3onedata



IES5328 Series
Layer 2 Managed Industrial Ethernet Switch Module
User Manual

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Preface

The switch module user manual introduces this switch module:

- Product features
- Product network management configuration
- Overview of related principles of network management

Audience

This manual applies to the following engineers:

- Network administrators responsible for network configuration and maintenance
- On-site technical support and maintenance personnel
- Network engineer

Port Convention

The port number in this manual is only an example, and does not represent the actual port with this number on the device. In actual use, the port number existing on the device shall prevail.

Text Format Convention

Format	Description
" "	Words with “” represent the interface words. Such as: “Port No.”.
>	Multi-level path is separated by ">". Such as opening the local connection path description: Open "Control Panel> Network Connection> Local Area Connection".
Light blue font	It represents the words clicked to achieve hyperlink. The font color is as follows: ‘Light Blue’.
About this chapter	The section ‘about this chapter’ provides links to various sections of this chapter, as well as links to the

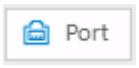
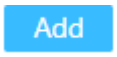
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Format	Description
	Principles/Operations Section of this chapter.

Icon Convention

Format	Description
 Notice	Remind the announcements in the operation, improper operation may result in data loss or equipment damage.
 Warning	Pay attention to the notes on the mark, improper operation may cause personal injury.
 Note	Conduct necessary supplements and explanations for the description of operation content.
 Key	Configuration, operation, or tips for device usage.
 Tips	Pay attention to the operation or information to ensure success device configuration or normal working.

Button Operation Convention

Format	Description
	There is a logout button in the upper right corner of the webpage. After clicking it, the webpage returns to the login page.
	There is a port button in the upper right corner of the webpage. Click or press F2 to view the port status, and press F2 or Esc to close the port status page.
	There is a restart button in the upper right corner of the webpage. After clicking, a restart confirmation box pops up. After confirmation, the device will restart.
	There is a Save button in the upper right corner of the webpage. Click it to save the current device configuration. After setting the device, the save icon will flash to remind the user to save the configuration, so as to avoid losing unsaved configuration information due to restart and other operations.
	Click the Add button to add a line of configuration. Note that repeated configuration may result in data overwrite.
	Check the line to be deleted, and then click the Delete button to delete the configuration.

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Format	Description
Config	Check the line to be configured, and then click the configure button to enter the configuration page.
	Click the function status button to switch the function status,  means on and  means off.
Apply	Click the Set button to submit the current configuration.
Clear	Click the “Clear” button to clear the information of current page.
Refresh	Click the Refresh button to refresh the information of current page.

Revision Record

Version No.	Revision Date	Revision Note
01	06/18/2026	Product release

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1 Login to the WEB Interface

1.1 System Requirements for WEB Browsing

Using this device, the system should meet the following conditions.

Hardware and Software	System Requirements
CPU	Above Pentium 586
Memory	Above 128MB
Resolution	Above 1024x768
Color	256 colors or above
Browser	Above Internet Explorer 9.0
Operating system	Windows 7/8/10 or above

1.2 Set the IP Address of PC

The default management IP address of the device is as follows:

IP Settings	Default Values
IP address	192.168.1.254
Subnet mask	255.255.255.0

When configuring a device through the Web:

- Before conducting remote configuration, please confirm the route between computer and device is reachable.
- Before making a local configuration, make sure that the IP address of the computer and the serial server are on the same subnet.

Note:
While configuring the device for the first time, if it's the local configuration mode, first confirm the network segment of current PC is 1.

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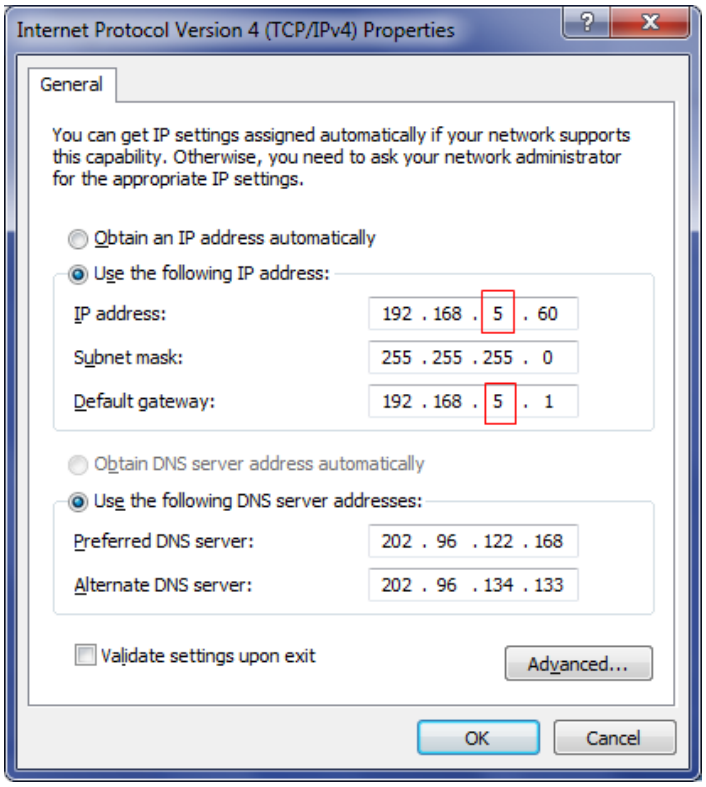
Eg: Assume that the IP address of the current PC is 192.168.5.60, change the network segment "5" of the IP address to "1".

Operation Steps

Amendment steps are as follows:

Step 1 Open "Control Panel > Network Connection> Local Area Connection> Properties> Internet Protocol Version 4 (TCP / IPv4)> Properties".

Step 2 Change the "5" selected by the red frame in the figure to "1".



Step 3 Click "OK", modification is successful.

Step 4 End.

1.3 Login to the WEB Configuration Interface

Operation Steps

Log in to the WEB configuration interface as follows:

Step 1 Run the computer browser.

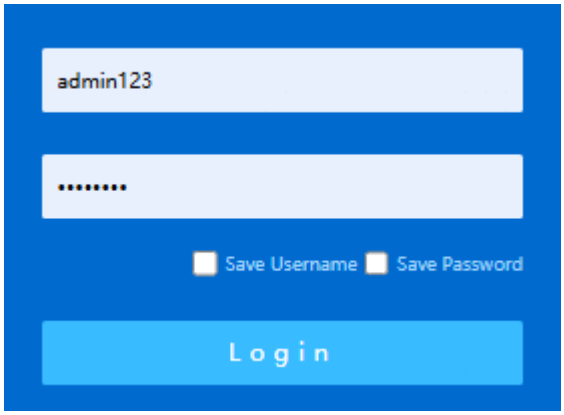
Step 2 Enter the address of the device "http://192.168.1.254" in the address bar of the browser.

Step 3 Click the “Enter” key.

Step 4 Pop-up dialog box as shown below, enter the user name and password in the login

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window.



Note:

- The default username and password are “admin123”; please strictly distinguish capital and small letter while entering.
- Default user account has the administrator privileges.
- When the user has not operated the Web network management configuration page for a long time, the system will log out and return to the Web login page after timeout; By default, the timeout of Web page login is 15 minutes.
- When the number of consecutive password login errors of a user reaches the limit (default is 5 times), the user will be restricted from logging in for the following time (default is 10 minutes).

Step 5 Click "Login".

Step 6 End.

After login successfully, user can configure relative parameters and information of WEB interface according to demands.

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2 System Information

Function Description

View port status such as port type and connection status.

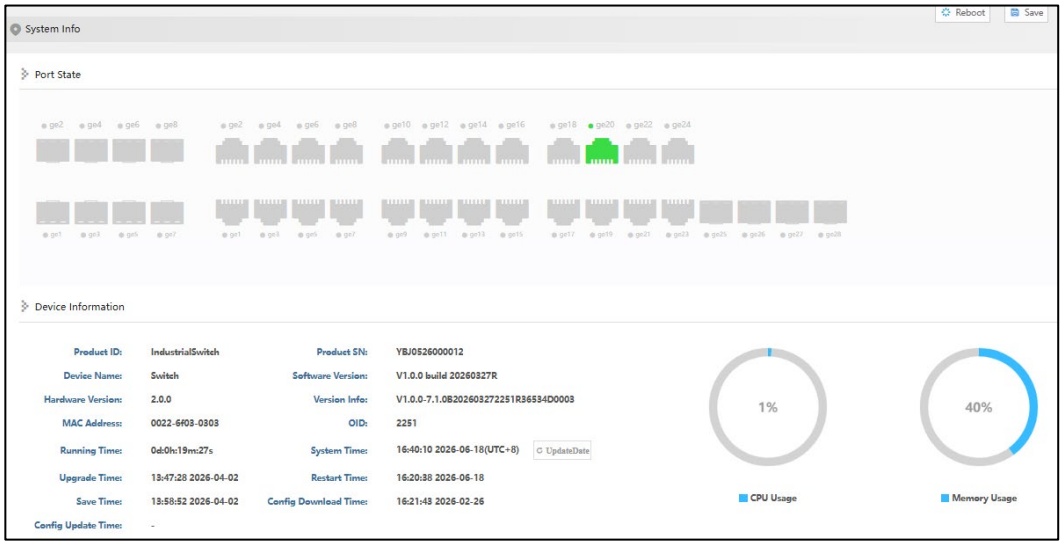
Check device information such as product model, software and hardware version, etc.

Operation Path

Open in the navigation bar: “System Information”.

Interface Description

System information interface is as follows:



The main element configuration description of System Info interface:

Interface Element	Description
Port State	Display port icon and port connection status of the device: •  Copper port icon, highlighting indicates that the port is connected.

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Interface Element	Description
	• Copper port icon, grayed out indicates that the port is not connected or disabled. •  Fiber port icon, highlighting indicates that the port is connected. • Fiber port icon, grayed out indicates that the port is not connected or disabled.
Device Information	Basic information of software, hardware and operation of the device. • Product ID • Device Name • Hardware Version • MAC Address • Product SN • Software Version • Version Info • OID • Running Time • Upgrade Time • System Time • Restart Time • Save Time • Config Download Time • Config Update Time • CPU Usage • Memory Usage

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3 Login Configuration

3.1 Management IP

3.1.1 IPv4

Function Description

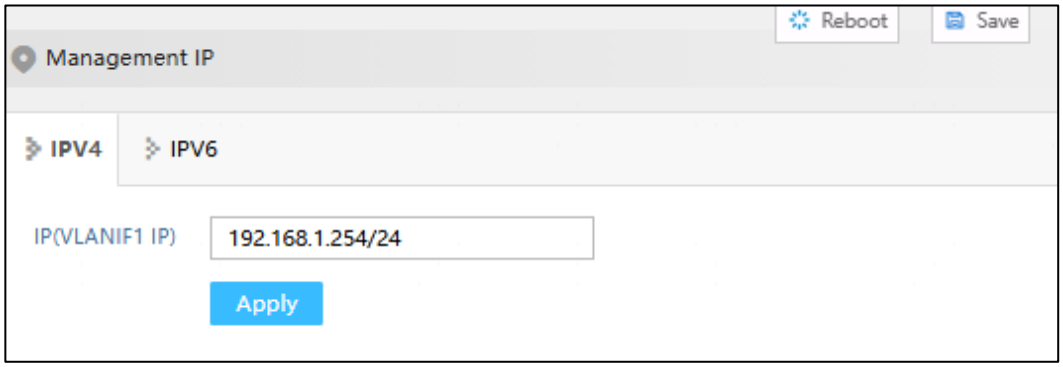
Configure the IPv4 address of the vlanif1 interface.

Operation Path

Open in order: "Login > Management IP > IPV4".

Interface Description

The IPV4 interface is as follows:



Main elements configuration descriptions of IPV4 interface:

Interface Element	Description
IP(VLANIF1 IP)	The IPv4 address and subnet mask of the vlanif1 interface of the device. The default IP is 192.168.1.254/24. Note: After modifying the IP of the device, re-enter the corresponding IP address to access the WEB interface.

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3.1.2 IPv6

Function Description

Add or delete IPv6 address of vlanif1 interface.

An IPv6 address is 128 bits long and is written as eight groups of four hexadecimal digits (base 16 digits represented by the numbers 0-9 and the letters A-F). Each group is separated by a colon (:). For the convenience of writing, IPv6 also provides a compression format. The specific compression rules are:

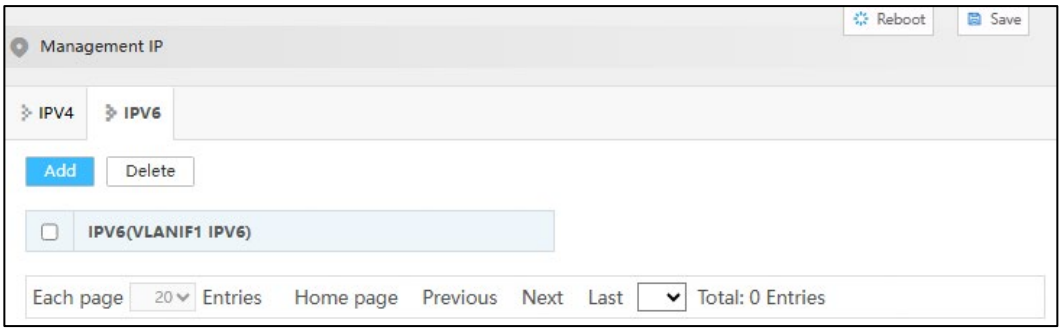
- The leading "0" in each group can be omitted.
- The address contains two or more consecutive groups of 0s, which can be replaced by double colons "::".

Operation Path

Open in order: "Login > IP Address > IPV6".

Interface Description

The IPV6 interface is as follows:



Main elements configuration descriptions of IPV6 interface:

Interface Element	Description
IPV6	IPv6 address and prefix length of vlanif1 interface of device.

3.2 User

Function Description

To add and delete user, user needs to enter username and password to access the device, the initial username and password are: admin123/admin123.

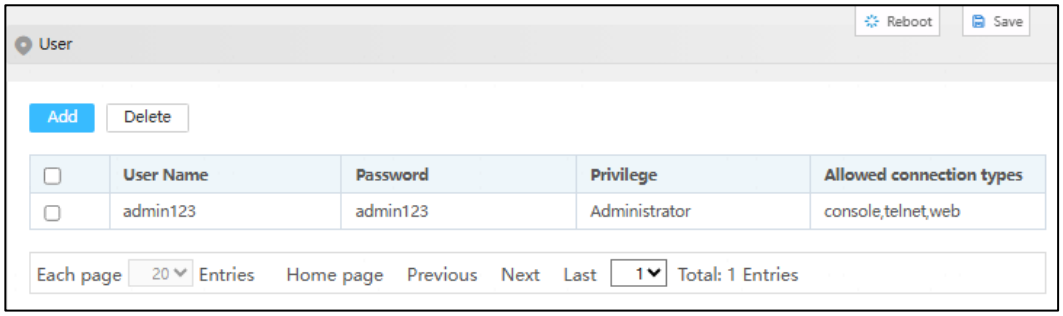
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Operation Path

Open in order: "Login > User".

Interface Description

User interface is as follows:



The main element configuration description of user interface:

Interface Element	Description
User Name	Identification of the visitor. Note: • User name supports 1-16 valid characters, consisting of uppercase letters, lowercase letters, numbers or special characters (! @ _-). • User name does not support sensitive characters such as root, daemon, bin, sys, sync, mail, proxy, www-data, backup, operator, haldaemon, dbus, ftp, nobody, sshd, default, etc.
Password	Password used by the visitor. Note: • Password supports 8-16 valid characters, consisting of combination of two or more of uppercase letters, lowercase letters, numbers, special characters (~! @ # $% _-.). • The password is valid for 90 days by default, and the password needs to be revised after it expires.
Privilege	Visitor permissions are divided into four categories. • Viewer: visit level; you can only view the system information, IP address and log information of the device, and conduct network diagnosis (Ping, Traceroute). • Auditor: view level; the configuration information of the device can be viewed, but the configuration of the device cannot be modified. • Operator: configuration level; User can view the configuration information of the device and configure some functional parameters of the device, but cannot

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Interface Element	Description
	manage the device. • Administrator: manage level, user has all privileges of the device, including downloading, uploading, rebooting, modifying device information and other operations. Note: • Users can view, delete or add other users whose permissions are no higher than their own. • If the added user name already exists, the original user information will be overwritten.
Allowed connection types	Provide Telnet protocol for users, with the following options: • Telnet • Console • Web • SSH

3.3 Protocol Authorization

Function Description

Configure device TELNET service and SSH service.

The CLI interface of the device can be accessed through TELNET protocol and SSH2.0 protocol. TELNET transmission process uses TCP protocol for plaintext transmission, and SSH (Secure Shell) protocol provides secure remote login, ensuring the safe transmission of data.

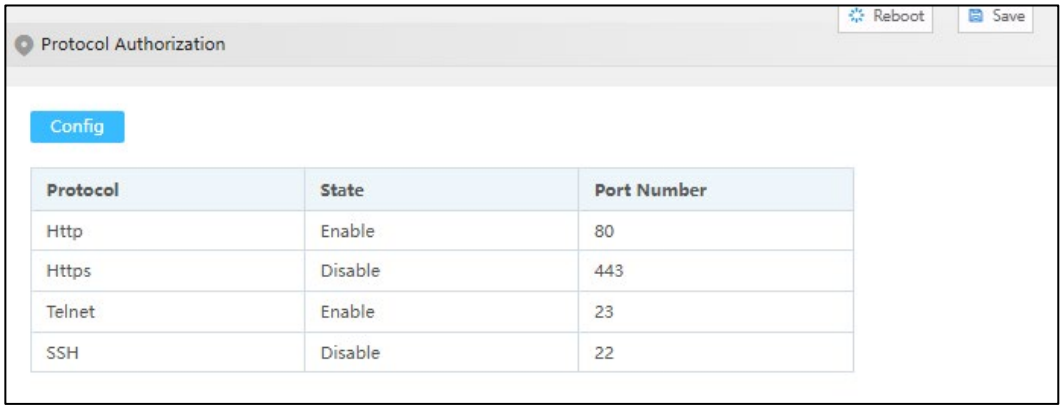
Operation Path

Open in order: "Login > Protocol Authorization".

Interface Description

Protocol authorization interface is as below:

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Configuration description of main elements of the protocol authorization interface:

Interface Element	Description
Protocol	The configurable protocol provided by the system is as follows: ● Http Enabled by default; users can access the WEB configuration interface via a web browser. After closing, the WEB configuration interface cannot be accessed through HTTP, but it can be reopened through WEB or command-line configuration. Note: When disabling HTTP, this configuration takes effect after restarting the device. ● Https After enabling, users can access the WEB configuration interface via the web page. After closing, the WEB configuration interface cannot be accessed through HTTPS, but it can be reopened through WEB or command-line configuration. Note: When enabling or disabling HTTPS, this configuration takes effect after restarting the device. ● Telnet After opening, users can access the command line configuration interface through Ethernet port. ● SSH After opening, users can access the command line configuration interface through Ethernet port.
State	The system provides the following optional states: ● Disable

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Interface Element	Description
	● Enable
Port Number	The default port numbers for the protocol are as follows: ● Http: 80 ● Https: 443 ● Telnet: 23 ● SSH: 22

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4 Port Configuration

4.1 Port Setting

Function Description

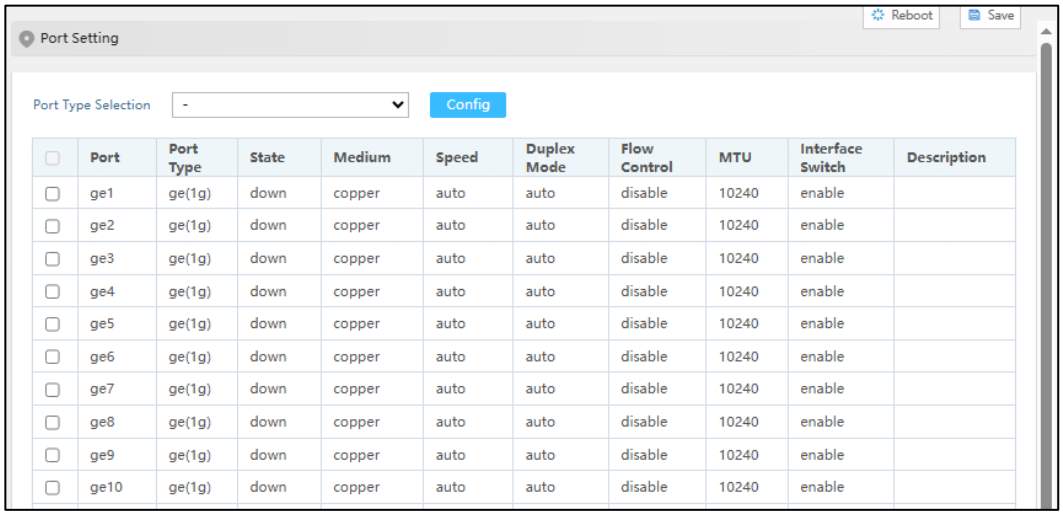
Set port parameters individually or in batches.

Operation Path

Open in order: "Port > Port Setting".

Interface Description

Port setting interface is as follows:



Main elements configuration description of port setting interface:

Interface Element	Description
Port Type	Select ports of the same type in batches for configuration, and the options are as follows: • none • ge: Gigabit port

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Interface Element	Description
	• sa: static aggregation group • po: dynamic aggregation group Note: The port type is based on the actual port of the device.
Port	The corresponding port name of the device Ethernet port.
State	Ethernet port connection status, display status as follows: • down: represent the port is disconnected; • up: represent the port is connected.
Medium	The connection types of Ethernet ports, the status is shown as follows: • copper: copper port medium.
Speed	The default is self-adaption mode, and the display status is as follows: • auto: self-adaption; • 10m: 10M; • 100m: 100M; • 1g: Gigabit.
Duplex Mode	The default is self-adaption mode, and the display status is as follows: • auto: self-adaption; • half: half-duplex; • full: full duplex.
Flow control	Port flow control status, the display status is as follows: • disable • both: Enable port data sending or receiving flow control. • send on: Enable port data sending flow control; • send off: Disables port sending data flow control. • receive on: Enable port data receiving flow control; • receive off: Disables port receiving data flow control.
MTU	The maximum Ethernet data frame length that can pass through an Ethernet port ranges from 64 to 10240.
Interface Switch	Enable or disable Ethernet port. Options are as follows: • enable • disable
Description	Port description information, which supports 0-32 characters and consists of uppercase letters, lowercase letters, numbers or special characters (! @ _-).

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4.2 Link Aggregation

4.2.1 Link Aggregation

Function Description

Link aggregation is the shorter form of Ethernet link aggregation; it binds multiple Ethernet physical links into a logical link, achieving the purpose of increasing the link bandwidth. At the same time, these bundled links can effectively improve the link reliability by mutual dynamic backup.

The Link Aggregation Control Protocol (LACP) protocol based on the IEEE802.3ad standard is a protocol for implementing dynamic link aggregation. Devices running this protocol exchange LACPDU (Link Aggregation Control Protocol Data Unit, Link Aggregation Control Protocol Data Unit) to exchange link aggregation related information.

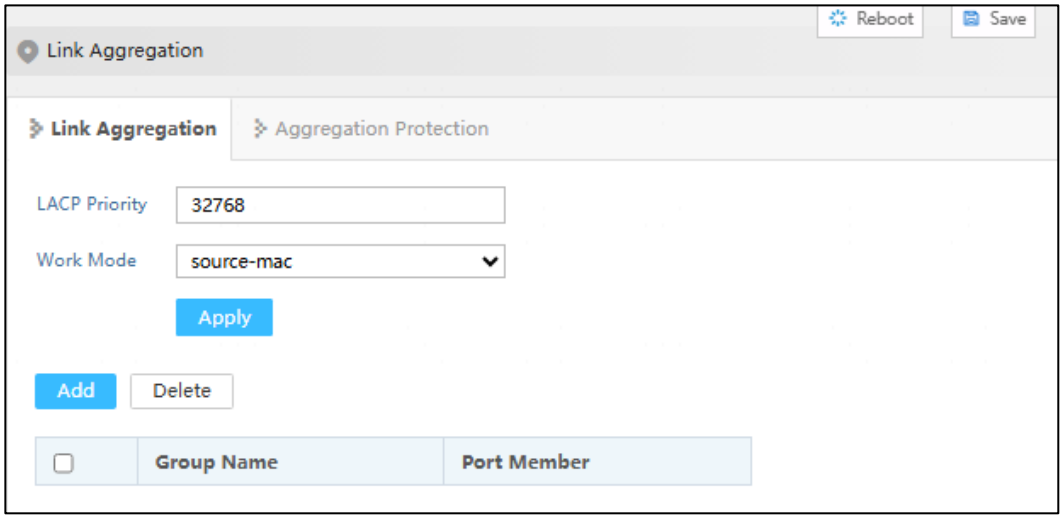
Based on the enabling or disabling of LACP protocol, the link aggregation can be divided into two modes, static aggregation and dynamic aggregation.

Operation Path

Open in order: "Port > Link Aggregation > Link Aggregation".

Interface Description

Link Aggregation interface is as below:



The main element configuration description of Link Aggregation interface:

Interface Element	Description
LACP Priority	Priority level setting of dynamic aggregation system, the

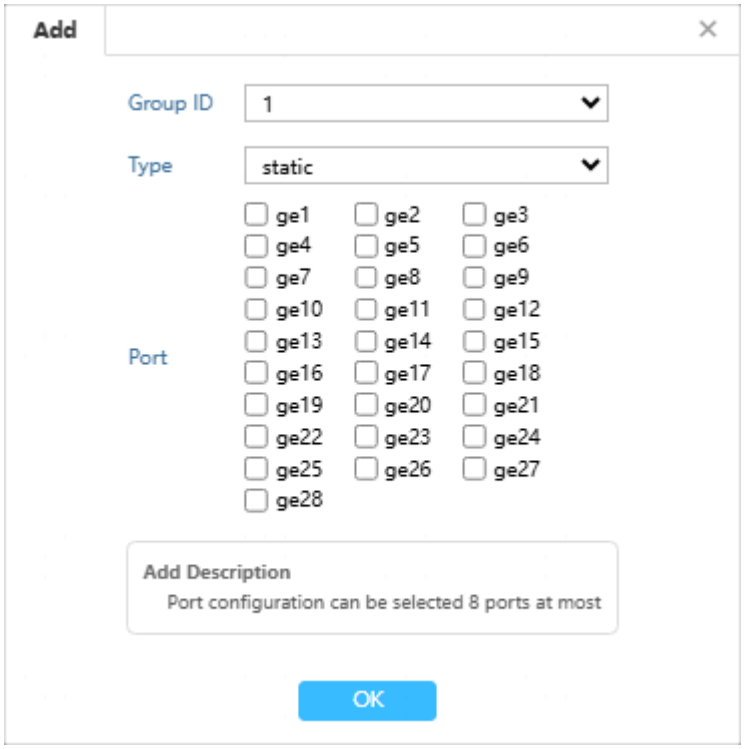
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Interface Element	Description
	setting range is 1-65535, defaults to 32768. Note: The lower the priority value of the system LACP is, the higher the priority is, and the activity interface of the device with high system priority is selected at both ends of the aggregation link.
Work Mode	Configure the load balancing mode of the aggregation group. The options are as follows: • source-mac: Load balance mode based on source MAC • source-ip: the load balancing mode based on source IP • Source-port: load balancing mode is based on source port. • Destination-port: load balancing mode is based on the destination port. • destination-ip: the load balancing mode based on destination IP • destination-mac: Load balance mode based on destination MAC • source-dest-ip: Load balance mode based on source and destination IP • source-dest-mac: Load balance mode based on source and destination MAC • source-dest-port: The load balancing mode is based on the source and destination TCP/UDP ports.
Group Name	Group type and ID, sa is a static aggregation group, po is a dynamic aggregation group, and the aggregation group ID supports up to 12 groups. Each group can configure up to 8 ports to join aggregation.
Port Member	Port member in the link aggregation group.

Interface Description: Add

The Link Aggregation-Add interface is as follows:

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The main elements configuration description of Link Aggregation-Add interface:

Interface Element	Description
Group ID	The ID number of the aggregation group, which can support up to 8 groups.
Type	Type of aggregation group: • static: static aggregation • dynamic: dynamic aggregation
Aggregation Mode	Dynamic Aggregation Group Mode: • active: active mode, in which the port actively initiates the aggregation negotiation process. • passive: the mode in which the port passively receives the aggregate negotiation process. Note: Under dynamic type, display this configuration.
Port	Port members in this aggregation group. Each group can configure up to 8 ports to join the aggregation.

4.2.2 Aggregation Protection

Function Description

Configure static aggregation protection.

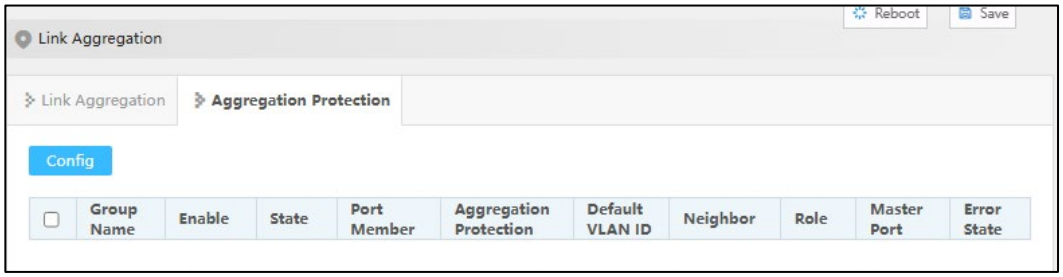
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Operation Path

Open in order: "Port > Link Aggregation > Aggregation Protection".

Interface Description

The aggregation protection interface is shown as follows:



Description of configuration of main elements of aggregation protection interface:

Interface Element	Description
Group Name	The name of the static aggregation group set in Link Aggregation.
Enable	The enabled state of the aggregation group. • Enable • Disable
State	Status of the aggregation group port. • Up: if any port member is Up, the status of the aggregation group is up; • Down: if all port members are Down, the status of the aggregation group is Down.
Port Member	Port member in the aggregation group.
Aggregation Protection	The enabled state of the aggregation protection. • Enable • Disable
Default VLAN ID	The VLAN where that aggregate group port resides.
Neighbor	MAC address of the opposite device of aggregation group. Note: If no device is connected to the opposite end, the MAC address is displayed as 0000.0000.0000.
Role	Elected roles in this device and the opposite device • Master: the one with a smaller MAC address is elected as Master • Slave: the one with a larger MAC address is elected as Slave
Master Port	The second link port of the master device is the master port.
Error State	Error message prompt of aggregation protection:

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Interface Element	Description
	• Neighbor timed out • Loop: forming a loop • Link error (such as generating many error frames).

4.3 Port Speed Limit

Function Description

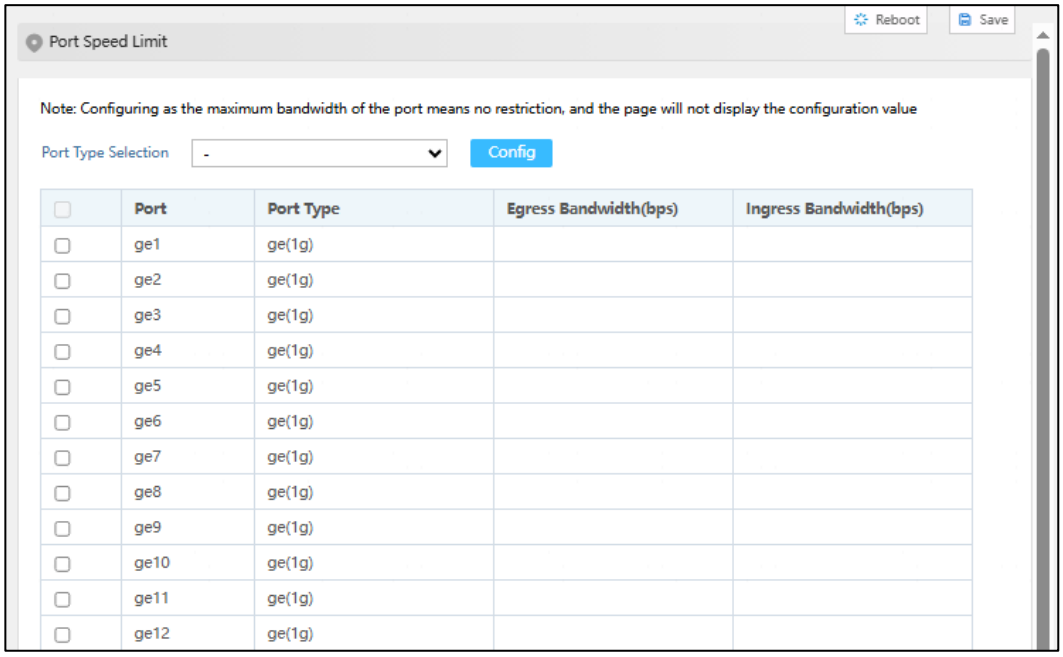
Limit the egress bandwidth and ingress bandwidth of the port.

Operation Path

Open in order: "Port > Port Speed Limit".

Interface Description

Port speed limit interface is as follows:



The main element configuration description of port rate limit interface:

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
Egress Bandwidth (bps)	The limitation of port on the bandwidth of egress data transmission.
Ingress Bandwidth (bps)	The limitation of port on the bandwidth of ingress data transmission. Note:

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Interface Element	Description
	Support unit selection of K/M/G when configuring the bandwidth. In WEB display, unit conversion will be conducted and similar values will be taken according to the input value and the unit.

Note

- When using the port rate limit, flow control should be enabled, otherwise the rate between devices will no longer be a smooth curve;
- When using the port rate limit, packet loss should not occur unless the flow control is disabled. The representation of packet loss is the fluctuating transmission speed.
- Port speed limit has high requirements on network cable quality, otherwise lots of conflict packets and broken packet would appear.

4.4 Storm Control

Function Description

Configure the maximum broadcast, multicast or unknown unicast packet flow the port allows.

When the sum of each port broadcast, unknown multicast or unknown unicast flow achieves the value user sets, the system will discard the packets beyond the broadcast, unknown multicast or unknown unicast flow limit, so that the proportion of overall broadcast, unknown multicast or unknown unicast flow can be reduced to limited range, ensuring the normal operation of network business.

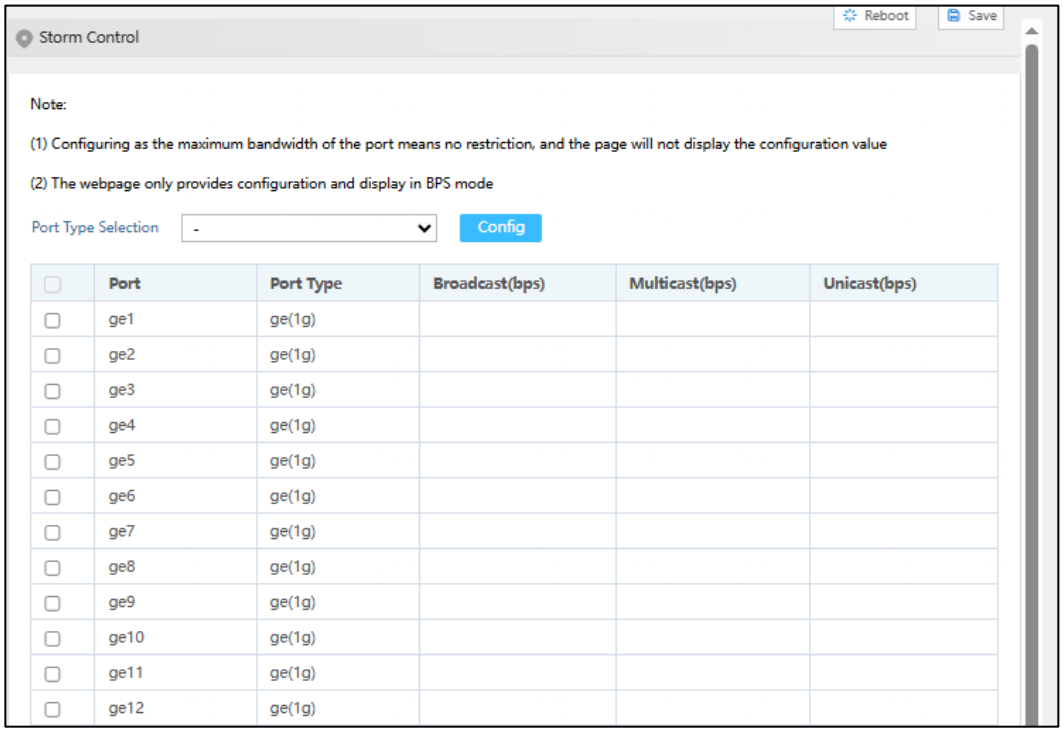
Operation Path

Open in order: "Port > Storm Control".

Interface Description

Storm control interface is as follows:

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Main elements configuration description of storm control interface:

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
Broadcast (bps)	The device procedure can suppress the transmission speed of broadcast packet Note: Broadcast packet, namely, the data frame with the destination address of FF-FF-FF-FF-FF-FF.
Multicast (bps)	Port suppression to the transmission speed of unknown multicast data packet. Note: Multicast packet, namely, the destination address is XX-XX-XX-XX-XX-XX data frame, the second X is odd number, such as: 1, 3, 5, 7, 9, B, D, F, other X represents arbitrary number.
Unicast (bps)	Port suppression to the transmission speed of unknown unicast data packet. Note: Unknown unicast packet, namely, the MAC address of the data frame doesn't exist in the MAC address table of the device, which needs to be forwarded to all ports.

Note

Support unit of K/M/G when click the "Config" button to configure the rate. In WEB display, unit conversion will be conducted and similar values will be taken according to the input value and the unit.

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4.5 Port Mirroring

Function Description

Copy the data from the origin port to appointed port for data analysis and monitoring.

Operation Path

Open in order: "Port > Port Mirroring".

Interface Description

Port mirroring interface is as follows:



The main element configuration description of port mirror interface:

Interface Element	Description
Source Port	Data source port, which can be one or more, from which the device will collect data in the specified direction.
Direction	Data direction of the source port, options are as follows: • transmit: the message sent by the source port will be mirrored to the destination port. • receive: the packet received by the source port will be mirrored to the destination port. • both: the packet received or sent by the source port will be mirrored to the destination port.
Destination Port	The destination port of device mirroring. The device only supports one destination port.

Note

- The function must be shut down in normal usage, otherwise all senior management functions based on port are not available, such as RSTP, IGMP snooping etc.
- Mirror function only deals with FCS normal packet; it cannot handle the wrong data frame

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4.6 Port Isolation

Function Description

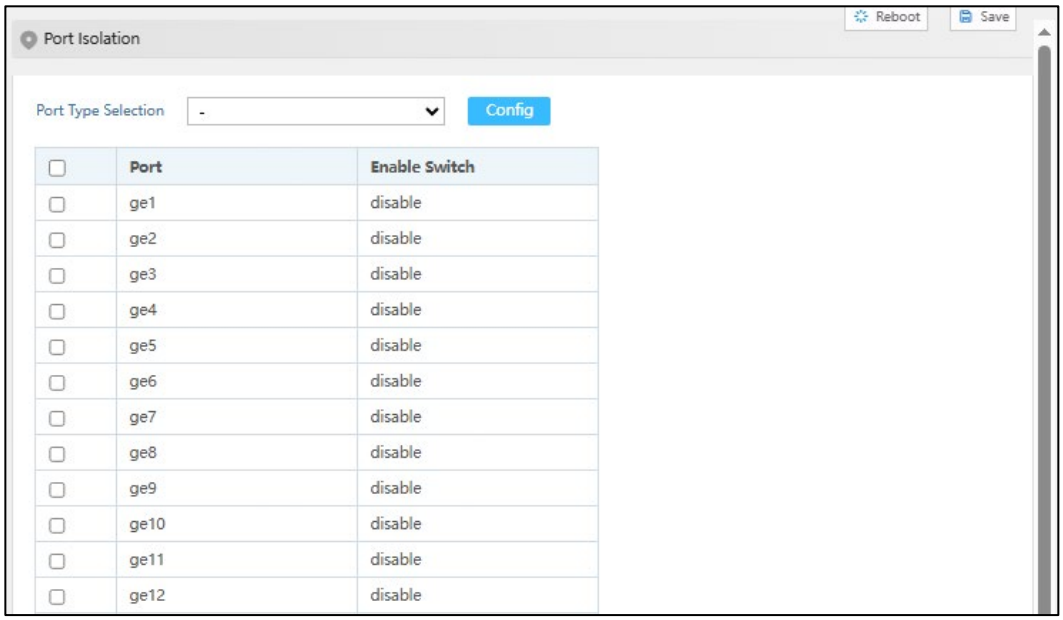
Port isolation is used for the layer 2 isolation between messages. It could add different ports to different VLANs, but waste limited VLAN resources. Adopting isolate-port characteristics can achieve isolation of ports within the same VLAN. After adding the ports to isolation group, user can achieve the layer 2 data isolation of ports within isolation group. Port isolation function has provided safer and more flexible networking scheme for users.

