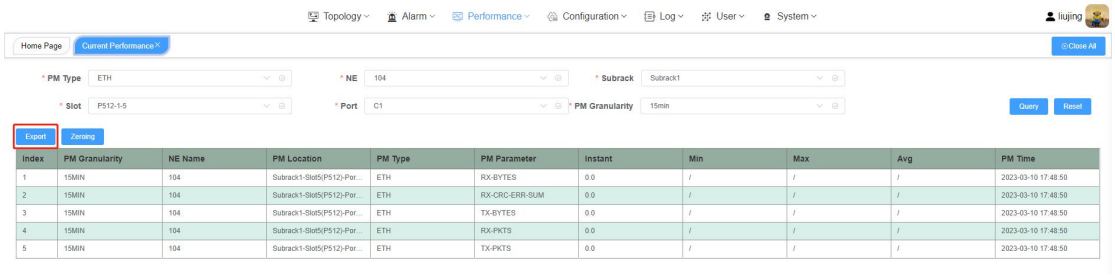
Operating steps

Click on the menu bar "Performance > Current Performance" to enter the current performance interface, first select the PM type, then select NE, subrack, slot, port, PM Granularity to query the current performance, click on the "Zeroing" button in the upper left corner of the query result table. Wait for the "Operation Successful" prompt to pop up, the current performance data will be cleared and the counting will start again.



9.1.3 Export Current performance

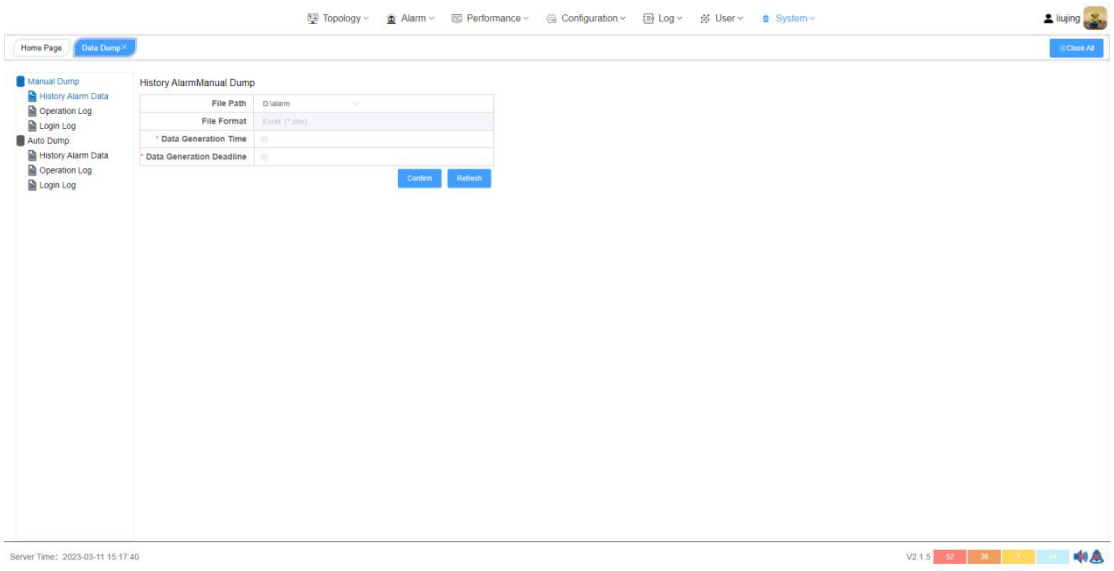
The "Export" button function exports the current data in the query results table to excel format for storage.



10 System management

10.1 Data dump

The data dump function facilitates the preservation and backup of data.



