



# 28-Port Series Layer 3 Managed Industrial Ethernet Switch User Manual

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# Preface

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This Switch User Manual has introduced:

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



Note

The reference model for the screenshot in this manual is 24 Gigabit PoE copper ports + 4 10Gigabit SFP+. In addition to the differences in the supported power supply and port number and type, the interface functions and operation of other models in this series are similar.

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## 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


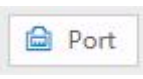


Format	Description
" "	Words with "" represent the interface words. Such as: "Port No."
>	Multi-level path is separated by ">". Such as opening the local










Format	Description
	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 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

Format	Description
	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.
	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.
	Click the Set button to submit the current configuration.
	Click the "Clear" button to clear the information of current page.
	Click the Refresh button to refresh the information of current page.

## Revision Record

Version No.	Revision Date	Revision Note
01	08/02/2024	Product release
02	03/12/2025	Add PoE product

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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 Value
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:

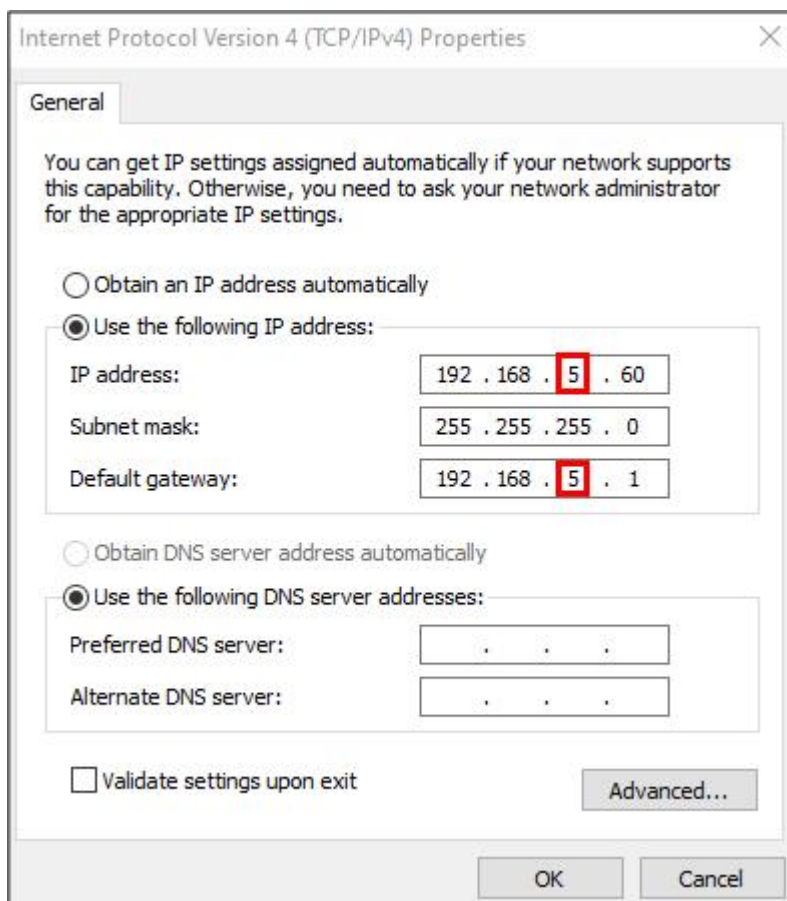
While configuring the device for the first time, if it's the local configuration mode, first confirm the network segment of current PC is 1.

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

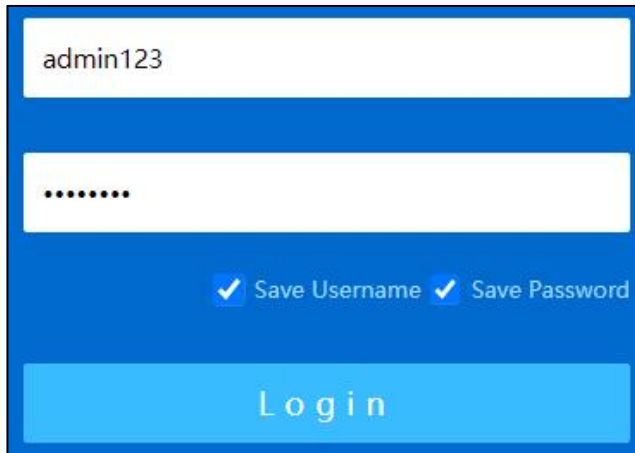
### Operation Steps

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 window.



The image shows a login dialog box with a blue background and a white border. It contains two input fields: the top one contains the text "admin123" and the bottom one contains seven dots. Below the password field are two checked checkboxes labeled "Save Username" and "Save Password". At the bottom is a large light blue button labeled "Login".

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.

# 2 System Information

## Function Description

View port status such as port type and connection status.

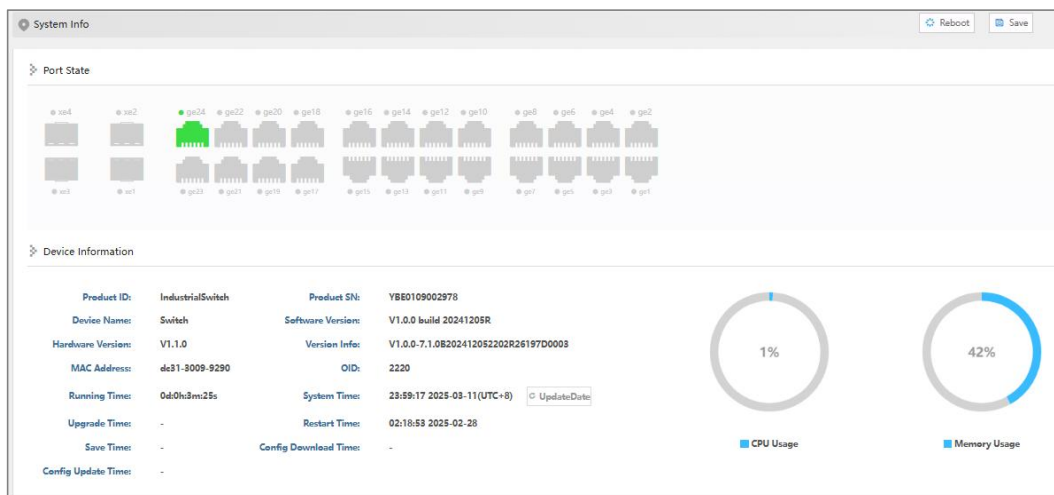
Check device information such as product model, software and hardware version, etc.