Operation Path

Open in order: "Port > Port Isolation".

Interface Description

Port isolation interface is as follows:



The main element configuration description of isolate-port config interface:

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
Enable Switch	Port isolation enable status can be displayed as follows: • Disable • Enable

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4.7 Port Statistics

4.7.1 Port Statistics-Overview

Function Description

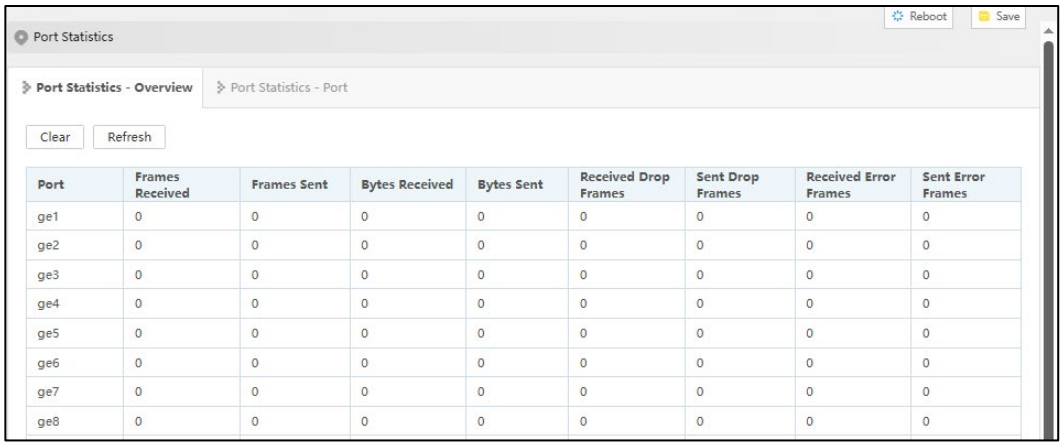
Check the number of messages and bytes, discarded messages and error messages sent and received by each port.

Operation Path

Open in order: "Port > Port Statistics > Port Statistics-Overview".

Interface Description

Port Statistics-Overview interface is as follows:



Port	Frames Received	Frames Sent	Bytes Received	Bytes Sent	Received Drop Frames	Sent Drop Frames	Received Error Frames	Sent Error Frames
ge1	0	0	0	0	0	0	0	0
ge2	0	0	0	0	0	0	0	0
ge3	0	0	0	0	0	0	0	0
ge4	0	0	0	0	0	0	0	0
ge5	0	0	0	0	0	0	0	0
ge6	0	0	0	0	0	0	0	0
ge7	0	0	0	0	0	0	0	0
ge8	0	0	0	0	0	0	0	0

4.7.2 Port Statistics-Port

Function Description

Check the classification statistics of the total number of messages sent and received by the designated port and the number of bytes of messages.

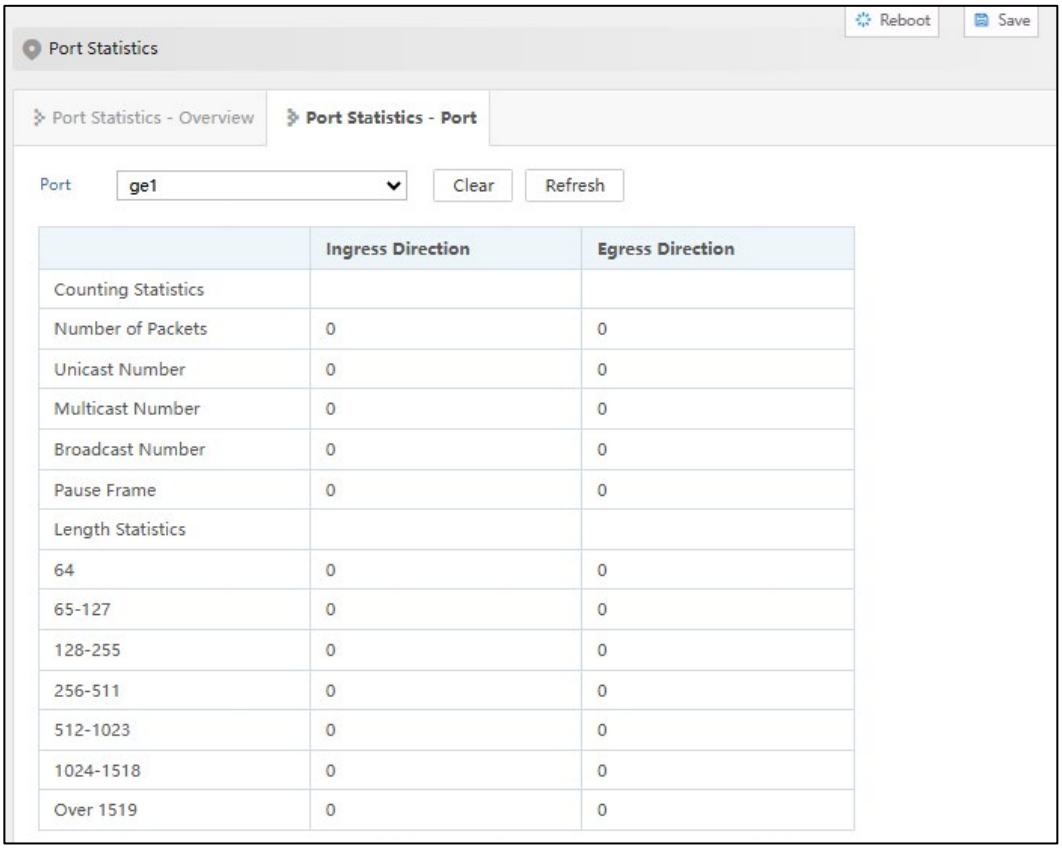
Operation Path

Open in order: "Port > Port Statistics > Port Statistics-Port".

Interface Description

Port Statistics-Port interface is as follows:

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	Ingress Direction	Egress Direction
Counting Statistics		
Number of Packets	0	0
Unicast Number	0	0
Multicast Number	0	0
Broadcast Number	0	0
Pause Frame	0	0
Length Statistics		
64	0	0
65-127	0	0
128-255	0	0
256-511	0	0
512-1023	0	0
1024-1518	0	0
Over 1519	0	0

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5 Layer 2 Configuration

5.1 VLAN

VLAN is Virtual Local Area Network. VLAN is the data switching technology that logically (note: not physically) divides the LAN device into each network segment (or smaller LAN) to achieve the virtual working group (unit).

VLAN advantages mainly include:

- Port isolation. Ports in different VLAN, even in the same switch, can't intercommunicate. Such a physical switch can be used as multiple logical switches.
- Network security. Different VLAN can't directly communicate with each other, which has eradicated the insecurity of broadcast information.
- Flexible management. Changing the network user belongs to needn't to change ports or connection; only needs to change the firmware configuration.

That is, ports within the same VLAN can intercommunicate; otherwise, ports can't communicate with each other. A VLAN is identified with VLAN ID, and ports with the same VLAN ID belong to a same VLAN.

5.1.1 VLAN Configuration

Function Description

Create VLAN and edit VLAN description.

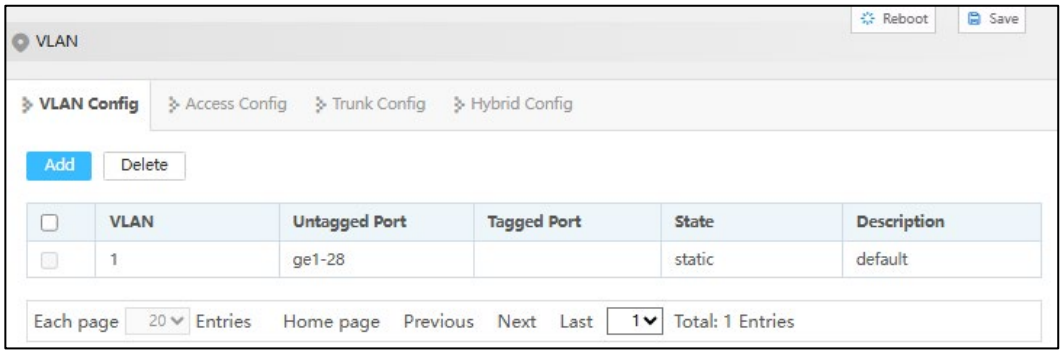
Operation Path

Open in order: "Layer-2 > VLAN > VLAN Config".

Interface Description

The VLAN configuration interface is as follows:

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Main element configuration description of VLAN configuration interface:

Interface Element	Description
VLAN	VLAN ID number, value range is 2-4094.
Untagged Port	Untagged port member to conduct untagged process to sending data frame.
Tagged Port	Tag port member to conduct tagged process to sending data frame.
State	VLAN status: • Static: static VLAN • Dynamic: dynamic VLAN
Description	VLAN description information, which supports 0-32 characters and consists of uppercase letters, lowercase letters, numbers or special characters (! @ _-).

5.1.2 Access Configuration

Function Description

Configure the PVID (Port Default VLAN ID) of the Access interface, or modify it to Trunk interface.

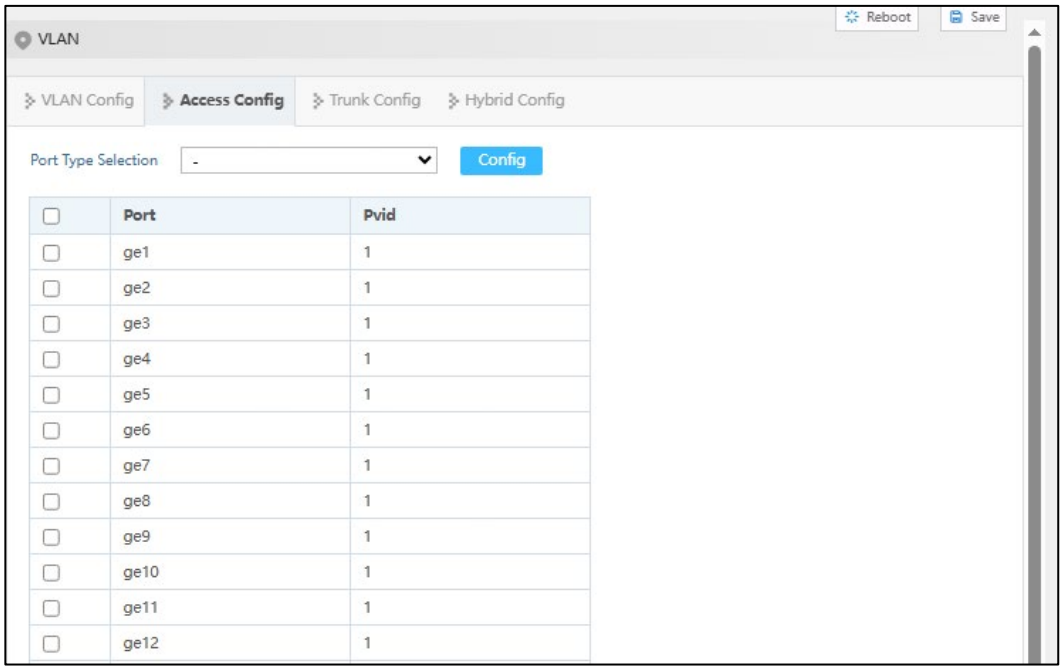
Operation Path

Open in order: "Layer-2 > VLAN > Access Config".

Interface Description

Access configuration interface is as follows:

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The main element configuration description of Access configuration interface.

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
PVID	Port Default VLAN ID, which is the default VLAN of the port. Default is 1, value range is 1-4094. Note: Each port has a PVID property, when the port receives Untag messages, it adds Tag mark on them according to PVID. When the port transmits data message with the same Tag mark as PVID, it would erase the Tag mark and then transmit the message. The PVID of all ports default to 1.
Config	Check the port and click “Config” to reset PVID and port mode. • Access: port only belongs to 1 VLAN (which is the default VLAN), all ports of the switch are Access mode by default and all PVID are 1. • Trunk: port can belong to multiple VLAN, Trunk port can allow the messages of multiple VLANs to pass with Tag, but only allow the messages of one VLAN to transmit without tag (strip Tag) from this kind of interface. Commonly used in the connection between network devices.

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5.1.3 Trunk Configuration

Function Description

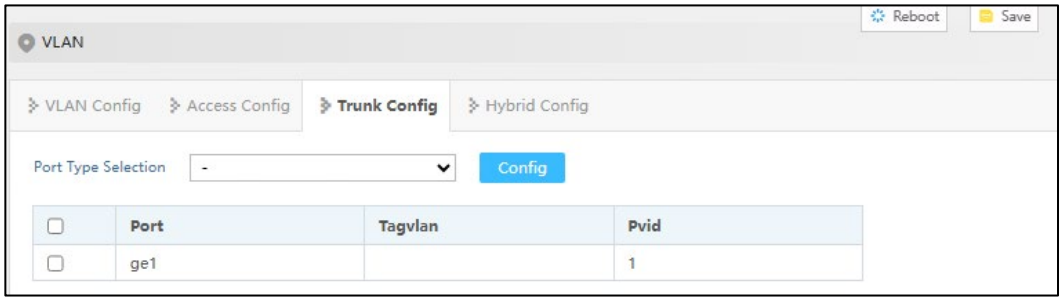
Configure the pvid value and tagvlan of Trunk port, or modify it to Access interface.

Operation Path

Open in order: "Layer-2 > VLAN > Trunk Config".

Interface Description

Trunk configuration interface is as follows:



The main element configuration description of Trunk configuration interface:

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
Tagvlan	The VLAN ID number that the port allows to pass.
Pvid	Port Default Vlan ID, which is the default VLAN of the port. Default is 1, value range is 1-4094.
Config	Check the port and click “Config” to configure the VLAN and PVID of the port, as well as the processing of PVID when sending messages.

5.1.4 Hybrid Configuration

Function Description

On the "Hybrid Configuration" page, user can configure Hybrid relative parameters.

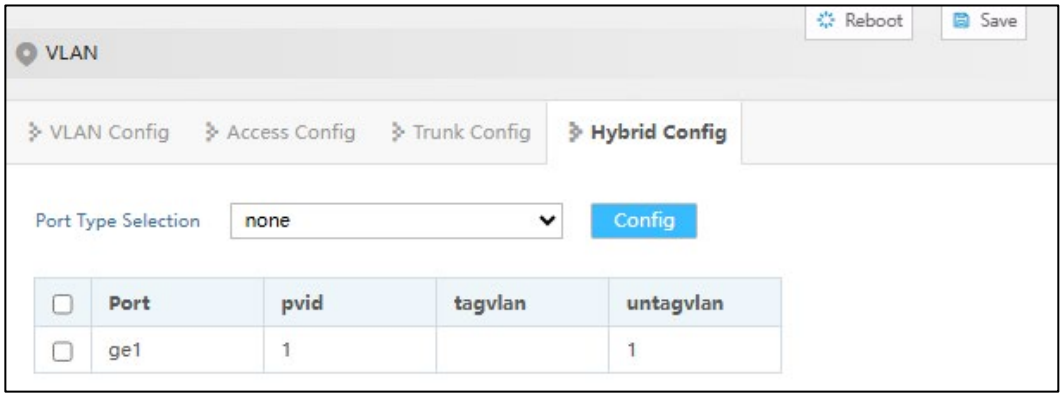
Operation Path

Open in order: "Layer-2 > VLAN > Hybrid Config".

Interface Description

Hybrid configuration interface is as follows:

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The main element configuration description of Hybrid configuration interface.

Interface Element	Description
Port Type Selection	Filter the ports to be configured through the drop-down list.
Config	Check or filter the entries that need to be reconfigured, click configure to reset the parameters of PVID, tagvlan, and untagvlan.
Pvid	VLAN ID number, value range is 1-4094.
untagvlan	The untagged value, an individual number or range (“-” represents range). For example: 9 or 10-15.
tagvlan	The tagged value, an individual number or range (“-” represents range). For example: 9 or 10-15.
Mode	Click “Mode” to set the type to access or trunk

Process for Port Receiving Message

Interface Type	Process for Receiving Untagged Message	Process for Receiving Tagged Message
Access	Receive this message and tag it with default VLAN ID.	• Receive the message when the VLAN ID is the same as default VLAN ID. • Discard the message when the VLAN ID is different from the default VLAN ID.
Trunk	Receive this message and tag it with default VLAN ID.	• Receive this message when the VLAN ID is in the list of VLAN ID that allow to pass through the interface. • Discard this message when the VLAN ID is not in the list of VLAN ID that allow to pass through the
Hybrid		

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Interface Type	Process for Receiving Untagged Message	Process for Receiving Tagged Message
		interface.

Process for Port Sending Message

Interface Type	The process of transmit frame
Access	Strip the PVID Tag of the message first, then transmit it.
Trunk	• When the VLAN ID is the same as the default VLAN ID, and it is the VLAN ID allowed to pass through the interface, it would strip the Tag and send this message. • When the VLAN ID is different from the default VLAN ID, and it's the VLAN ID allowed to pass through the interface, it would remain its original Tag and send the message.
Hybrid	When the VLAN ID is the one allowed to pass through the interface, it would send this message. It could be set to whether to carry Tag during transmission.

5.2 MAC

MAC (Media Access Control) address is the hardware identity of network device; the switch forwards the message according to MAC address. MAC address has uniqueness, which has guaranteed the correct retransmission of message. Each switch is maintaining a MAC address table. In the table, MAC address is corresponding to the switch port. When the switch receives data frames, it decides whether to filter them or forward them to the corresponding port according to the MAC address table. MAC address is the foundation and premise that switch achieves fast forwarding.

5.2.1 Global Configuration

Function Description

Set the aging time of dynamic MAC addresses.

Each port in the switch is equipped with automatic address learning function, it stores the frame source address (source MAC address, switch port number) that port sends and receives in the address table. Ageing time is a parameter influencing the switch

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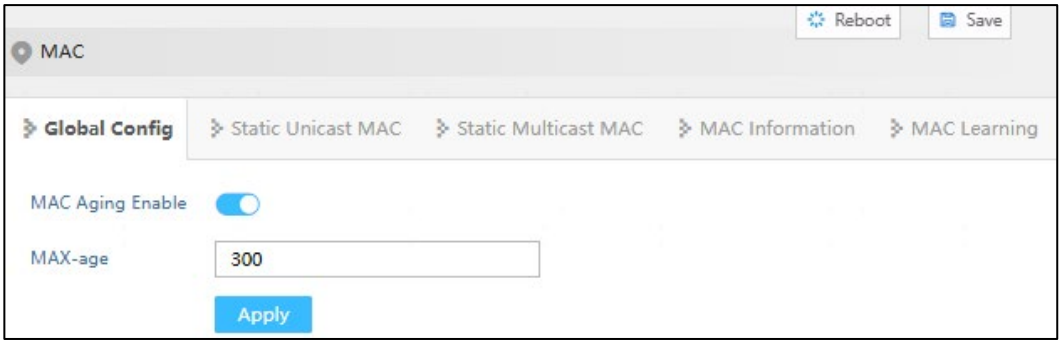
learning process; the default value is 300 seconds. When the timekeeping starts after an address record is added to the address table, if each port doesn't receive the frame whose source address is the MAC address within the ageing time, then these addresses will be deleted from dynamic forwarding address table (source MAC address, destination MAC address and their corresponding switch port number).

Operation Path

Open in order: "Layer 2 > MAC > Global Config".

Interface Description

Global configuration interface is as follows:



The main element configuration description of global configuration interface:

Interface Element	Description
MAC Aging Enable	Enable switch of MAC address aging.
MAX-age	MAC address aging-time, unit is second, default value is 300, and range is 10-1000000.

5.2.2 Static Unicast MAC

Function Description

Source unicast MAC address binding and filtering will not age.

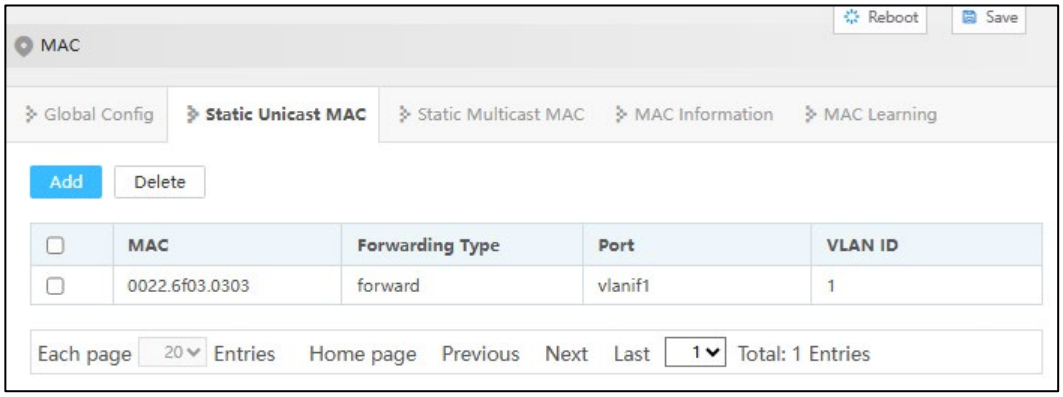
Operation Path

Open in order: "Layer-2 > MAC > Static Unicast MAC".

Interface Description

Static unicast MAC interface is as follows:

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The main element configuration description of static uniicast MAC interface:

Interface Element	Description
MAC	The unicast MAC address bound by the interface, such as 0001.0001.0001.
Forwarding Type	MAC forwarding type, as shown below: • Discard • Forward
Port	The binding port number.
VLAN ID	The VLAN ID number to which the data sent by this MAC address belongs, for example, 1-4094. Note: Input VLAN ID is the existing ID.

Note

- The function is a sort of security mechanism, please carefully confirm the setting, otherwise, part of the devices won't be able to communicate;
- Please don't adopt multicast address as the entering address;
- Please don't enter reserved MAC address, such as the local MAC address.

5.2.3 Static Multicast MAC

Function Description

Source multicast MAC address binding will not age.

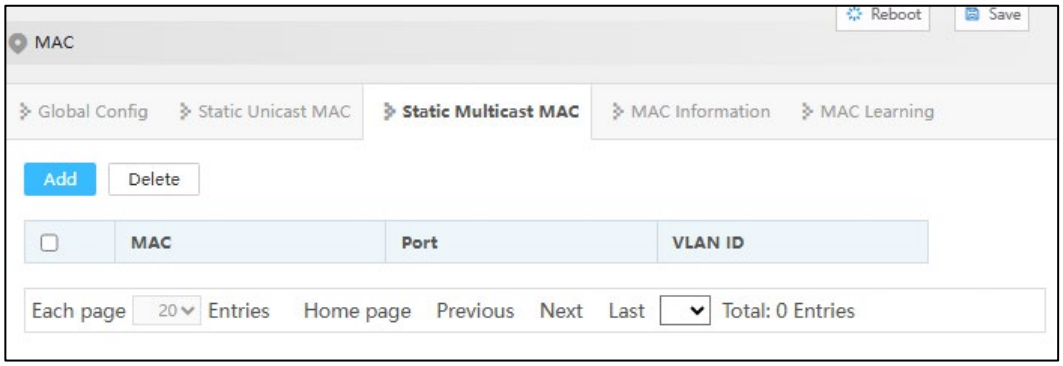
Operation Path

Open in order: "Layer-2 > MAC > Static Multicast MAC".

Interface Description

Static multicast MAC interface is as follows:

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The main element configuration description of static multicast MAC interface:

Interface Element	Description
MAC	Multicast MAC address bound to the interface, for example: 0100.5e01.0001.
Port	The Binding Port Number.
VLAN ID	The VLAN ID number to which the data sent by this MAC address belongs, for example, 1-4094. Note: Input VLAN ID is the existing ID.

5.2.4 MAC Information

Function Description

Check the MAC address table information.

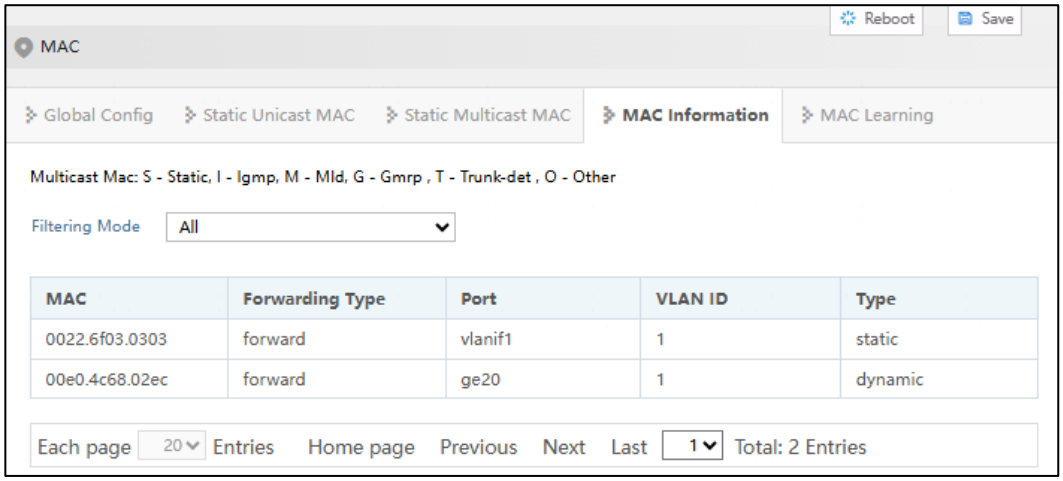
Operation Path

Open in order: "Layer-2 > MAC > MAC Information".

Interface Description

MAC Information interface is as follows:

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The main element configuration description of MAC information interface:

Interface Element	Description
Filtering Mode	Drop-down list of MAC mode to filter the display of the MAC address list of the specified type. The options are as follows: • All • Dynamic Unicast • Dynamic Multicast • Static Multicast • Static Unicast
MAC	The dynamic MAC addresses that the device have learned or the static MAC address information that user has configured.
Forwarding Type	MAC forwarding type, as shown below: • Discard • Forward
Port	Corresponding port number of the MAC address.
VLAN ID	VLAN ID number the data MAC address sending belongs to.
Type	The type of MAC address, it displays as follows: • dynamic • static

5.2.5 MAC Learning

Function Description

The main function of MAC learning is to limit the number of MAC learning on the port. When the MAC address table of the switch is full, it is impossible to learn new MAC addresses. At this time, if many forged messages with different source MAC

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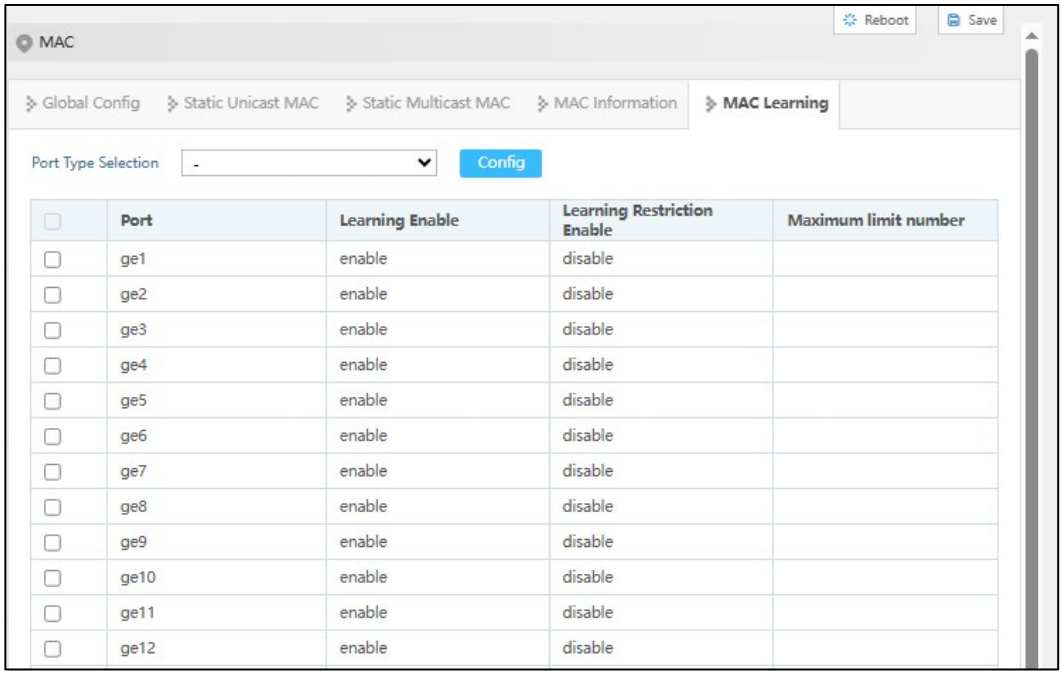
addresses are sent to the switch, it will exhaust the resources of the MAC address table of the switch and lead to the failure to learn normal MAC addresses. Therefore, limiting the number of MAC learning of the switch can prevent this from happening and improve the security of the switch and the network.

Operation Path

Open in order: "Layer-2 > MAC > MAC Learning".

Interface Description

The MAC learning interface is as follows:



The main element configuration description of MAC learning interface:

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
Learning Enable	"Learning Enable" means that the switch turns on or off the learning function of MAC address. When MAC learning is enabled, the switch will learn and record the MAC addresses received from each port to establish a MAC address table for forwarding packets. When MAC learning is disabled, the switch will stop learning new MAC addresses and will only use the learned MAC addresses for forwarding. The operation of the 'learning enable switch' is as follows: • Disable: disable the learning restriction; • Enable: enable the learning restriction.

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Interface Element	Description
Learning Restriction Enable	"Learning Restriction Enable" refers to the function of the switch to turn on or off the learning restriction of a VLAN and the number of MAC addresses learned on a port. When learning restriction is enabled, the switch will limit the number of MAC addresses learned on a certain port, and MAC addresses exceeding the limit may be discarded or ignored. When learning restriction is disabled, the switch does not limit the number of MAC addresses learned on a port. The operation of the 'learning limits enable switch' is as follows: • Disable: disable the learning restriction; • Enable: enable the learning restriction. Note: The "learning enable switch" and "learning restriction switch" can be turned on or off simultaneously, but the "learning restriction switch" only has actual impact when the "learning enable switch" is turned on.
Maximum limit number	The maximum number of restrictions means that "Learning Restriction Enable" restricts the number of MAC addresses learned on a port.

5.3 Spanning Tree

Spanning-tree protocol is a sort of layer 2 management protocol; it can eliminate the network layer 2 circuit via selectively obstructing the network redundant links. At the same time, it has link backup function. Here are three kinds of spanning-tree protocols:

- STP (Spanning Tree Protocol)
- RSTP (Rapid Spanning Tree Protocol)
- MSTP (Multiple Spanning Tree Protocol)

Spanning-tree protocol has two main functions:

- First function is utilizing spanning-tree algorithm to establish a spanning-tree that takes a port of a switch as the root to avoid ring circuit in Ethernet.
- Second function is achieving the convergence protection purpose via spanning-tree protocol when Ethernet topology changes.

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Compared to STP, RSTP, MSTP can converge the network more quickly when network structure changes; MSTP is compatible with STP and RSTP, and is better than STP and RSTP. It can not only quickly converge but also send different VLAN along each path to provide better load sharing system for redundant link.

5.3.1 Global Configuration

Function Description

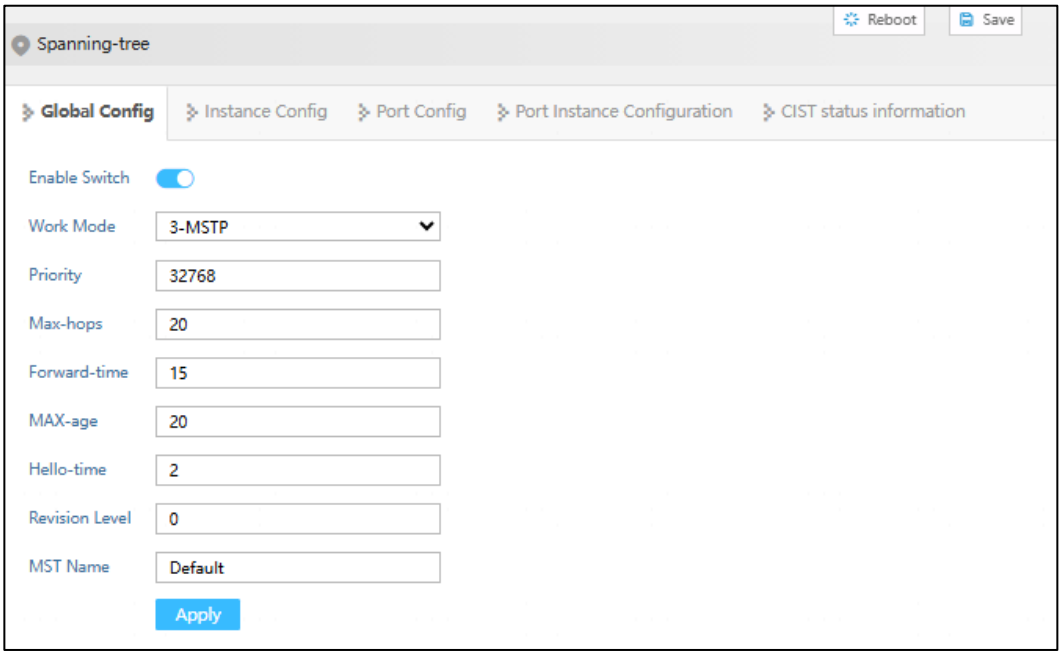
Configure the relevant parameters of spanning tree.

Operation Path

Open in order: "Layer-2 > Spanning-tree > Global Config".

Interface Description

Global configuration interface is as follows:



The main element configuration description of global configuration interface:

Interface Element	Description
Enable Switch	Spanning-tree enable switch. Disable by default
Work Mode	Defaults to MSTP, there are three modes for spanning-tree protocol choice: • 0-STP: Spanning-tree • 2-RSTP: Rapid spanning tree • 3-MSTP: Multiple spanning-trees Note: In RSTP or MSTP mode, when the connection with STP device is

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Interface Element	Description
	found, the port will automatically migrate to STP compatible mode to work.
Priority	Bridge priority level, value range is 0-61440. Note: Smaller the priority level value is, higher the priority level is. It must be a multiple of 4096.
Max-hops	The maximum hop in MST region, defaults to 20, the value range is 1-40. Note: The maximum hop in MST region has limited the size of MST region. The maximum hop configured on a domain root will be used as the maximum hop in MST region.
Forward-time	Port state transition delay, defaults to 15s, the value range is 4-30.
MAX-age	The maximum lifetime of the message in the device, defaults to 20s, the value range is 6-40. It's used to determine whether the configuration message times out.
Hello-time	Message sending cycle, defaults to 2s, the value range is 1-10. Note: • The spanning tree protocol sends configuration information every Hello time to check whether the link is faulty. • In order to avoid frequent network flap, forwarding delay, aging time and handshake time should satisfy the following formula: 2× (forwarding delay -1) ≥ aging time ≥2× (handshake time -1).
MST Name	MST domain name, defaults to Default, up to 32 characters.

5.3.2 Instance Configuration

Function Description

Configure instance-to-VLAN mapping.

Multiple Spanning Tree Regions (MST Regions) are composed of multiple devices in the switched network and the network segments between them.

In an MST region, multiple spanning trees can be generated through MSTP. Each spanning tree is independent to others and corresponding to special VLAN. Each spanning tree is called an MSTI (Multiple Spanning Tree Instance).

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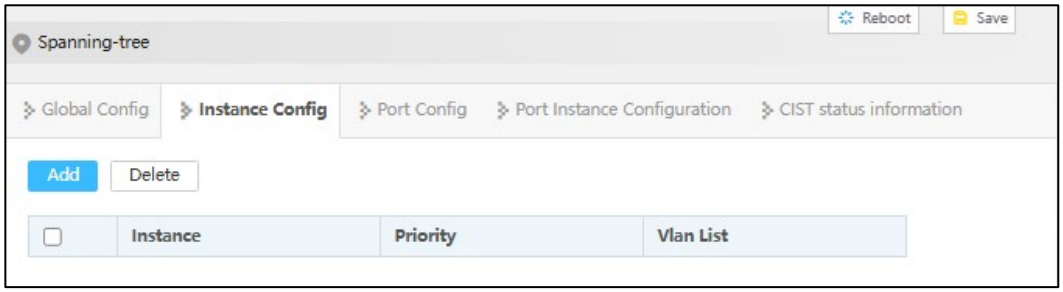
VLAN mapping table is an attribute of MST region, and it's used to describe the mapping relation between VLAN and MSTI.

Operation Path

Open in order: "Layer-2 > Spanning-tree > Instance Config".

Interface Description

Instance configuration interface is as follows:



The main element configuration description of instance configuration interface:

Interface Element	Description
Instance	Instance ID number of Multiple Spanning-tree. The value range is 1-16.
Priority	The priority level of the device ranges from 0 to 61440, with a default value of 32768 and a step size of 4096. During adding, choose a priority based on 0-15 times the value on the 4096. Note: The priority of a device participates in spanning tree calculation. Its size determines whether the device can be selected as the root bridge of a spanning tree.
VLAN List	The list of VLANs mapped to MSTI instances, each VLAN can only correspond to one MSTI. Note: VLAN mapping table is an attribute of MST region, and it's used to describe the mapping relation between VLAN and MSTI. MSTP achieves load balancing based on the VLAN mapping table.

5.3.3 Port Configuration

Function Description

Enable port to participate in spanning-tree and configure port type, link type and BPDU protection function.