10.1.1 Alarm dump

10.1.1.1 Automatic dump

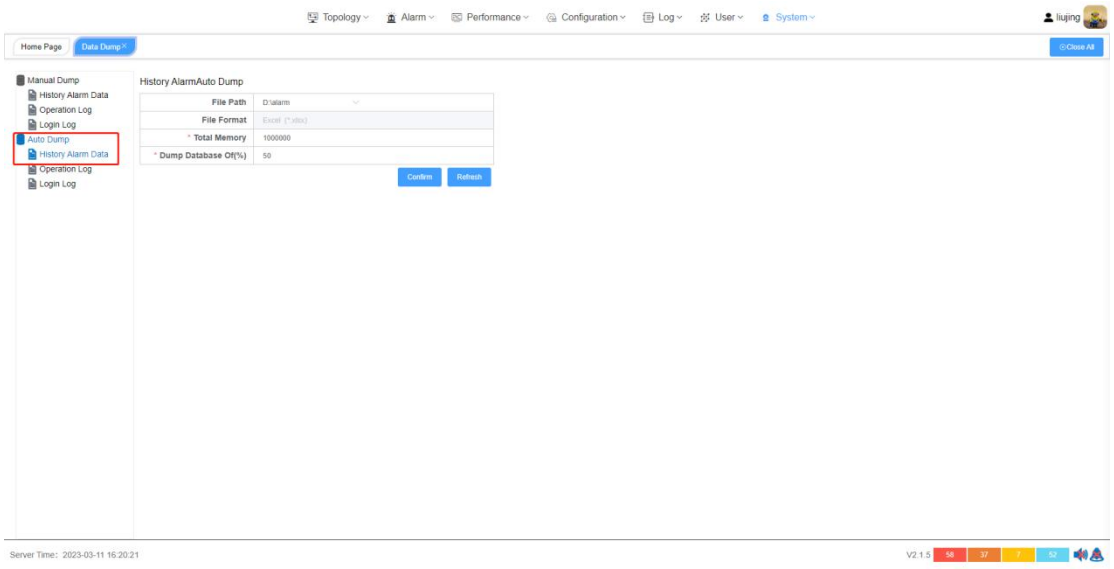
Background information

The automatic file dump time is 02:00 and when the data exceeds the maximum storage capacity a percentage (%) of the database will be automatically dumped to the corresponding folder on the network management server.

Operating steps

Click on the menu bar - "System", click on the sub-menu "Data Dump" to enter the data dump interface view. To automatically dump historical alarm data, select "History

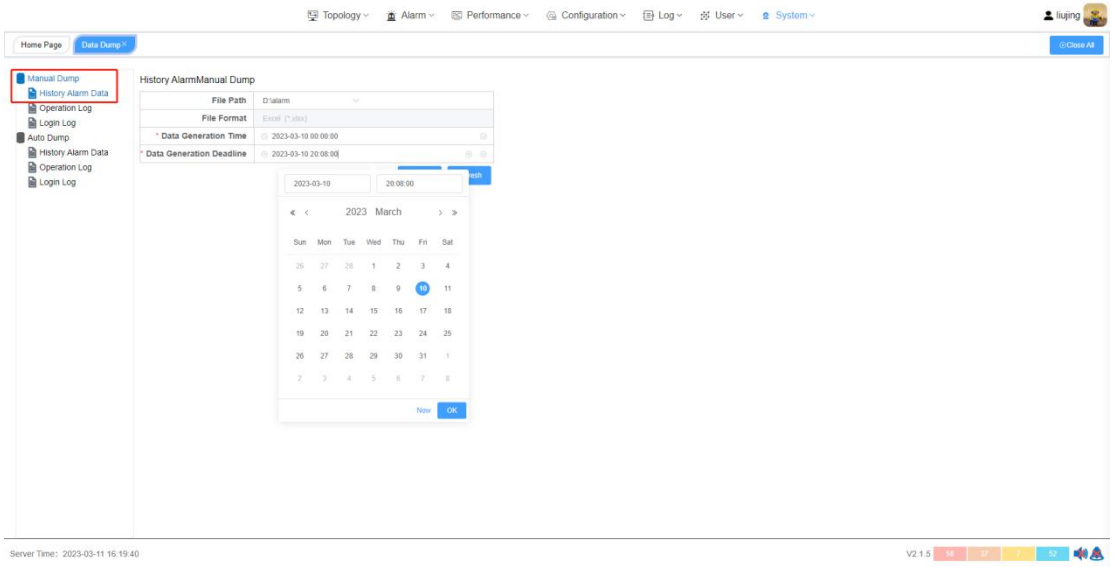
alarm data" and choose the dump location, enter the maximum storage capacity, the percentage of the database to be dumped (%) and click "confirm"" to set up the dump successfully.