## 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: <ul style="list-style-type: none"> <li>  Copper port icon, highlighting indicates that the port is connected.             </li> </ul>

Interface Element	Description
	<ul style="list-style-type: none"><li data-bbox="632 253 1394 371">•  Copper port icon, grayed out indicates that the port is not connected or disabled.</li><li data-bbox="632 389 1394 508">•  Fiber port icon, highlighting indicates that the port is connected.</li><li data-bbox="632 526 1394 645">•  Fiber port icon, grayed out indicates that the port is not connected or disabled.</li></ul>
Device information	<p data-bbox="632 667 1394 741">Basic information of software, hardware and operation of the device.</p> <ul style="list-style-type: none"><li data-bbox="632 763 820 792">• Product ID</li><li data-bbox="632 815 831 844">• Product SN</li><li data-bbox="632 866 858 896">• Device Name</li><li data-bbox="632 918 903 947">• Software Version</li><li data-bbox="632 969 914 999">• Hardware Version</li><li data-bbox="632 1021 839 1050">• Version Info</li><li data-bbox="632 1072 863 1102">• MAC Address</li><li data-bbox="632 1124 735 1153">• OID</li><li data-bbox="632 1176 863 1205">• Running Time</li><li data-bbox="632 1227 852 1256">• System Time</li><li data-bbox="632 1279 868 1308">• Upgrade Time</li><li data-bbox="632 1330 847 1359">• Restart Time</li><li data-bbox="632 1382 823 1411">• Save Time</li><li data-bbox="632 1433 975 1462">• Config Download Time</li><li data-bbox="632 1485 938 1514">• Config Update Time</li><li data-bbox="632 1536 836 1565">• CPU Usage</li><li data-bbox="632 1588 879 1617">• Memory Usage</li></ul>

# 3 Login Configuration

## 3.1 IP address

### 3.1.1 IPv4

#### Function Description

Configure the IPv4 address of the vlanif1 interface.

#### Operation Path

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

#### Interface Description

The IPV4 interface is as follows:

The screenshot shows a configuration window titled "IP Address". At the top right, there are "Reboot" and "Save" buttons. Below the title bar, there are two tabs: "IPV4" (which is selected) and "IPV6". Under the "IPV4" tab, there is a label "IP" followed by a text input field containing the value "192.168.1.254/24". Below the input field is a blue "Apply" button.

Main elements configuration descriptions of IPV4 interface:

Interface Element	Description
IP	The IPv4 address and subnet mask of the vlanif1 interface of

Interface Element	Description
	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.

## 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:

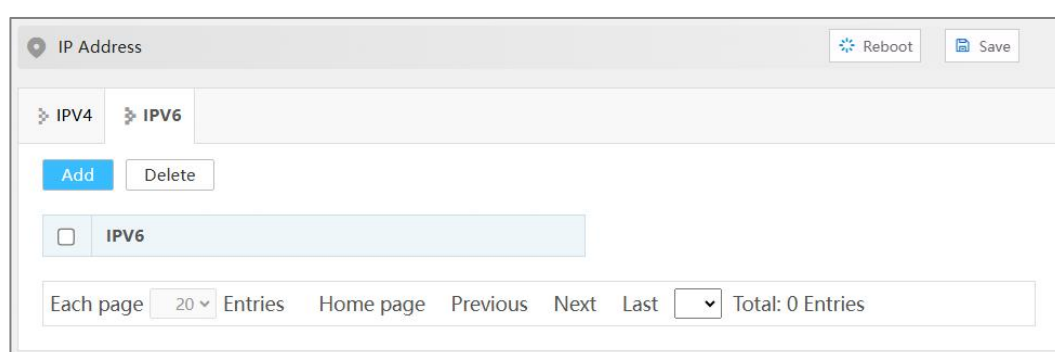
- The leading "0" in each group can be omitted.
- The address contains two or more consecutive groups of 0s, which can be replaced by double colons "::".

### 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 Users

### Function Description

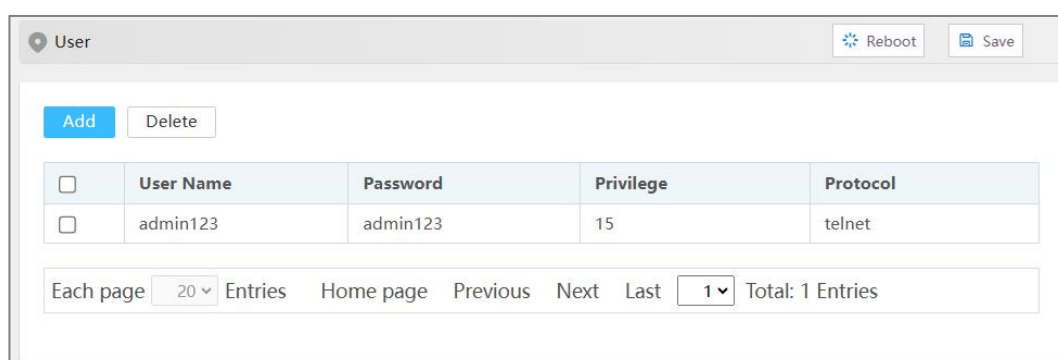
To add and delete user, user needs to enter username and password to access the device, the initial username and password are: admin123.

### Operation Path

Open in order: "Login > User".

### Interface Description

User interface as follows:



The main element configuration description of user interface:

Interface Element	Description
User Name	<p>Identification of the visitor.</p> <p>Note:</p> <ul style="list-style-type: none"> <li>User name supports 1-16 valid characters, consisting of uppercase letters, lowercase letters, numbers or special characters (! @ _ -).</li> <li>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.</li> </ul>
Password	<p>Password used by the visitor.</p> <p>Note:</p> <ul style="list-style-type: none"> <li>Password supports 8-16 valid characters, consisting of combination of two or more of uppercase letters, lowercase letters, numbers, special characters (~! @ # \$% _ -).</li> <li>The password is valid for 90 days by default, and the password needs to be revised after it expires.</li> </ul>
Privilege	<p>The visitor's privilege is 0-15, and it supports 16 priorities in 4 categories.</p> <ul style="list-style-type: none"> <li>0: visit level; You can only view the system information,</li> </ul>

Interface Element	Description
	<p>IP address and log information of the device, and conduct network diagnosis (Ping, Traceroute).</p> <ul style="list-style-type: none"> <li>• 1: view level; The configuration information of the device can be viewed, but the configuration of the device cannot be modified.</li> <li>• 2: configuration level; User can view the configuration information of the device and configure some functional parameters of the device, but cannot manage the device.</li> <li>• 3-15: manage level, user has all privileges of the device, including downloading, uploading, rebooting, modifying device information and other other operations.</li> </ul> <p>Notice:</p> <ul style="list-style-type: none"> <li>• Users can view, delete, or add other users whose priority does not exceed their own.</li> <li>• If the added user name already exists, the original user information will be overwritten.</li> </ul>
Protocol	<p>Provide Telnet protocol for users, with the following options:</p> <ul style="list-style-type: none"> <li>• Telnet</li> <li>• SSH</li> </ul>

## 3.3 Protocol Authorization

### Function Description

Configure device TELNET service and SSH service.

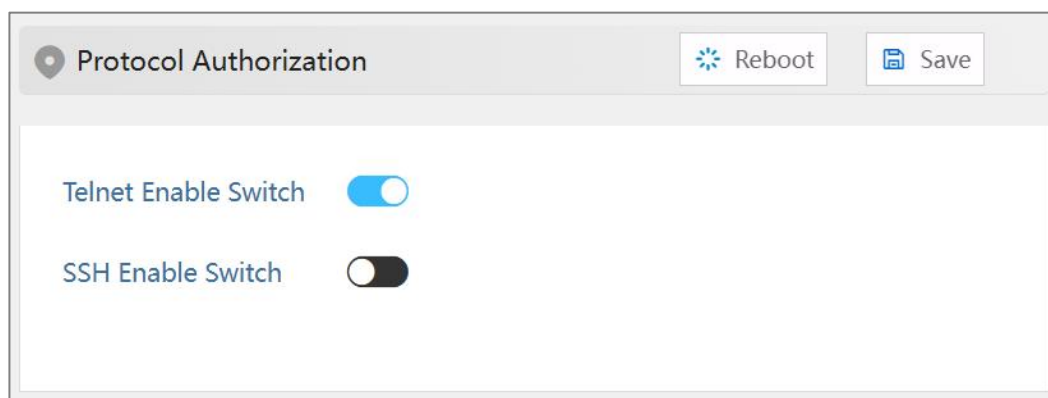
The CLI interface of the device can be accessed through TELNET protocol and SSH2.0 protocol. TELNET transmission process uses TCP protocol for plaintext transmission, and SSH (Secure Shell) protocol provides secure remote login, ensuring the safe transmission of data.