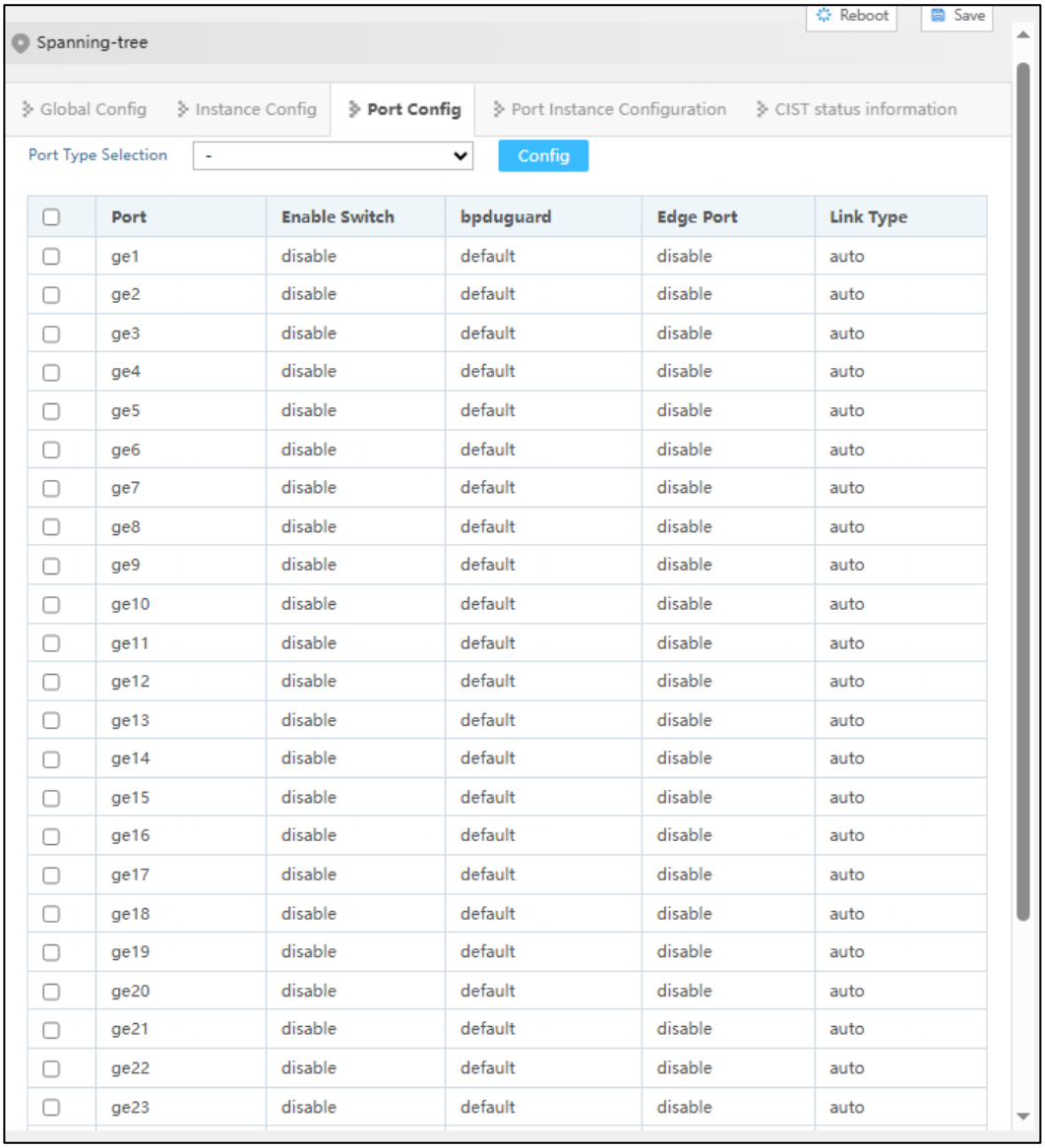
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Operation Path

Open in order: "Layer-2 > Spanning-tree > Port Config".

Interface Description

Check port configuration interface as below:



The main element configuration description of port configuration interface:

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
Enable Switch	The enable status of ports participating in spanning tree can be shown as follows: • Enable • Disable
BPDU Guard	BPDU (Bridge Protocol Data Unit) protection function. After

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Interface Element	Description
	starting the BPDU protection, if the edge port receives the BPDU message that should not exist, the edge port will be closed, and it can return to normal after a certain time. Edge Port BPDU Guard State: • Default: global configuration protection status • Enable • Disable
Edge Port	The port that directly connects to terminal instead of other switches. The edge port does not participate in the spanning tree operation, and can be directly transferred to the Forwarding state by Disable. Enable state of edge port: • Enable • Disable
Link Type	Fast entry of the port into the forwarding state requires that the port must be a point-to-point link, not a shared media link. Port link type: • Auto: if the port is full duplex, it is judged as a point-to-point link; If it is half-duplex, it is judged as a non-point-to-point link. • Point-to-point: point-to-point link. • Shared: Non-point-to-point link.

5.3.4 Port Instance Configuration

Function Description

Configure port priority and cost

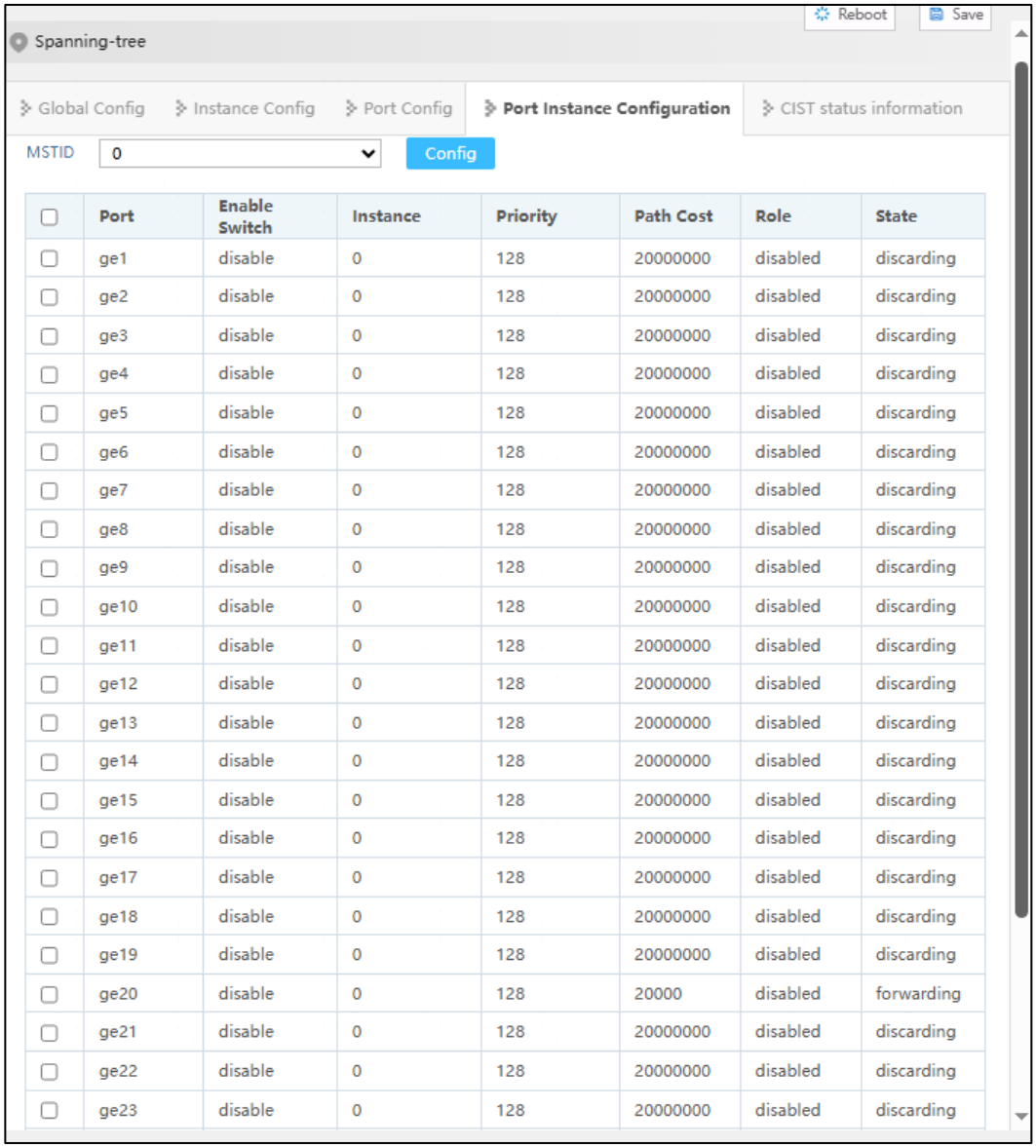
Operation Path

Open in order: "Layer-2 > Spanning-tree > Port Instance Configuration".

Interface Description

Check port instance configuration interface as below:

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Port	Enable Switch	Instance	Priority	Path Cost	Role	State
ge1	disable	0	128	20000000	disabled	discarding
ge2	disable	0	128	20000000	disabled	discarding
ge3	disable	0	128	20000000	disabled	discarding
ge4	disable	0	128	20000000	disabled	discarding
ge5	disable	0	128	20000000	disabled	discarding
ge6	disable	0	128	20000000	disabled	discarding
ge7	disable	0	128	20000000	disabled	discarding
ge8	disable	0	128	20000000	disabled	discarding
ge9	disable	0	128	20000000	disabled	discarding
ge10	disable	0	128	20000000	disabled	discarding
ge11	disable	0	128	20000000	disabled	discarding
ge12	disable	0	128	20000000	disabled	discarding
ge13	disable	0	128	20000000	disabled	discarding
ge14	disable	0	128	20000000	disabled	discarding
ge15	disable	0	128	20000000	disabled	discarding
ge16	disable	0	128	20000000	disabled	discarding
ge17	disable	0	128	20000000	disabled	discarding
ge18	disable	0	128	20000000	disabled	discarding
ge19	disable	0	128	20000000	disabled	discarding
ge20	disable	0	128	20000	disabled	forwarding
ge21	disable	0	128	20000000	disabled	discarding
ge22	disable	0	128	20000000	disabled	discarding
ge23	disable	0	128	20000000	disabled	discarding

The main element configuration description of port instance configuration interface:

Interface Element	Description
MSTID	Choose multiple Spanning-tree ID number.
Port	The corresponding port name of the device Ethernet port.
Enable Switch	Port enable status: • Enable: participate in spanning-tree; • Disable: not participate in spanning-tree.
Instance	Instance ID number port belongs to.
Priority	Port priority, the value range is 0-240, the step size is 16, the default value is 128, and the priority based on 0-15 times the value of 16 can be selected. Note: Port priority level in bridge, port priority level is higher when the value is smaller. The higher the priority of the port, the more likely

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Interface Element	Description
	it is to be a root port.
Path Cost	The path cost from network bridge to root bridge, defaults to 20000000. Value range: 1-200000000. Note: When the configuration cost is the default value, the actual cost of link up port is converted according to the port rate, the rate of 10M corresponds to the cost of 2000000, and 100M corresponds to the cost of 200000.
Role	Role • unkn: Unknown; • root: Root port; • desg: Designated port; • altn: Alternate port; • back: Backup port; • disa: Disable port.
State	Port status in spanning-tree: • Disable: Port close status; • Blocking: Blocked state; • Listening: Monitoring state. • Discarding: Discarding status • Learning: Learning state; • Forwarding: Forwarding state.

5.3.5 CIST Status Information

Function Description

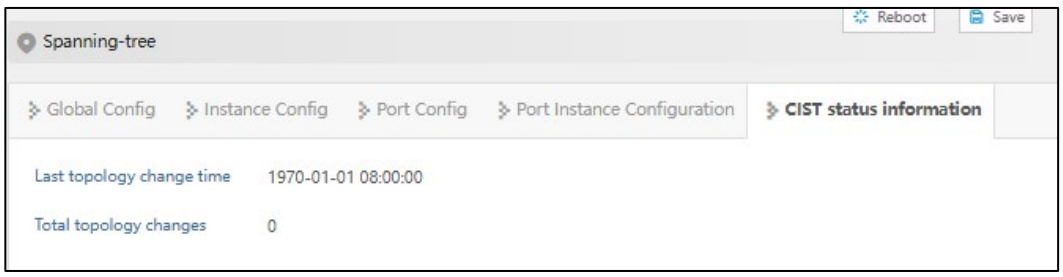
Configure port priority and cost

Operation Path

Open in order: "Layer-2 > Spanning-tree > CIST status information".

Interface Description

Check CIST status information interface as below:



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The main element configuration description of CIST status information interface:

Interface Element	Description
Last topology change time	The time of the last topology change.
Total topology changes	This entry records the total number of topology changes.

5.4 Ring

Ring is a private ring network algorithm developed and designed for highly reliable industrial control network applications that require link redundancy backup. Its design concept is completely in accordance with international standards (STP and RSTP) implementation, and do the necessary for industrial control application optimization, with Ethernet link redundancy, fault fast automatic recovery ability.

Ring adopts the design of no master station. The devices running the Ring protocol discover the loop in the network by exchanging information with each other, and block a certain port. Finally, the ring network structure is trimmed into a tree network structure without loop, thus preventing messages from circulating continuously in the ring network, and avoiding the reduction of processing capacity caused by repeated reception of the same message. In a multi-Ring network composed of 250 switches, when the network is interrupted or fails, the ring can ensure that the user network automatically resumes link communication within 20 ms.

Ring needs to manually divide the ring network ports in advance, support multiple ring network types such as single ring, coupled ring, chain and Dual Homing, and provide visual management of network topology. In a single Ring, Ring supports master/slave and no master configuration to meet various network environment requirements.

5.4.1 Global Configuration

Function Description

Configure Ring private protocol ring network.

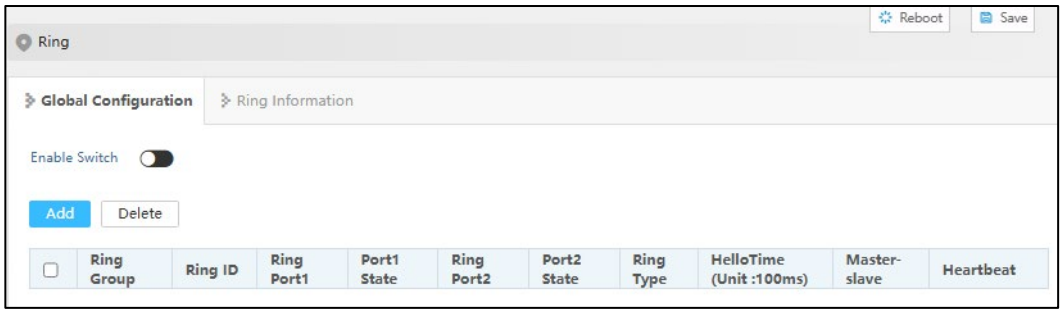
Operation Path

Open in order: "Layer-2 > Ring > Global Configuration".

Interface Description

Global configuration interface is as follows:

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The main element configuration description of global configuration interface:

Interface Element	Description
Enable Switch	Enable switch, which can enable the Ring network function after being enabled.
Ring group	Support ring group 1-12, it can create multiple ring networks at the same time.
Ring ID	When multiple switches form a ring, the current ring ID would be network ID. Different ring network has different ID. Value range is 0-255. Note: The ring network identification must remain the same in one ring network.
Ring Port 1	The network port 1 on the switch device used to form the ring network. Note: When the ring network type is "Couple", ring port 1 is the "Coupled Port". Coupling port is the port that connects different network identities.
Port1 State	Conduction state of ring network port 1.
Ring Port 2	The network port 2 on the switch device used to form the ring network. Note: When the ring network type is “Couple”, ring port 2 is the “console port”. Console port is the port in the chain where two rings intersect.
Port2 State	Conduction state of port 2 of ring network.
Ring Type	According to the requirement in the scene, user can choose different ring type. • Single: single ring, using a continuous ring to connect all device together. • Couple: couple ring is a redundant structure used for connecting two independent networks. • Chain: chain can enhance user’s flexibility in constructing all types of redundant network topology via an advanced

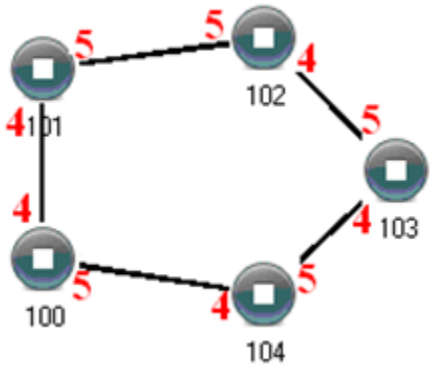
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Interface Element	Description
	software technology. • Dual: Two adjacent rings share a switch; users can carry the same switch on two different networks or two different switching devices on the same network.
Hello Time (Unit: 100ms)	Hello_time is the sending time interval of Hello packet; via the ring port, CPU sends query packet to adjacent device for confirming the connection is normal or not. Value range is 0-300.
Master-slave	Single ring supports no master station and one master and multiple slave modes (optional): • slave: When all the single-loop devices are slave stations, the single-loop structure is no-master station. • master: When the device is set as master device and one end of it is backup link, it can enable backup link to ensure the normal operation of the network when failure occurs in ring network.
Heartbeat	Heartbeat detection mechanism. When this configuration is enabled, the network association will periodically send heartbeat messages to detect whether the corresponding devices are in live state, thus enhancing the reliability of the network.

Single Ring Configuration

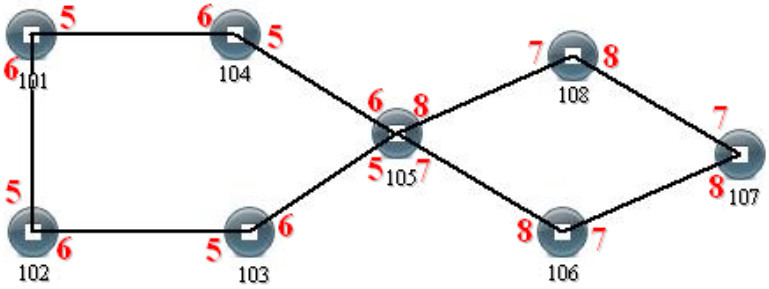
Enable Single, enable ring group 1 (other ring group is OK), Set the device port 4 and port 5 to ring port, and set other switches to the same configuration as the switch above, enable these devices, and adopt network cable to connect port 4 and port 5 of the switch, then search it via network management software, the ring topology structure picture as below:

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Double Ring Configuration

Double ring as shown below, in the figure, double ring is the tangency between two rings, and the point of tangency is NO. 105 switch.



Configuration Method:

Step 1 Adopt single ring configuration method to configure port 5 and port 6 of NO. 101, 102, 103, 104, 105 switches as the ring port, and the ring group is 1;

Step 2 Adopt single ring configuration method to configure port 7 and port 8 of NO. 105, 106, 107 and 108 switches as the ring ports and the ring group 2;

Step 3 Adopt network cable to connect the ring group 1;

Step 4 Adopt network cable to connect the ring group 2;

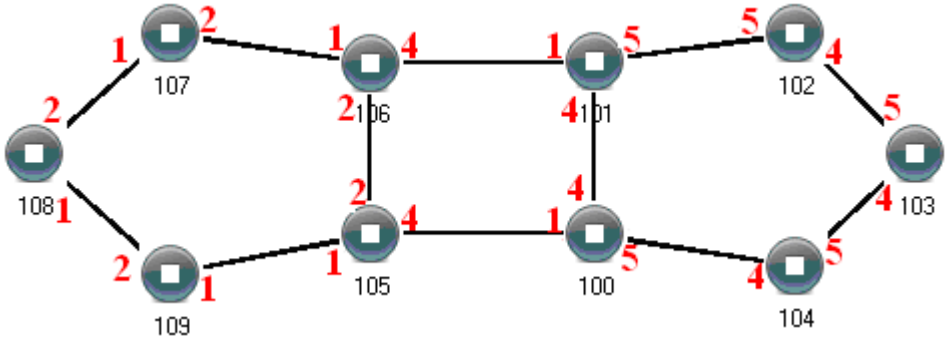
Step 5 Search the topology structure picture via network management software;

Since NO. 105 devices belong to two ring groups, the network IDs of the two ring groups cannot be the same.

Coupling Ring Configuration

Coupling ring basic framework is as the picture below:

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Operation method:

Step 1 Enable ring network group 1 and 2: (Hello_time could be disabled, but the time could not be set to make Hello packet send too fast, otherwise it would effect CPU processing speed seriously).

Step 2 Set the ring port of NO. 105, 106 device ring group to port 1 and port 2, network identification to 1, ring type to Single; Set the coupling port of ring group 2 to port 4, console port to 2, ring identification to 3, ring type to Coupling.

Step 3 Set the ring port of NO. 100, 101 device ring group 1 to port 4 and port 5, network identification to 2, ring type to Single; Set the coupling port of ring group 2 to port 1, console port to port 4, ring identification to 3, ring type to Coupling.

Step 4 Set the ring port of NO. 107, 108 and 109 device ring group 1 to port 1 and port 2, network identification to 1, ring type to Single; Set the ring port of NO. 102, 103 and 104 device ring group 1 to port 4 and port 5, network identification to 2, ring type to Single.

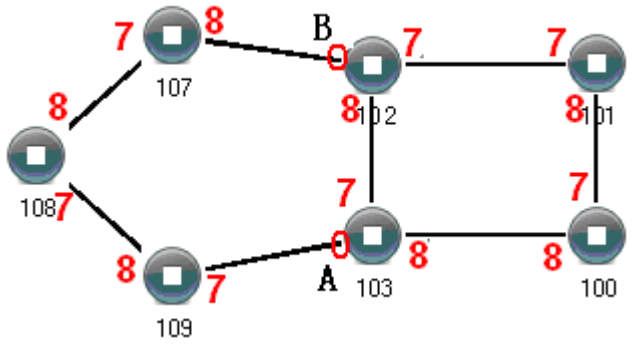
Step 5 Connect the port 4 and port 5 of five devices NO. 100-104 to the single ring in turn, adopt network cable to connect the port 1 and port 2 of four devices NO. 105109 to the single ring in turn, then adopt Ethernet cable to connect port 4 of NO. 106 device to port 1 of NO. 101 device, port 4 of NO. 105 device to port 1 of NO. 100 device, coupling ring combination is completed.

Console ports are two ports connected to NO. 105 device and NO. 106 device in the above picture. The two ports connected to NO. 100 device and NO. 101 device are also called console ports.

Chain Configuration

Chain basic framework as the picture below:

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Operation method:

Step 1 Enable ring group1: (Hello_time could be disabled, but the time shouldn't be set to send Hello packet too fast, otherwise it would affect the processing speed of CPU seriously).

Step 2 Set the ring port of NO. 100, 101, 102 and 103 device ring group 1 to port 7 and port 8, network identification to 1, ring type to Single. Set the ring port of NO. 107, 108 and 109 devices ring group 1 to port 7 and port 8, network identification to 2, ring type to Chain.

Step 3 Adopt network cable to connect the port 7 and port 8 of three devices NO. 107-109, adopt network cable to connect the port 7 and port 8 of four devices NO. 100-103 to the single ring in turn, then adopt network cable to connect port 7 of NO. 107 device and port 7 of NO. 109 device to normal ports of NO. 102 and 103 device, chain combination is complete.

Note

- Port that has been set to port aggregation can't be set to rapid ring port, and one port can't belong to multiple rings;
- Network identification in the same single ring must be consistent, otherwise it cannot form a normal ring or normal communicate;
- Network identification in different ring must be different;
- When forming double ring and other complex ring, user should notice whether the network identification in the same single ring is consistent, and network identification in different single ring is different.

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5.4.2 Ring Information

Function Description

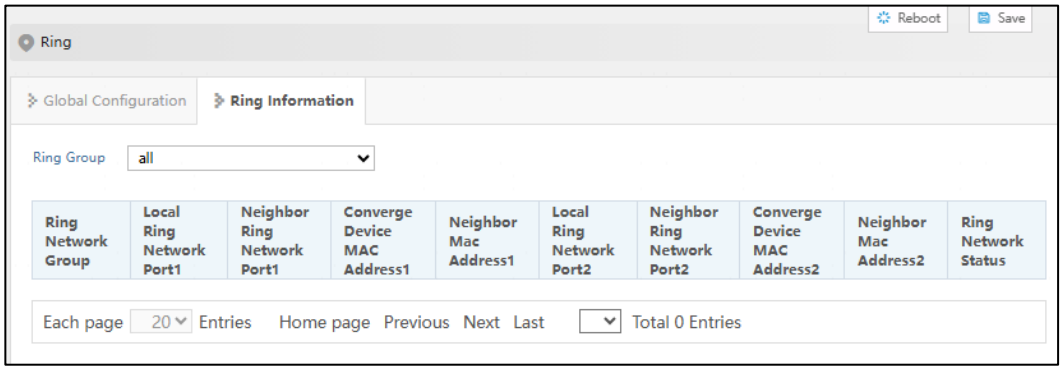
This function is provided by the system, and you can view it through the "Ring Information" page.

Operation Path

Open in order: "Layer-2 > Ring > Ring Information".

Interface Description

Ring Information interface is as follows:



The main element configuration description of Ring information interface:

Interface Element	Description
Ring Network Group	Support the display of ring network groups 1-12.
Local Ring Network Port 1	The network port 1 on the switch device used to form the ring network. Note: When the ring network type is "Couple", ring port 1 is the "Coupled Port". Coupling port is the port that connects different network identities.
Neighbor Ring Network Port 1	The port number of the neighbor ring network port 1, for example: 3.
Convergence Device MAC Address 1	The MAC address 1 of the convergence device is the MAC address 1 of the ring network device, for example, 00:22:6f:01:d0:a2.
Neighbor MAC Address 1	The MAC address 1 of the neighbor device of the ring network group, for example: 00:22:6f:01:cc:a2.
Local Ring Network Port 2	The network port 2 on the switch device used to form the ring network. Note: When the ring network type is “Couple”, ring port 2 is the

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Interface Element	Description
	"console port". Console port is the port in the chain where two rings intersect.
Neighbor Ring Network Port 2	The port number of the neighbor ring network port 2, for example: 5.
Convergence Device MAC Address 2	The MAC address 2 of the convergence device is the MAC address 2 of the ring network device, for example, 00:22:6f:01:d0:a2.
Neighbor MAC Address 2	The MAC address 2 of the neighbor device of the ring network group, for example: 00:22:6f:01:cc:a2.
Ring Network Status	Ring network status display: ● stable: indicates that the current ring network group is in a stable state; ● open: indicates that the current ring network group is in an open state.

5.5 MRP

MRP (Media Redundancy Protocol), in MRP ring network, one device is regarded as redundancy manager, and the others are redundancy client. MRP supports up to 50 devices, and when the loop network is interrupted, the loop reconfiguration time is less than 200ms.

Function Description

Configure MRP ring network.

Operation Path

Open in order: "Layer-2 > MRP".

Interface Description

MRP interface is as below:



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The main element configuration descriptions of MRP interface:

Interface Element	Description
Enable Switch	Enable switch, which can enable the MRP ring network function after being enabled.
Group ID	The ID of ring network, its value range is 1-4.
Port1	Ring network port 1, the ports that make up the ring network and the forwarding state of port data.
Port2	Ring network port 2, the ports that make up the ring network and the forwarding state of port data.
Role	The redundant role of device in the ring network can be selected as follows: • manager: media redundancy manager • client: media redundancy client
Interval (ms)	When the MRP ring network is disconnected, the ring network reconfigures the convergence time. The options are as follows: • 200ms • 500ms
VLAN	VLAN ID used by MRP management message, its value range is 1-4094.
Ring State	Status of MRP ring network, Open or Close.
Domain ID	MRP ring network group domain ID, the format is x.x.x.x.x.x.x.x.x.x.x.x.x.x.x.x.

5.6 GMRP

GMRP stands for GARP Multicast Registration Protocol, which is a specific application of GARP (Generic Attribute Registration Protocol).

5.6.1 Global Configuration

Function Description

GMRP optimizes layer 2 multicast management through dynamic protocol mechanisms, making it particularly suitable for industrial network scenarios that require high real-time and flexibility. The core functions reflect the extended application of the GARP protocol in the multicast field. GMRP is a pure Layer 2

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multicast management protocol and is suitable for non-IP multicast. GMRP automatically updates multicast paths through dynamic protocols, avoiding the complexity and scalability limitations of static configuration.

Operation Path

Open in order: "Layer-2 > GMRP > Global Config".

Interface Description

Global configuration interface is as follows:



The main element configuration description of global configuration interface:

Interface Element	Description
Enable Switch	GMRP Enable Switch - When activated, GMRP can be used to dynamically manage multicast membership protocols at the Layer 2 (Data Link Layer) network, allowing switching devices (e.g., switches) to automatically maintain multicast MAC address table entries.

5.6.2 Port Configuration

Function Description

Configure GMRP port

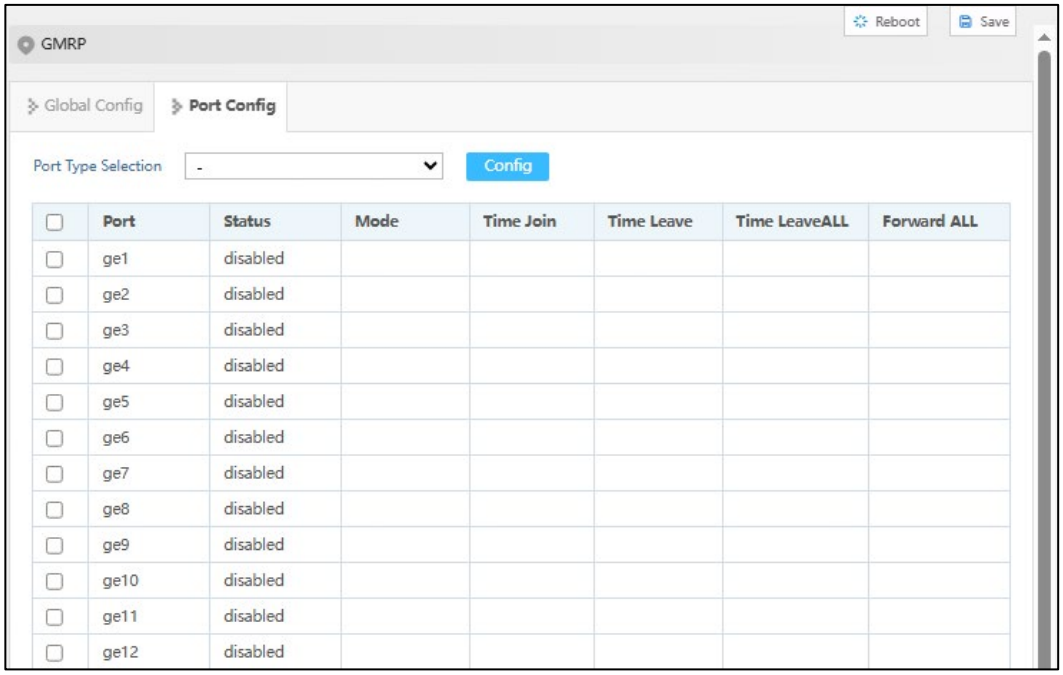
Operation Path

Open in order: "Layer-2 > GMRP > Port Config".

Interface Description

Check port configuration interface as below:

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The main element configuration description of port configuration interface:

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
Status	Port GMRP enable status: • enabled • disabled: port is not enabled.
Mode	GMRP provides three registration modes to control the dynamic registration and deregistration of multicast MAC addresses: • Normal mode (default): Allows dynamic registration and deregistration of multicast addresses. Applicable to scenarios with frequent network topology changes. • Fixed Mode: Prohibit deregistration of registered multicast addresses (even upon receiving Leave messages) and reject new registration requests. Suitable for stable networks requiring fixed multicast paths. • Forbidden mode: Prohibit the registration of new multicast addresses and clear all registered dynamic table entries (except for proxy-registered ones). Commonly used for port isolation or high-security requirement scenarios.
Time Join	Join Timer: Control the retransmission interval of Join messages (registration requests). If no JoinIn acknowledgment is received from the peer before the Join

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Interface Element	Description
	Timer expires, the Join message is retransmitted. Default value: 20 centiseconds. Valid Range: 1~4,294,967,295(cs). The Join Timer value must be less than one-third of the Leave Timer value.
Time Leave	Leave Timer: Activated upon receiving a Leave message. If no new Join message is received before timeout, the multicast address will be deregistered. Prevent accidental deletion of multicast paths due to transient network fluctuations. Default value: 60 centiseconds. Valid Range: 1~4,294,967,295(cs). The Leave Timer value must be less than the LeaveAll Timer value.
Time Leave ALL	LeaveAll Timer: Periodically sends LeaveAll messages to trigger network-wide multicast attribute re-registration, ensuring network state consistency. All devices synchronously purge expired entries based on the minimum timer value. Default value: 100 centiseconds. Valid Range: 1~2147483647(cs). The LeaveAll Timer value must be greater than the Leave Timer value.
Forward ALL	Forward ALL defaults to disable. If the GMRP multicast filtering mechanism is not enabled, the switch will broadcast multicast traffic to all ports, causing network congestion. When GMRP is enabled, the switch forwards multicast traffic only to registered ports, replacing the default "Forward All" behavior to optimize bandwidth utilization.

5.7 ERPS

Ethernet Ring Protection Switching (ERPS) is the Ethernet Ring Network Link Layer Technology with high reliability and stability. ERPS is a protocol defined by the International Telecommunication Union Telecommunication Standardization Sector (ITU-T) to eliminate loops at layer 2. Because the standard number is ITU-T G.8032/Y1344, ERPS is also called G.8032. ERPS defines Ring Auto Protection Switching (RAPS) Protocol Message and protection switching mechanisms. It can

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prevent the broadcast storm caused by data loop when the Ethernet ring is intact. When the Ethernet ring link failure occurs, it has high convergence speed that can rapidly recover the communication path between each node in the ring network.

5.7.1 Timer Configuration

Function Description

Configure the parameters of ERPS ring network timer After the failure of the node device or link in the ERPS ring is restored, in order to prevent the flap, the timer to the ERPS ring will be enabled to help reduce the interruption time of traffic flow.

In ERPS protocol, timers used mainly include WTR (Wait to Restore) Timer, Guard and Hold Timer.

- WTR timer

  If an RPL owner port is unblocked due to a link or node fault, the involved port may not go Up immediately after the link or node recovers. Blocking the RPL owner port may cause network flapping. To prevent this problem, the node where the RPL owner port resides starts the wait to restore (WTR) timer after receiving an RAPS (NR) message. The WTR Timer will be turned off if SF (Signal Fail) RAPS messages are received from other ports before the timer expires. If the node does not receive any RAPS (SF) message before the timer expires, it blocks the RPL owner port when the timer expires and sends NR-RB (RPL Block, RPL) RAPS message. After receiving this RAPS (NR, RB) message, the nodes set their recovered ports on the ring to the Forwarding state.

- Guard timer

  Device involved in link failure or node failure sends NR (No Request) RAPS message to other device after failure recovery or clearing operation, and starts Guard Timer at the same time, and does not process NR RAPS message before the timer expires, in order to prevent receiving expired NR RAPS message. Before the Guard timer expires, the device does not process any RAPS (NR) messages to avoid receiving out-of-date RAPS (NR) messages. After the Guard timer expires, if the device still receives an RAPS (NR) message, the local port enters the Forwarding state.

- Hold Timer

  On Layer 2 networks running ERPS, there may be different requirements for protection switching. For example, on a network where multi-layer services are provided, after a server fails, users may require a period to rectify the server fault so that clients do not detect the fault. Users can set the Hold timer. If the fault

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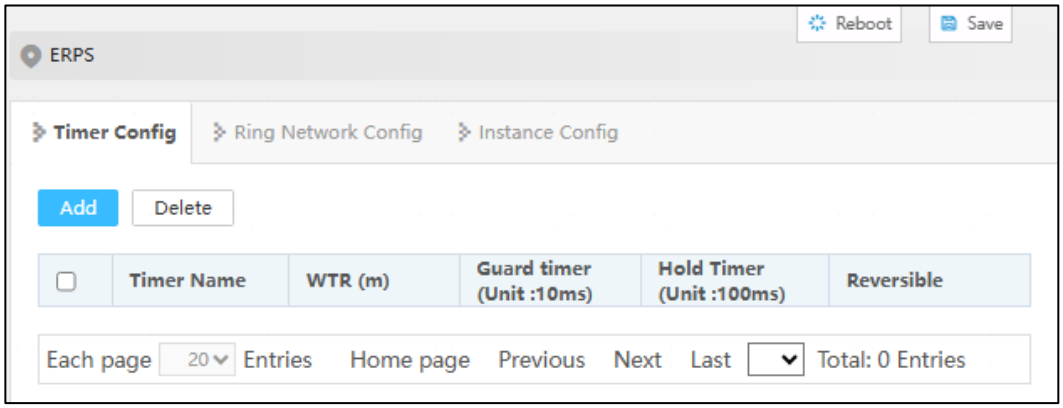
occurs, the fault is not immediately sent to ERPS until the Hold Timer expires and the fault is still not recovered.

Operation Path

Open in order: "Layer-2 > ERPS > Timer Config".

Interface Description

Timer configuration interface is as follows:



Main elements configuration description of timer configuration interface:

Interface Element	Description
Timer Name	The name of ERPS timer, which supports 1-32 characters and consists of uppercase letters, lowercase letters, numbers or special characters (! @ _-).
WTR (m)	WTR timer, value range is 1-12, unit: minute.
Guard Timer (unit: 10ms)	Guard timer, its value range is 1-200, unit 10ms.
Hold Timer (unit: 100ms)	Hold timer, its value range is 0-100, unit 100ms.
Reversible	ERPS reversible mode status, options as follows: • enable If the failed link recovers, the RPL owner port will be blocked again after waiting for WTR time. Blocked links are switched back to RPL. • disable If the failed link recovers, the WTR timer is not started, and the original faulty link is still blocked and will be switched to RPL.

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5.7.2 Ring Network Configuration

Function Description

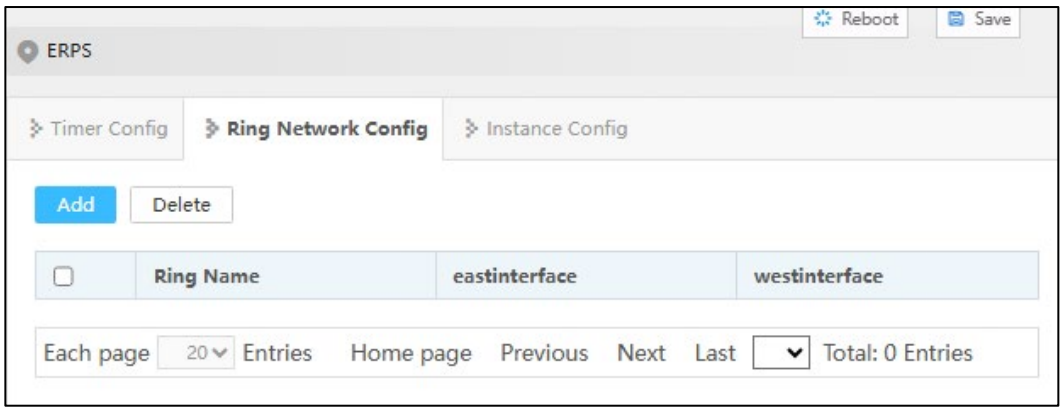
Configure ERPS ring port.

Operation Path

Open in order: "Layer-2 > ERPS > Ring Network Config".

Interface Description

Ring network configuration interface is as follows:



The main element configuration description of ring configuration interface:

Interface Element	Description
Ring Name	The name of ERPS ring network, which supports 1-32 characters, consists of uppercase letters, lowercase letters, numbers or special characters (! @ _-).
East Interface	ERPS ring port. Note: When the device is an intersecting node, only EastInterface can be configured for some ports of the sub-ring.
West Interface	ERPS ring port. Notice: • ERPS ring ports can be normal physical ports or static aggregation groups. • ERPS ring port cannot be opened at the same time with other layer 2 ring network protocols, when ERPS guard instance is not 0, it can be opened at the same time with MSTP. • ERPS ring ports can't be the same ports. • ERPS ring ports must be trunk ports and allow the ring instance VLAN to pass.

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5.7.3 Instance Configuration

Function Description

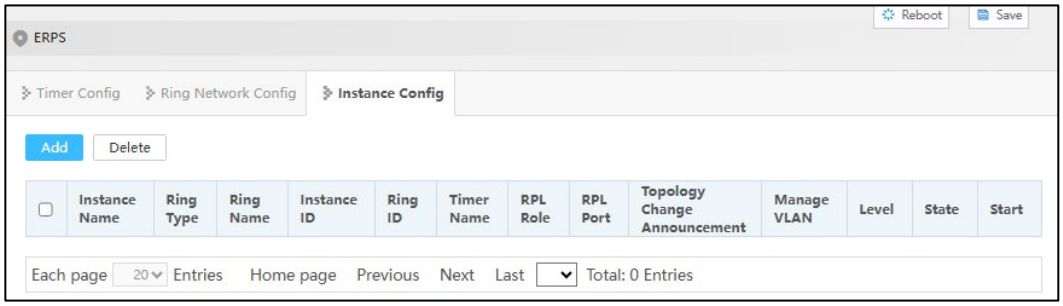
Configure ERPS ring network instance.