10.1.1.2 Manual dump

Operating steps

Click on the menu bar - "System", click on the sub-menu "Data Dump" to enter the data dump interface view. To manually dump history alarm data, select "History Alarm data" and choose the dump location, enter the data generation time and data generation deadline, then click "ok”and wait for the successful operation prompt to pop up and check the corresponding file directory of the server for the existence of the specified dumped The folder is successfully dumped.

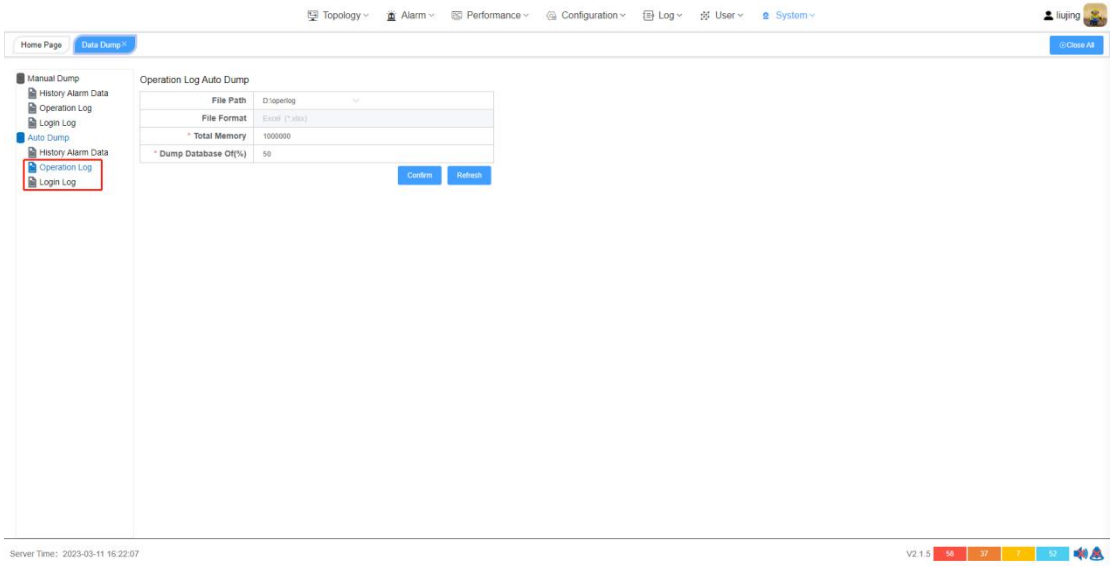


10.1.2 Log dump

10.1.2.1 Automatic dump

Operating steps

Click on the menu bar - "System", click on the sub-menu "Data Dump", enter the data dump interface view. To automatically dump log data, select "Operation Log" and choose the dump location, enter the maximum storage capacity, the percentage of the database to be dumped (%) and then click "confirm"" to set up the dump successfully.



10.1.2.2 Manual dump

Operating steps

Click on the menu bar - "System", click on the sub-menu "Data Dump" to enter the data dump interface view. To manually dump log data, select "Operation Log" and choose the dump location, enter the data generation time and data generation deadline, then click "ok"" and wait for the successful operation prompt to pop up and check the corresponding file directory for the existence of the specified dump folder. The dump is successful. The procedure for manual dumping of logs is the same as above.