### Operation Path

Open in order: "Login > Protocol Authorization".

### Interface Description

Protocol authorization interface is as below:



Configuration description of main elements of the protocol authorization interface:

Interface Element	Description
Telnet Enable Switch	TELNET service enable switch button, which is enabled by default.
SSH Enable Switch	SSH service enable switch button, which is disabled by default.

# 4 Port Configuration

## 4.1 Port Settings

### Function Description

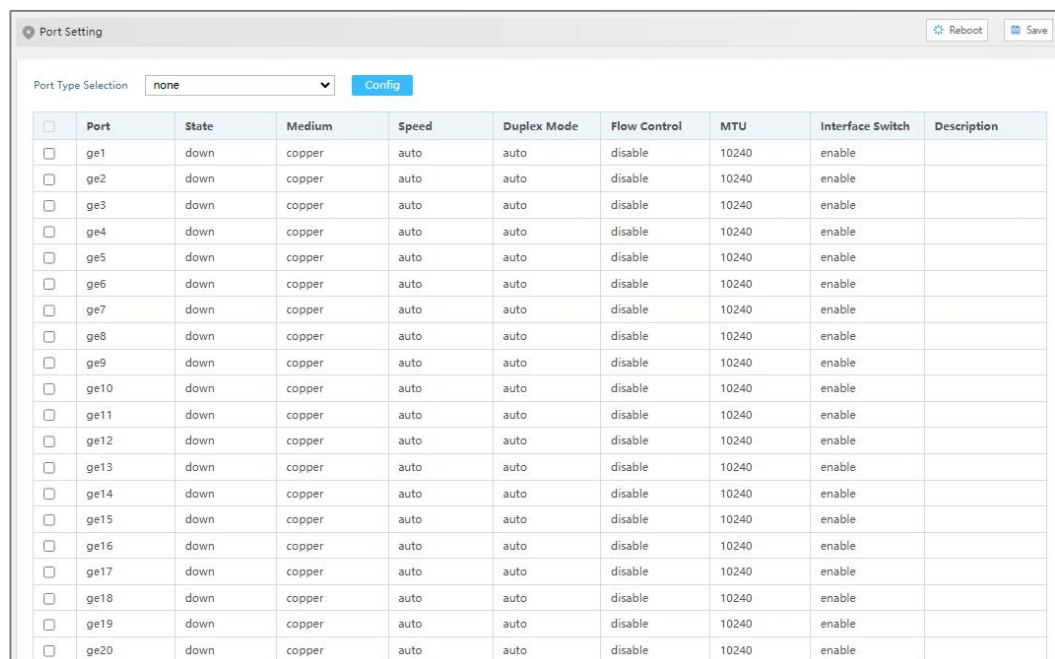
Set port parameters individually or in batches.

### Operation Path

Open in order: "Port > Port Setting".

### Interface Description

Port setting interface is as follows:



The screenshot shows the 'Port Setting' interface with a 'Port Type Selection' dropdown set to 'none' and a 'Config' button. Below is a table listing port configurations for ports ge1 through ge20.

<input type="checkbox"/>	Port	State	Medium	Speed	Duplex Mode	Flow Control	MTU	Interface Switch	Description
<input type="checkbox"/>	ge1	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge2	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge3	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge4	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge5	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge6	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge7	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge8	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge9	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge10	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge11	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge12	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge13	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge14	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge15	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge16	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge17	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge18	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge19	down	copper	auto	auto	disable	10240	enable	
<input type="checkbox"/>	ge20	down	copper	auto	auto	disable	10240	enable	

Main elements configuration description of port settings interface:

Interface Element	Description
-------------------	-------------

Interface Element		Description
Port Selection	Type	<p>Select ports of the same type in batches for configuration, and the options are as follows:</p> <ul style="list-style-type: none"> <li>• none</li> <li>• fe:100M port</li> <li>• ge: Gigabit port</li> <li>• xe: 10Gigabit port</li> <li>• sa: static aggregation group</li> <li>• po: dynamic aggregation group</li> </ul> <p>Note: The port type is based on the actual port of the device.</p>
Port		The corresponding port name of the device Ethernet port.
State		<p>Ethernet port connection status, display status as follows:</p> <ul style="list-style-type: none"> <li>• down: represent the port is disconnected;</li> <li>• up: represent the port is connected.</li> </ul>
Medium		<p>The connection types of Ethernet ports, the status is shown as follows:</p> <ul style="list-style-type: none"> <li>• fiber: fiber port medium.</li> <li>• copper: copper port medium.</li> </ul>
Speed		<p>The default is self-adaption mode, and the display status is as follows:</p> <ul style="list-style-type: none"> <li>• auto: self-adaption;</li> <li>• 10m: 10M;</li> <li>• 100m: 100M;</li> <li>• 1g: Gigabit.</li> <li>• 2500m: 2.5G</li> <li>• 10g: 10 Gigabit.</li> </ul>
Duplex Mode		<p>The default is self-adaption mode, and the display status is as follows:</p> <ul style="list-style-type: none"> <li>• auto: self-adaption;</li> <li>• half: half-duplex</li> <li>• full: full duplex</li> </ul>
Flow Control		<p>Port flow control status, the display status is as follows:</p> <ul style="list-style-type: none"> <li>• disable</li> <li>• Both: Enable port data sending or receiving flow control.</li> <li>• send on: Enable port data sending flow control;</li> <li>• send off: Disables port sending data flow control.</li> <li>• receive on: Enable port data receiving flow control;</li> <li>• receive off: Disables port receiving data flow control.</li> </ul>

Interface Element	Description
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: <ul style="list-style-type: none"> <li>• enable</li> <li>• disable</li> </ul>
Description	Port description information, which supports 0-32 characters and consists of uppercase letters, lowercase letters, numbers or special characters (! @ _-).