Operation Path

Open in order: "Layer-2 >ERPS > Instance Config".

Interface Description

Instance configuration interface is as follows:



The main element configuration description of instance configuration interface:

Interface Element	Description
Instance Name	The name of the ERPS instance, which supports 1-32 characters, consists of uppercase letters, lowercase letters, numbers or special characters (! @ _-).
Ring Type	ERPS instance ring network type, the options are as follows: • Major-ring: main ring, closed ring. • Sub-ring: a sub-ring, an unclosed ring, forms a multi-ring network such as an intersecting ring with the main ring.
Ring Name	ERPS Ring Name. Note: The ring name should be created in advance in ERPS "Ring Network Configuration", and the ring network port should be specified.
Instance ID	The ID of ERPS protection instance, its value range is 0-16. The VLAN in which RAPS PDUs and data packets are transmitted must be mapped to an Ethernet Ring Protection (ERP) instance so that ERPS forwards or blocks the packets based on configured rules. Note: • By default, all VLAN in MST domain are mapped to instance 0. • The mapping with VLAN instance can be created in spanning

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Interface Element	Description
	tree instance configuration.
Ring ID	The ID of ERPS ring network, its value range is 1-239. The ring ID is used to uniquely identify an ERPS ring, and all nodes on the same ERPS ring should be configured with the same ring ID. Note: ERPS ring ID will be the last byte of the MAC destination of the RAPS message.
Timer Name	The name of the timer, which supports the default parameter timer or customization in the timer configuration.
RPL Role	Each device in ERPS ring is called a node. The node role is decided by user configuration, they are divided into following types: • owner: owner node is responsible for blocking and unblocking the port in RPL of the node to prevent loop forming and conduct link switching. • neighbor: neighbor node is connected to Owner node on RPL. Cooperating to the Owner node, it blocks and unblocks the ports on RPL of the node and conduct link switching. • non-owner: non-owner node is responsible for receiving and forwarding the protocol packet and data packet in the link.
RPL Port	Port connected by RPL link, the options are as follows: • West-interface • East-interface
Topology Change Announcement	Notify the network topology change of this ERPS ring to other ERPS rings, and the enabling status is as follows: • Enable • Disable
Manage VLAN	The VLAN channel of protocol packet, its value range is 1-4094.
Level	ERPS ring network level, the value range is 0-7. The higher the ring network level, the greater the value. When the R-APS message needs to be transmitted across the ring, it can only be crossed by the ring with high rank to low rank.
State	The instance statuses of ERPS are as follows: • ERPS_INIT: initial state, which is the initialized state

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Interface Element	Description
	when the protocol starts. • ERPS__IDLE: idle state, it would enter this state when the ring topology is complete; • ERPS_FS: force-switch state, it would enter this state when force-switch command is implemented. • ERPS_MS: manual-switch state, it would enter this state when manual-switch command is implemented. • ERPS_PROTECTION: protection state, it would enter this state when the ring link has failure. • ERPS_PENDING: pending state, it would enter this state when the ring link has recovered from failure.
Start	ERPS instance startup status: • start • stop

5.8 IGMP Snooping

IGMP Snooping (Internet Group Management Protocol Snooping) is an IPv4 layer 2 multicast Protocol. It maintains the egress interface information of Group broadcast by snooping for the multicast protocol messages sent between the layer 3 multicast device and the user host, to manage and control the forwarding of multicast data message in the data link layer.

5.8.1 Global Configuration

Function Description

Enable/disable IGMP-Snooping and resident multicast.

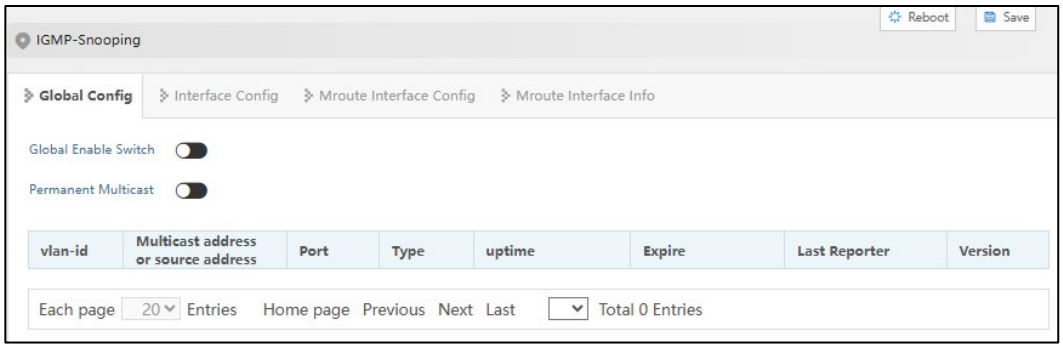
Operation Path

Open in order: "Layer-2 > IGMP-Snooping > Global Config".

Interface Description

Global configuration interface is as follows:

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The main element configuration description of global configuration interface:

Interface Element	Description
Global Enable Switch	Global enable configuration of IGMP-Snooping. By enabling IGMP Snooping, layer 2 devices can dynamically establish layer 2 multicast forwarding entries by listening to the IGMP protocol messages between the IGMP querier and the user host, thus realizing layer 2 multicast.
Permanent Multicast	Do not age the received IGMP report member groups.
Vlan-ID	VALN ID of the port that receives multicast messages.
Multicast address or source address	Based on the network environment, the multicast address and source address information can be displayed.
Port	Port number that receives multicast messages.
Type	The method of adding multicast member ports to multicast groups. Possible display options are: • Remote: Dynamic grouping, joining multicast groups by sending messages through the terminal devices connected to the interface. • Static: Static grouping, joining multicast groups by configuring ports through commands. • Remote (static): Dynamic (static), joining multicast groups through static or dynamic means.
uptime	Time that receives multicast messages.
Expire	Time when the multicast message expires. Possible display options are: • Static: Static address, multicast does not automatically expire and needs to be manually deleted or reconfigured. • Permanent: Permanent multicast, even if the multicast group members change, the multicast route will not be

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Interface Element	Description
	automatically deleted. • Include: When a network device receives multicast data, it checks whether the data belongs to the multicast group in the include list. If so, allow these data to pass through; If not, discard these data. • Exclude: When a network device receives multicast data, it checks whether the data belongs to the multicast group in the exclude list. If so, discard these data; If not, allow these data to pass through.
Last Reporter	The IP address of the multicast member who sends the last report message to join the multicast group.
Version	Version of IGMP Snooping.

5.8.2 Interface Configuration

Function Description

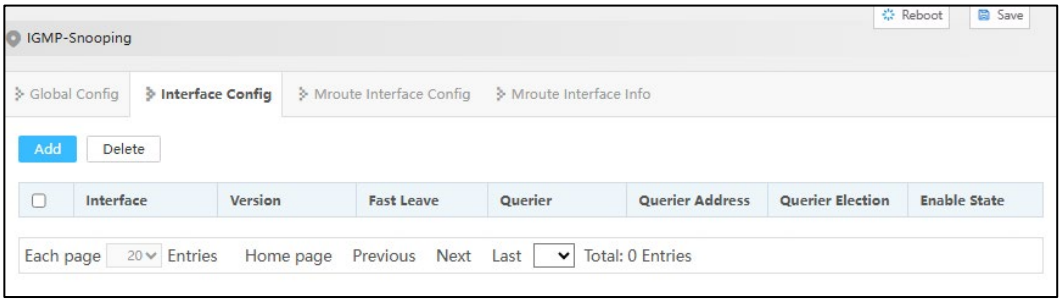
Configure parameters related to IGMP Snooping of VLANIF interface.

Operation Path

Open in order: "Layer-2 > IGMP-Snooping > Interface Config".

Interface Description

Interface configuration interface is as follows:



The main element configuration description of interface configuration interface:

Interface Element	Description
Interface	VLANIF interface, the value range is 1-4094.
Version	Different versions of IGMP Snooping can handle corresponding versions of IGMP protocol. IGMP Snooping

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Interface Element	Description
	protocol version, with the following options: • 1 • 2 • 3
Fast Leave	The enable state of the multicast group fast leave. After enabling fast leave, when the switch receives the IGMP Leave message sent by the host from a certain port and leaves a certain multicast group, it directly deletes the port from the multicast forwarding table without waiting for the port aging, which can save bandwidth and resources. Note: When there are multiple receivers under the port, this function will cause other receivers in the same multicast group to interrupt receiving multicast data. It is recommended to configure this function on a port with only one receiver connected.
Querier	Enable status of IGMP Snooping inquirer. After the IGMP Snooping querier function is enabled, the switch will regularly send IGMP Query messages to all interfaces (including router ports) in the VLAN by broadcast. If the IGMP querier already exists in the multicast network, it will cause the IGMP querier to be re-elected.
Querier Address	The source IP address of IGMP Snooping querier when sending inquiry message.
Querier Election	Enable election status of IGMP Snooping querier. IGMPv2 uses an independent inquirer election mechanism. When there are multiple multicast routers on the shared network segment, the router with the smallest IP address becomes an inquirer, while the non-inquirer no longer sends universal group inquiry messages.
Enable State	IGMP Snooping enable status, enabling IGMP snooping on global or VLAN interface. Note: Only when IGMP snooping is enabled on the global and VLAN interfaces can the configuration of the other IGMP snooping properties on that interface take effect.

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5.8.3 Mroute Interface Config

Function Description

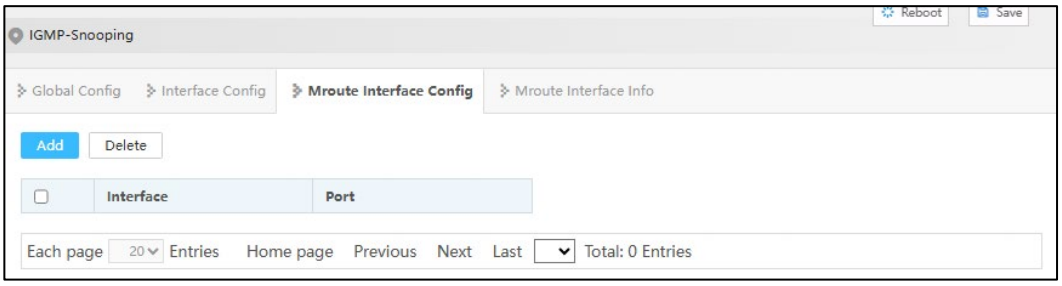
Configure multicast router ports.

Operation Path

Open in order: "Layer-2 > IGMP-Snooping > Mroute Interface Config".

Interface Description

Routing port configuration interface is as below:



Main elements configuration description of routing port configuration interface:

Interface Element	Description
Interface	VLANIF interface, the value range is 1-4094.
Port	The static router port in VLAN is generally the interface of Layer 2 device towards the upstream Layer 3 multicast device. If it is necessary to forward the IGMP Report/Leave message from an interface to the upstream IGMP querier stably for a long time, the interface can be configured as a static router port.

5.8.4 Mroute Interface Info

Function Description

Check the router port information of IGMP Snooping in VLAN, including static router port and dynamic router port.

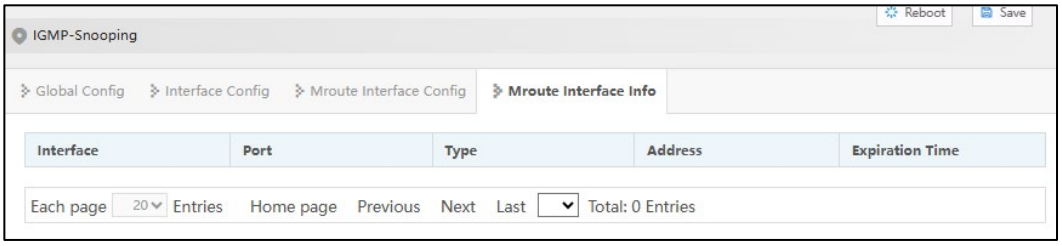
Operation Path

Open in order: "Layer-2 > IGMP Snooping > Mroute Interface Info".

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Interface Description

Mroute Interface Info interface is as follows:



Configuration description of main elements of routing port information interface:

Interface Element	Description
Interface	VLANIF interface, the value range is 1-4094.
Port	Router port in VLAN.
Type	The type of router port, including dynamic and static.
Address	IP address.
Expiration Time	The remaining aging time of dynamic router port.

5.9 IPv6 MLD-Snooping

MLD Snooping (Multicast Listener Discovery Snooping) is an IPv6 layer 2 multicast Protocol. It maintains the egress port information of Group broadcast by snooping for the multicast protocol messages sent between the layer 3 multicast device and the user host, to manage and control the forwarding of multicast data message in the data link layer.

5.9.1 Global Configuration

Function Description

Enable/disable Mld-Snooping and resident multicast.

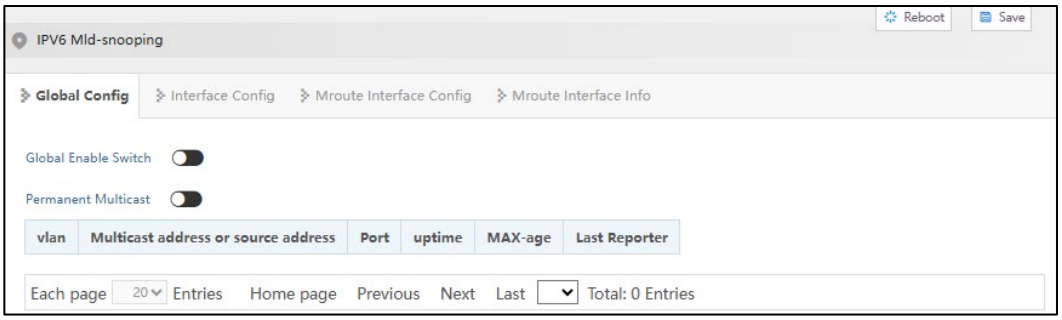
Operation Path

Open in order: "Layer-2 > IPv6 MLD-Snooping > Global Config".

Interface Description

Global configuration interface is as follows:

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The main element configuration description of global configuration interface:

Interface Element	Description
Global Enable Switch	Global enable configuration of MLD-Snooping. By enabling MLD Snooping, layer 2 devices can dynamically establish layer 2 multicast forwarding entries by listening to the MLD protocol messages between the MLD querier and the user host, thus realizing layer 2 multicast.
Permanent Multicast	Configure the multicast group as a resident multicast group without aging or leaving.
Vlan	VALN ID of the port that receives multicast messages.
Multicast address or source address	Based on the network environment, the multicast address and source address information can be displayed.
Port	Port number that receives multicast messages.
uptime	Time that receives multicast messages.
MAX-age	Time when the multicast message expires. Possible display options are: • Static: Static address, multicast does not automatically expire and needs to be manually deleted or reconfigured. • Permanent: Permanent multicast, even if the multicast group members change, the multicast route will not be automatically deleted. • Include: When a network device receives multicast data, it checks whether the data belongs to the multicast group in the include list. If so, allow these data to pass through; If not, discard these data. • Exclude: When a network device receives multicast data, it checks whether the data belongs to the multicast group in the exclude list. If so, discard these data; If not, allow these data to pass through.

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Interface Element	Description
Last Reporter	The IP address of the multicast member who sends the last report message to join the multicast group.

5.9.2 Interface Configuration

Function Description

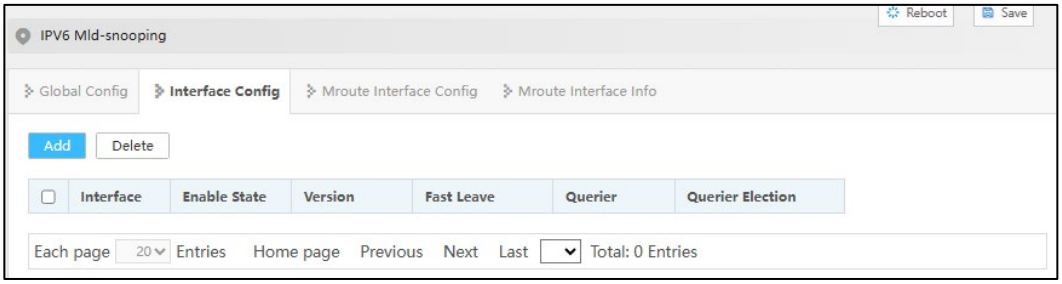
Configure parameters related to MLD Snooping of VLANIF interface.

Operation Path

Open in order: "Layer-2 > IPV6 MLD-Snooping > Interface Config".

Interface Description

Interface configuration interface is as follows:



The main element configuration description of interface configuration interface:

Interface Element	Description
Interface	VLANIF interface, the value range is 1-4094.
Enable State	MLD Snooping enable status, enabling MLD snooping on global or VLAN interface. Note: Only when MLD snooping is enabled on the global and VLAN interfaces can the configuration of the other MLD snooping properties on that interface take effect.
Version	Different versions of MLD Snooping can handle corresponding versions of MLD protocol. MLD Snooping protocol version, with the following options: • 1 • 2
Fast Leave	The enable state of the multicast group fast leave. After enabling fast leave, when the switch receives the MLD Done message sent by the host from a certain port and leaves a

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Interface Element	Description
	certain multicast group, it directly deletes the port from the multicast forwarding table without waiting for the port aging, which can save bandwidth and resources. Note: When there are multiple receivers under the port, this function will cause other receivers in the same multicast group to interrupt receiving multicast data. It is recommended to configure this function on a port with only one receiver connected.
Querier	Enable status of MLD Snooping querier. After the MLD Snooping querier function is enabled, the switch will regularly send MLD Query messages to all interfaces (including router ports) in the VLAN by broadcast. If the MLD querier already exists in the multicast network, it will cause the MLD querier to be re-elected.
Querier Election	Enable election status of MLD Snooping querier. When there are multiple multicast routers on the shared network segment, the router with the smallest IPv6 address becomes an inquirer, while the non-inquirer no longer sends universal group inquiry messages.

5.9.3 MRoute Interface Configuration

Function Description

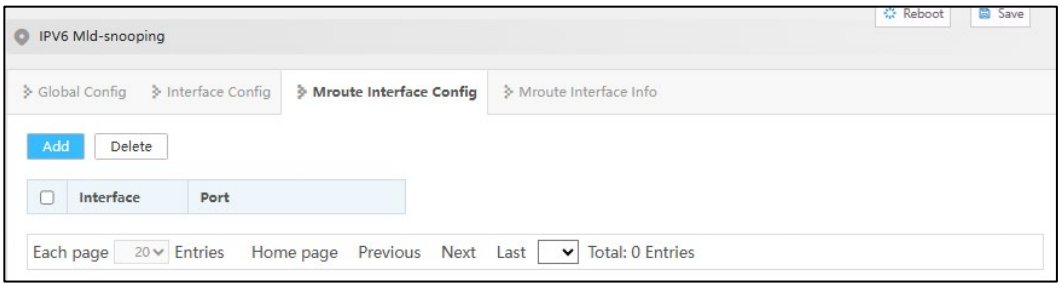
Configure multicast router ports.

Operation Path

Open in order: "Layer-2 > IPv6 Mld-Snooping> Mroute Interface Config".

Interface Description

Mroute Interface Config interface is as below:



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Main elements configuration description of routing port configuration interface:

Interface Element	Description
Interface	VLANIF interface, the value range is 1-4094.
Port	The static router port in VLAN is generally the interface of Layer 2 device towards the upstream Layer 3 multicast device. When it is necessary to receive and forward multicast data from an interface stably for a long time, the interface can be configured as a static router port.

5.9.4 Mroute Interface Info

Function Description

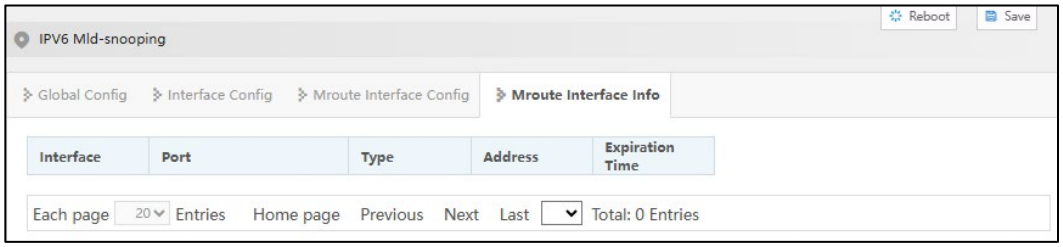
Check the router port information of MLD Snooping in VLAN, including static router port and dynamic router port.

Operation Path

Open in order: "Layer-2 > IPv6 IGMP Snooping > Mroute Interface Info".

Interface Description

Mroute Interface Info interface is as follows:



Configuration description of main elements of routing port information interface:

Interface Element	Description
Interface	VLANIF interface, the value range is 1-4094.
Port	Router port in VLAN.
Type	The type of router port, including dynamic and static.
Address	IP address.
Expiration Time	The remaining aging time of dynamic router port.

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5.10 Link Flap Protection

Network jitter or network cable failure will cause frequent Up/Down changes in the physical state of device interface, which will lead to link flapping and frequent changes in network topology, thus affecting user communication. For example, in the application of active-standby link, when the physical Up/Down state of the main link interface changes frequently, the service will switch back and forth between the active-standby link, which will not only increase the device burden, but also cause the loss of service data.

In order to solve the above problems, users can configure the link flapping protection function, and close the interface whose physical Up/Down state changes frequently to keep it remain Down, so that the network topology will stop changing frequently back and forth.

5.10.1 Global Configuration

Function Description

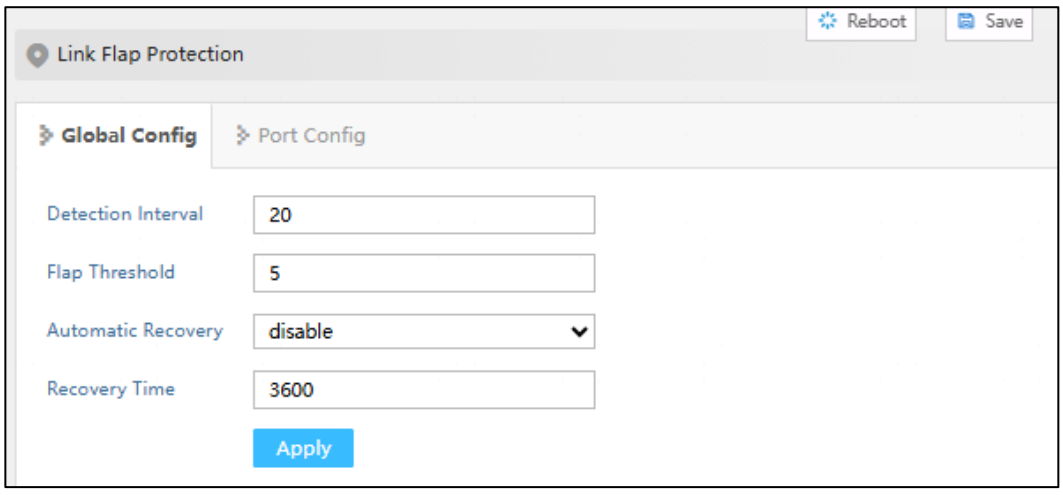
Configure relative parameters of link flapping protection.

Operation Path

Open in order: "Layer-2 > Link Flap Protection > Global Config".

Interface Description

Global configuration interface is as follows:



The main element configuration description of global configuration interface:

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Interface Element	Description
Detection Interval	The value range of link detection interval is 10-100s, and the default value is 20s.
Flap Threshold	The threshold value of the number of oscillations detected by the link. If the number of oscillations exceeds the threshold value within the time specified by the "detection interval", an alarm log will be generated and the port will be set to shutdown. The range is from 3 to 100, default value is 5.
Automatic Recovery	Automatic recovery enable configuration. After being enabled, the port will automatically return to normal within the specified time.
Recovery Time	The value range of the time when the port automatically returns to normal is 30-86400s, and the default value is 3600s.

5.10.2 Port Configuration

Function Description

Enable link oscillation protection for this port.

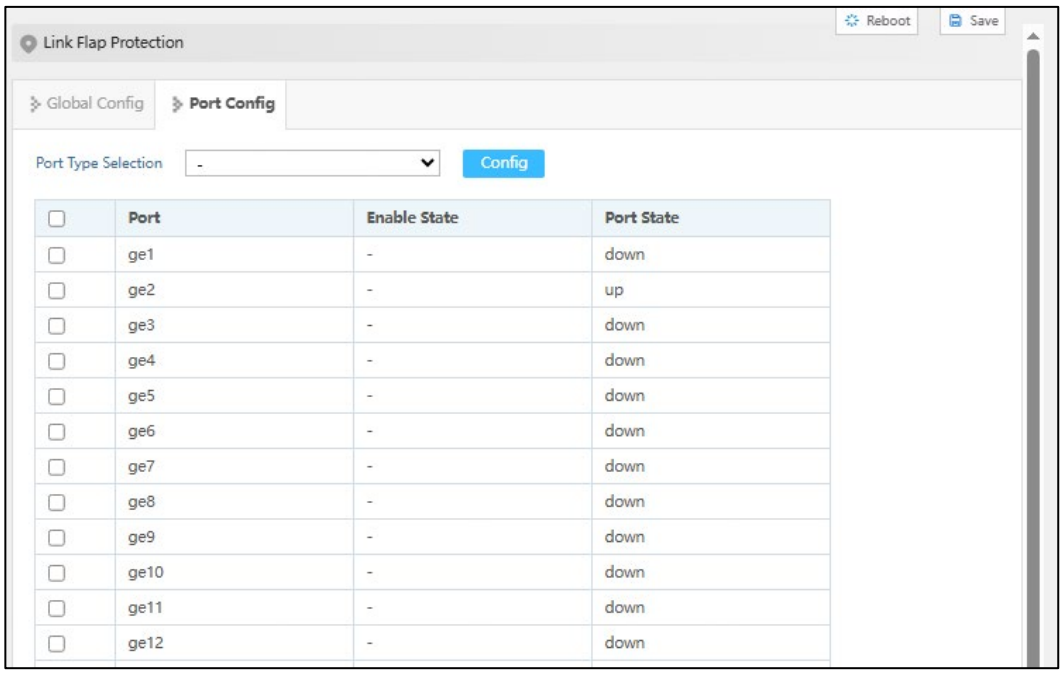
Operation Path

Open in order: "Layer-2 > Link Flap Protection > Port Config".

Interface Description

Check port configuration interface as below:

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The main element configuration description of port configuration interface:

Interface Element	Description
Port	The corresponding port number of this device's Ethernet port.
Enable State	The enable status of port link flapping protection can be shown as follows: • ON: means enabled; • -: means disable
Port State	Ethernet port connection status, display as follows: • down: the port is not connected or forced to shutdown • up: port is connected.

5.11 Port Loopback Detection

The function of loop detection is to detect whether loop exists in external network of single port of switch. If it does, it would lead to address learning errors and broadcast storm easily, even switch and network breakdown in severe case. The influence created by port loop could be effectively eradicated when enabling port protocol and closing port with loop.

Function Description

Enable port loop detection.

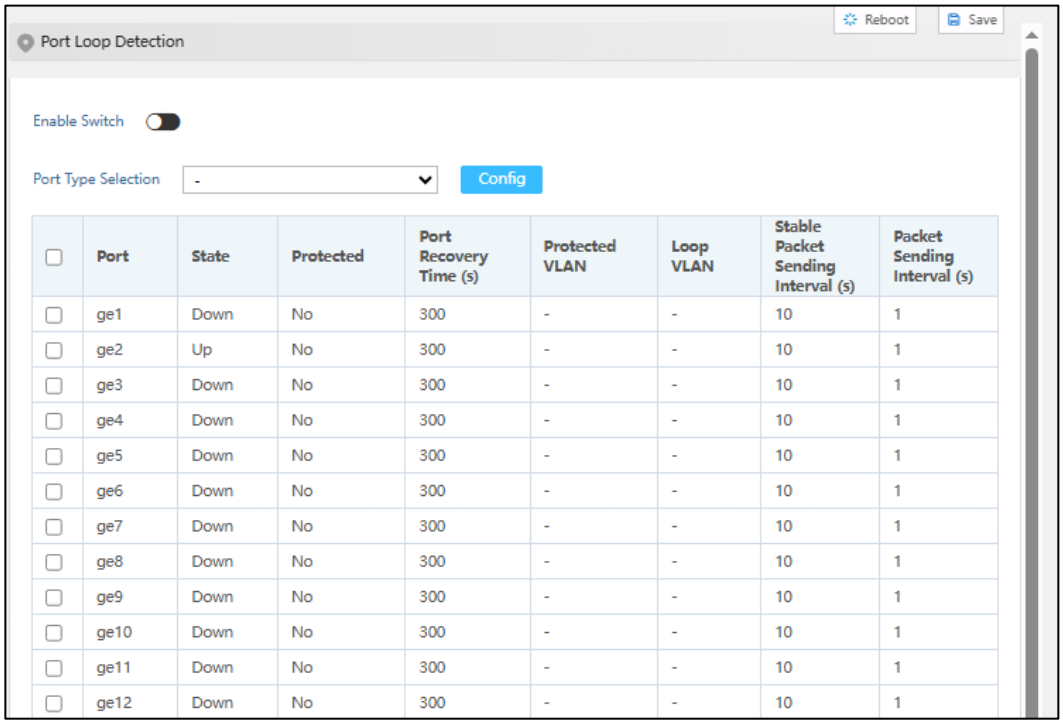
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Operation Path

Open in order: "Layer-2 > Port Loop Detection".

Interface Description

Port loop detection interface is as follows:



The main element configuration description of port loop detection interface:

Interface Element	Description
Enable Switch	Global enable configuration of port loop detection.
Port	The corresponding port number of this device's Ethernet port.
State	The connection status of this port, values are: • Down: the port is physically disconnected • Up: the port is connected • Shutdown: the port is closed • No Shutdown: the port is not closed
Protected	The protected status of the port can be shown as follows: • Yes • No
Port Recovery Time (s)	The delay time for the shutdown port to automatically return to normal after detecting the loop, ranging from 300-776000 seconds.
Protected VLAN	The VLAN ID of loop protection. The value range: 1-4094, the number of VLAN ID is ≤16.

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Interface Element	Description
	Note: This parameter must be configured, otherwise there would be errors in down sending the data.
Loop VLAN	The VLAN ID of the currently generated loop.
Stable Packet Sending Interval (s)	The normal interval time of loop detection data packet sending, value range: 10-300 seconds.
Packet Sending Interval (s)	After the port is connected, the interval between sending loop detection packets. In this interval, three detection messages will be sent out, and then the packet-sending interval will return to the normal packet-sending interval.

5.12 IPDT

Function Description

Configure IPDT (IP Detection) to detect the specified destination address (ICMP) and link it with other functions, such as VRRP.

Operation Path

Open in order: "Layer-2 > IPDT Config".

Interface Description

IPDT interface is as below:



The main element configuration descriptions of IPDT interface:

Interface Element	Description
IPDT ID	IPDT session ID, value range 1-8.
State	IPDT function enable status.
Source IP	The source IP address that sends ICMP probe packet.
Destination IP	Destination IP address of ICMP probe packet.
Echo-time	The number of request packets sent by each probe, the value range is 1-3.
Echo-interval(ms)	The time interval of each probe request, the unit is 100ms, with a value range of 1-15.

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Interface Element	Description
Opposite Device State	The status of the opposite device is shown as follows: • UP: the opposite end device is online normally. • DOWN: there is no response from the opposite end device, which may lead to device disconnection or link failure. • not be detected.
Requests	Display the number of probe packets sent.
Responses	Display the number of probe packets answered by the destination IP.
Failed Requests	Displays the number of requests that failed.
Other Responses	Displays the number of probe packets responded by other devices.

5.13 IPv6DT

Function Description

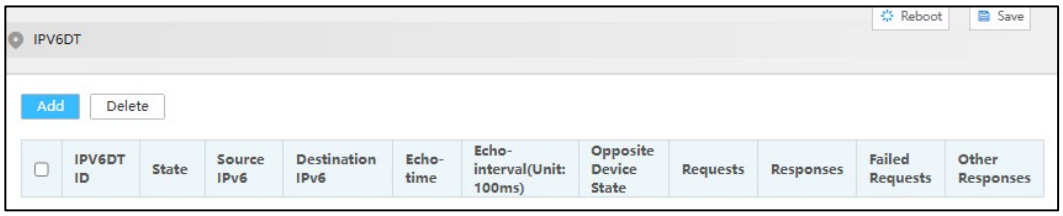
Configure IPv6DT (IPv6-Detection) to detect the specified destination IPv6address (ICMPv6) and link it with other functions, such as IPv6 VRRP.

Operation Path

Open in order: "Layer-2 > IPv6DT".

Interface Description

The IPv6DT interface is as follows:



Main elements configuration descriptions of IPv6DT interface:

Interface Element	Description
IPv6DT ID	IPv6DT session ID, value range 1-8.
State	IPv6DT function enable status.
Source IPv6	The source IPv6 address that sends ICMPv6 probe packet.
Destination IPv6	Destination IPv6 address of ICMPv6 probe packet.

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Interface Element	Description
Echo-time	The number of request packets sent by each probe, the value range is 1-3.
Echo-interval (Unit:100ms)	The time interval of each probe request, the unit is 100ms, with a value range of 1-15.
Opposite Device State	The status of the opposite device is shown as follows: • UP: the opposite end device is online normally. • DOWN: there is no response from the opposite end device, which may lead to device disconnection or link failure. • not be detected.
Requests	Display the number of probe packets sent.
Responses	Display the number of probe packets answered by the destination IPv6.
Failed Requests	Displays the number of requests that failed.
Other Responses	Displays the number of probe packets responded by other devices.

5.14 Smart-link

Smart Link, also known as backup link. A Smart Link consists of two interfaces, one of which is the backup of the other. Smart Link is commonly used in dual uplink networking, providing reliable and efficient backup and fast switching mechanism.

5.14.1 Global Configuration

Function Description

Configure Smart-link related parameters.

Operation Path

Open in order: "Layer-2 > Smart-link > Global Config".

Interface Description

Global configuration interface is as follows:

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The main element configuration description of global configuration interface:

Interface Element	Description
Group ID	Smart Link Group ID, the value range is 1-16.
Send Control VLAN	Sending control VLAN is the VLAN used by Smart Link group to broadcast Flush message, and its value range is 1-4094. When Smart Link switches links, Smart Link notifies related devices to refresh MAC table and ARP table entries by sending Flush message. Note: • If the sending control VLAN is configured, the peer device needs to configure the receiving control VLAN. • Different device manufacturers may have different definitions of Flush message format, so it is recommended to use this function between the device of the same manufacturer.
Master Port	When both interfaces in the Smart Link group are in the Up state, the master interface will enter the forwarding state first, while the slave interface will remain in the standby state. Note: Smart Link group port cannot be used as a member port of ring network, aggregation group, etc.
Slave Port/Priority	• Slave port: slave interfaces in the Smart Link group will be blocked after the Smart Link group is started. When the link where the master interface is located fails, the slave interface will switch to the forwarding state. • Priority: slave port priority level, the value range is 1-63. Smaller the priority level value is, higher the priority level is.
Load-balance	Load sharing instance ID, the value range is 0-16. In the load sharing mode, the backup link forwards the VLAN data traffic mapped in the specified load sharing instance, which can improve the utilization rate of the link.
Restore Enable	When the original main link recovers from faults, it will remain

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Interface Element	Description
	at the block state to keep the traffic stable without preemption. If you need to restore it to the main link, you can enable the failback function of the Smart Link group, the main link would be automatically switched after the failback timer expires. Switch-back enable status, which can be displayed as follows: • Enable • Disable
Restore Time (s)	Failback delay time, it can inhibit Smart Link switching caused by link flash, the value range is 3~1200 seconds.
Active Link Detection VLAN	When there are multiple VLANs in the link, the main link detection requires monitoring and fault detection of the data transmission path of a certain VLAN, and the value range of VLAN is 1-4094.
Detection Time Interval (ms)	The detection time interval for real-time monitoring and fault detection of VLAN data transmission paths on the main link ranges from 10-10000ms, with a default of 10ms.
Enable Switch	Smart Link function enable status can be displayed as follows: • Enable • Disable

5.14.2 Interface Configuration

Function Description

Configure Smart-link interface to receive control VLAN.

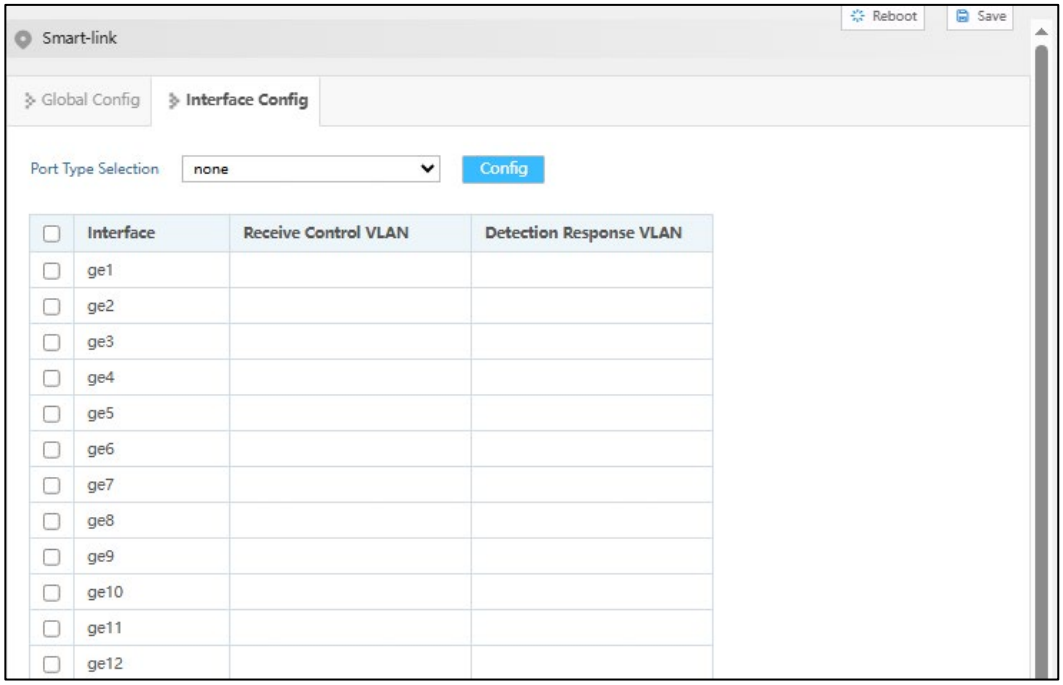
Operation Path

Open in order: "Layer-2 > Smart-link > Interface Config".

Interface Description

Interface configuration interface is as follows:

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The main element configuration description of interface configuration interface:

Interface Element	Description
Interface	The corresponding port number of this device's Ethernet port.
Receive Control VLAN	Receive control VLAN is used to receive and handle the VLAN of Flush messages, the value range is 1-4094. When Smart Link has switched links, the device would handle the Flush messages received that belong to receive control VLAN, thus refreshing MAC table and ARP table.
Detection Response VLAN	In network link backup, there needs to be a mechanism to detect the health status of the main link, which may be achieved by sending specific detection messages. After the detection message is sent, if these response messages are also processed and forwarded in a specific VLAN, the detection and response mechanism is limited to a specific VLAN to ensure that these operations do not interfere with normal communication in other VLANs.

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6 IP Network Configuration

6.1 Interface

6.1.1 Layer 3 Interface

Function Description

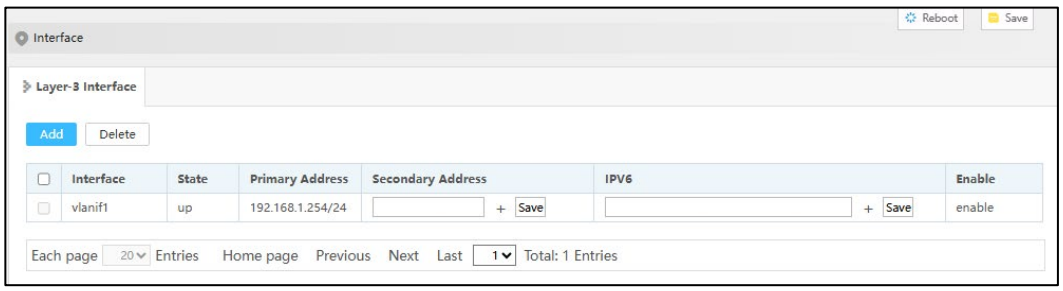
Create layer 3 VIANIF Interfaces and configure interface IP address.

Operation Path

Open in order: "IP Network > Interface > Layer-3 Interface".

Interface Description

Layer-3 interface configuration interface is as follows:



The main element configuration description of interface configuration interface:

Interface Element	Description
Interface	VLANIF interface, the value range is 1-4094. VLANIF interface is a logical interface with layer 3 features that can be used to realize inter-VLAN access and Layer 3 task deployment by configuring the IP address of VLANIF Interfaces.
State	The connection state of the VLANIF port, which can be

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Interface Element	Description
	displayed as follows: • Up: connection is normal. • Down: disconnected
Primary Address	Master IPv4 address and subnet mask of VLANIF interface, such as 192.168.1.1/24.
Secondary Address	Slave IPv4 address and subnet mask of VLANIF interface, such as 192.168.1.1/24. In order to connect one interface of the switch with multiple subnets, user can configure multiple IP addresses on one interface, one as the master IP address and the rest as the slave IP address.
IPV6	Ipv6 address and prefix length of VLANIF interface, such as 1::1/127.
Enable	The VLANIF interface enabled status can be displayed as follows: • enable • disable

6.2 ARP

ARP (Address Resolution Protocol) is the protocol that resolves IP address into Ethernet MAC address (or physical address).

In local area network, when the host or other network device sends data to another host or device, it must know the network layer address (IP address) and MAC address of the opposite side. So, it needs a mapping from IP address to the physical address. ARP is the protocol to achieve the function.

6.2.1 ARP Information

Function Description

Check information such as IP address, MAC address and interface of the user via ARP table entries.

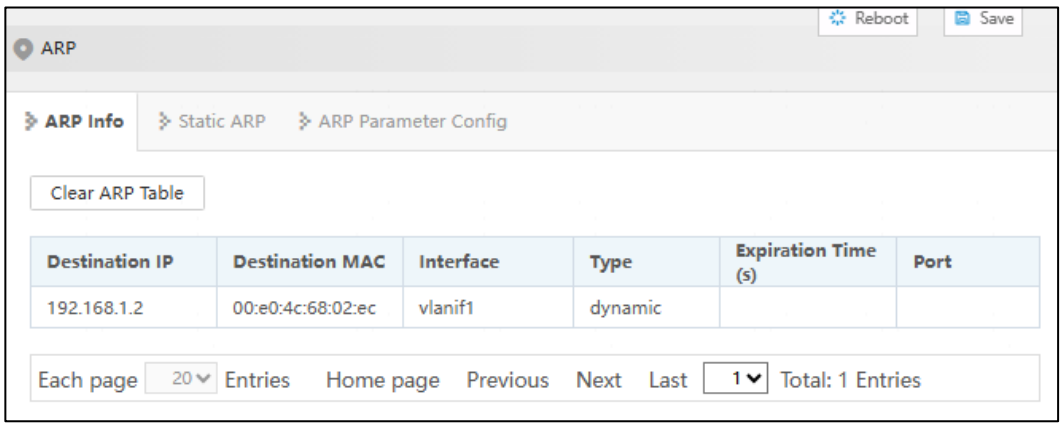
Operation Path

Open in order: "IP Network > ARP > ARP Info".

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Interface Description

ARP Information interface is as follows:



The main element configuration description of ARP information interface:

Interface Element	Description
Destination IP	Static binding or ARP resolves dynamically learned IP addresses.
Destination MAC	Static binding or ARP resolves dynamically learned MAC addresses.
Interface	VLANIF Interface to which ARP entry belongs.
Type	ARP table entry type, as shown below: • Static • Dynamic
Expiration Time (s)	The remaining survive time of dynamic ARP table entries, unit: second.
Port	Ports learned to ARP table entry.

6.2.2 Static ARP

Function Description

Configure static ARP entries, bind IP address and MAC address to avoid aging and prevent ARP attacks.

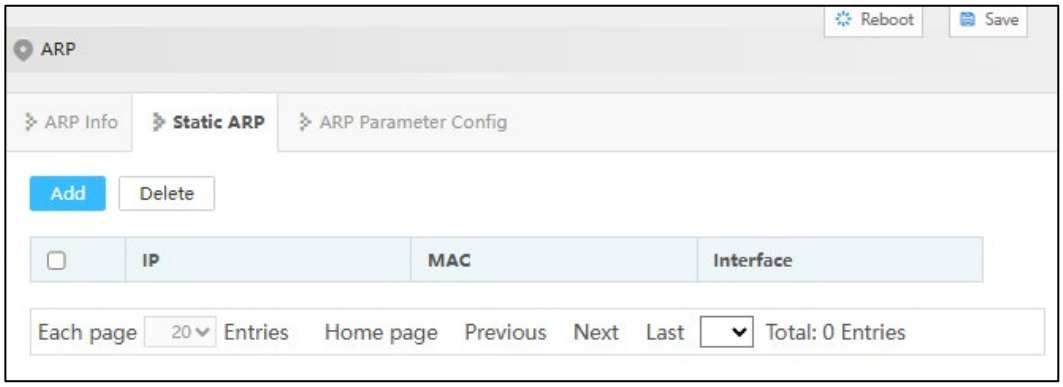
Operation Path

Open in order: "IP Network > ARP > Static ARP".

Interface Description

Static ARP interface is as follows:

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The main element configuration description of static ARP interface:

Interface Element	Description
IP	IP address of static ARP table entry, such as 192.168.1.1.
MAC	MAC address bound to static IP address such as 0001.0001.0001.
Interface	Display VLANIF Interface to which static ARP entry belongs.

6.2.3 ARP Parameter Configuration

Function Description

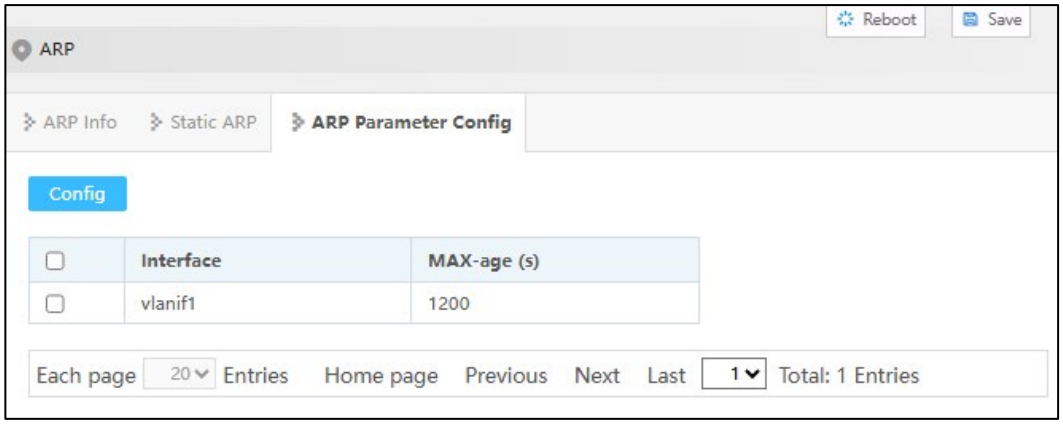
Configure the aging time of dynamic ARP.

Operation Path

Open in order: "IP Network > ARP > ARP Parameter Config".

Interface Description

ARP parameter configuration interface is as follows:



The main element configuration description of ARP Parameter Config interface:

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Interface Element	Description
Interface	Display VLANIF Interface name in ARP entry.
MAX-age (s)	Configure aging time of dynamic ARP table entries, the value range is 1-1200 seconds.

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7 Unicast Routing Table

7.1 IPv4

7.1.1 IPv4 Routing Table

Function Description

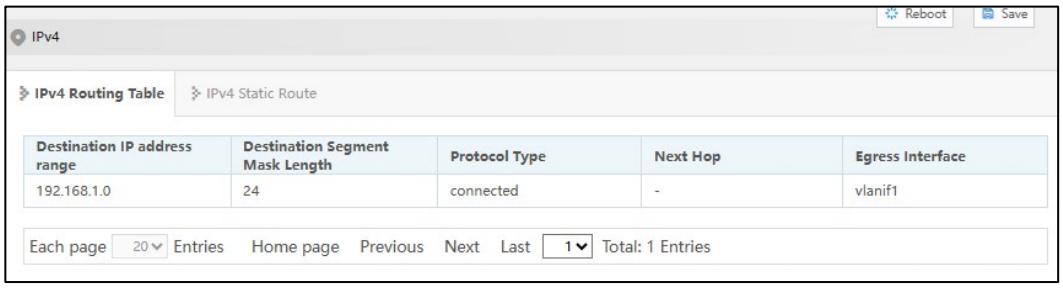
Check IPv4 routing table information.

Operation Path

Open in order: "Unicast Routing > IPv4 > IPv4 Routing Table".

Interface Description

The IPv4 routing table interface is as follows:



The main elements configuration description of IPv4 routing interface:

Interface Element	Description
Destination IP address range	Destination IP addresses.
Destination Segment Mask Length	The length of destination subnet mask.
Protocol Type	The routing protocol type of the current connection.
Next Hop	Gateway address information of next hop.
Egress Interface	Interface name.

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7.1.2 IPv4 Static Route

Static route refers to the route information that user or network administrator manually configures. When the network topology structure or link status changes, network administrator needs to manually modify relative static route information in the routing table. Static route usually adapts to simple network environment, under this environment, network administrator can clearly know the network topology structure, which is convenient for setting correct route information.

Function Description

Configure IPv4 static routing.

Operation Path

Open in order: "Unicast Routing > IPv4 > IPv4 Static Route".

Interface Description

The IPv4 Static Route interface is as follows:



The main element configuration description of IPv4 Static Route interface:

Interface Element	Description
Destination IP address range	Destination network IPv6 address, such as destination address is 192.168.1.1.
Destination Segment Mask Length	Destination IP mask length. Value range is 0-32.
Next Hop	The gateway address of the next hop, format: no input or 192.168.1.1.
Egress Interface	Interface name.
Routing Distance Value	The routing distance value is used for priority determination. When a router receives routing information from multiple

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Interface Element	Description
	routing protocols, it will determine which routing information should be prioritized based on the management distance value of these routing information. The smaller the management distance value, the higher the credibility of the routing information, and the more likely the router is to adopt this routing information. The range is from 1 to 255, default value is 1.
Tag	IPv4 static routing label, with a value range of 0-4294967295 and a default value of 0.

7.2 IPv6

7.2.1 IPv6 Routing Table

Function Description

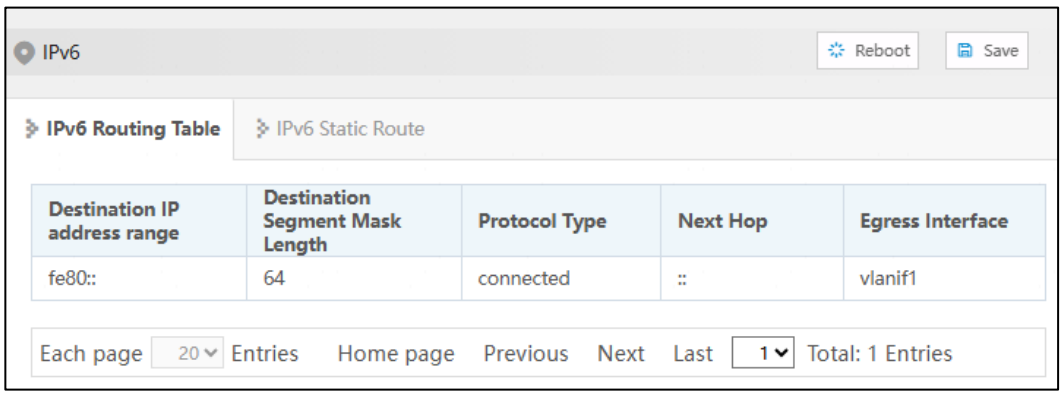
Check IPv6 routing table information.

Operation Path

Open in order: "Unicast Routing > IPv6 > IPv6 Routing Table".

Interface Description

The IPv6 routing table interface is as follows:



The main elements configuration description of IPv6 routing table interface:

Interface Element	Description
Destination IP address range	Destination IP addresses.
Destination Segment Mask Length	The length of destination subnet mask.

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Interface Element	Description
Protocol Type	The routing protocol type of the current connection.
Next Hop	Gateway address information of next hop.
Egress Interface	Interface name.

7.2.2 IPv6 Static Route

Static route refers to the route information that user or network administrator manually configures. When the network topology structure or link status changes, network administrator needs to manually modify relative static route information in the routing table. Static route usually adapts to simple network environment, under this environment, network administrator can clearly know the network topology structure, which is convenient for setting correct route information.

Function Description

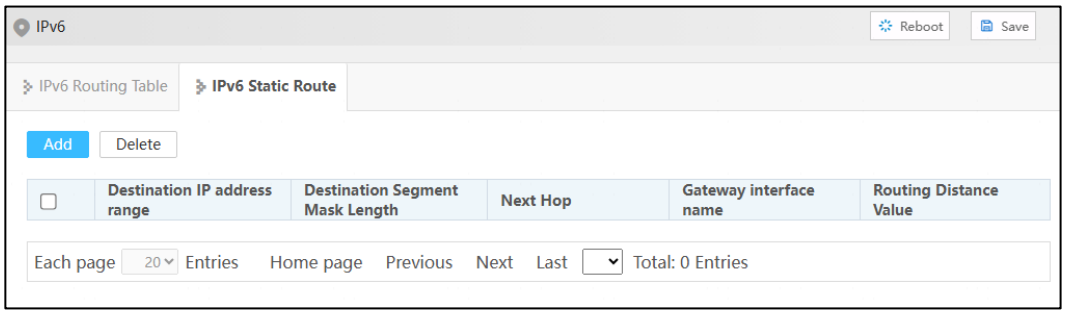
Configure IPv6 static routing.

Operation Path

Open in order: "Unicast Routing > IPv6 > IPv6 Static Route".

Interface Description

The IPv6 static routing interface is as follows:



The main element configuration description of IPv6 static route interface:

Interface Element	Description
Destination IP address range	Destination network IPv6 address, such as destination address is 0001::01.
Destination Segment Mask Length	Destination IPv6 mask length. Value range is 0-128.
Next Hop	The gateway address for the next hop can be empty, and there are two similar IPv6 address formats:

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Interface Element	Description
	• 0001:0000:0000:0000:085b:3c51:f5ff:ffdb • 0001::01
Gateway interface name	Gateway interface name
Routing Distance Value	The routing distance value is used for priority determination. When a router receives routing information from multiple routing protocols, it will determine which routing information should be prioritized based on the management distance value of these routing information. The smaller the management distance value, the higher the credibility of the routing information, and the more likely the router is to adopt this routing information. The range is from 1 to 255, default value is 1.

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8 Network Management

8.1 ACL

The ACL (Access Control List) is a set composed of one or more rules. Rule refers to the judgment statement describing the message matching condition. These conditions may be the source address, destination address, port number of messages. ACL can realize accurate identification and control of message flow in the network, and achieve the purpose of controlling network access behavior, preventing network attacks and improving network bandwidth utilization, thus ensuring the security of network environment and the reliability of network service quality.

8.1.1 ACL Effective Period Configuration

Function Description

On the "ACL Effective Period Configuration" page, you can configure the effective period of ACL rules.

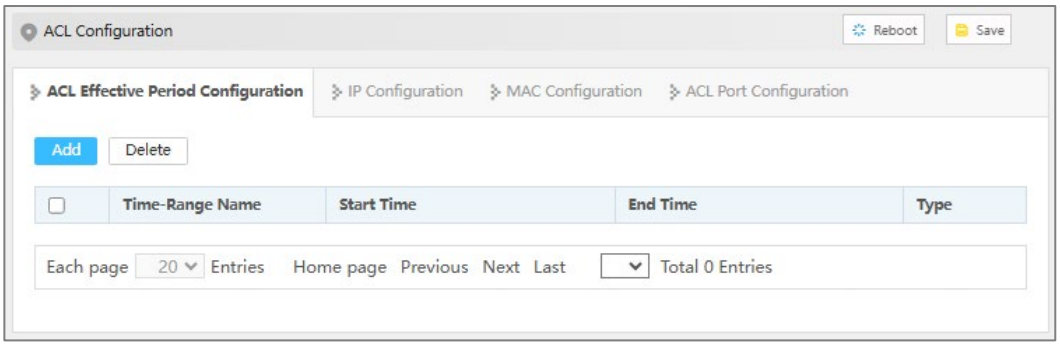
Operation Path

Open in order: "Network > ACL > ACL Effective Period Configuration".

Interface Description

ACL Effective Period Configuration interface is as follows:

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Main element configuration description of ACL Effective Period configuration interface:

Interface Element	Description
Add	Click "Add" to add time-range entry.
Delete	Check time range entry and click “Delete” button to delete specified entries in batches.
Time-Range Name	The name of the ACL valid time period, which supports absolute time and regular time.
Start Time	The start time of the absolute time or regular time range.
End Time	The end time of the absolute time or regular time range.
Type	Time type options are as follows: • Absolute Time; • Cycle Time.
Operation	Delete: Click the "Delete" button to delete the the current entry.

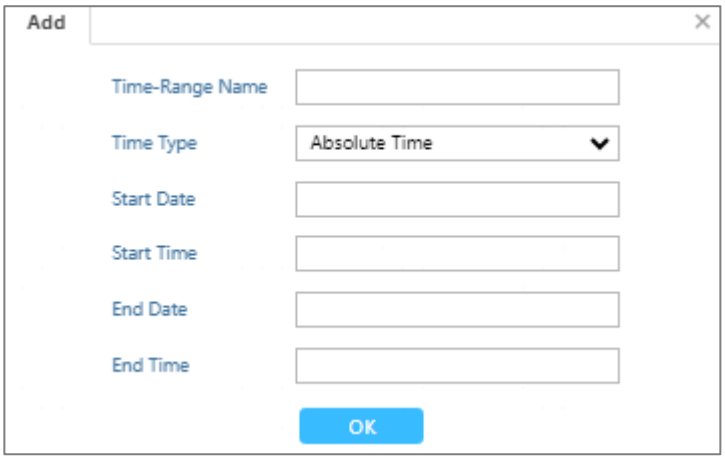
Click “Add” button to add time entry.

In the “Add” interface, check the “Absolute Time” radio box.

Interface Description 1: Add-Absolute Time

The Add-absolute time interface is as follows:

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The main element configuration description of Add-Absolute time interface:

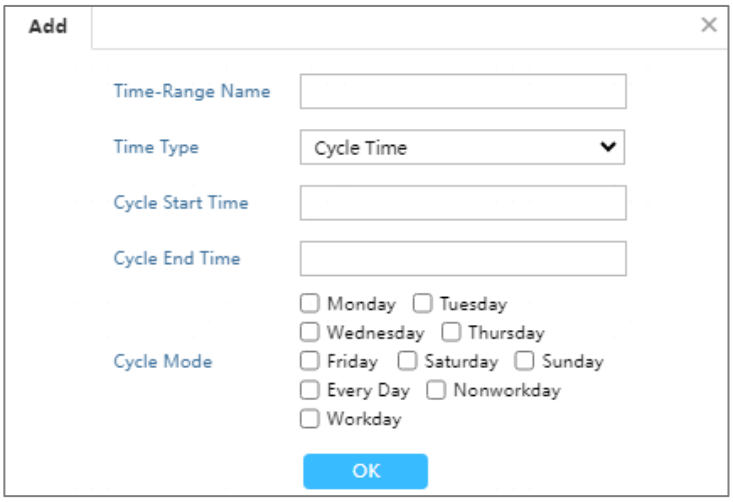
Interface Element	Description
Time-Range Name	The name of the ACL effective time period. There are two modes in the effective time period, and the options that can be checked are: • Absolute time: it starts from a certain time on a certain day of a certain year and ends at a certain time on a certain day of a certain year, which means that the rules will take effect within this time range. • Regular time: the time range is defined by taking the week or workday as the parameter, which means that the rule takes effect cyclically with a week cycle (e.g., 8: 00 to 12: 00 every Monday).
Time Type	Time type options are as follows: • Absolute Time; • Cycle Time.
Start Date	Start date of absolute time, format: YYYY-MM-DD (Year-month-day).
Start Time	The starting time of the absolute time, format: hh:mm:ss (hour:minute:second).
End Date	End date of absolute time, format: YYYY-MM- DD (Year-month-day).
End Time	End time of absolute time, format: hh:mm:ss (hour:minute:second).

In the “Add” interface, check the “Cycle time” radio box.

Interface Description 2: Add-Cycle Time

The Add-regular time interface is as follows:

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The main element configuration description of Add-Cycle Time interface:

Interface Element	Description
Time-Range Name	The name of the ACL effective time period. There are two modes in the effective time period, and the options that can be checked are: • Absolute time: it starts from a certain time on a certain day of a certain year and ends at a certain time on a certain day of a certain year, which means that the rules will take effect within this time range. • Regular time: the time range is defined by taking the week or workday as the parameter, which means that the rule takes effect cyclically with a week cycle (e.g., 8: 00 to 12: 00 every Monday).
Time Type	Time type options are as follows: • Absolute Time; • Cycle time.
Cycle Start Time	Start time range of cycle time, format: hh:mm:ss- hh:mm:ss (Hour:minute:second).
Cycle End Time	End time of cycle time, format: hh:mm:ss- hh:mm:ss (Hour:minute:second).
Cycle Mode	You can select the radio buttons for week, day, non working day, or working day, and specify the dates to be repeated. The options are as follows: • Monday • Tuesday • Wednesday • Thursday

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Interface Element	Description
	• Friday • Saturday • Sunday • Every Day • Nonworkday • Workday

8.1.2 IP Configuration

Function Description

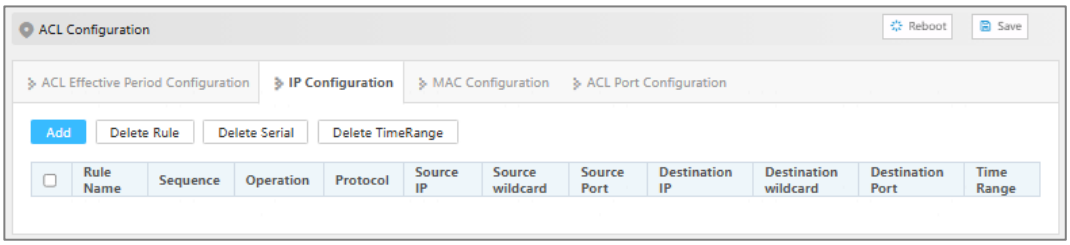
On the "IP ACL Configuration" page, user can configure IP ACL rule. Users can assign numbers to ACLs when creating them, and different numbers correspond to different types of ACLs. At the same time, in order to facilitate memory and identification, users can also create named ACLs, that is, when creating ACLs, set their names.

Operation Path

Open in order: "Network > ACL > IP Configuration".

Interface Description

The IP configuration interface is as follows:



Main element configuration description of IP configuration interface:

Interface Element	Description
Add	Click "Add" to add IP entry.
Delete Rule	Check rule entry and click “Delete Rule” button to delete specified entries in batches.
Delete Serial	Check rule entry and click “Delete Serial” button to delete specified entries in batches.
Delete TimeRange	Clear rule entries that have already been bound to TimeRange.

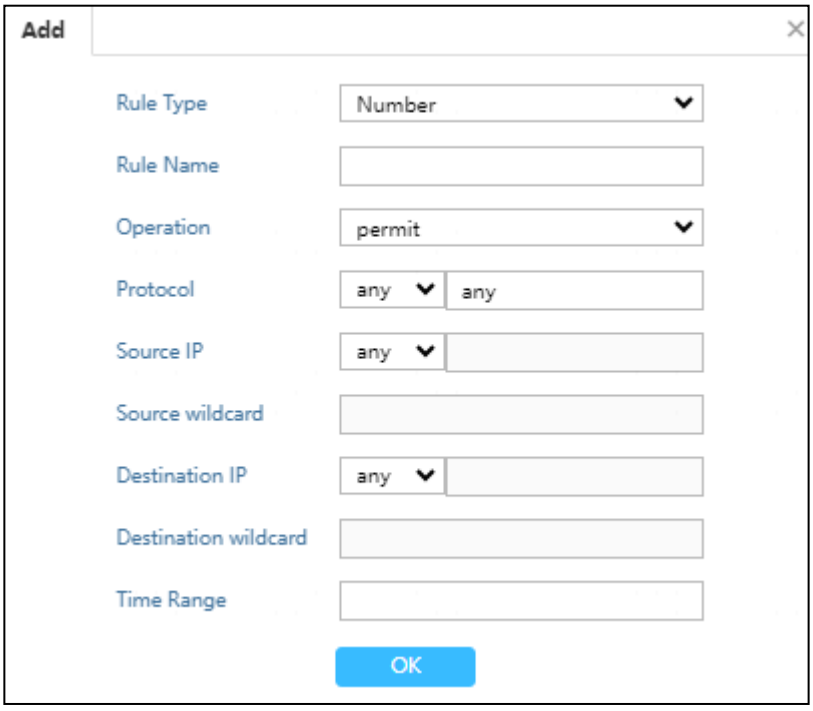
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Interface Element	Description
Rule Name	IP rule name or number.
Sequence	The content of different rules under the same rule name. Note: A maximum of 32 sequences are supported under the same rule name.
Operation	The actions of IP rules, including permit/deny, indicate permission/deny.
Protocol	Protocol type of data packets.
Source IP	Source IP address information of the packet.
Source wildcard	Source IP address wildcard mask.
Source Port	Source IP address port number
Destination IP	Destination IP address information of the packet.
Destination wildcard	Destination IP address wildcard mask.
Destination Port	Destination IP address port number
Time Range	The name of the effective period of the IP rule.

Click “Add” button to add IP rule entry.

Interface Description: Add

The interface of Add is as follows:



The main elements configuration description of “Add” interface:

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Interface Element	Description
Rule Type	The drop-down list of IP rule type. The options are: • Name: ACL is identified by name instead of number. • Number: When creating an ACL, specify a unique number to identify the ACL.
Rule Name	IP rule name or number. When the rule type is name, it supports the combination of @, !, _, numbers and letters that does not exceed 16 digits. When the rule type is number, 1-199 or 1300-2699 is supported. Note: • Standard ACL (1-99, 1300-1999): Only the source IP address, fragmentation information and effective time period information of the message are used to define the rule. • Extended ACL (100-199, 2000-2699): both the source IP address of IPv4 message and the destination IP address, protocol type and effective time period can be used to define rules.
Operation	The action drop-down list of ACL rules. The options are: • Permit • Deny
Protocol	The protocol type of extended ACL rules, support filtering messages based on protocol type, and the value range of protocol number is 0-255. You can click the drop-down list of “Protocol” to select an existing agreement name.
Source IP	The source IP address information of the packet, such as 192.168.1.1. No input indicates any IP address.
Source wildcard	Wildcard mask of source IP address, such as 0.0.0.255. The wildcard mask of IP address is a 32-bit numeric string used to indicate which bits in IP address will be checked. "0" means "check the corresponding bit", and "1" means "do not check the corresponding bit".
Destination IP	The destination IP address information of the packet, such as 192.168.1.1. No input indicates any IP address.
Destination wildcard	Wildcard mask of destination IP address, such as 0.0.0.255. The wildcard mask of IP address is a 32-bit numeric string used to indicate which bits in IP address will be checked. "0" means "check the corresponding bit", and "1" means "do not check the corresponding bit".

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Interface Element	Description
Time Range	The name of the effective period of the IP rule.

8.1.3 MAC Configuration

Function Description

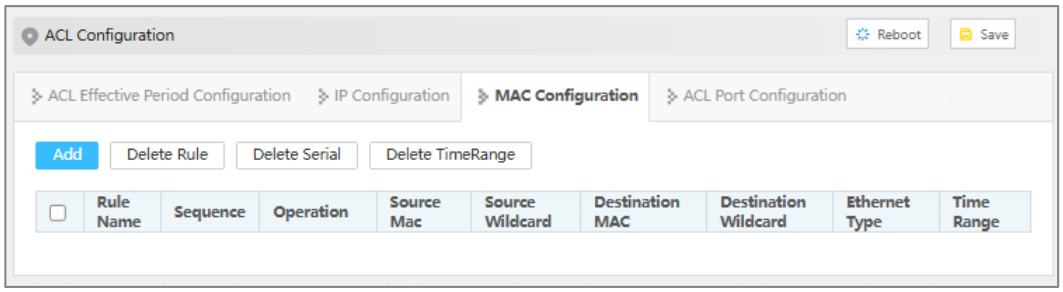
On the “MAC Configuration” page, you can create MAC rules. The layer-2 ACL uses the Ethernet header information of the message to define rules, such as according to the source MAC (Media Access Control) address, destination MAC address, etc.

Operation Path

Open in order: "Network > ACL > MAC Configuration".

Interface Description

The MAC configuration interface is as follows:



Main element configuration description of MAC configuration interface:

Interface Element	Description
Add	Click "Add" to add MAC rule.
Delete Rule	Check rule entry and click “Delete rule” button to delete specified entries in batches.
Delete Serial	Check rule entry and click “Delete sequence” button to delete specified entries in batches.
Delete TimeRange	Clear rule entries that have already been bound to TimeRange.
Rule Name	Mac rule number.
Sequence	The content of different rules under the same rule name. Note: A maximum of 32 sequences are supported under the same rule name.
Operation	The actions of MAC rules, including permit/deny, indicate permission/deny.

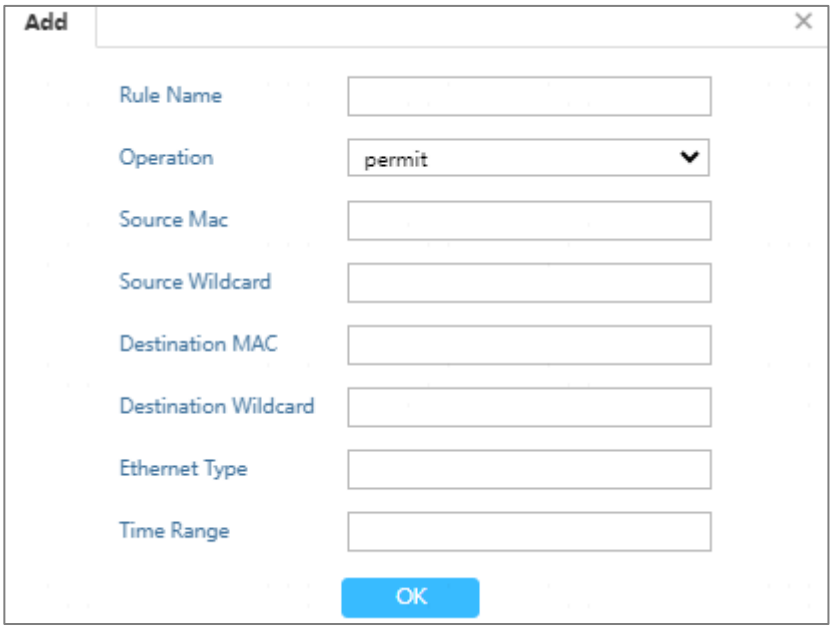
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Interface Element	Description
Source MAC	Source MAC address information of the packet.
Source Wildcard	Source MAC address wildcard mask.
Destination MAC	Destination MAC address information of the packet.
Destination Wildcard	Destination MAC address wildcard mask.
Ethernet Type	Ethernet type of packet.
Time Range	The name of the effective period of the MAC rule.

Click “Add” button to add IP MAC rule entry.

Interface Description: Add

The interface of Add is as follows:



The main elements configuration description of “Add” interface:

Interface Element	Description
Rule Name	MAC rule number, the value range is 100-199 or 2000-2699.
Operation	The action drop-down list of ACL rules. The options are: • Permit • Deny
Source MAC	The source MAC address information of the packet, such as 0001.0001.0001. No input indicates any MAC address.
Source Wildcard	Wildcard mask of source MAC address, such as 0001.0001.0001. Wildcard mask of MAC address, used to indicate which bits in the MAC address will be checked. "0"

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Interface Element	Description
	means "check the corresponding bit", and "1" means "do not check the corresponding bit".
Destination MAC	The destination MAC address information of the packet, such as 0001.0001.0001. No input indicates any MAC address.
Destination Wildcard	Wildcard mask of destination MAC address, such as 0001.0001.0001. Wildcard mask of MAC address, used to indicate which bits in the MAC address will be checked. "0" means "check the corresponding bit", and "1" means "do not check the corresponding bit".
Ethernet Type	Ethernet type of the packet, value range is 1536-65535 (0x0600-0xffff).
Time Range	The name of the effective period of the MAC rule.

8.1.4 ACL Port Configuration

Function Description

On the “ACL Port Configuration” page, you can configure ports to enable IP ACL and MAC ACL rules.

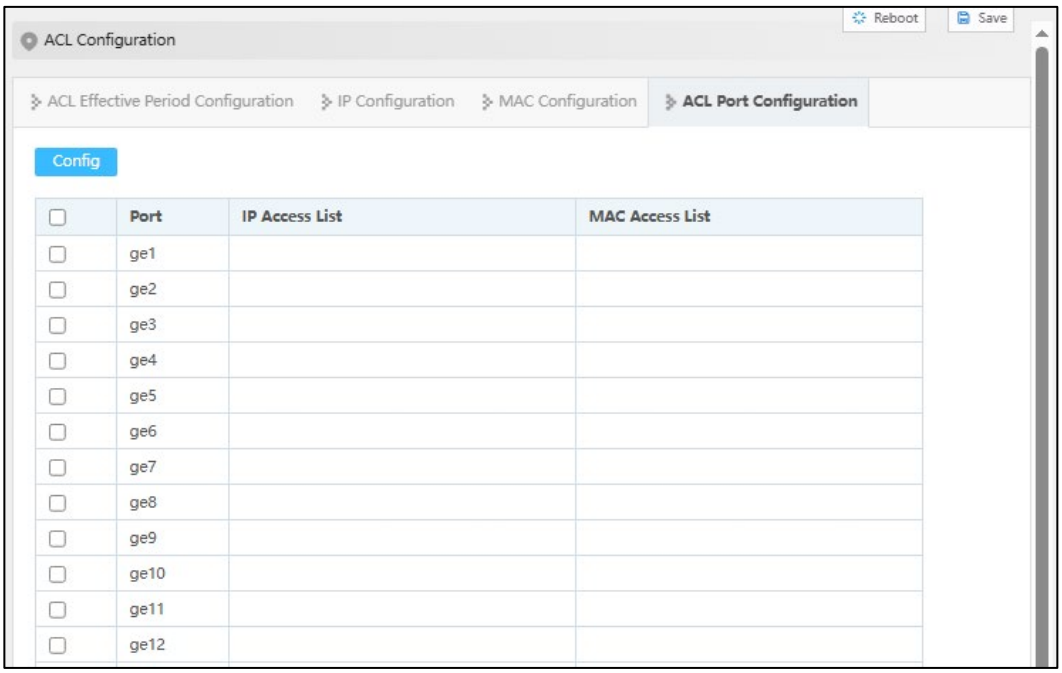
Operation Path

Open in order: "Network > ACL > ACL Port Configuration".

Interface Description

The ACL port configuration interface is as follows:

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The main element configuration description of ACL port configuration interface:

Interface Element	Description
Port	The Ethernet port number of the device.
IP Access List	The port supports IP ACL rules supports, supports "in": data ingress direction.
MAC Access List	The port supports MAC ACL rules and supports "in": data ingress direction.

8.2 SNMP

Now, the broadest network management protocol in network is SNMP (Simple Network Management Protocol). SNMP is the industrial standard that is widely accepted and comes into use, it's used for guaranteeing the management information transmission between two points in network, and is convenient for network manager search information, modify information, locate faults, complete fault diagnosis, conduct capacity plan and generate a report. SNMP adopts polling mechanism and only provides the most basic function library, especially suit for using in minitype, rapid and low-price environment. SNMP implementation is based on connectionless transmission layer protocol UDP, therefore, it can achieve barrier - free connection to many other products.

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8.2.1 SNMP Switch

Function Description

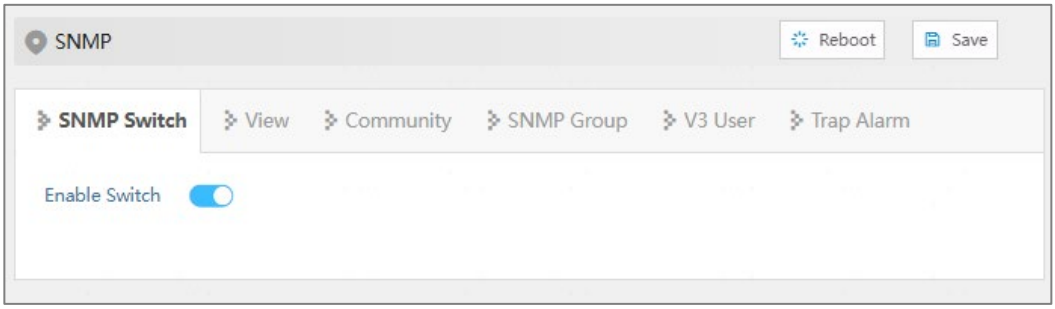
Enable/disable SNMP function.

Operation Path

Open in order: "Network > SNMP > SNMP Switch".

Interface Description

SNMP switch interface is as follows:



The main element configuration description of SNMP switch interface:

Interface Element	Description
Enable Switch	SNMP enable switch, which is enabled by default Note: If the agent side has opened, the SNMP server can't be closed.

8.2.2 View

Function Description

Add/delete SNMP view.

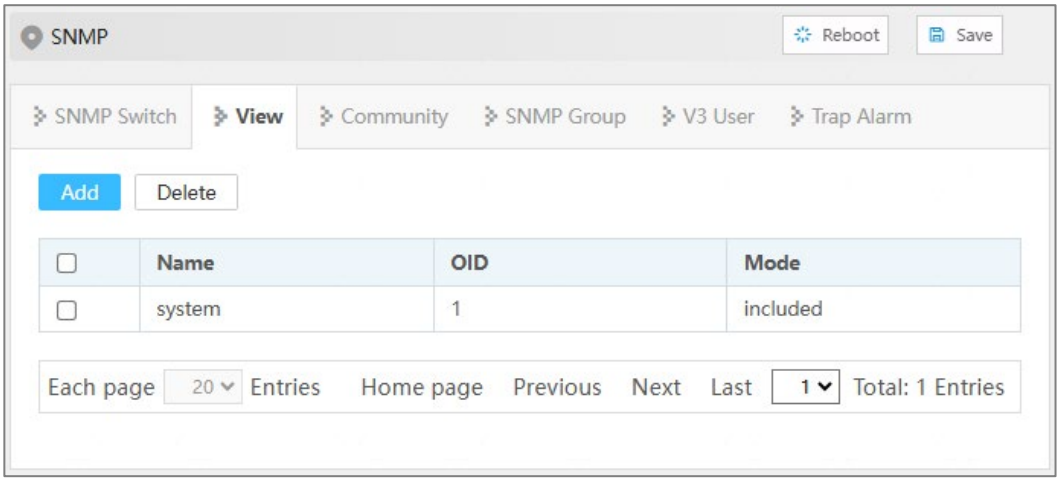
Operation Path

Open in order: "Network > SNMP > View".