## 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 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: <ul style="list-style-type: none"> <li>source-mac: Load balance mode based on source MAC</li> <li>destination-mac: Load balance mode based on destination MAC</li> <li>source-dest-ip: Load balance mode based on source and destination IP</li> <li>source-dest-mac: Load balance mode based on source and destination MAC</li> <li>source-dest-port: The load balancing mode is based on the source and destination TCP/UDP ports.</li> </ul>
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:

**Add** [Close]

Group ID: 1

Type: static

Port:

ge1    ge2    ge3  
 ge4    ge5    ge6  
 ge7    ge8    ge9  
 ge10    ge11    ge12  
 ge13    ge14    ge15  
 ge16    ge17    ge18  
 ge19    ge20    ge21  
 ge22    ge23    ge24  
 xe1    xe2    xe3  
 xe4

**Add Description**  
 Port configuration can be selected 8 ports at most

OK

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 12 groups.
Type	Type of aggregation group: <ul style="list-style-type: none"> <li>static: static aggregation</li> <li>dynamic: dynamic aggregation</li> </ul>
Aggregation Mode	Dynamic Aggregation Group Mode: <ul style="list-style-type: none"> <li>active: active mode, in which the port actively initiates the aggregation negotiation process.</li> <li>passive: the mode in which the port passively receives the aggregate negotiation process.</li> </ul> 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

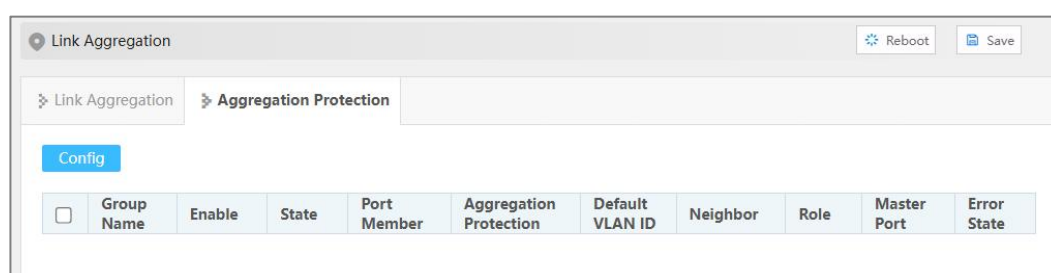
Configure static aggregation protection.

### 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. <ul style="list-style-type: none"> <li>• Enable</li> <li>• Disable</li> </ul>
State	Status of the aggregation group port. <ul style="list-style-type: none"> <li>• Up: as long as any port member is Up, the status of the aggregation group is up;</li> <li>• Down: if all port members are Down, the status of the aggregation group is Down.</li> </ul>
Port Member	Port member in the aggregation group.
Aggregation Protection	The enabled state of the aggregation protection. <ul style="list-style-type: none"> <li>• Enable</li> <li>• Disable</li> </ul>
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 <ul style="list-style-type: none"> <li>• Master: the one with a smaller MAC address is elected as</li> </ul>

Interface Element	Description
	Master <ul style="list-style-type: none"> <li>Slave: the one with a larger MAC address is elected as Slave</li> </ul>
Master Port	The second link port of the master device is the master port.
Error State	Error message prompt of aggregation protection: <ul style="list-style-type: none"> <li>Neighbor timed out</li> <li>Loop: forming a loop</li> <li>Link error (such as generating a large number of error frames).</li> </ul>

## 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 rate limit interface is as follows:

Port Speed Limit
Reboot
Save

Note: Configuring as the maximum bandwidth of the port means no restriction, and the page will not display the configuration value

Port Type Selection  Config

	Port	Egress Bandwidth(bps)	Ingress Bandwidth(bps)
<input type="checkbox"/>	ge1		
<input type="checkbox"/>	ge2		
<input type="checkbox"/>	ge3		
<input type="checkbox"/>	ge4		
<input type="checkbox"/>	ge5		
<input type="checkbox"/>	ge6		
<input type="checkbox"/>	ge7		
<input type="checkbox"/>	ge8		
<input type="checkbox"/>	ge9		
<input type="checkbox"/>	ge10		

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: 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:

Storm Control
Reboot Save

Note: Configuring as the maximum bandwidth of the port means no restriction, and the page will not display the configuration value

Port Type Selection none Config

<input type="checkbox"/>	Port	Broadcast(bps)	Multicast(bps)	Unicast(bps)
<input type="checkbox"/>	ge1			
<input type="checkbox"/>	ge2			
<input type="checkbox"/>	ge3			
<input type="checkbox"/>	ge4			
<input type="checkbox"/>	ge5			
<input type="checkbox"/>	ge6			
<input type="checkbox"/>	ge7			
<input type="checkbox"/>	ge8			
<input type="checkbox"/>	ge9			
<input type="checkbox"/>	ge10			
<input type="checkbox"/>	ge11			
<input type="checkbox"/>	ge12			
<input type="checkbox"/>	ge13			
<input type="checkbox"/>	ge14			
<input type="checkbox"/>	ge15			

Main elements configuration description of storm suppression 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

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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 mirror 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: <ul style="list-style-type: none"> <li>transmit: the message sent by the source port will be mirrored to the destination port.</li> <li>receive: the packet received by the source port will be mirrored to the destination port.</li> <li>both: the packet received or sent by the source port will be mirrored to the destination port.</li> </ul>
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
-

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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

Isolate-port configuration interface is as follows:

Port Isolation
Reboot
Save

Port Type Selection none Config

<input type="checkbox"/>	Port	Enable Switch
<input type="checkbox"/>	ge1	disable
<input type="checkbox"/>	ge2	disable
<input type="checkbox"/>	ge3	disable
<input type="checkbox"/>	ge4	disable
<input type="checkbox"/>	ge5	disable
<input type="checkbox"/>	ge6	disable
<input type="checkbox"/>	ge7	disable
<input type="checkbox"/>	ge8	disable
<input type="checkbox"/>	ge9	disable
<input type="checkbox"/>	ge10	disable
<input type="checkbox"/>	ge11	disable
<input type="checkbox"/>	ge12	disable
<input type="checkbox"/>	ge13	disable
<input type="checkbox"/>	ge14	disable
<input type="checkbox"/>	ge15	disable
<input type="checkbox"/>	ge16	disable
<input type="checkbox"/>	ge17	disable
<input type="checkbox"/>	ge18	disable
<input type="checkbox"/>	ge19	disable
<input type="checkbox"/>	ge20	disable

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: <ul style="list-style-type: none"> <li>Disable</li> <li>enable</li> </ul>

## 4.7 Port Statistics

### 4.7.1 Port Statistics-Overview

#### Function Description

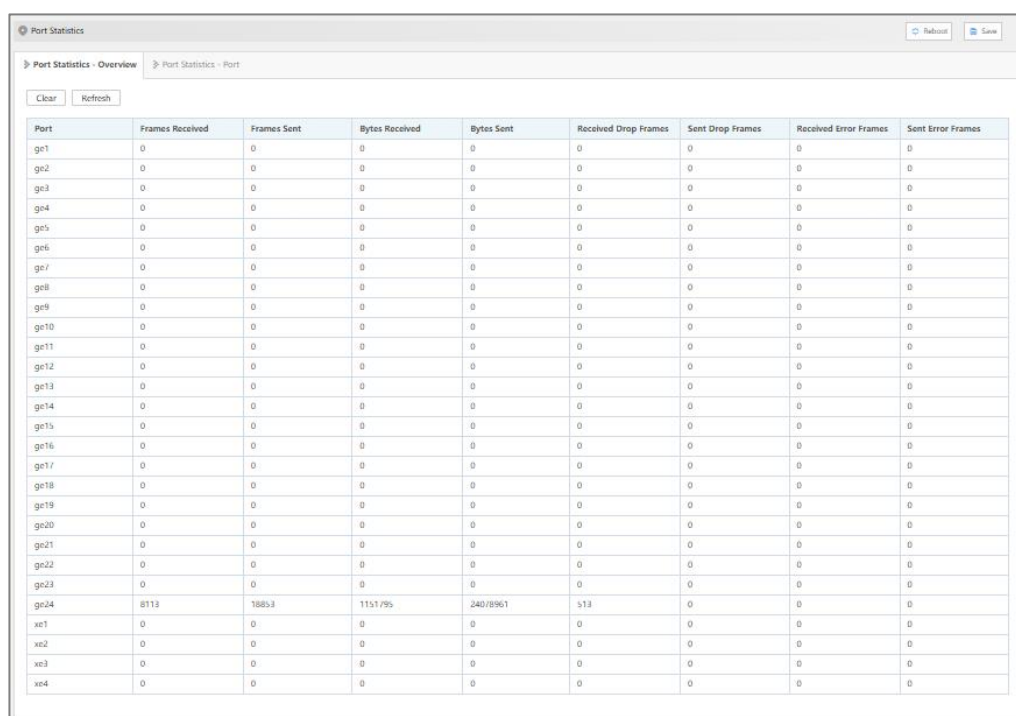
Check the number of messages and bytes, discarded messages and error messages sent and received by each port.