Interface Description

View interface is as below:

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The main element configuration description of view interface:

Interface Element	Description
Name	SNMP view name definition, support 32 characters input.
OID	Node location information of MIB tree where the device resides. Note: • OID object identifier, a component node of MIB, uniquely identified by a string of numbers that represent the path. • The information of OID could be viewed via the third-party software MG-SOFT MIB Browser.
Mode	Node OID dealing method, options as below: • Included: It contains all objects under the node subtree; • Excluded: Eliminate all objects beyond the node subtree.

8.2.3 Community

Function Description

Add/delete SNMP community. Define MIB view that community name can access, set MIB object access privilege of community name as read-write privilege or read-only privilege.

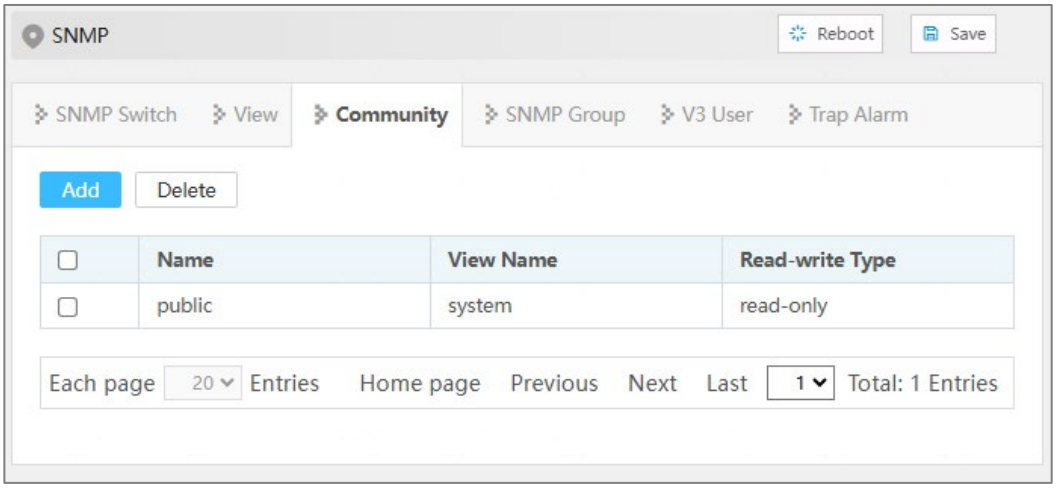
Operation Path

Open in order: “Network > SNMP > Community”.

Interface Description

Community interface is as below:

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The main element configuration description of community interface:

Interface Element	Description
Name	Group name, including numbers or letters, with a length of no more than 32 characters.
View Name	SNMP view name.
Read-write Type	View read-write permissions, options are as follows: • Read Only • Read-Write

8.2.4 SNMP Group

Function Description

Configure a new SNMP group and set the secure mode and corresponding SNMP view of the SNMP group.

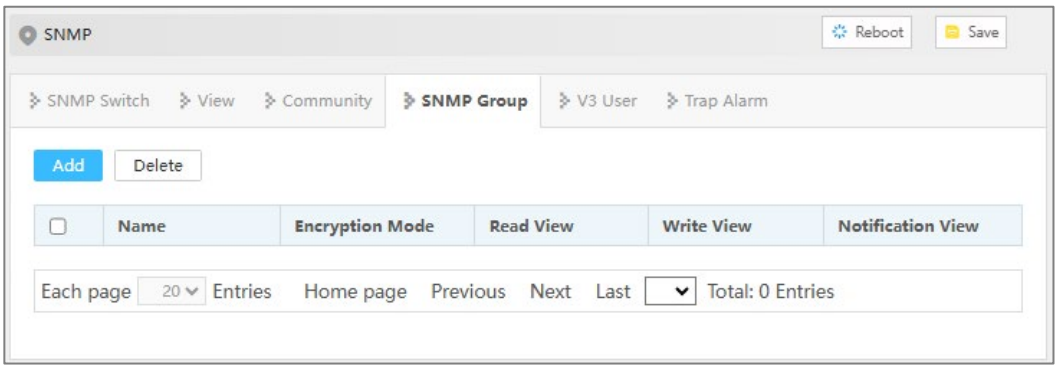
Operation Path

Open in order: “Network > SNMP > SNMP Group”.

Interface Description

SNMP Group interface is as follows:

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Main elements configuration description of SNMP Group interface:

Interface Element	Description
Name	SNMP group name, ranging from 1 to 32 characters.
Encryption Mode	Whether to authenticate and encrypt the message, values: • auth: indicates that the message is authenticated but not encrypted; • noauth: indicates that the message is neither authenticated nor encrypted; • priv: indicates that the message is authenticated and encrypted.
Read View	Specify the read view of the group.
Write View	Specify the write and read view of the group
Notification View	Specify the notification view of the group.

8.2.5V3 User

Function Description

SNMPv3 adopts User-Based Security Model (USM) authentication mechanism. Network manager can configure authentication and encryption function. Authentication is used to verify the validity of the packet sender and prevent unauthorized users from accessing it. Encryption encrypts the transmission packet between NMS and Agent to prevent eavesdropping. It adopts authentication and encryption function to provide higher security for the communication between NMS and Agent.

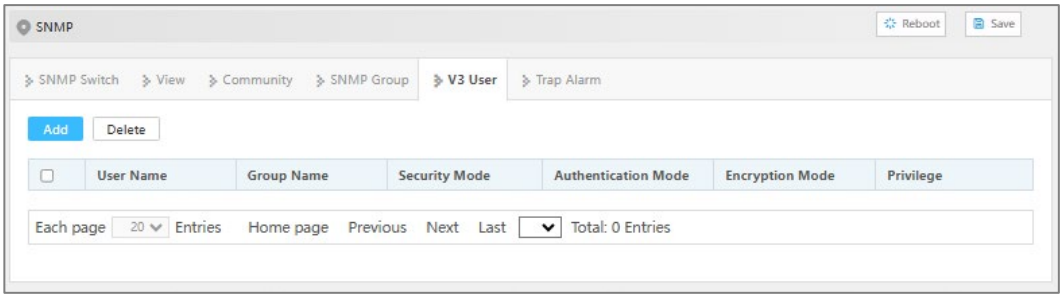
Operation Path

Open in order: "Network > SNMP > V3 User".

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Interface Description

V3 user interface is as follows:



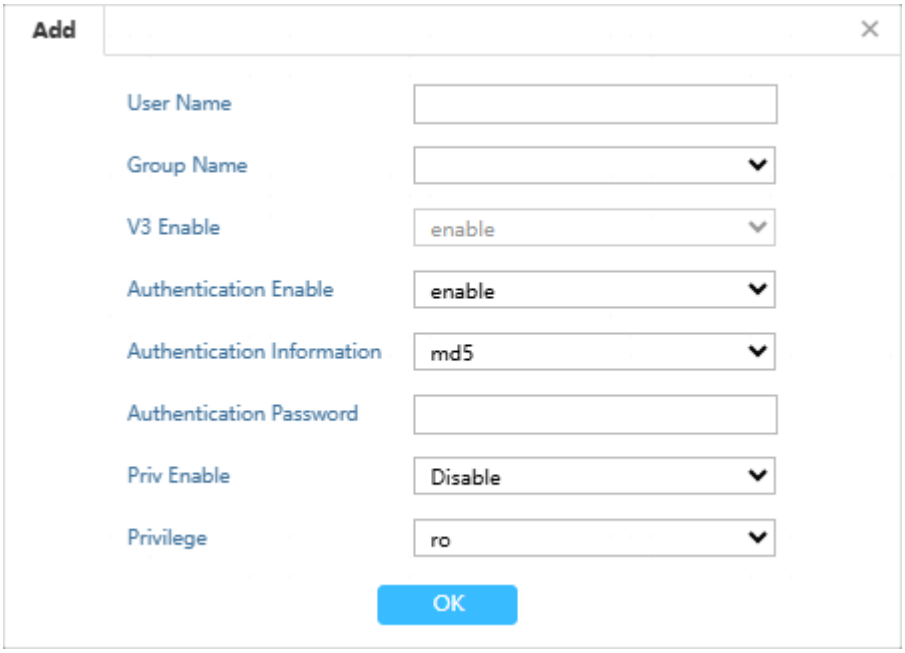
The main element configuration description of V3 user interface:

Interface Element	Description
User Name	SNMP v3 user name definition, can only contain numbers, letters, or @_! , no longer than 32 characters.
Group Name	Group name, ranging from 1 to 32 characters. Note: Group name must be created snmp group, and only created group can create SNMP v3 users.
Security Mode	Whether to authenticate and encrypt the message, values: • auth: indicates that the message is authenticated but not encrypted; • noauth: indicates that the message is neither authenticated nor encrypted; • priv: indicates that the message is authenticated and encrypted.
Authentication Mode	Authentication mode type, acceptable value: • Md5: Information abstract algorithm 5; • Sha: Secure hash algorithm.
Encryption Mode	V3 user data encryption algorithm, options as follows: • Des: Adopt data encryption algorithm; • Aes: Adopt advanced encryption standard.
Privilege	User protocol type, the options are as follows: • ro: Read only permission, allowing users to get the values of SNMP objects, but not allowing users to set these values. Users can get device status and information through this permission, but cannot set it; • rw: Read and write permission, allowing users to get and set the values of SNMP objects. Users can read the status and information of the device and have the right to make changes, including setting parameters, enabling, or

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Interface Element	Description
	disabling functions, etc.

V3 User: “Add” Interface Description



The main element configuration description of V3 user “add” interface:

Interface Element	Description
User Name	SNMP v3 user name definition, can only contain numbers, letters, or @_! , no longer than 32 characters.
Group Name	The drop-down list of SNMP group name.
V3 Enable	V3 Enable, options are as follows: • enable • Disable
Authentication Enable	Authentication Enable, options are as follows: • enable • Disable
Authentication Information	Authentication information type, acceptable values: • Md5: Information abstract algorithm 5; • Sha: Secure hash algorithm.
Authentication Password	Authentication password, character string, length greater than or equal to 8 bytes.
Priv Enable	Priv Enable, options are as follows: • enable • Disable
Encrypted	V3 user data encryption algorithm, options are as follows:

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Interface Element	Description
Information	• Des: Adopt data encryption algorithm; • Aes: Adopt advanced encryption standard.
Encrypted Password	Encrypted password, character string, length is 8-20 digits.
Privilege	Select from the username drop-down list.

8.2.6 Trap Alarm

Function Description

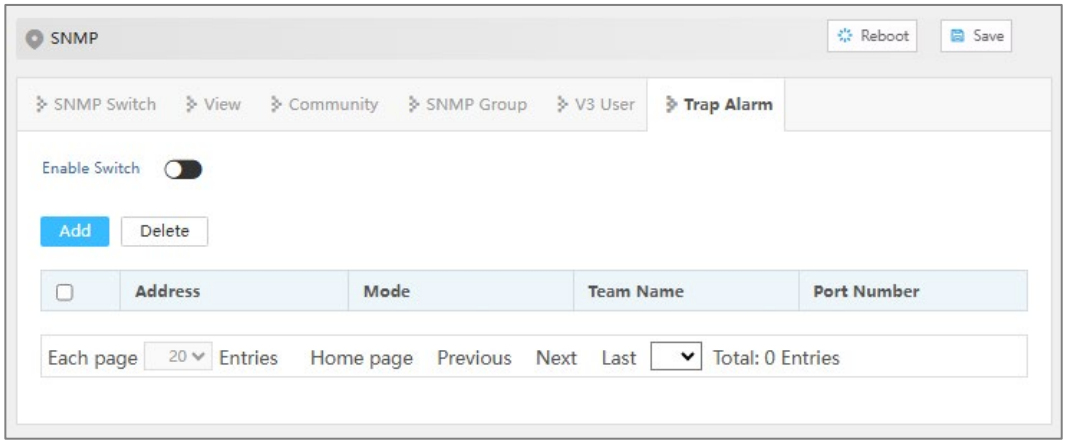
Base on TCP/IP protocol, SNMP usually adopts UDP port 161 (SNMP) and 162 (SNMP-traps), SNMP protocol agent exists in the network device and adopts information specific to the device (MIBs) as the device interface; these network devices can be monitored or controlled via Agent. When a trap event occurs, the message is transmitted by SNMP Trap. At this point, an available trap receiver can receive the trap message.

Operation Path

Open in order："Network > SNMP > Trap Alarm".

Interface Description

Trap alarm interface as below:



The main element configuration description of Trap alarm interface:

Interface Element	Description
Enable Switch	SNMP Trap alarm enable switch.
Address	IP address of SNMP management device, used for receiving

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Interface Element	Description
	alarm information, such as PC.
Mode	SNMP management device version, options are as below: • 1 • 2c • 3
Team Name	Group name.
Port Number	Port number of Trap, it defaults to 162, the value range is 0~65535.

8.3 RMON

RMON (Remote Network Monitoring) mainly achieves statistics and alarm functions, which are used for remote monitoring and management of management device to managed devices. Statistical function refers to that managed device can periodically or continuously keep track of all the traffic information on the network segment connected to the port, for example, the total number of packets received on a network segment in a period of time, or the total number of received super long packets. Alarm function refers to that the managed device can monitor the value of the specified MIB variable. When the value reaches the alarm threshold (such as the port rate reaches the specified value or the proportion of broadcast message reaches the specified value), it can automatically log and send Trap messages to the managed device.

8.3.1 Event Group

Function Description

On the "Event Group" page, user can add, delete or check the configuration information of event.

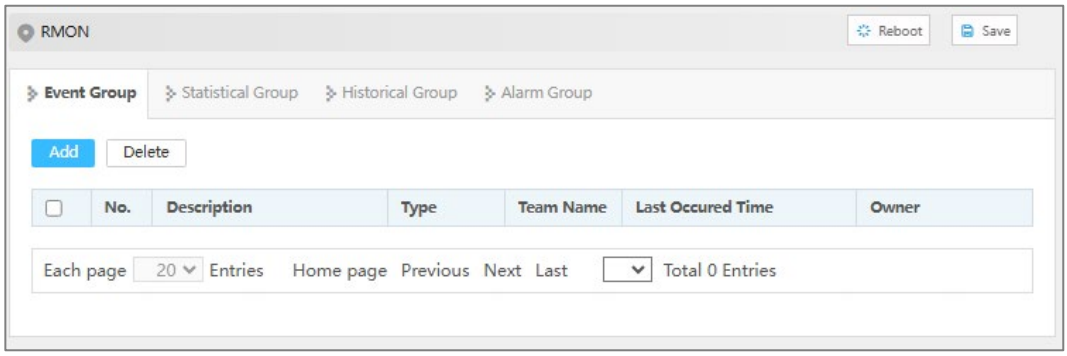
Operation Path

Open in order: “Network > RMON > Event Group”.

Interface Description

Event group interface is as below:

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The main element configuration description of event group interface:

Interface Element	Description
No.	Triggered event serial number when monitoring MIB object exceeds threshold value. Note: This serial number corresponds to the rising event index and falling event index set in RMON alarm configuration information.
Description	Some description information for describing the event.
Type	Event dealing method, options as below: • log: Record the event in the log table when the event is triggered; • trap: Send Trap information to management station for informing the occurring of event when the event is triggered; • Log, trap: Record the event in the log table and produce a trap information when the event is triggered.
Team Name	Community name of the network management station receiving the alarm information.
Last Occured Time	The time of the last incident occurred.
Owner	The creator of the table entry.
Operation	Check the entry and click the "Delete" button to delete it.

8.3.2 Statistical Group

Function Description

On the "Statistical Group" page, user can add, delete or check the configuration information of statistical.

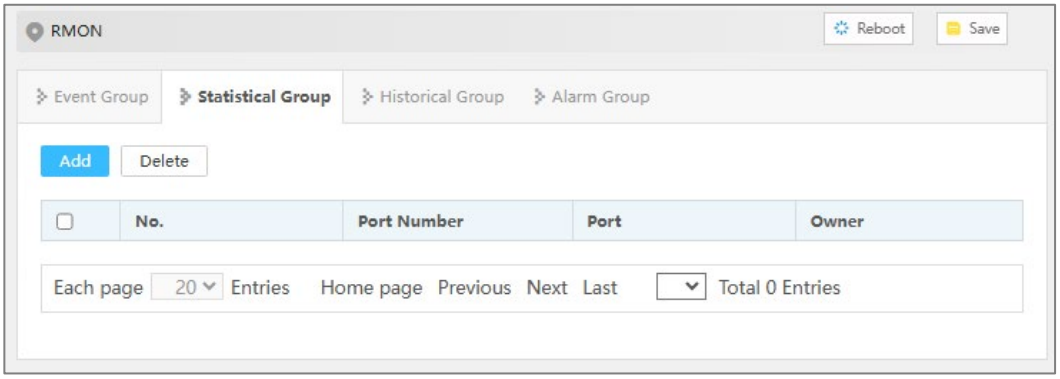
Operation Path

Open in order: “Network > RMON > Statistical Group”.

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Interface Description

Statistical group interface is as below:



The main element configuration description of statistical group interface：

Interface Element	Description
No.	Serial number is used to identify a special application interface, when the serial number is same to the application interface serial number set before, previous configuration will be replaced.
Port Number	The counted port serial number.
Port	The name of the port being counted.
Owner	The creator of the table entry.
Operation	Check the entry and click the "Delete" button to delete it.

8.3.3 Historical Group

Function Description

On the "Historrical Group" page, user can add, delete or check the configuration information of history.

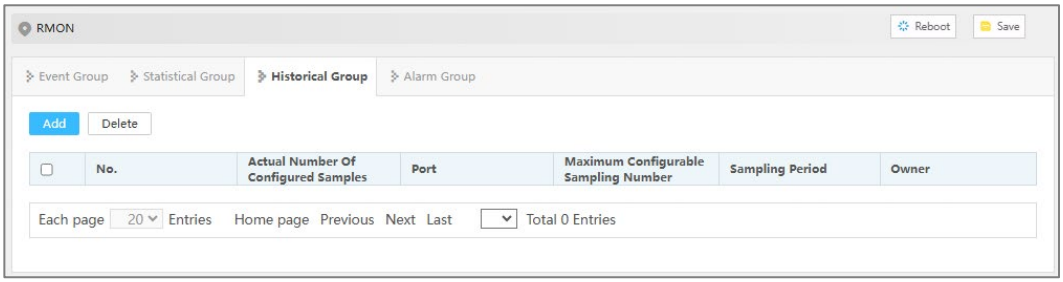
Operation Path

Open in order: “Network > RMON > Historical Group”.

Interface Description

Historical group interface is as below:

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The main element configuration description of historical group interface：

Interface Element	Description
No.	Serial number is used to identify a special application interface, when the serial number is same to the application interface serial number set before, previous configuration will be replaced.
Actual Number of Configured Samples	Set the historical statistics capacity corresponding to the history group, ranging from 1-65535.
Port	The recorded port name.
Maximum Configurable Sampling Number	Maximum capacity of historical statistics table supported by device.
Sampling Period	The interval time of gaining statistics data each two times.
Owner	The creator of the table entry.
Operation	Check the entry and click the "Delete" button to delete it.

8.3.4 Alarm Group

Function Description

On the "Alarm" page, user can add, delete the alarm, or check the alarm configuration information. Alarm type adopts absolute to directly monitor MIB object value; Alarm type adopts delta to monitor changes in MIB object values between two samples;

- When monitoring MIB object reaches or surpasses the rising threshold value, it will trigger corresponding event of rising event index;
- When monitoring MIB object reaches or surpasses declining threshold value, it will trigger corresponding event of declining event index.

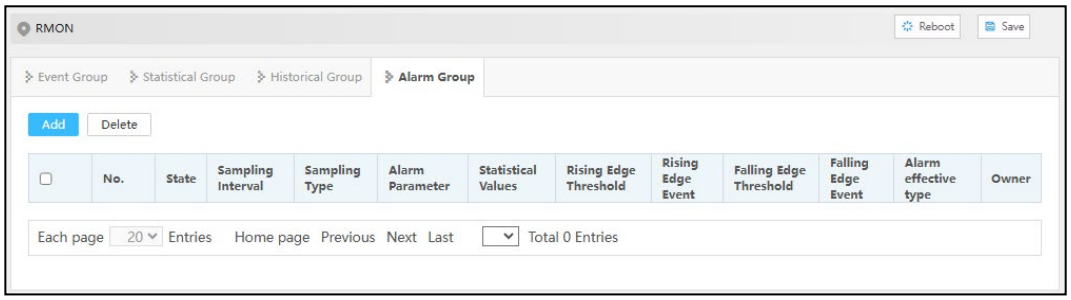
Operation Path

Open in order："Network > RMON > Alarm Group".

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Interface Description

Alarm group interface is as below:



The main element configuration description of alarm group interface:

Interface Element	Description
No.	Triggered event serial number when monitoring MIB object exceeds threshold value. Note: This serial number corresponds to the rising event index and falling event index set in RMON alarm configuration information.
State	The status of alarm list items, which is not configurable when configuring alarm list items and is VALID by default.
Sampling Interval	Sampling time interval value, value range is 1-2147483647, unit: second.
Sampling Type	Two sampling methods, options as follows: • Absolute: When alarm variable value reaches alarm threshold value, an alarm is triggered; If the second sampling is same to last sampling alarm type, alarm isn't triggered again; • Delta: When alarm variable value reaches alarm threshold value during each sampling, an alarm is triggered.
Alarm Parameter	The monitored MIB node supports string format instead of oid format.
Statistical Values	That is, the defined statistical group.
Rising Edge Threshold	Alarm variable value, upper limit alarm, threshold value is between 1-12147483647. Note: In the rising process of alarm variable value, when the variable value surpasses rising threshold, an alarm occurs at least one time.
Rising Edge Event	Event index, when alarm variable value reaches or surpasses the rising event threshold value, it will activate corresponding event in event group, value range is 1-65535.
Falling Edge	Alarm variable value, lower limit alarm, threshold value is

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Interface Element	Description
Threshold	between 1-2147483647. Note: In the falling process of alarm variable value, when the variable value reaches falling threshold, an alarm occurs at least one time.
Falling Edge Event	Event index, when alarm variable value reaches or is less than the falling threshold value, it will activate corresponding event in event group, value range is 1-65535.
Alarm effective type	There are three alarm effect types. The options are as follows: • Rising edge effect • Falling edge effect • Both the rising and falling edges take effect
Owner	The creator of the table entry.
Operation	Check the entry and click the "Delete" button to delete it.

8.4 LLDP

LLDP (Link Layer Discovery Protocol) is a link layer discovery protocol defined in IEEE 802.1ab. LLDP is a standard layer-2 discovery method, which can organize the management address, device identification, interface identification and other information of local devices and publish it to its neighbor devices. After receiving the information, the neighbor devices save it in the form of standard MIB (Management Information Base) for the network management system to query and judge the communication status of links.

8.4.1 Global Configuration

Function Description

Configure LLDP global parameter.

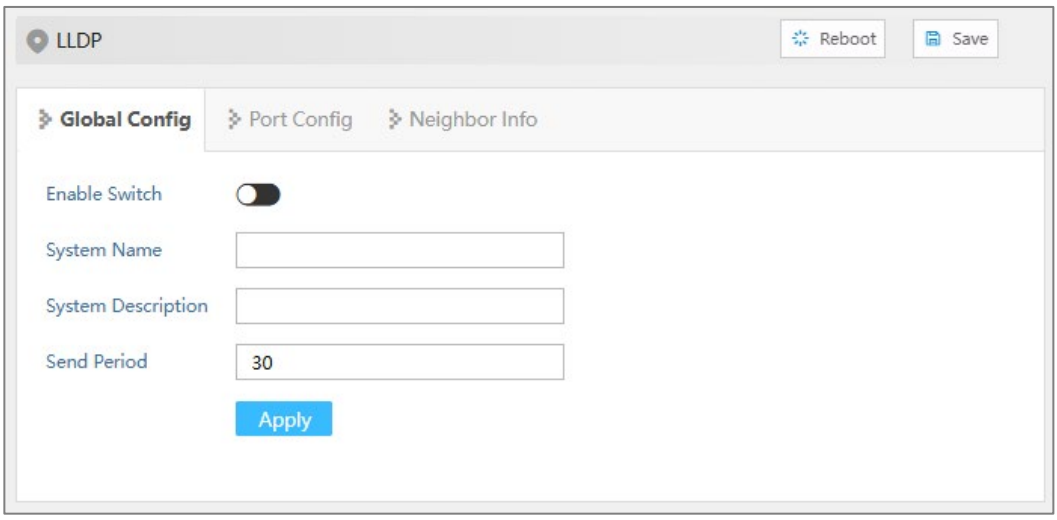
Operation Path

Open in order: "Network > LLDP > Global Configuration".

Interface Description

Global configuration interface is as follows:

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The main element configuration description of global configuration interface:

Interface Element	Description
Enable Switch	LLDP enable switch.
System Name	The system name, which supports 0-32 characters, consists of uppercase letters, lowercase letters, numbers or special characters (! @ _-).
System Description	The system description information, which supports 0-32 characters, consisting of uppercase letters, lowercase letters, numbers or special characters (! @ _-).
Send Period	LLDP message sending cycle, the value range is 5-32768. When no device status changes, the device periodically sends LLDP messages to its adjacent nodes. Note: Type of TLV(Type/Length/Value) encapsulated by LLDP message, which can include system name and system description.

8.4.2 Port Configuration

Function Description

Configure the sending and receiving mode and management address of the port.

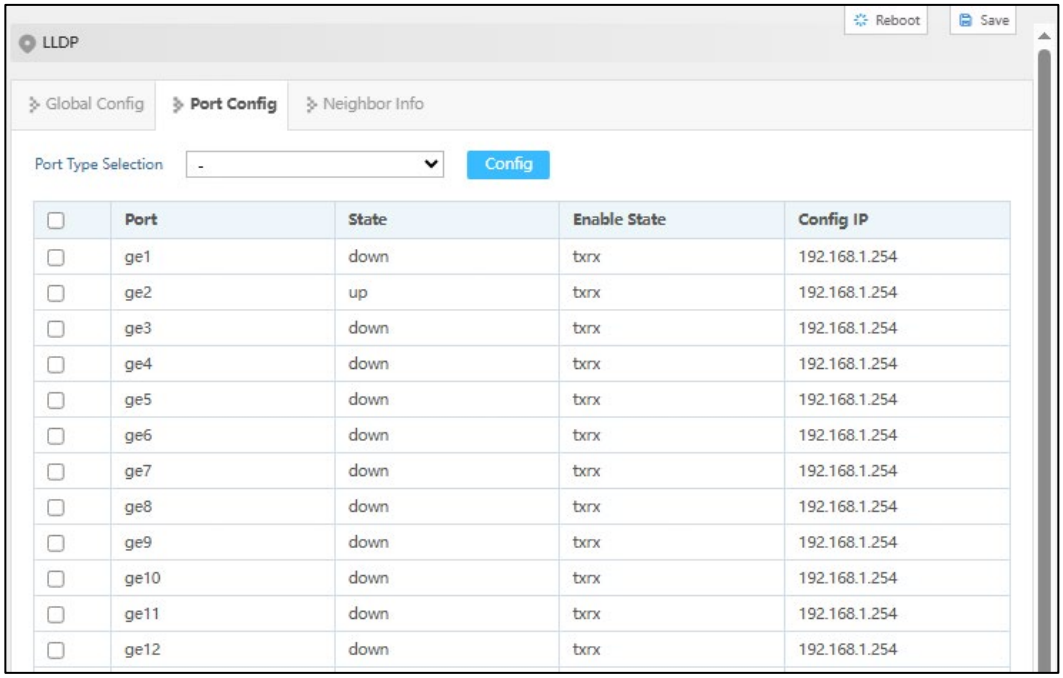
Operation Path

Open in order: "Network > LLDP > Port Config".

Interface Description

Check port configuration interface as below:

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The main element configuration description of port configuration interface:

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
State	Ethernet port connection status, display status as follows: • down: port is disconnected • up: port is connected
Enable State	The options of LLDP working states of device port are as follows: • txonly: working mode is Tx, only sending and not receiving LLDP message. • rxonly: working mode Rx, only receiving, and not sending LLDP message. • txrx: working mode is TxRx, both sending and receiving LLDP message. • disable: the working mode is Disable, neither receiving nor sending LLDP message. Note: By default, the working mode of LLDP is TxRx when global LLDP is enabled.
Config IP	Corresponding LLDP management IP address of the port. Note: • LLDP management address is the address to be marked and managed by network management system. Management address can mark a device, which is beneficial to the drawing of network topology and network management. Management address is encapsulated in Management Address TLV field of

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Interface Element	Description
	LLDP message and sent to adjacent nodes. • The management address released by the port in the LLDP message defaults to the main IP address of the smallest VLAN o in the VLAN where the port resides. If the VLAN is not configured with a main IP address, it will be 0.0.0.0.

8.4.3 Neighbor Information

Function Description

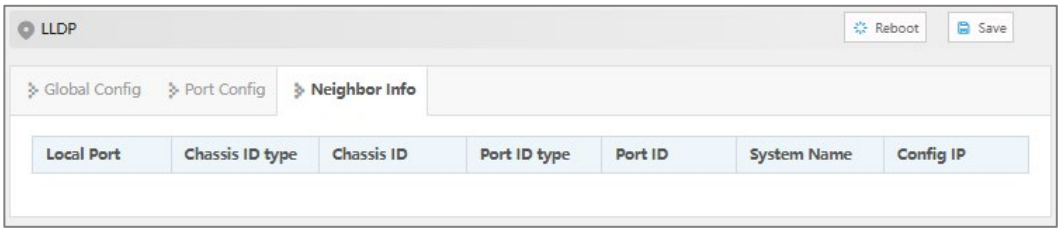
View neighbor-related information.

Operation Path

Open in order: " Network > LLDP > Neighbor Info".

Interface Description

Neighbor information interface is as follows:



Main elements configuration description of neighbor information interface:

Interface Element	Description
Local Port	Local port number of local switch connected to adjacent devices.
Chassis ID type	Neighbor device ID type.
Chassis ID	Neighbor device ID.
Port ID type	ID type of neighbor port.
Port ID	Port ID of neighbor device.
System Name	System name of the neighbor device.
Config IP	Management IP address of neighbor device or port.

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8.5 DHCP

DHCP (Dynamic Host Configuration Protocol) is usually applied to large LAN environment. Its main functions are centralized management and IP address distribution, which enables the host in the network to acquire IP address, Gateway address, DNS server address dynamically and improve the usage of addresses.

8.5.1 DHCP Switch

Function Description

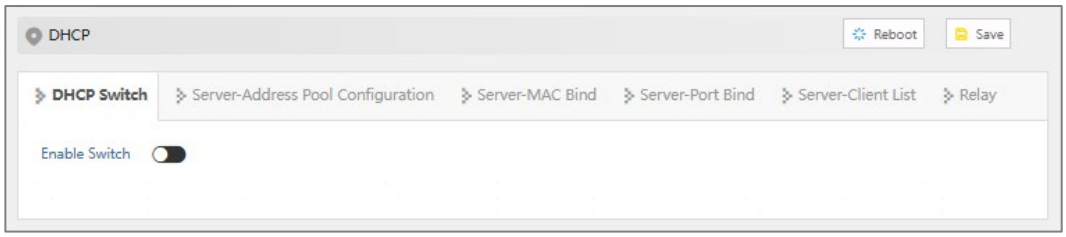
Enable/Disable DHCP Server.

Operation Path

Open in order: "Network > DHCP > DHCP Switch".

Interface Description

DHCP switch interface is as follows:



The main element configuration description of DHCP switch interface:

Interface Element	Description
Enable Switch	The enable switch of DHCP server, when enabled, it can assign IP addresses to other devices connected to this device.

8.5.2 Server-Address Pool Configuration

After user defines DHCP range and exclusion range, surplus addresses constitute an address pool; addresses in the address pool can be dynamically distributed to hosts in network. Address pool is valid only for the method of automated IP acquisition; manual IP configuration can ignore this option only if conforming to the rules.

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Function Description

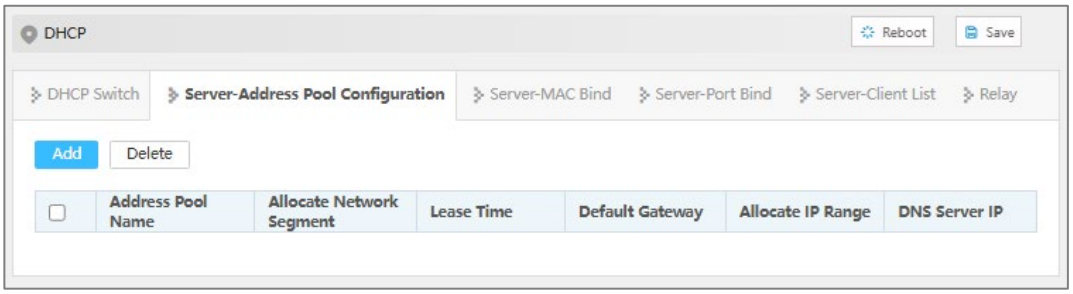
Add, delete the address pool, and check the configuration information of address pool.

Operation Path

Open in order: "Network > DHCP > Server-Address Pool Configuration".

Interface Description

Server-address pool configuration interface is as follows:



The main element configuration description of Server-address pool configuration interface:

Interface Element	Description
Address Pool Name	The name of address pool, up to 32 characters.
Allocate Network Segment	Address pool distributes the IP address network segment of client, for example: 192.168.1.1/24.
Lease Time	IP address utilization valid time of client, format: day, hour, minute, range is 0-30 day, 0-24h and 0-59m, which are separated by space. Note: When the time of ip address obtained by dhcp client reaches the lease time, it needs to renew it otherwise the ip address would be invalid and dhcp client needs to request ip address again.
Default Gateway	Default client gateway address, example: 192.168.1.1.
Allocate IP range	The lowest address and the highest address in the DHCP address pool. The address that belongs to the range could be distributed effectively.
DNS Server IP	IP address of DNS server.

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8.5.3 Server-MAC Bind

Function Description

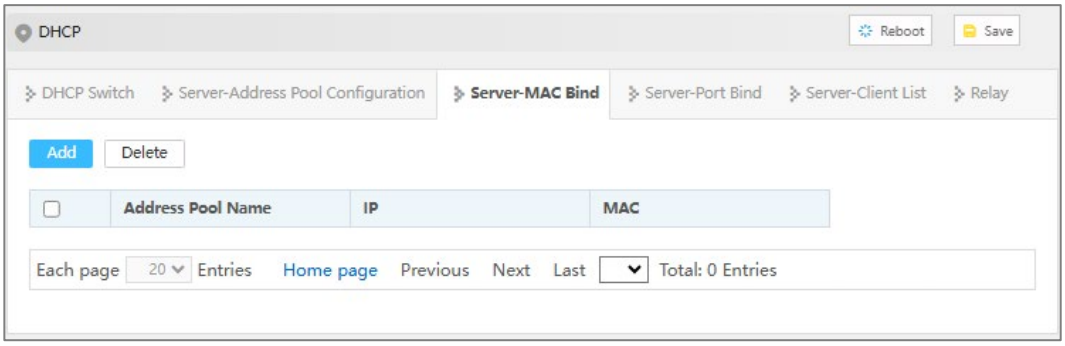
Bind the IP address assigned by the address pool to the MAC address of the device.

Operation Path

Open in order: "Network > DHCP > Server-MAC Bind".

Interface Description

Server-MAC binding interface is as follows:



The main element configuration description of Server-MAC binding interface:

Interface Element	Description
Address Pool Name	The name of DHCP address pool.
IP	IP addresses distributed by DHCP address pool, IP addresses obtained by this MAC address.
MAC	The MAC address of the IP-bound device.

8.5.4 Server-Port Bind

Function Description

The IP address that can be assigned by the binding port.

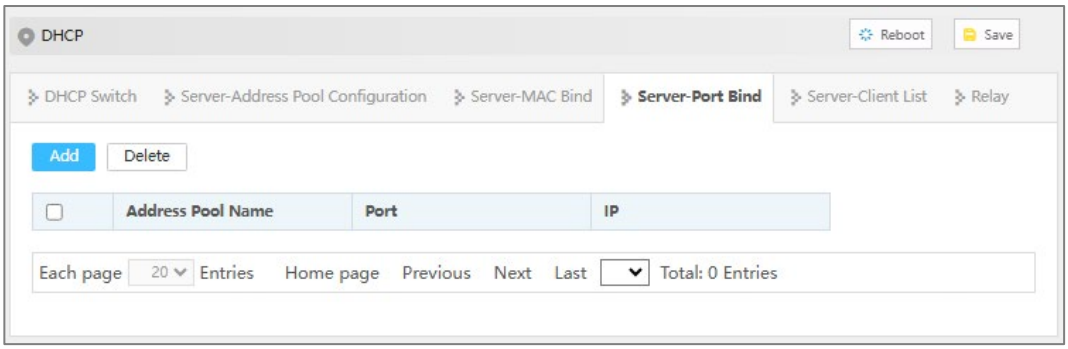
Operation Path

Open in order: "Network > DHCP > Server-Port Bind".

Interface Description

Server-Port Bind interface is as follows:

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The main element configuration description of server-port binding interface:

Interface Element	Description
Address Pool Name	The name of DHCP address pool.
Port	The corresponding port name of the device Ethernet port.
IP	IP address distributed by DHCP address pool, the IP addresses that client gains in the port.

8.5.5 Server-Client List

Function Description

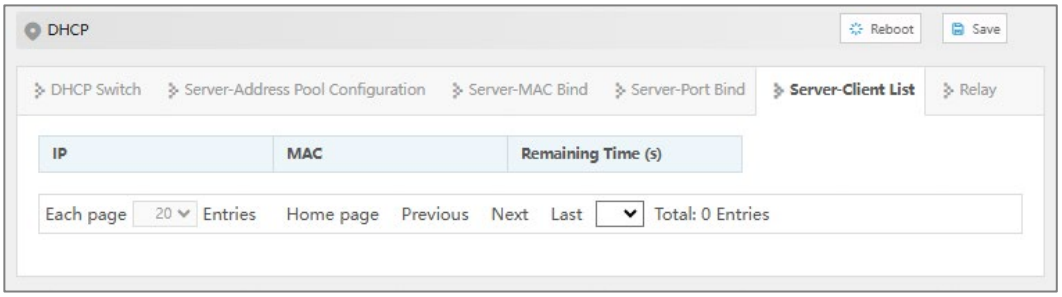
Check the information of DHCP client.

Operation Path

Open in order: "Network > DHCP > Server-Client List".

Interface Description

Server-Client list interface is as follows:



The main element configuration description of server-client list interface:

Interface Element	Description
IP	IP address of DHCP client device.
MAC	MAC address of DHCP client device.
Remaining Time (s)	Aging time of IP address acquired by DHCP client.

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8.5.6 Relay

DHCP relay agent forwards DHCP messages between a DHCP server and DHCP clients, and helps the DHCP server to dynamically allocate network parameters to the DHCP clients. When a DHCP server is on a different network segment from the DHCP client, the DHCP server can not receive request messages from the DHCP client, a DHCP relay agent must be deployed to forward DHCP messages to the DHCP server.

Function Description

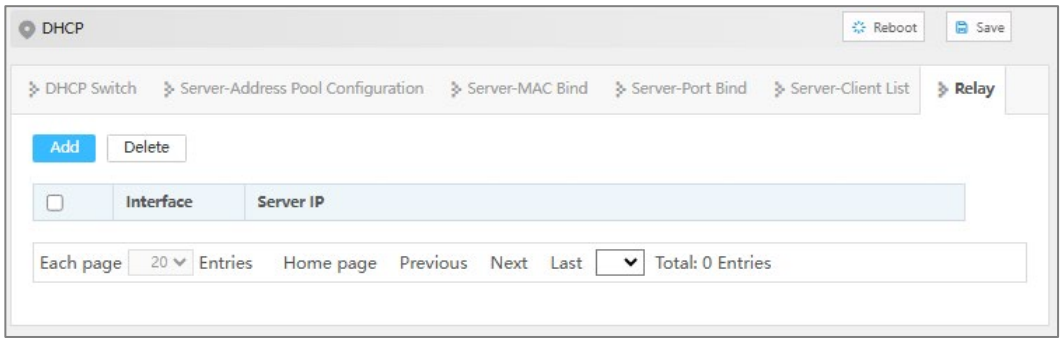
Configure the related parameters of the Relay interface.

Operation Path

Open in order: "Network > DHCP > Relay".

Interface Description

Relay interface is as follows:



Main element configuration description of Relay interface:

Interface Element	Description
Interface	Interface name.
Server IP	IP address of DHCP server represented by DHCP relay.

8.6 DHCP-Snooping

The function of DHCP Snooping

DHCP Snooping is a security feature of DHCP, which has the following functions:

1 Ensure that clients get IP addresses from legitimate servers.

If there is a pseudo-DHCP server set up privately in the network, it may cause the DHCP client to get the wrong IP address and network configuration parameters, and can't communicate normally. To enable DHCP clients to obtain IP addresses

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through legitimate DHCP servers, DHCP Snooping security mechanism allows ports to be set as trusted ports and untrusted ports:

- The trust port forwards the received DHCP message normally.
- The untrusted port discards the DHCP-ACK and DHCP-OFFER messages responded by the DHCP server.

The ports connecting DHCP server and other DHCP Snooping devices need to be set as trusted ports, and other ports should be set as untrusted ports, so as to ensure that DHCP clients can only obtain IP addresses from legitimate DHCP servers, while pseudo-DHCP servers erected privately cannot assign IP addresses to DHCP clients.

2 Record the corresponding relationship between IP address and MAC address of DHCP client

DHCP Snooping receives DHCP-ACK packets by listening to DHCP-REQUEST packets and trusted port, and records the DHCP Snooping table entry, including the client's MAC address, obtained IP address, port connected to the DHCP client, and the VLAN to which the port belongs. Using this information, you can achieve:

- ARP Detection: according to the DHCP Snooping table entry, judge whether the user sending ARP message is legal or not, so as to prevent ARP attack by illegal users.
- IP Source Guard: filter the messages forwarded by the port by dynamically obtaining DHCP Snooping entries to prevent illegal messages from passing through the port.

Option 82

Option 82 is called the relay agent information option and records the location information of the DHCP client. When the DHCP relay or DHCP Snooping device receives the request message sent by the DHCP client to the DHCP server, it adds Option 82 to the message and sends it to the DHCP server.

Administrators can obtain location information of DHCP client from Option 82, so as to locate DHCP client and realize control over security and billing of client. Servers that support Option 82 can also make allocation policies for IP addresses and other parameters based on information about that Option, providing a more flexible address allocation scheme.

Option 82 can contain up to 255 sub-option. If Option 82 is defined, define at least one sub-option. Currently, the DHCP relay supports only three sub-options: Sub-Option 1 (Circuit ID, Circuit ID sub-option) and Sub-option 2 (Remote ID, Remote ID sub-option) and sub-option 3 (Subscriber ID, Subscriber ID sub-option).

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8.6.1 Global Configuration

Function Description

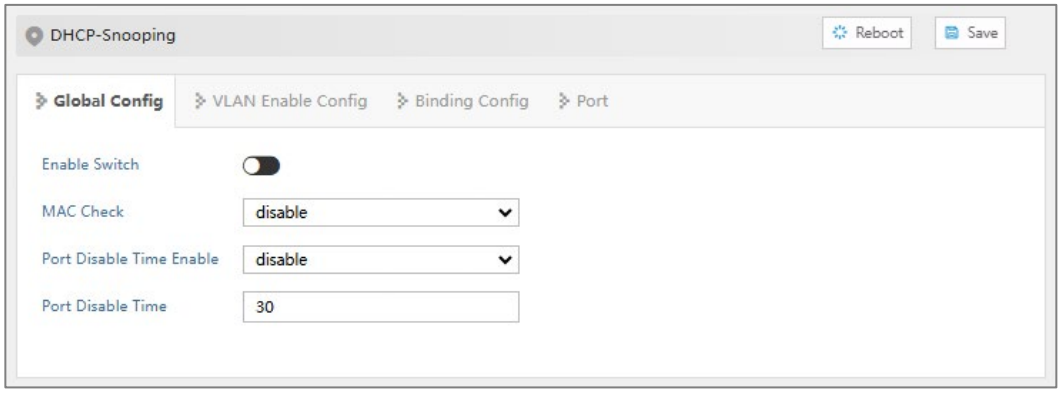
On the “Global Configuration” page, user can enable/disable DHCP Snooping.

Operation Path

Open in order: "Network > DHCP Snooping > Global Config".

Interface Description

Global configuration interface is as follows:



The main element configuration description of global configuration interface:

Interface Element	Description
Enable Switch	Swipe to the right to enable DHCP-Snooping.
MAC Check	Enable DHCP client MAC address checking. Note: Enabling DHCP-Snooping will automatically turn on DHCP client MAC address checking.
Port Disable Time Enable	When the DHCP message rate of a port is lower than the configured rate of the port, the port’s port disable duration will be disabled.
Port Disable Time	Port disable time, the input range is 1-3600, the unit is s, and the default is 30s.

8.6.2 VLAN Enable Configuration

Function Description

On the “VLAN Enable Configuration” page, user can specify that the VLAN to enable DHCP Snooping.

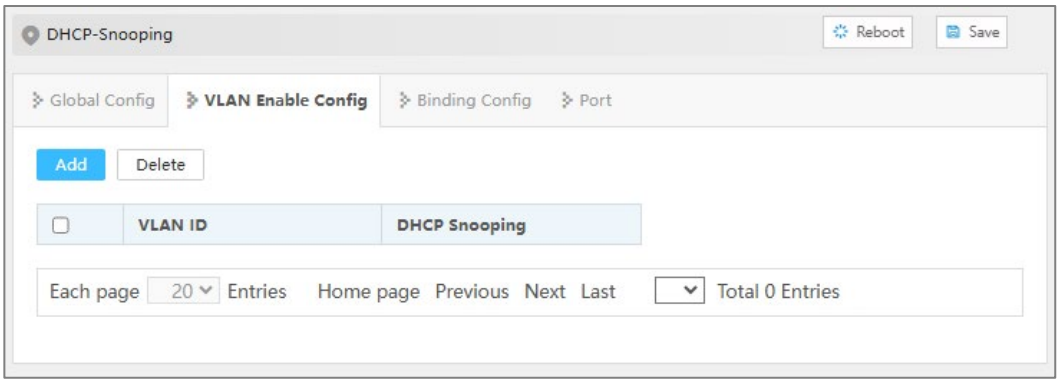
Copyright © 3onedata Co., Ltd.

Operation Path

Open in order: "Network > DHCP-Snooping > VLAN Enable Config".

Interface Description

The Vlan enable configuration interface is as follows:



Main elements configuration description of Vlan enable configuration interface:

Interface Element	Description
VLAN ID	The VLAN number.
DHCP Snooping	Enable status of DHCP Snooping. • enable • disalbe

8.6.3 Binding Configuration

Function Description

On the Binding Configuration page, user can bind ports, IP addresses and MAC addresses.

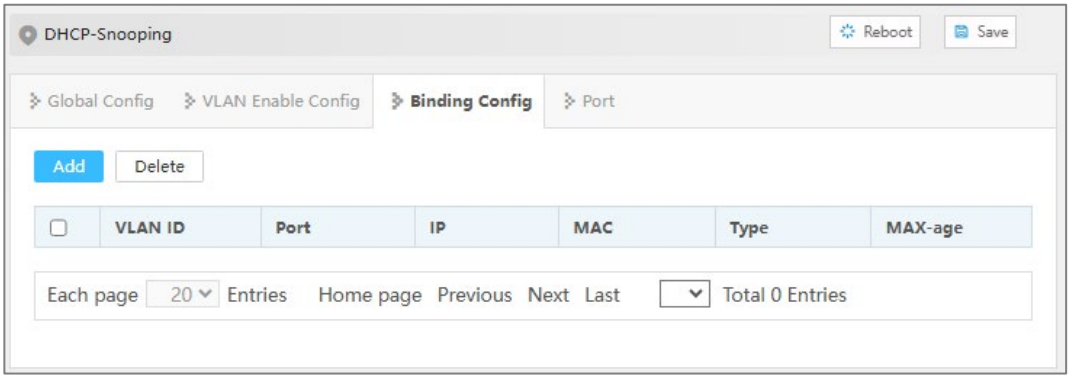
Operation Path

Open in order: "Network > DHCP-Snooping > Binding Config".

Interface Description

The bind configuration interface is as follows:

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Main elements configuration description of bind configuration interface:

Interface Element	Description
VLAN ID	Binding VLAN ID information, for example: 1-4094.
Port	The corresponding port name of the device Ethernet port.
IP	Binding IP address, for example: 192.168.1.1.
MAC	Binding MAC address, for example: 0001.0001.0001.
Type	Port type: • Static Configuration • Dynamic
MAX-age	Port aging time.

8.6.4 Port Configuration

Function Description

On the port configuration page, user can configure DHCP Snooping port information.

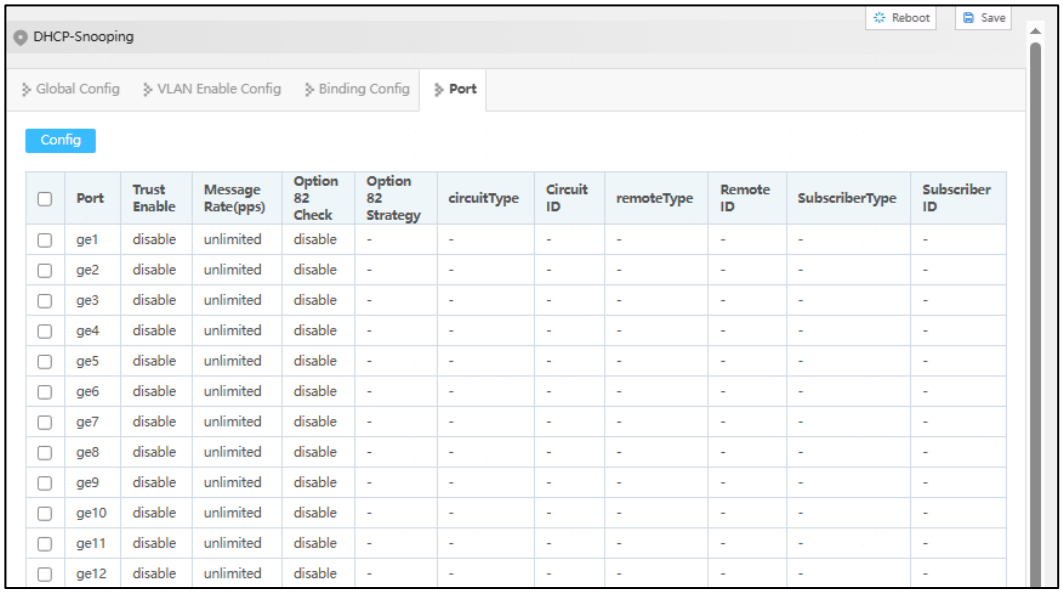
Operation Path

Open in order: "Network > DHCP-Snooping > Port".

Interface Description

Check port configuration interface as below:

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The main element configuration description of global configuration interface:

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
Trust Enable	Port trust enable, and the trust port forwards the received DHCP message normally.
Message Rate (pps)	Message transmission speed of port, the input range is 10-1000 (pps), and the default value is 1000s.
Option 82 Check	When Option 82 check is turned on, the location information of DHCP client can be obtained from Option 82, so as to locate DHCP client.
Option 82 Strategy	Option 82 dealing strategy, options as follows: • Drop: Discard messages. • Keep: Adopt different modes to fill Option 82, replace prime Option 82 in message and forward, filling modes will be described as below. • Replace: Keep Option 82 in messages unchanged and forward.
Circuit Type	Circuit type, available options are as follows: • ASCII: Character mode • HEX: Hexadecimal mode
Circuit ID	The filling content of the circuit ID sub-option supports ASCII and HEX formats. Note: • The input length is limited between 2 and 64; • When Hex is selected, the input content is a combination of uppercase and lowercase letters and numbers. • When ASCII is selected, the content is not limited.

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Interface Element	Description
Remote Type	Remote connection or remote access type, available options are as follows: • ASCII: Character mode • HEX: Hexadecimal mode
Remote ID	The filling content of the remote ID sub-option supports ASCII and HEX formats. Note: • The input length is limited between 2 and 64; • When Hex is selected, the input content is a combination of uppercase and lowercase letters and numbers. • When ASCII is selected, the content is not limited.
Subscriber Type	User option fill type, which supports ASCII format.
Subscriber ID	The filling content of Subscriber ID sub-option supports ASCII and HEX formats. Note: • The input length is limited between 2 and 64; • When Hex is selected, the input content is a combination of uppercase and lowercase letters and numbers. • When ASCII is selected, the content is not limited.

8.7 QoS

QoS (Quality of Service) is used to evaluate the ability of the service provider to meet the service needs of customers. As for network business, service quality includes transmission bandwidth, transfer delay, data packet loss rate and so on.

The service quality issues that traditional network faces are caused by network congestion. The so-called congestion refers to the phenomenon that the forwarding rate decreases and extra delays are introduced due to the relative shortage of supply resources, thus leading to the decline of service quality. As for congestion management, queue technology is generally adopted. It uses a queue algorithm to classify flow, then uses some priority algorithm to send these flow.

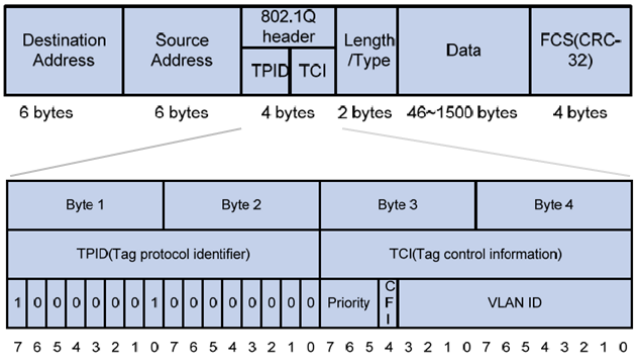
Priority is used to tag the priority of message transmission.

- CoS

  Ethernet defines 8 business priorities (CoS, Class of Service) in the VLAN TAG of Ethernet frame head. The 802.1Q label head of 4 bytes has included 2-byte TPID（Tag Protocol Identifier) and 2-byte TCI（Tag Control Information), TPID's is 0x8100, the following graph has displayed the details of 802.1Q label head,

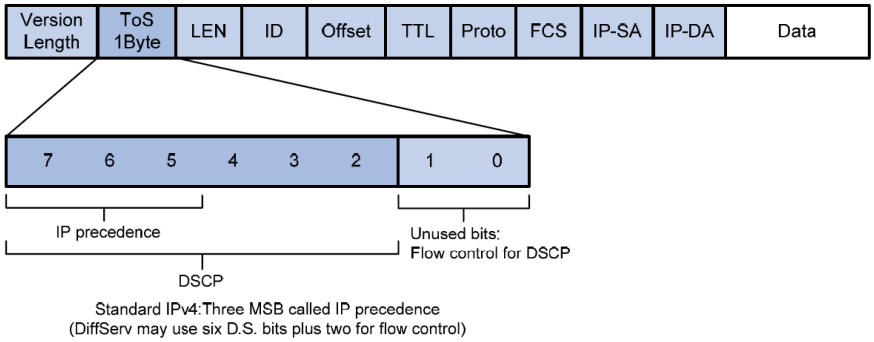
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priority field is 802.1p priority.



- DSCP

  The ToS (Type of Service) domain in the head of IP message is called DS (differential Services) domain, in which the priority of DSCP (Differentiated Services Code Point) is represented by the first 6 digits (0 ~ 5 digits) of this domain, with a value range of 0-63, and the last 2 digits (the 6th and 7th digit) are reserved. The greater the priority level value, the higher the priority level.



8.7.1 Global Configuration

Function Description

On the “Global Configuration” page, user can enable/disable QoS enable state.

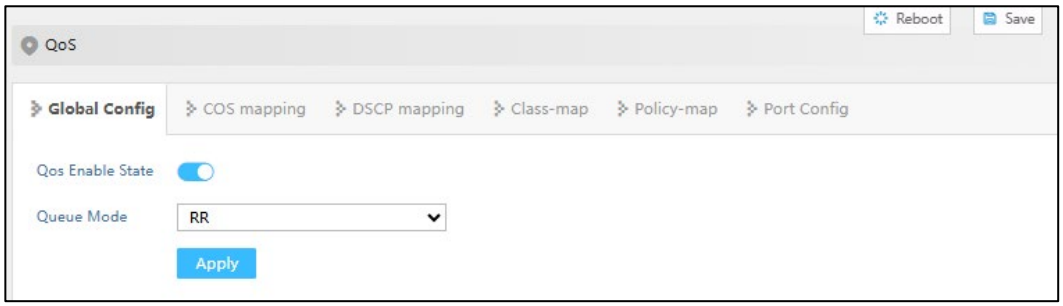
Operation Path

Open in order: "Network > QoS > Global Config".

Interface Description

The screenshot of global configuration interface:

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The main element configuration description of QoS classification interface:

Interface Element	Description
Queue Mode	Queuing scheduling setting, options are: • SP (Strict Priority Scheduling Algorithm): Strict priority queue scheduling algorithm includes 4 queues and schedules in the decreasing order of priority. When the queue with high priority is empty, then it would send groupings of queue with fairly low priority. • WRR (Weighted Round Robin Scheduling Algorithm): a weighted round robin scheduling algorithm, in which the number of packets that each queue can transmit at a time is determined according to the set weight value. • RR (Round-Robin Scheduling Algorithm): Round-robin scheduling algorithm assigns a time slice to each queue. When the time a queue occupies the CPU exceeds one time slice, the queue is suspended and moved to the end of the ready queue, waiting for its next turn to forward.

Note

- When the DSCP and CoS are not enabled, queuing and scheduling are in the order of port priority.
- When the DSCP or CoS are enabled, queuing, and scheduling according to DSCP or CoS instead of considering port priority.
- If the DSCP and CoS are enabled at the same time, queuing according to DSCP priority. When the DSCP values are the same, queuing according to CoS priority.

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8.7.2 CoS Mapping

Function Description

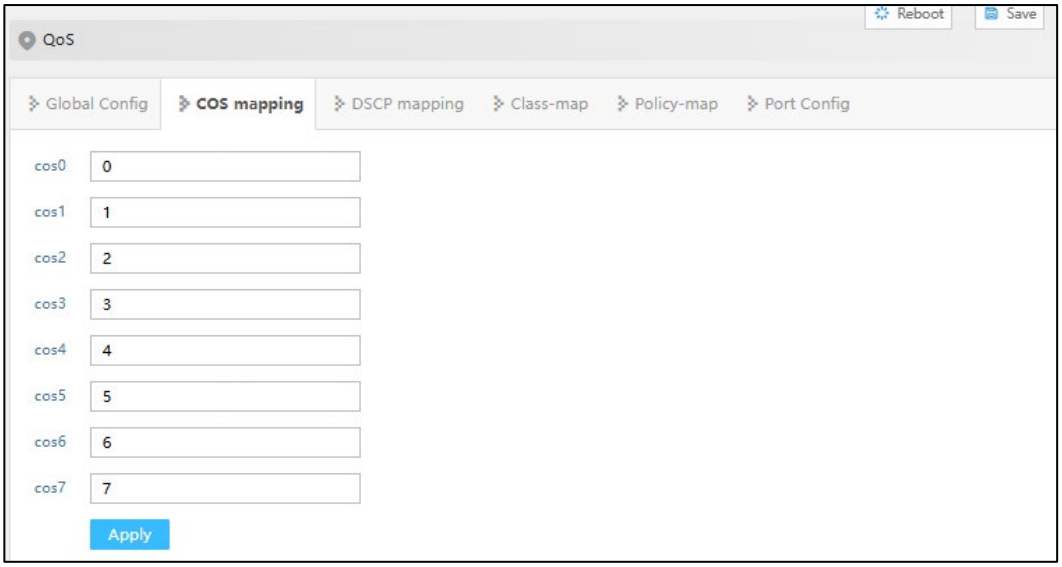
On the page of “CoS Mapping”, user can configure mapping between CoS value and priority queues.

Operation Path

Open in order: “Network > QoS > QoS Mapping”.

Interface Description

Screenshot of QoS Mapping interface:



The main element configuration description of QoS mapping interface:

Interface Element	Description
CoS value	Display CoS value.
Priority queue	Set mapping between CoS value and priority queue, value range is 0-7, the greater the value, the higher the priority level. • Low: low priority queue • Normal: normal priority queue • Medium: medium priority queue • High: high priority queue

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8.7.3 DSCP Mapping

Function Description

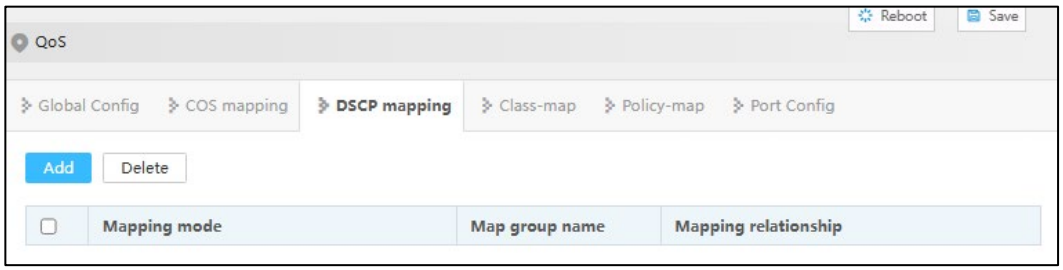
On the page of “DSCP Mapping”, user can configure mapping relation between DSCP value and priority queue.

Operation Path

Open in order: “Network > QoS > DSCP Mapping”.

Interface Description

DSCP Mapping interface screenshot:



The main element configuration description of DSCP mapping interface:

Interface Element	Description
Map group name	The map group name, which supports 0-32 characters, consists of uppercase letters, lowercase letters, numbers or special characters (! @ _-).
Mapping mode	Mapping mode, options as follows: • dscp-mutation: means to modify the DSCP field value of the ingress message according to the dscp field value of the egress message; • dscp-cos: represents priority mapping, which is used to realize the conversion between the DSCP, a QoS priority field carried by the message, and the internal priority of the device, so as to provide differentiated QoS service quality.
Mapping relationship	Incoming/outgoing DSCP values, ranging from 0-63, supporting up to 8 values, with multiple values separated by commas.

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8.7.4 Class-map

Function Description

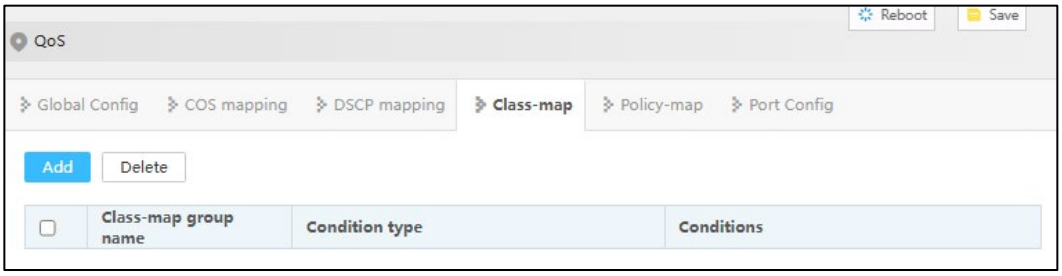
On the page of “Class-map”, user can configure mapping relation between Class-map and priority queue.

Operation Path

Open in order: "Network > QoS > Class-map".

Interface Description

Class-map interface screenshot:



The main elements configuration description of “Class-map” interface:

Interface Element	Description
Class-map group name	The Class-map group name, which supports 0-32 characters, consists of uppercase letters, lowercase letters, numbers or special characters (! @ _-).
Condition type	Condition type, options are as follows: • "-": No conditions selected. • access-group • vlan • layer4
Conditions	Display as follows: • access-group: "ACL Group Name" must be configured. • vlan: "Start VLAN" and "End VLAN" must be configured (valid range: 1-4094). • layer4: Must configure "Port Type (destination-port & source-port)", "Start Port No.", and "End Port No." (valid range: 1-65535).

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8.7.5 Policy-map

Function Description

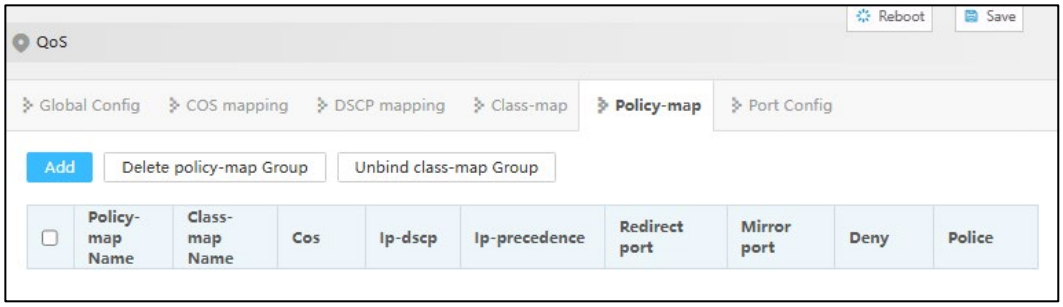
On the page of “Policy-map”, user can configure mapping relation between Policy-map and priority queue.

Operation Path

Open in order: "Network > QoS > Policy-map".

Interface Description

Policy-map interface screenshot:



The main elements configuration description of “Policy-map” interface:

Interface Element	Description
Policy-map Name	The map group name, which supports 0-32 characters, consists of uppercase letters, lowercase letters, numbers or special characters (! @ _-).
Class-map Name	The Class-map group name, which supports 0-32 characters, consists of uppercase letters, lowercase letters, numbers or special characters (! @ _-).
Cos	CoS mapping value.
Ip-dscp	IP-DSCP (Differentiated Services Code Point) occupies the first 6 bits of the ToS field, extending the marking range of IP-Precedence to enable more granular priority classification. Its valid range is 0-63, supporting more complex service classification.
Ip-precedence	IP-Precedence occupies the first 3 bits of the ToS (Type of Service) field in the IPv4 packet header, used to identify the

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	transmission priority of data packets. The valid range is 0-7 (8 levels in total), with higher values indicating higher priority.
Redirect Port	Redirect port mapping relationships.
Mirror port	Mirrored port mapping relationships.
Deny	Select "Deny" to block the traffic directly.
Police	Selecting "Police" will limit the data traffic.

8.7.6 Port Configuration

Function Description

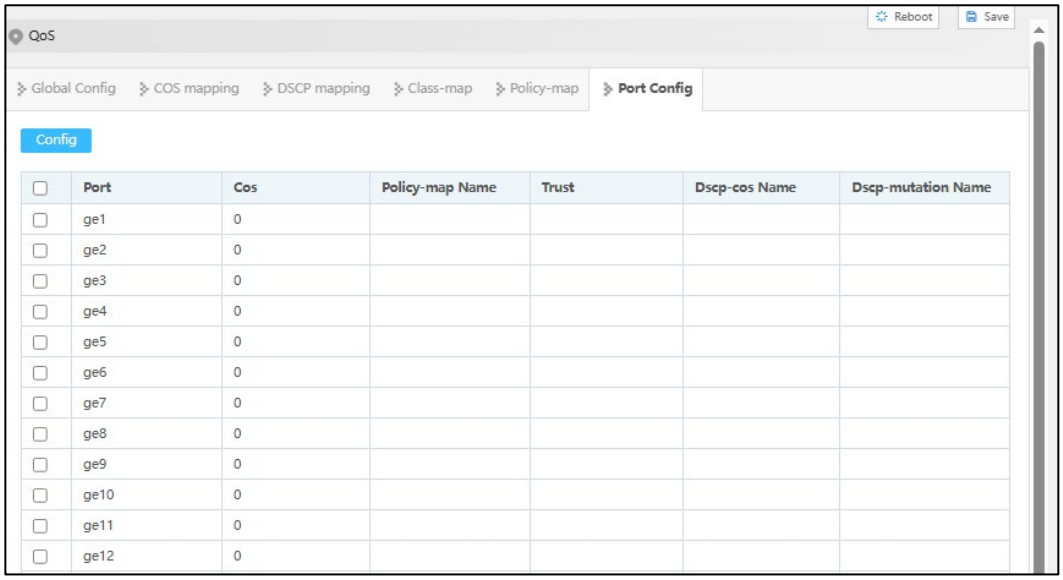
Configure the sending and receiving mode and management address of the port.

Operation Path

Open in order: "Network > QoS > Port Config".

Interface Description

Check port configuration interface as below:



The main element configuration description of port configuration interface:

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
Cos	Optional Service Classification (0-7) • 0-7

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Interface Element	Description
	• -: null field
Policy-map Name	Indicates that the the Policy- map is bound to the interface.
Trust	Controls whether a specific DSCP value is trusted. Only frames with trusted DSCP values are mapped to a specific QoS class and Drop Precedence Level. Frames with untrusted DSCP values are treated as a non-IP frame.
Dscp-cos Name	Indicates that the dscp-cos mapping group is bound to the interface.
Dscp-mutation Name	Indicates that the dscp-mutation mapping group is bound to the interface.

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9 System Maintenance

9.1 Network Diagnosis

9.1.1 Ping

Function Description

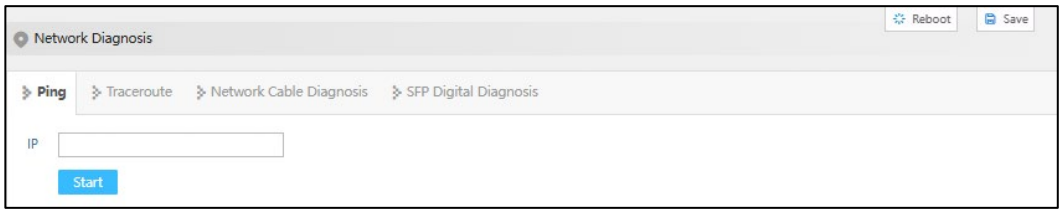
Ping is used to check whether the network is open or network connection speed. The Ping command uses the uniqueness of the IP address on the network to send a packet to the target IP address, and then asks to return a packet of the same size to determine whether the network is connected and what the delay is.

Operation Path

Open in order: "System > Network Diagnosis > Ping".

Interface Description

The Ping interface is as follows:



The main element configuration description of Ping interface:

Interface Element	Description
IP	The IPv4 or IPv6 address of the detected device, that is, the destination address. The device can check the network intercommunity to other devices via the ping command.

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9.1.2 Traceroute

Function Description

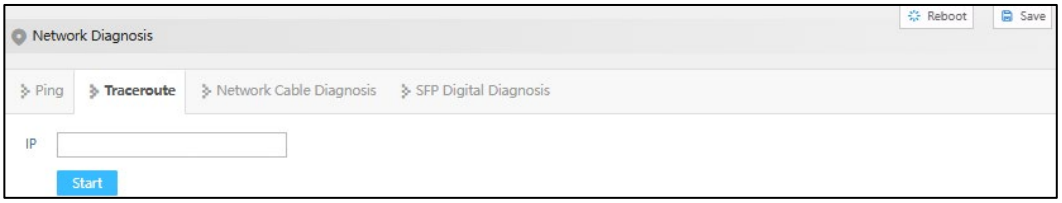
Test the network situation between the switch and the target host. Traceroute measures how long it takes by sending small packets to the destination device until they return. Each device on a path Traceroute returns three test results. Output result includes each test time (ms), device name (if exists) and the IP address.

Operation Path

Open in order: "System > Network Diagnosis > Traceroute".

Interface Description

Traceroute interface is as follows:



The main element configuration description of Traceroute interface:

Interface Element	Description
IP	Destination device IPv4 or IPv6 address, fill in the opposite device IP address that needs test.

9.1.3 Network Cable Diagnosis

Function Description

It can detect whether there is a fault in the cable used by the copper port of the device. When the cable is in normal condition, the length in the detection information refers to the total length of the cable. When the cable is in abnormal condition, the length in the detection information refers to the length from this interface to the fault location. The 8-wire network cable has 4 groups of differential lines, and the device can detect the length and status of each group of differential lines.

Note

- The accuracy of detecting cable length is about 5 meters, and the test results are for

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reference only. The test results of different types or different manufacturers may be different.

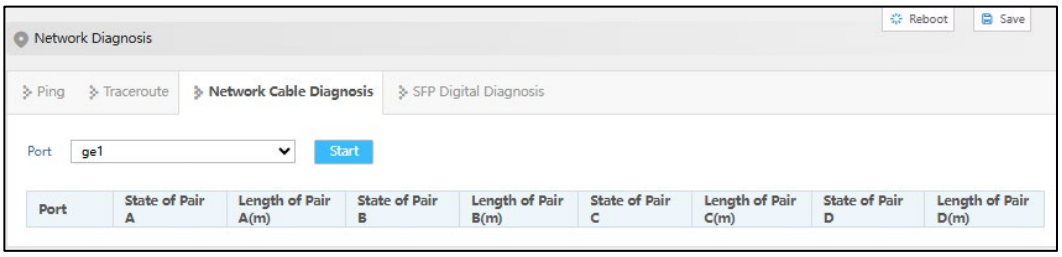
- When testing, it will affect the normal use of the interface business in a short time, and may also cause the interface of UP to oscillate.

Operation Path

Open in order: "System > Network Diagnosis > Network Cable Diagnosis".

Interface Description

Network cable diagnosis interface screenshot is as follows:



Main elements configuration description of network cable diagnosis interface:

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
State of Pair A/B/C/D	The state of the differential line, such as OK (normal), OPEN (open circuit), SHORT (short circuit), CROSS (cross/crosstalk), etc.
Length of Pair A/B/C/D (m)	Length of the differential line, unit: meter.

9.1.4 SFP Digital Diagnosis

Function Description

Monitor SFP parameters in real time. This function has greatly facilitated the troubleshooting process of optical fiber link and the cost of on-site debugging.

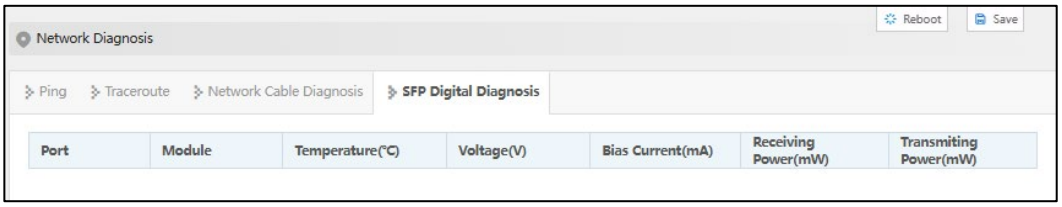
Operation Path

Open in order: "System > Network Diagnosis > SFP Digital Diagnosis".

Interface Description

The SFP digital diagnostic interface is as follows:

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The main element configuration description of SFP digital diagnosis interface:

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
Module	Parameter information of optical module:
Temperature（℃）	This device's SFP temperature. Its unit is ℃. The working temperature of SFP module should not exceed the normal
Voltage (V)	The voltage provided by the device to SFP, unit: V. Overvoltage could lead to the breakdown of CMOS device; under voltage would disable the normal operation of lasers.
Bias Current (mA)	The bias current of laser.
Receiving Power (mW)	Optical input power, referring to the lowest optical power of receiving in certain rate and bit error rate.
Transmitting Power (mW)	Optical output power, referring to the output power of optical source in the sending end of optical module.

9.2 Time

9.2.1 NTP Configuration

The full name of NTP protocol is Network Time Protocol. Its destination is to transmit uniform and standard time in international Internet. Specific implementation scheme is appointing several clock source websites in the network to provide user with timing service, and these websites should be able to mutually compare to improve the accuracy. It can provide millisecond time correction, and is confirmed by the encrypted way to prevent malicious protocol attacks.

Function Description

Configure the device time and NTP server information.

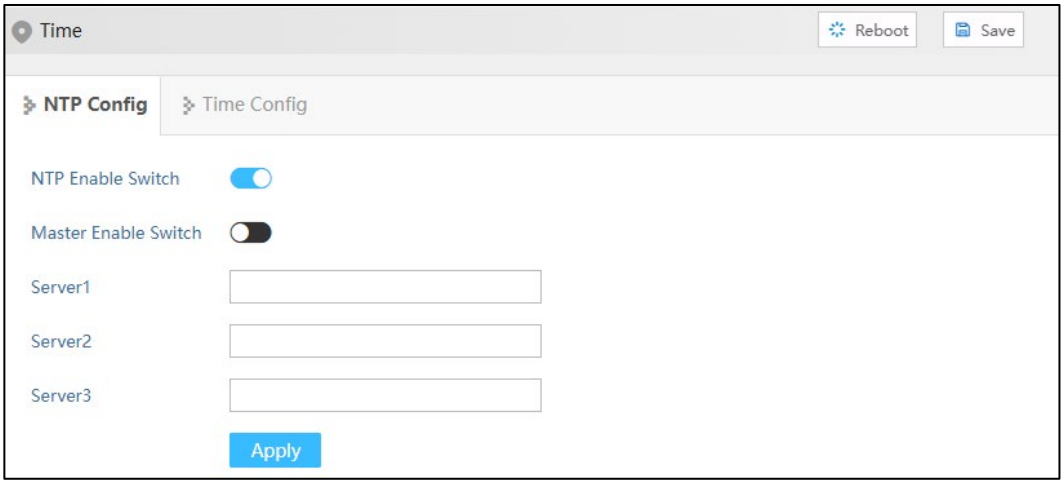
Operation Path

Open in order: "System > Time > NTP Configuration".

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Interface Description

The NTP configuration interface is as follows:



Main element configuration description of NTP configuration interface:

Interface Element	Description
NTP Enable Switch	NTP protocol enable switch.
Master Enable Switch	Master enable switch, after enabled, the device starts NTP service, and uses the local clock of the device as NTP master clock to provide clock source for other devices.
Server	IP address of NTP server, for example: 192.168.1.1. Note: As NTP client, the system will synchronize time with NTP server every 11 minutes.

9.2.2 Time Configuration

Function Description

Configure device time

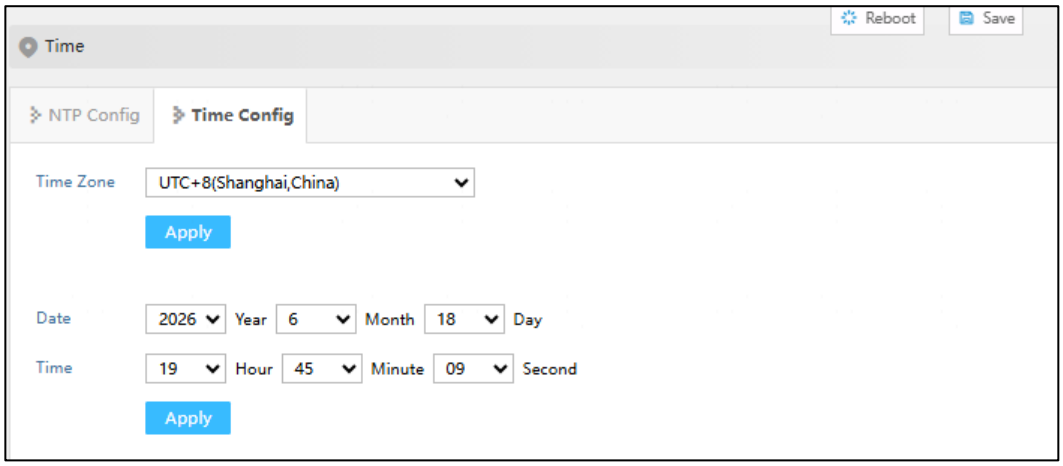
Operation Path

Open in order: "System > Time > Time Config".