#### Operation Path

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

#### Interface Description

Port Statistics-Overview interface is as follows:



The screenshot shows the 'Port Statistics - Overview' interface. It features a table with columns for 'Port', 'Frames Received', 'Frames Sent', 'Bytes Received', 'Bytes Sent', 'Received Drop Frames', 'Sent Drop Frames', 'Received Error Frames', and 'Sent Error Frames'. The table lists various ports (ge0 through ge24, xe1 through xe4) with their respective statistics. Most ports show zero values, while port ge24 shows non-zero values: 8113 Frames Received, 18853 Frames Sent, 1151795 Bytes Received, 24018961 Bytes Sent, and 513 Received Drop Frames.

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
ge9	0	0	0	0	0	0	0	0
ge10	0	0	0	0	0	0	0	0
ge11	0	0	0	0	0	0	0	0
ge12	0	0	0	0	0	0	0	0
ge13	0	0	0	0	0	0	0	0
ge14	0	0	0	0	0	0	0	0
ge15	0	0	0	0	0	0	0	0
ge16	0	0	0	0	0	0	0	0
ge17	0	0	0	0	0	0	0	0
ge18	0	0	0	0	0	0	0	0
ge19	0	0	0	0	0	0	0	0
ge20	0	0	0	0	0	0	0	0
ge21	0	0	0	0	0	0	0	0
ge22	0	0	0	0	0	0	0	0
ge23	0	0	0	0	0	0	0	0
ge24	8113	18853	1151795	24018961	513	0	0	0
xe1	0	0	0	0	0	0	0	0
xe2	0	0	0	0	0	0	0	0
xe3	0	0	0	0	0	0	0	0
xe4	0	0	0	0	0	0	0	0

### 4.7.2 Port Statistics-Port

#### Function Description

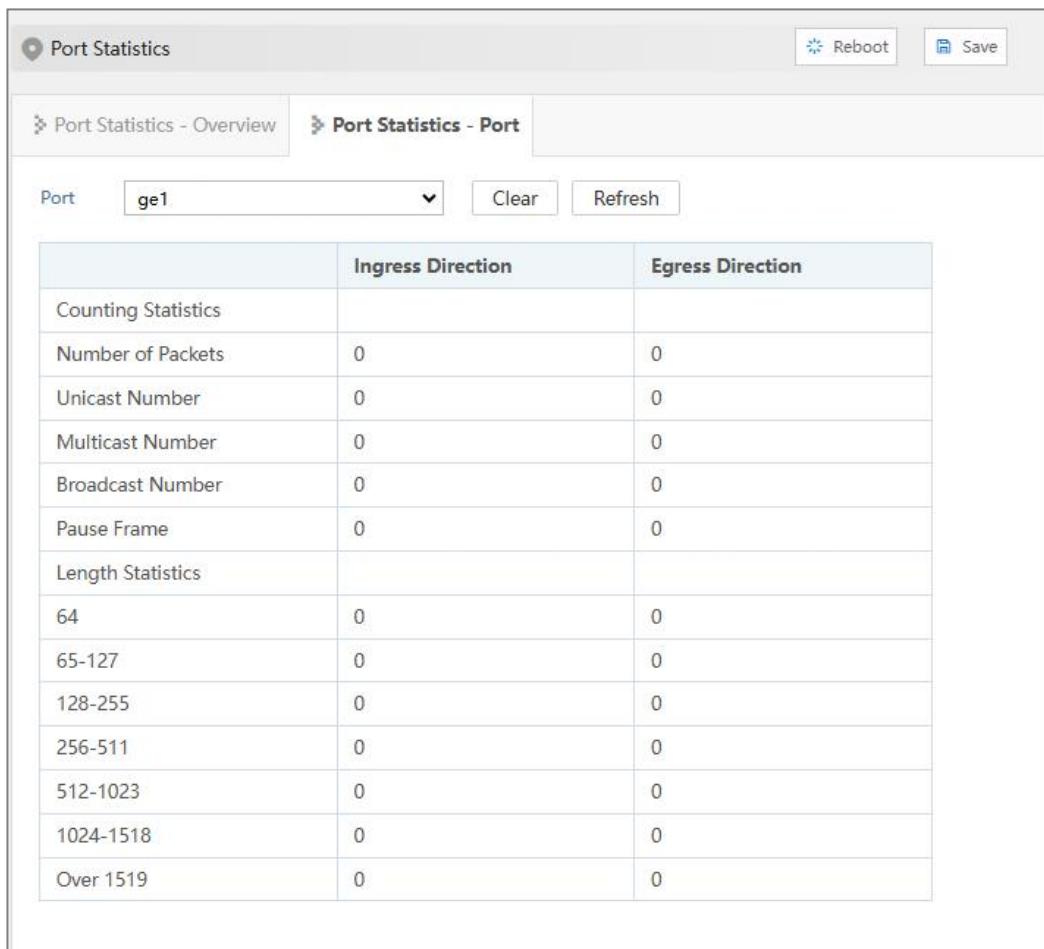
Check the classification statistics of the total number of messages sent and received by the designated port and the number of bytes of messages.

#### Operation Path

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

## Interface Description

Port Statistics-Port interface is as follows:



The screenshot shows the 'Port Statistics' interface. At the top, there are 'Reboot' and 'Save' buttons. Below that, there are tabs for 'Port Statistics - Overview' and 'Port Statistics - Port'. The 'Port' dropdown menu is set to 'ge1', with 'Clear' and 'Refresh' buttons next to it. The main content is a table with three columns: 'Counting Statistics', 'Ingress Direction', and 'Egress Direction'. The table lists various statistics, all of which have a value of 0.

Counting Statistics	Ingress Direction	Egress Direction
Number of Packets	0	0
Unicast Number	0	0
Multicast Number	0	0
Broadcast Number	0	0
Pause Frame	0	0
Length Statistics	Ingress Direction	Egress Direction
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

## 4.8 POE Management

PoE (Power over Ethernet) means supplying power through Ethernet. It's a wired Ethernet power supply technology that allows electric power to be transmitted to terminal device through data line or free line.

PoE power supply system includes:

- PSE (Power-sourcing Equipment): PoE device that supplies powered device with power through Ethernet.
- PD (Powered Device): powered device like wireless AP (Access Point), POS machine, camera and so on.
- PoE power supply: PoE power supply powers the whole PoE system. The quantity of PD that connects to PSE is limited by the power of PoE power supply.



Note

Only devices with PoE ports support this function, and non-PoE devices do not display this

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 page.
 

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## 4.8.1 Global Configuration

### Function Description

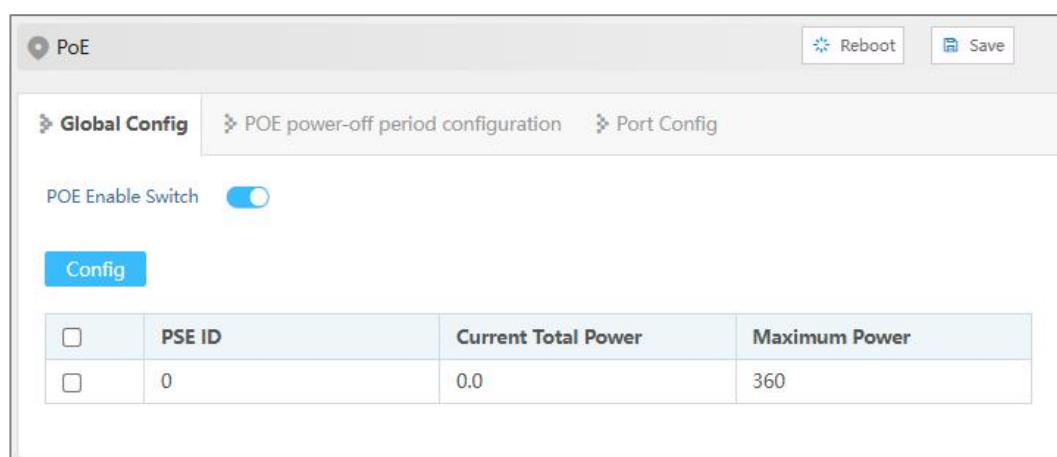
On the "Global Config" page, user can configure the maximum PoE output power of the device.

### Operation Path

Open in order: "Port > PoE > Global Configuration".

### Interface Description

Global configuration interface is as follows:



The main element configuration description of global configuration interface:

Interface Element	Description (check the power checkbox, click "config" to configure it.)
PSE ID	PSE module ID display of the current device.
Current Total Power	The total output power display of current device's PoE port, its unit is W.
Maximum Power	The maximum power limit of current device's PoE output, the unit is W.

## 4.8.2 POE Power-off Period Configuration

### Function Description

On the "POE Power-off Period Config" page, user can configure the maximum PoE output power of the device.

### Operation Path

Open in order: "Port > POE > POE power-off period configuration".

### Interface Description

POE power-off period configuration interface is as follows:

The main element configuration description of POE power-off period configuration interface:

Interface Element	Description
Time-Range Name	<p>The name of the effective time period. There are two modes in the effective time period, and the options that can be checked are:</p> <ul style="list-style-type: none"> <li>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.</li> <li>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).</li> </ul>
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	<p>Time type options are as follows:</p> <ul style="list-style-type: none"> <li>Absolute Time;</li> <li>Cycle time.</li> </ul>

## 4.8.3 Port Configuration

### Function Description

On the “Port Configuration” page, user can configure the device's PoE port enable, maximum output power, power supply priority etc.

### Operation Path

Open in order: "Port > POE > Port Configuration”.

### Interface Description

Check port configuration interface as below:

<input type="checkbox"/>	Port Name	PoeState	One click to extend PoE	Port State	Enable	Overload	Current Power(W)	Current Voltage(V)	Current(mA)	Maximum Power	Priority	Time-Range
<input type="checkbox"/>	ge1	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge2	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge3	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge4	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge5	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge6	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge7	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge8	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge9	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge10	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge11	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge12	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge13	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge14	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge15	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge16	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge17	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge18	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge19	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge20	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge21	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge22	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge23	OFF	disable	down	enable	N	0.0	0.0	0.0	30	low	
<input type="checkbox"/>	ge24	OFF	disable	up	enable	N	0.0	0.0	0.0	30	low	

The main element configuration description of port configuration interface:

Interface Element	Description (check the checkbox of the port, click “config” to configure it.)
Port Name	The corresponding port name of the device PoE Ethernet port.
PoE State	The port PoE work state of current device, display state as follows: <ul style="list-style-type: none"> <li>ON: PoE port supplies power to PD;</li> <li>OFF: PoE port is not powered or PD is not connected.</li> </ul>
One click to extend PoE	By enabling the one-click extension setting for PoE, the transmission distance of PoE technology can be extended, with the display status as follows: <ul style="list-style-type: none"> <li>disable;</li> </ul>

Interface Element	Description (check the checkbox of the port, click “config” to configure it.)
	<ul style="list-style-type: none"> <li>enable</li> </ul>
Port State	Ethernet port connection status, display status as follows: <ul style="list-style-type: none"> <li>down: represent the port is disconnected;</li> <li>up: represent the port is connected.</li> </ul>
Enable	Port enable check box, check the check box to enable the PoE port; not check this check box, the PoE port would be disabled.
Overload	The overload status of current device’s PoE port, display items as follows: <ul style="list-style-type: none"> <li>Y: The current PoE port output power is greater than the maximum power.</li> <li>N: The current PoE port output power is smaller than or equal to the maximum power.</li> </ul>
Current Power (W)	The output power display of current device’s PoE port, its unit is W.
Current Voltage (V)	The output voltage display of current device’s PoE port, its unit is V.
Current (mA)	The current display of current device’s PoE port, its unit is mA.
Maximum Power	The maximum power value configuration of PoE output of current device, and the value range is 0-30, and the unit is W.
Priority	The priority configuration of PoE port power supply. Priority is assigned to the port power under the total power limit. The priority drop-down list can be selected as follows: <ul style="list-style-type: none"> <li>High: high priority;</li> <li>Medium: medium priority;</li> <li>Low: low priority.</li> </ul> Note: When the switch supplies power at nearly full capacity, it would first supply power to the PD device that connects to the port with High priority; then the PD device that connects to port with Medium priority.
Time-Range	Effective time period name.

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# 5 Layer 2 Configuration

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## 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

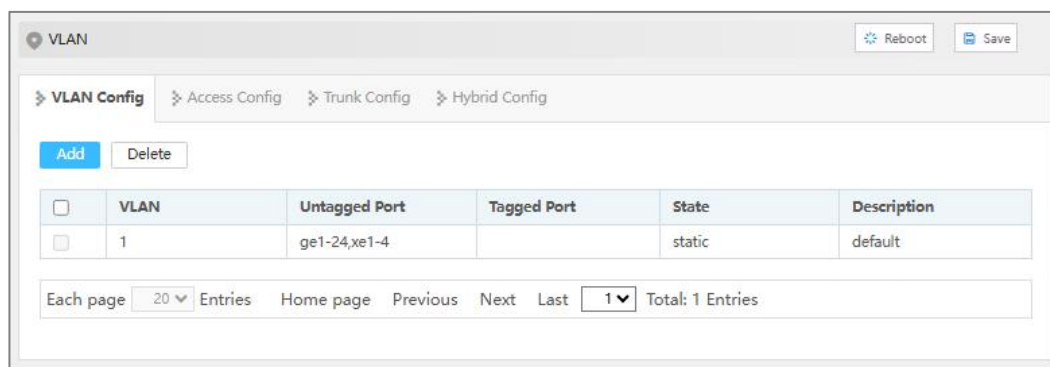
Create VLAN and edit VLAN description.