Interface Description

Time settings interface is as follows:

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Main elements configuration description of time settings interface:

Interface Element	Description
Time Zone	UTC (Universal Time Coordinated) time zone. Due to different regions, users can freely set the system clock according to the regulations of their own country or region.
Date	Data configuration, year/month/day.
Time	Time configuration, hour/minute/second.

9.3 Alarm

9.3.1 Alarm Trigger

Function Description

The device system provides multiple alarm trigger sources, including port status, abnormal temperature, power failure, and excessive network load. When these trigger sources are activated, users can trigger the alarm by configuring LED indicator, relay, Trap message or email alarm mode, so as to respond and deal with potential problems in time.

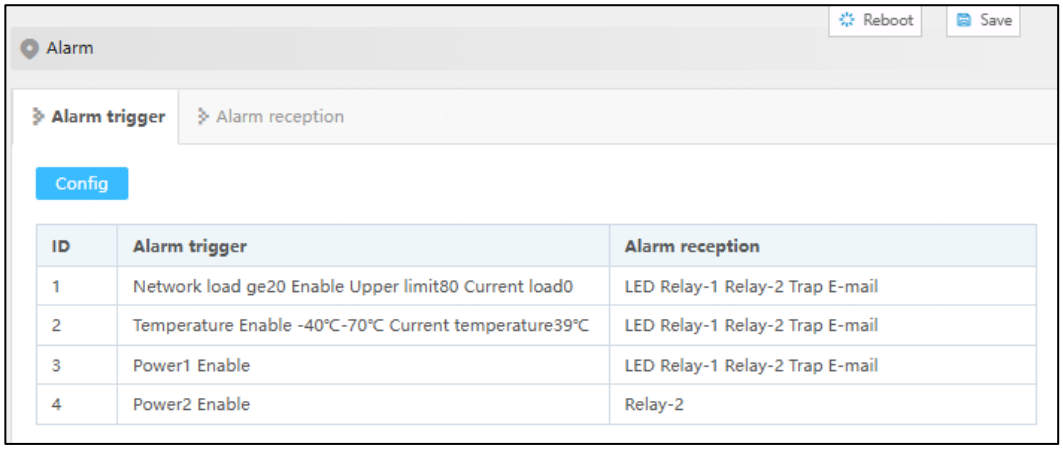
Operation Path

Open in order: "System > Alarm > Alarm trigger".

Interface Description

The Alarm Trigger interface is as follows:

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The main element configuration description of Alarm Trigger interface:

Interface Element	Description
ID	Alarm trigger entry.
Alarm trigger	Device alarm triggers include port, temperature, power supply and network load.
Alarm reception	Device alarm modes include LED, Relay1, Relay2, Trap and E-mail.

9.3.1.1 Port Alarm

Function Description

Configure the port alarm function. When the device port is in an abnormal state, the administrator can be informed in time, and the device state can be quickly repaired to avoid excessive loss.

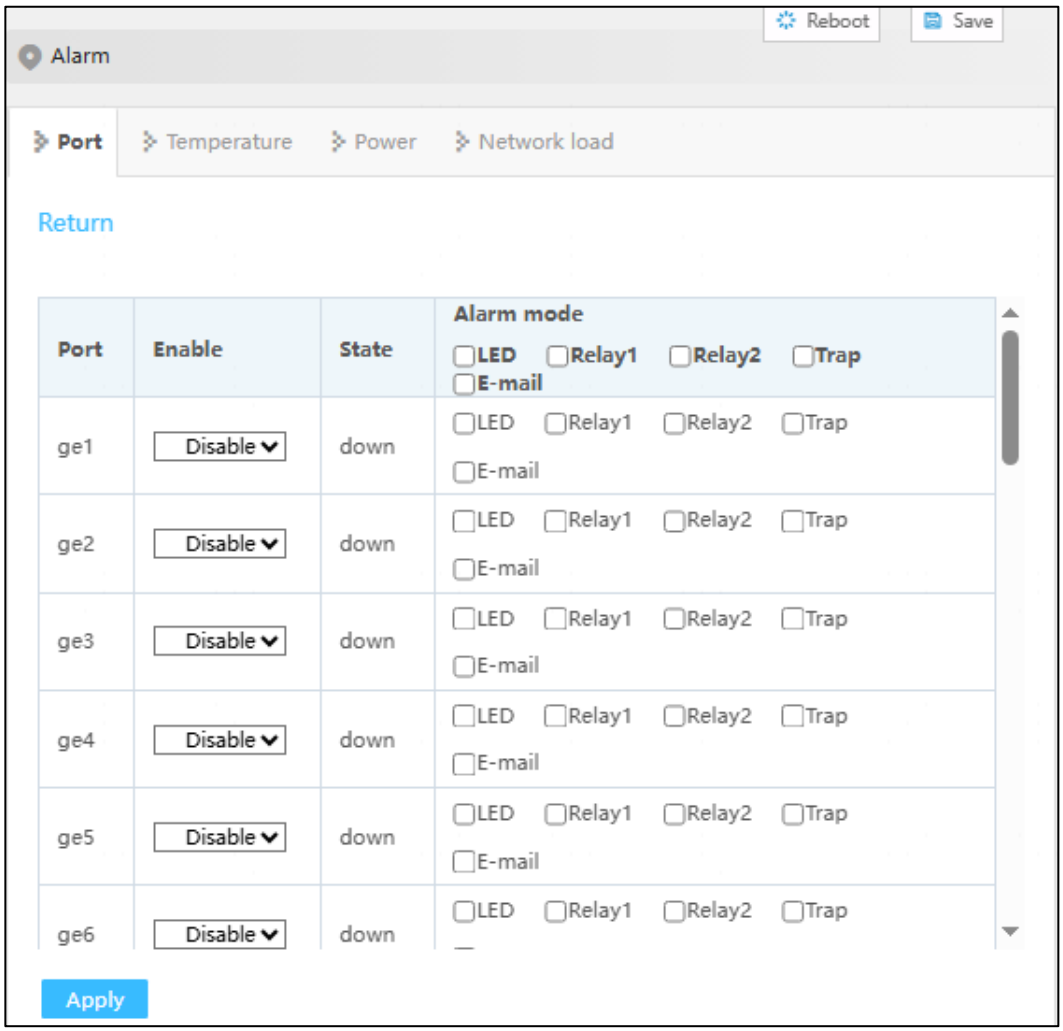
Operation Path

Open in order: "System > Alarm > Alarm Trigger > Port".

Interface Description

Port alarm interface is as below:

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The main element configuration description of port alarm configuration interface:

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
State	Port link status, display items as follows: • link • down
Enable	Port alarm function status, options are as follows: • Enable • Disable Note: After enabling port alarm, when port occurs abnormal status, such as disconnection, the device will output an alarm signal to hint the abnormal operation of device port via setting LED indicator, relay, Trap message or e-mail.
Alarm mode	Alarm mode of port alarm, with options: • LED • Relay1 • Relay2

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Interface Element	Description
	• Trap • E-mail Note: If checked, the LED indicator, Relay1, Relay2, Trap message or email alarm mode will be turned on to trigger the alarm.

9.3.1.2 Temperature Alarm

Function Description

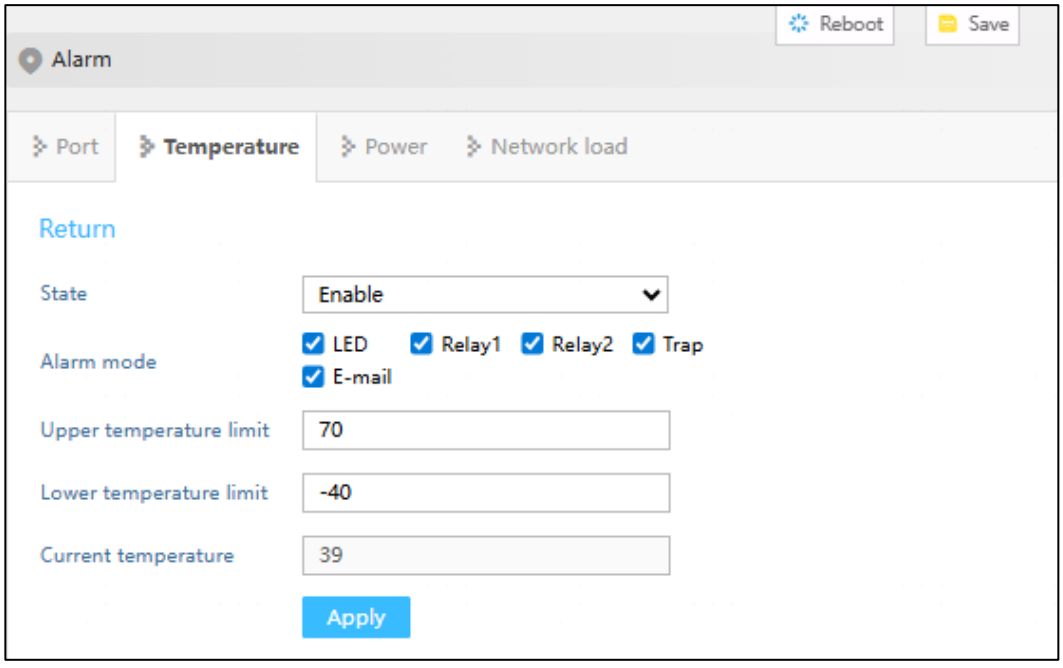
Configure the temperature alarm function. When the device temperature is in an abnormal state, the administrator can be informed in time, and the device can be quickly protected to avoid damage.

Operation Path

Open in order: "System > Alarm > Alarm Trigger > Temperature".

Interface Description

The temperature alarm interface is as follows:



The main element configuration description of temperature alarm information interface:

Interface Element	Description
State	Temperature alarm switch status, with options: • Enable

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Interface Element	Description
	• Disable Note: After the temperature alarm is enabled, when the temperature of the device is abnormal, such as when the temperature exceeds the set upper limit or lower limit, the device will output an alarm signal to remind the device that the temperature is abnormal by setting LED indicator, relay, Trap message or email.
Alarm mode	Alarm mode of temperature alarm, with options: • LED • Relay1 • Relay2 • Trap • E-mail Note: If checked, the LED indicator, Relay1, Relay2, Trap message or email alarm mode will be turned on to trigger the alarm.
Upper temperature limit	Set the upper limit temperature of the device, ranging from -40 to 120 C.
Lower temperature limit	Set the lower limit temperature of the device, ranging from -40 to 120 C.
Current temperature	Current temperature state of the device.

9.3.1.3 Power Alarm

Function Description

The device system provides this function, and you can set the power alarm function.

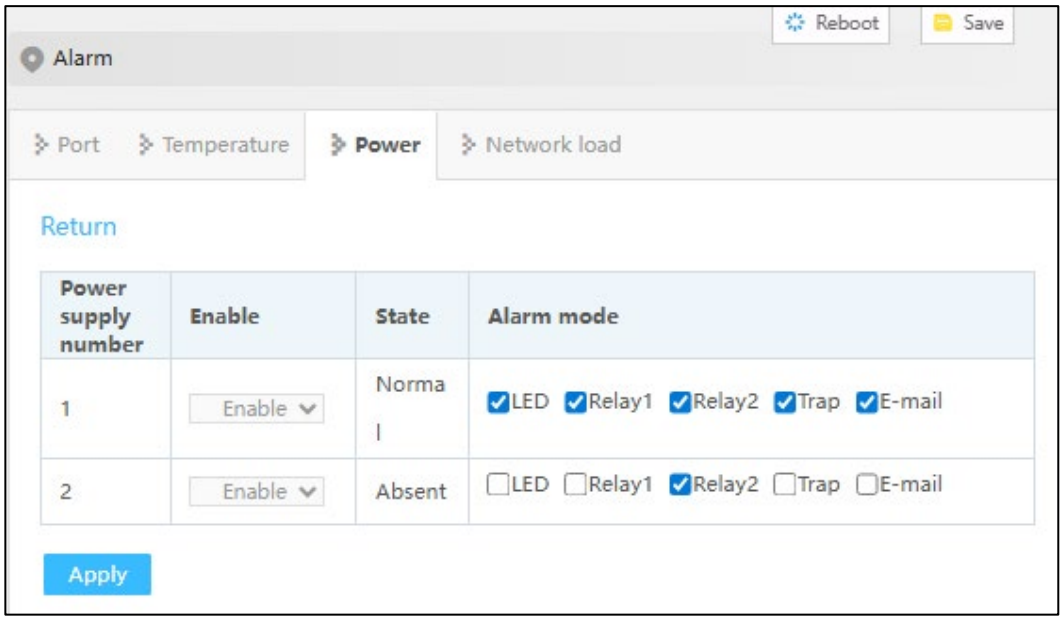
Operation Path

Open in order: "System > Alarm > Alarm Trigger > Power ".

Interface Description

Power alarm interface is as below:

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Main elements configuration description of power alarm interface:

Interface Element	Description
Power supply number	The corresponding name of this device's power supply
Enable	The state of power supply alarm, with options: • Enable • Disable Note: The power alarm is applicable to dual power supplies. After it is enabled, when one of the power supplies is disconnected or fails, the device will output an alarm signal to hint the abnormal operation of device power via LED indicator, relay, Trap message or email.
State	Device power link status, display items as follows: • Normal • Absent
Alarm mode	Alarm mode of power alarm, with options: • LED • Relay1 • Relay2 • Trap • E-mail Note: If checked, the LED indicator, Relay1, Relay2, Trap message or email alarm mode will be turned on to trigger the alarm.

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9.3.1.4 Network Load Alarm

Function Description

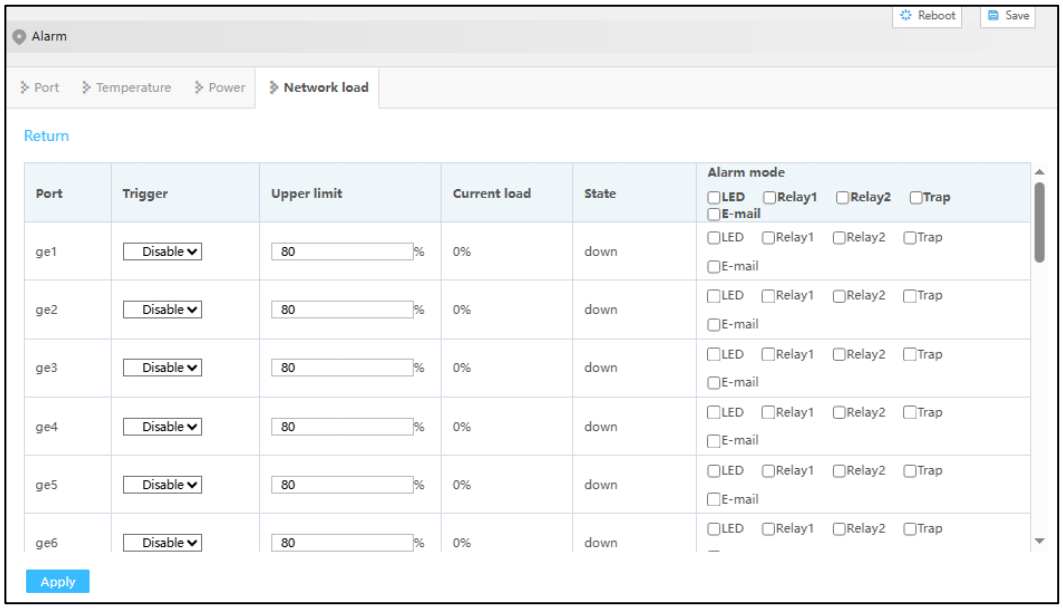
The device system provides this function, and you can set the network load alarm function.

Operation Path

Open in order: "System > Alarm > Alarm Trigger > Network Load".

Interface Description

Network load alarm interface is as follows:



The main element configuration description of network load alarm interface:

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
Trigger	Network load alarm switch status, with options: • Enable • Disable Note: After enabling network load alarm, when the device's network load is abnormal, such as when the current network load of the device exceeds the upper limit value, the device will output an alarm signal, which will prompt the device to be abnormal by setting LED indicator, relay Trap messages, or email.
Upper limit	Set the upper limit of network load of device, ranging from 0 to 100.
Current load	If the current network load value of the device exceeds the upper limit value, an alarm will be triggered.

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Interface Element	Description
State	Port link status, display items as follows: • link • down
Alarm mode	Alarm mode of network load alarm, with options: • LED • Relay1 • Relay2 • Trap • E-mail Note: If checked, the LED indicator, Relay1, Relay2, Trap message or email alarm mode will be turned on to trigger the alarm.

9.3.2 Alarm reception

Function Description

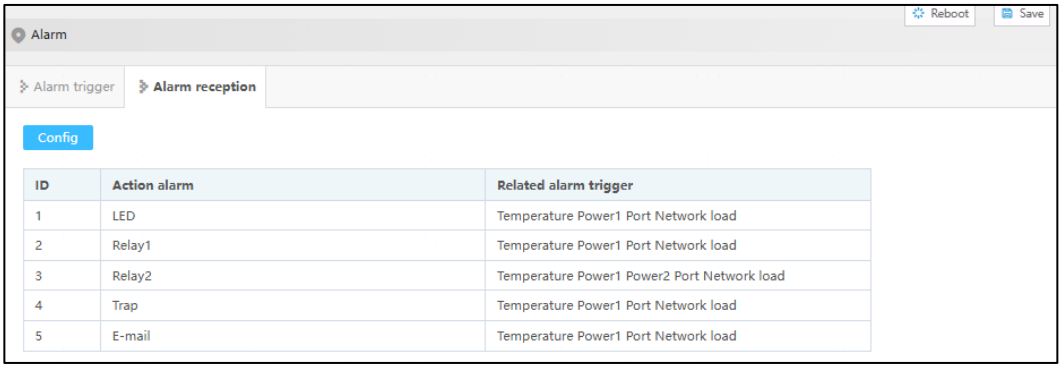
Users can check the configured LED indicator, relay, Trap or email alarm modes, so as to know the different alarm modes of the device in time.

Operation Path

Open in order: "System > Alarm > Alarm Reception".

Interface Description

Alarm reception interface is as below:



The main element configuration description of alarm reception interface:

Interface Element	Description
ID	Alarm mode entry.
Action alarm	Device alarm modes include LED, Relay1, Relay2, Trap and E-mail.

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Interface Element	Description
Related alarm trigger	Device alarm triggers include port, temperature, power supply and network load.

9.3.2.1 Trap Setting

Function Description

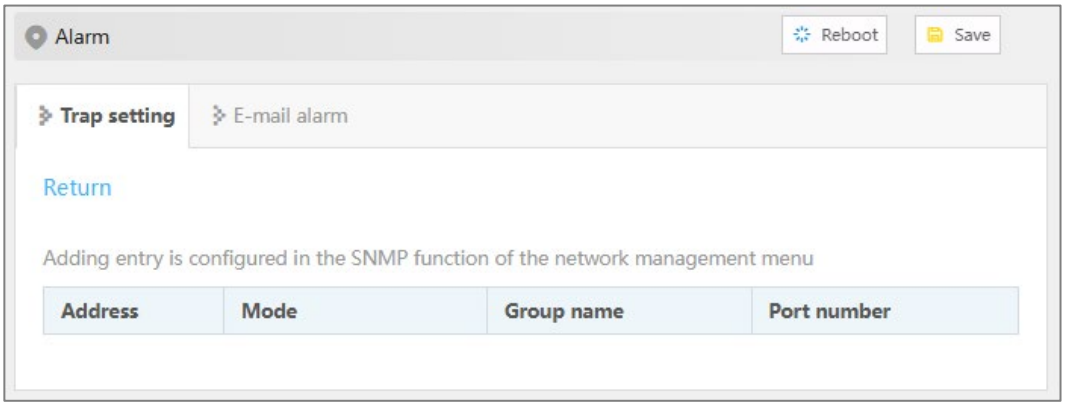
By setting the Trap message trap, the administrator can realize real-time monitoring and quick response to the device or system status, so as to find and deal with problems in time.

Operation Path

Open in order: "System > Alarm > Alarm Reception > Trap Setting".

Interface Description

The Trap setting interface is as follows:



The main element configuration description of Trap setting interface:

Interface Element	Description
Address	IP address of SNMP management device, used for receiving alarm information, such as PC.
Mode	SNMP management device version, options as below: • v1 • v2c • v3
Group name	Group name.
Port number	The corresponding port name of the device Ethernet port.

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9.3.2.2 E-mail Alarm

Function Description

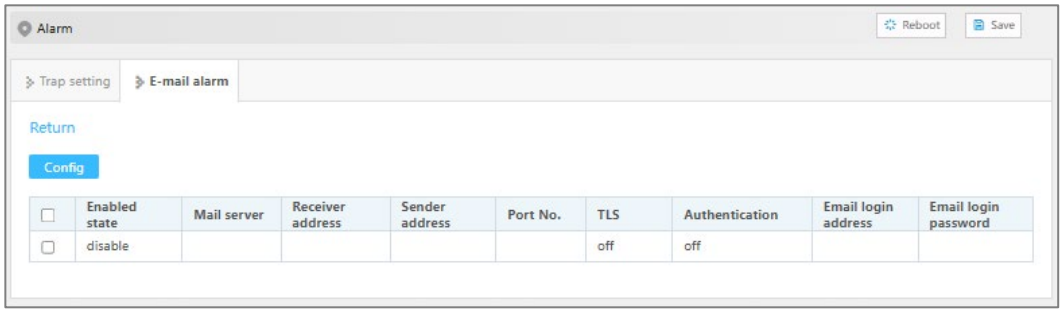
On the "Email Alarm" page, user can configure the sender, recipient, mailbox server and other parameters. The system can inform the hot start, cold start, login failure, static IP modification and password modification of the device by email.

Operation Path

Open in order: "System > Alarm > Alarm Reception > E-mail Alarm".

Interface Description

The E-mail alarm configuration interface is as follows:



Main elements configuration description of E-mail alarm configuration interface:

Interface Element	Description
Enable state	Enable/disable E-mail alarm.
Mail server	Server address of used E-mail should be filled according to the account of used E-mail address. The host IP address or used host name that provides E-mail delivery service for the device.
Receiver address	Mailbox address used for receiving alarm mails.
Sender address	Mailbox address used for sending alarm mails.
Port No.	Port number of mailbox server.
TLS	TLS (Transport Layer Security) is a transport-layer security encryption protocol, which is used to provide data confidentiality and integrity in network communication. By using TLS protocol, the transmission process of mail will be encrypted to prevent sensitive information from being eavesdropped or tampered with during transmission. The operation of "TLS" is as follows: • Off: disable TLS encryption protocol; • On: enable TLS encryption protocol.

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Interface Element	Description
Authentication	Authentication refers to whether to verify the mailbox password. The operation of "Authentication" is as follows: • Off: disable the verification email password; • On: enable the verification email password.
Email login address	User name for logging in to the mailbox server.
Email login password	Password of the user name for logging in to the mailbox server.

9.4 Configuration File Management

9.4.1 Current Configuration

Function Description

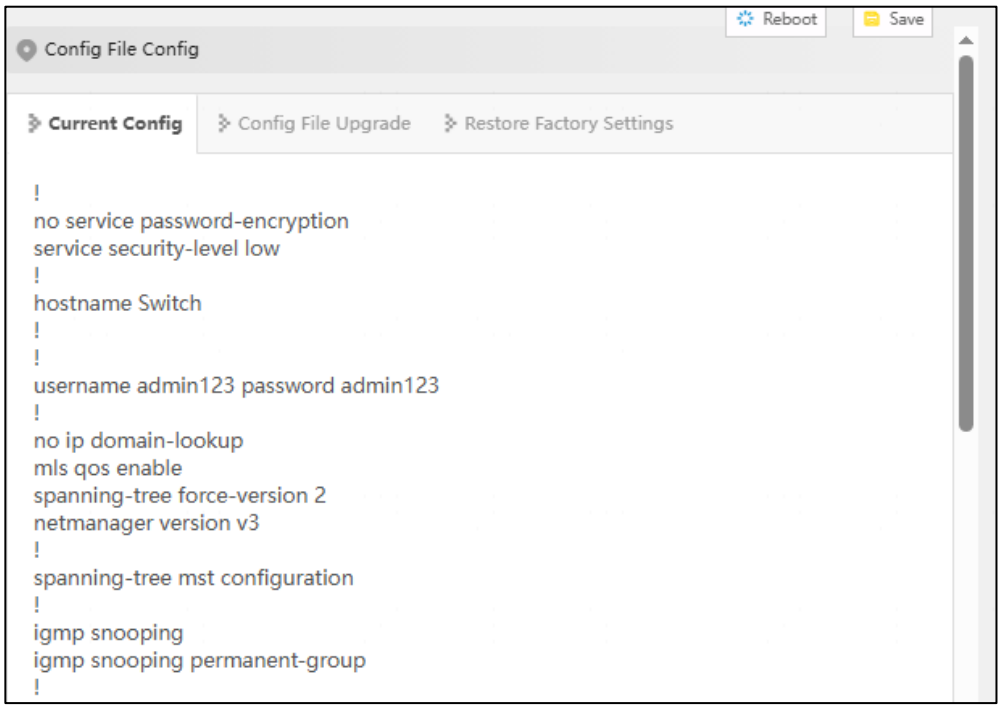
Check current configuration information.

Operation Path

Open in order: "System > Config File > Current Config".

Interface Description

The current configuration interface is as follows:



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9.4.2 Configuration File Upgrade

Function Description

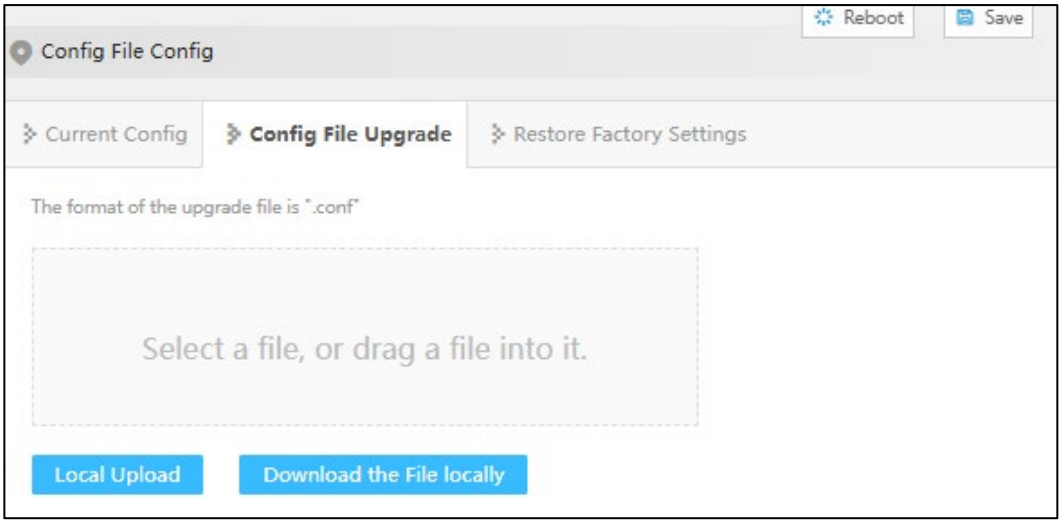
Upload and upload configuration file.

Operation Path

Open in order: "System > Config File > Config File Upgrade".

Interface Description

Configuration file upgrade interface is as follows:



The main element configuration description of configuration file upgrade interface:

Interface Element	Description
Select a file, or drag a file into it	To select the uploaded configuration file, click this area to select the local configuration file, or drag the local configuration file directly into this area.
Local Upload	After selecting the uploaded configuration file, click the "Local Upload" button to start uploading the configuration.
Download the File locally	Click to download the configuration file of the current device. The default file name is "device.conf".

9.4.3 Restore Factory Settings

Function Description

Restore device to factory settings.

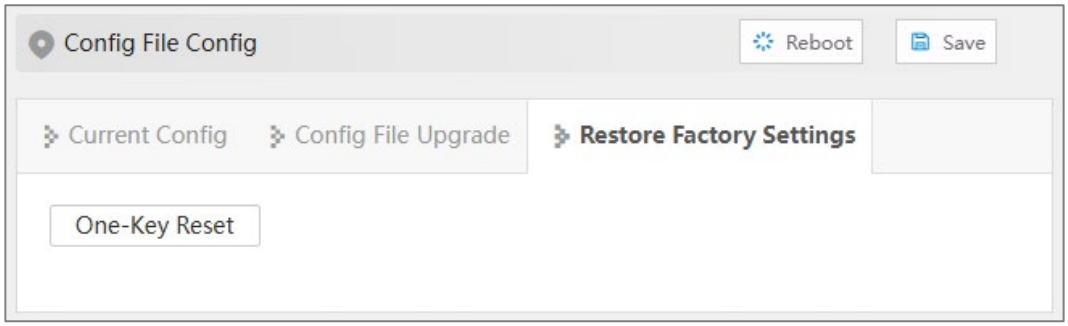
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Operation Path

Open in order: "System > Configure File > Restore Factory Settings".

Interface Description

Restore Factory Settings interface is as follows:



The main element configuration description of restore factory settings interface:

Interface Element	Description
One-Key Reset	Click "One-Key Reset" button, and the configuration file will be restored to the factory configuration.

9.5 Software Upgrade

Function Description

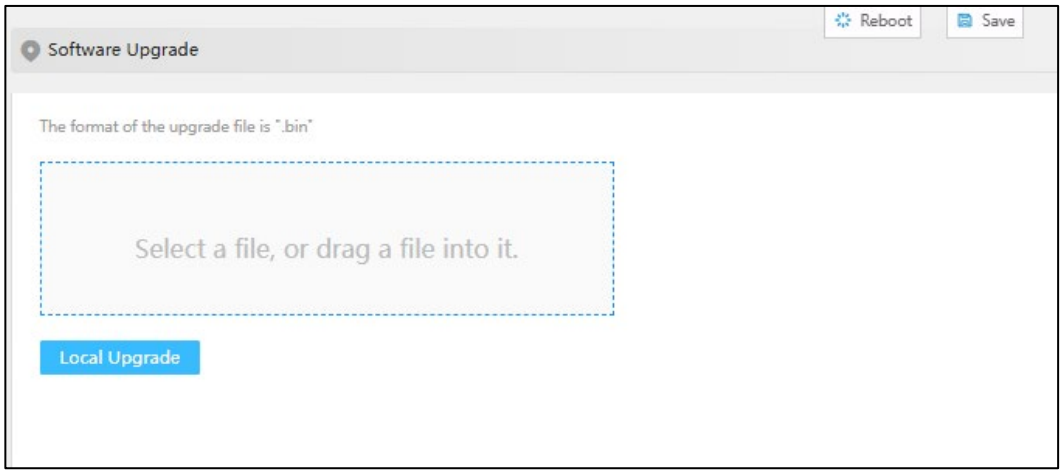
Update and upgrade the device program.

Operation Path

Open in order: "System > Software Upgrade".

Interface Description

The software upgrade interface is as follows:



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The main elements configuration description of software update interface:

Interface Element	Description
Select a file, or drag a file into it	For the upgrade files, click this area to select the local upgrade files, or drag the local upgrade files directly into this area.
Local Upgrade	After selecting the upgraded files, click the "Local Upgrade" button to start the upgrade process. Note: Generally, upgrade firmware is in ".bin" format.

9.6 Log Information

9.6.1 Log Information

Function Description

Check the log information of the device. Log information mainly records user operation, system failure, system safety and other information, including user log, security log and diagnostic log.

- User log: records user operations and system operation information.
- Security log: records information including account management, protocol, anti-attack and status.
- Diagnostic log: records information that assists in problem identification.

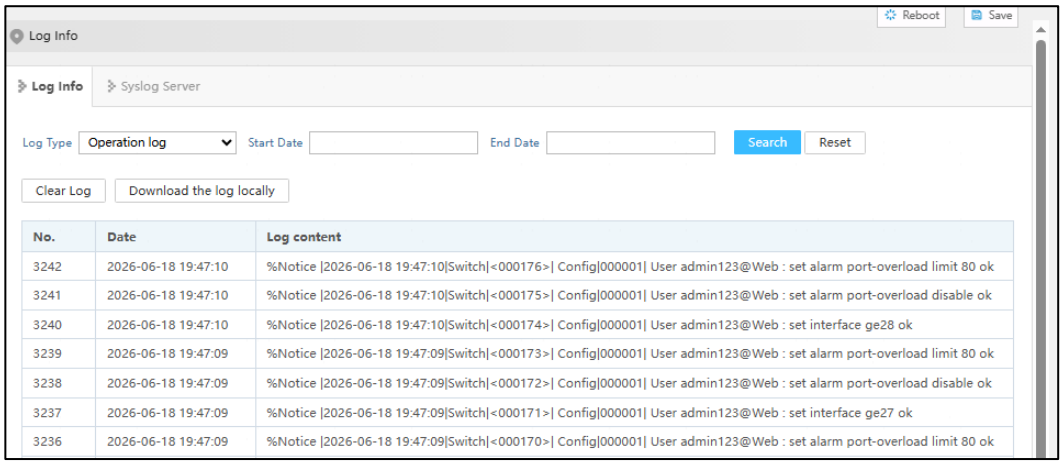
Operation Path

Open in order: "System > Log Info > Log Info".

Interface Description

Log information interface is as follows:

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Main elements configuration description of log information interface:

Interface Element	Description
Download the log locally	Click the "Download the log locally" button to download the current log information to the local.
Clear Log	Click the “Clear Log” button to clear the current log information record.

9.6.2 Syslog Server

Function Description

Configure the Syslog server IP address, and the system log information can be sent to the configured syslog server.

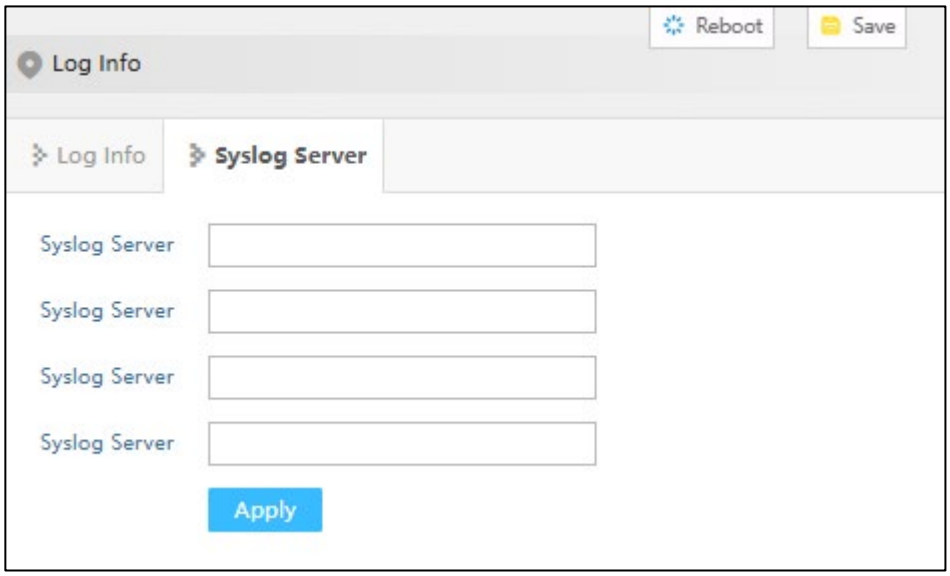
Operation Path

Open in order: "System > Log Info > Syslog Server".

Interface Description

The Syslog server interface is as follows:

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Syslog server interface main elements configuration instructions:

Interface Element	Description
Syslog Server	IP address of Syslog server Note: • Supports port configuration and the input format is IP: port, for example: 192.168.1.1 | fe80::02. • Users can configure up to 4 syslog servers at a time. If the configuration of one or more syslog servers needs to be canceled, delete the input box and click Set.

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10 FAQ

10.1 Login Problem

1. **Why the web page display abnormally when browsing the configuration via WEB?**

   Before accessing the WEB, please eliminate IE cache and cookies. Otherwise, the web page will display abnormally.

2. **What should I do if I forget my login password?**

   IF you forget the login password, you can initialize the password by restoring factory settings. The specific method is to search by management software and use restore factory setting function, then the password will be initialized. Both of the initial user name and password are "admin123".

3. **Is configuring via WEB browser same to configuring via management software?**

   Both configurations are the same, without conflict.

10.2 Configuration Problem

1. **Why the bandwidth can't be increased after configuring Trunking (port aggregation) function?**

   Check whether the port attributes set to Trunking are consistent, such as rate, duplex mode, VLAN and other attributes.

2. **How to deal with the problem that part of switch ports are impassable?**

   When some ports on the switch are impassable, it may be network cable, network

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adapter and switch port faults. User can locate the faults via following tests:

- Keep connected computer and switch ports unchanged, change other network cables;
- Keep connected network cable and switch port unchanged, change other computers;
- Keep connected network cable and computer unchanged, change other switch port;
- If the switch port faults are confirmed, please contact supplier for maintenance.

3. **How about the order of port self-adaption state detection?**

   The port self-adaption state detection is conducted according to following order: 1000Mbps full duplex, 100Mbps full duplex, 100Mbps half-duplex, 10Mbps full duplex, 10Mbps half-duplex, detect in order from high to low, connect automatically in supported highest speed.

10.3 Indicator Problem

1. **Why is the power supply indicator off?**

   Possible reasons include:

   - Not connected to the power socket; troubleshooting, connected to the power socket.
   - Power supply or indicators faults; troubleshooting, change the power supply or device test.
   - Power supply voltage can't meet the device requirements; troubleshooting, configure the power supply voltage according to the device manual.

2. **Link/Act indicator isn't bright, what's the reason?**

   Possible reasons include:

   - The network cable portion of Ethernet copper port is disconnected or bad contact; troubleshooting, connect the network cable again.
   - Ethernet terminal device or network card works abnormally; troubleshooting, eliminate the terminal device fault.
   - Not connected to the power socket; troubleshooting, connected to the power socket.
   - Interface rate doesn't match the pattern; troubleshooting, examine whether the device transmission speed matches the duplex mode.

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3. **Ethernet copper port and fiber port indicator are connected normally, but can't transmit data, what's the reason?**

   When the system is power on or network configuration changes, the device and switch configuration in the network will need some time. Troubleshooting, after the device and switch configuration are completed, Ethernet data can be transmitted; if it's impassable, power off the system, and power on again.

4. **Why does the communication crashes after a period of time, namely, it cannot communicate, and it returns to normal after restarting?**

   Reasons may include:

   - Surrounding environment disturbs the product; troubleshooting, product grounding adopts shielding line or shields the interference source.
   - Site wiring is not normative; Troubleshooting, optical fiber, network cable, optical cable cannot be arranged with power line and high-voltage line.
   - Network cable is disturbed by static electricity or surge; Troubleshooting, change the shielded cable or install a lightning protector.
   - High and low temperature influence; troubleshooting, check the device temperature usage range.

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11 Maintenance and Service

Since the date of product delivery, our company provides 5-year product warranty. According to our company's product specification, during the warranty period, if the product exists any failure or functional operation fails, our company will repair or replace the product for users free of charge. However, the commitments above do not cover damage caused by improper usage, accident, natural disaster, incorrect operation or improper installation.

In order to ensure that consumers benefit from our company's managed switch products, consumers can get help and solutions in the following ways:

- Internet Service;
- Service Hotline;
- Product repair or replacement;

11.1 Internet Service

More useful information and tips are available via our company website. Website: http://www.3onedata.com

11.2 Service Hotline

Users of our company's products could call technical support office for help. Our company has professional technical engineers to answer your questions and help you solve the product or usage problems ASAP. Free service hotline: +86-4008804496

11.3 Product Repair or Replacement

As for the product repair, replacement or return, customers should firstly confirm with the company's technical staff, and then contact the salesmen to solve the problem.

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According to the company's handling procedure, customers should negotiate with our company's technical staff and salesmen to complete the product maintenance, replacement or return.

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