#### Operation Path

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

#### Interface Description

The VLAN configuration interface is as follows:



Main element configuration description of VLAN configuration interface:

Interface Element	Description
VLAN	VLAN ID number, value range is 1-4094.
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: <ul style="list-style-type: none"> <li>• Static: static VLAN</li> <li>• Dynamic: dynamic VLAN</li> </ul>
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 Configuration".

### Interface Description

Access configuration interface is as follows:

VLAN
Reboot
Save

VLAN Config
**Access Config**
Trunk Config
Hybrid Config

Port Type Selection none Config

<input type="checkbox"/>	Port	Pvid
<input type="checkbox"/>	ge1	1
<input type="checkbox"/>	ge2	1
<input type="checkbox"/>	ge3	1
<input type="checkbox"/>	ge4	1
<input type="checkbox"/>	ge5	1
<input type="checkbox"/>	ge6	1
<input type="checkbox"/>	ge7	1
<input type="checkbox"/>	ge8	1
<input type="checkbox"/>	ge9	1
<input type="checkbox"/>	ge10	1
<input type="checkbox"/>	ge11	1
<input type="checkbox"/>	ge12	1
<input type="checkbox"/>	ge13	1
<input type="checkbox"/>	ge14	1
<input type="checkbox"/>	ge15	1
<input type="checkbox"/>	ge16	1
<input type="checkbox"/>	ge17	1

The main element configuration description of Access configuration interface.

Interface Element	Description
Port	The corresponding port name of the device Ethernet port.
PVID	<p>Port Default VLAN ID, which is the default VLAN of the port.</p> <p>Default is 1, value range is 1-4094.</p> <p>Note:</p> <p>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.</p>
Config	<p>Check the port and click “Configure” to reset PVID and port mode.</p> <ul style="list-style-type: none"> <li>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.</li> <li>Trunk: port can belong to multiple VLAN, Trunk port can</li> </ul>

Interface Element	Description
	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.

## 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 Configuration".

### Interface Description

Trunk configuration interface is as follows:

The screenshot shows a web-based configuration interface for VLANs. At the top, there are 'VLAN', 'Reboot', and 'Save' buttons. Below this, there are four tabs: 'VLAN Config', 'Access Config', 'Trunk Config' (which is active), and 'Hybrid Config'. Under the 'Trunk Config' tab, there is a 'Port Type Selection' dropdown menu currently set to 'none', followed by a blue 'Config' button. Below these elements is a table with three columns: 'Port', 'Tagvlan', and 'Pvid'. There is an unchecked checkbox to the left of the 'Port' column.

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.
Configuration	Check the port and click "Configure" 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 Configuration".

### Interface Description

Hybrid configuration interface is as follows:

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 setting 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.	<ul style="list-style-type: none"> <li>Receive the message when the VLAN ID is the same as default</li> </ul>

Interface type	Process for Receiving Untagged Message	Process for Receiving Tagged Message
		VLAN ID. <ul style="list-style-type: none"> <li>Discard the message when the VLAN ID is different from the default VLAN ID.</li> </ul>
Trunk	Receive this message and tag it with default VLAN ID.	<ul style="list-style-type: none"> <li>Receive this message when the VLAN ID is in the list of VLAN ID that allow to pass through the interface.</li> <li>Discard this message when the VLAN ID is not in the list of VLAN ID that allow to pass through the interface.</li> </ul>
Hybrid		

### 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	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>
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 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:

The main element configuration description of static unicast 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: <ul style="list-style-type: none"> <li>Discard</li> <li>Forward</li> </ul>
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

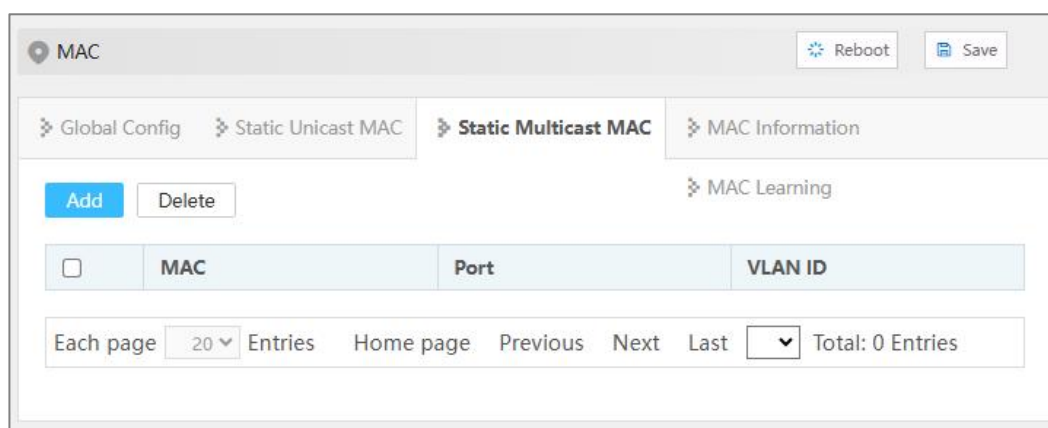
Source multicast MAC address binding will not age.

### Operation Path

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

### Interface Description

Static multicast MAC interface is as follows:



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.
Interface	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:

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: <ul style="list-style-type: none"> <li>All</li> <li>Dynamic Unicast</li> <li>Dynamic Multicast</li> <li>Static Multicast</li> <li>Static Unicast</li> </ul>
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: <ul style="list-style-type: none"> <li>Discard</li> <li>Forward</li> </ul>
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: <ul style="list-style-type: none"> <li>dynamic</li> <li>static</li> </ul>

## 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 a large number of forged messages with different source MAC 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 Information".

### Interface Description

The MAC learning interface is as follows:

<input type="checkbox"/>	Port	Learning Enable	Learning Restriction Enable	Maximum limit number
<input type="checkbox"/>	ge1	enable	disable	
<input type="checkbox"/>	ge2	enable	disable	
<input type="checkbox"/>	ge3	enable	disable	
<input type="checkbox"/>	ge4	enable	disable	
<input type="checkbox"/>	ge5	enable	disable	
<input type="checkbox"/>	ge6	enable	disable	
<input type="checkbox"/>	ge7	enable	disable	
<input type="checkbox"/>	ge8	enable	disable	
<input type="checkbox"/>	ge9	enable	disable	
<input type="checkbox"/>	ge10	enable	disable	
<input type="checkbox"/>	ge11	enable	disable	
<input type="checkbox"/>	ge12	enable	disable	
<input type="checkbox"/>	ge13	enable	disable	
<input type="checkbox"/>	ge14	enable	disable	
<input type="checkbox"/>	ge15	enable	disable	
<input type="checkbox"/>	ge16	enable	disable	
<input type="checkbox"/>	ge17	enable	disable	

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

Interface Element	Description
	<p>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.</p> <p>The operation of the 'learning enable switch' is as follows:</p> <ul style="list-style-type: none"> <li>• Disable: disable the learning restriction;</li> <li>• Enable: enable the learning restriction.</li> </ul>
Learning Restriction Enable Switch	<p>"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.</p> <p>The operation of the 'learning limits enable switch' is as follows:</p> <ul style="list-style-type: none"> <li>• Disable: disable the learning restriction;</li> <li>• Enable: enable the learning restriction.</li> </ul> <p>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.</p>
Maximum limit number	<p>The maximum number of restrictions means that "Learning Restriction Enable" restricts the number of MAC addresses learned on a port.</p>

## 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.

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 Configuration".

### Interface Description

Global configuration interface is as follows:

The screenshot shows a configuration window for Spanning-tree. It has a title bar with 'Spanning-tree', 'Reboot', and 'Save' buttons. Below the title bar are four tabs: 'Global Config', 'Instance Config', 'Port Config', and 'Port Instance Configuration'. The 'Global Config' tab is selected and contains the following settings:

- Enable Switch:
- Work Mode: 3-MSTP (dropdown menu)
- Priority: 32768 (text input)
- Max-hops: 20 (text input)
- Forward-time: 15 (text input)
- MAX-age: 20 (text input)
- Hello-time: 2 (text input)
- Revision Level: 0 (text input)
- MST Name: Default (text input)

An 'Apply' button is located at the bottom of the configuration area.

The main element configuration description of global configuration interface:

Interface Element	Description
Enable Switch	Spanning-tree enable switch. Disable by default
Work Mode	<p>Defaults to MSTP, there are three modes for spanning-tree protocol choice:</p> <ul style="list-style-type: none"> <li>• 0-STP: Spanning-tree</li> <li>• 2-RSTP: Rapid spanning tree</li> <li>• 3-MSTP: Multiple spanning-trees</li> </ul> <p>Note: In RSTP or MSTP mode, when the connection with STP device is found, the port will automatically migrate to STP compatible mode to work.</p>
Priority	<p>Bridge priority level, value range is 0-61440.</p> <p>Note: Smaller the priority level value is, higher the priority level is. It must be a multiple of 4096.</p>
Max-hops	<p>The maximum hop in MST region, defaults to 20, the value range is 1-40.</p> <p>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.</p>
Forward-time	<p>Port state transition delay, defaults to 15s, the value range is 4-30.</p>

Interface Element	Description
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: <ul style="list-style-type: none"> <li>The spanning tree protocol sends configuration information every Hello time to check whether the link is faulty.</li> <li>In order to avoid frequent network flap, forwarding delay, aging time and handshake time should satisfy the following formula: <math>2 \times (\text{forwarding delay} - 1) \geq \text{aging time} \geq 2 \times (\text{handshake time} - 1)</math>.</li> </ul>
Revision Level	MSTP revision level, defaults to 0, the value range is 0-65535. Note: When the MST region name, revision level, instance-to-VLAN mapping relation are the same, the two or more bridges will belong to a same MST region.
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 a 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).

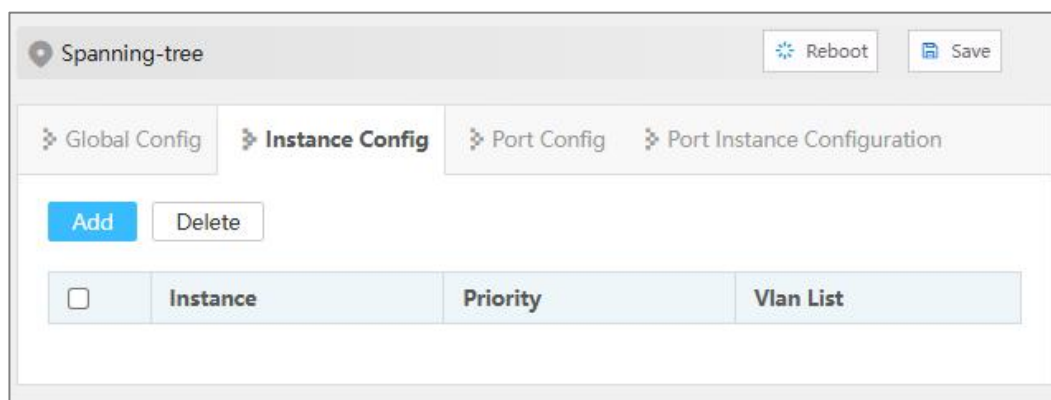
VLAN mapping table is an attribute of MST region, and it's used to describe the mapping relation between VLAN and MSTI.

### Operation Path

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

### 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	Device priority level, value range is 0-61440, default to 32769, step is 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.

#### Operation Path

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

#### Interface Description

Check port configuration interface as below:

Spanning-tree Reboot Save

Global Config Instance Config **Port Config** Port Instance Configuration

Port Type Selection  Config

<input type="checkbox"/>	Port	Enable Switch	bpduguard	Edge Port	Link Type
<input type="checkbox"/>	ge1	enable	default	disable	auto
<input type="checkbox"/>	ge2	enable	default	disable	auto
<input type="checkbox"/>	ge3	enable	default	disable	auto
<input type="checkbox"/>	ge4	enable	default	disable	auto
<input type="checkbox"/>	ge5	enable	default	disable	auto
<input type="checkbox"/>	ge6	enable	default	disable	auto
<input type="checkbox"/>	ge7	enable	default	disable	auto
<input type="checkbox"/>	ge8	enable	default	disable	auto
<input type="checkbox"/>	ge9	enable	default	disable	auto
<input type="checkbox"/>	ge10	enable	default	disable	auto
<input type="checkbox"/>	ge11	enable	default	disable	auto
<input type="checkbox"/>	ge12	enable	default	disable	auto
<input type="checkbox"/>	ge13	enable	default	disable	auto
<input type="checkbox"/>	ge14	enable	default	disable	auto
<input type="checkbox"/>	ge15	enable	default	disable	auto
<input type="checkbox"/>	ge16	enable	default	disable	auto
<input type="checkbox"/>	ge17	enable	default	disable	auto
<input type="checkbox"/>	ge18	enable	default	disable	auto
<input type="checkbox"/>	ge19	enable	default	disable	auto
<input type="checkbox"/>	ge20	enable	default	disable	auto

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: <ul style="list-style-type: none"> <li>• Enable</li> <li>• Disable</li> </ul>
bpduguard	BPDU (Bridge Protocol Data Unit) protection function. After 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: <ul style="list-style-type: none"> <li>• Default: global configuration protection status</li> <li>• Enable</li> </ul>

Interface Element	Description
	<ul style="list-style-type: none"> <li>• Disable</li> </ul>
Edge Port	<p>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:</p> <ul style="list-style-type: none"> <li>• Enable</li> <li>• Disable</li> </ul>
Link Type	<p>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.</p> <p>Port link type:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Point-to-point: point-to-point link.</li> <li>• Shared: Non point-to-point link.</li> </ul>

## 5.3.4 Instance Port Configuration

### Function Description

Configure port priority and cost

### Operation Path

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

### Interface Description

Port instance configuration interface is as follows:

Spanning-tree
Reboot Save

Global Config
Instance Config
Port Config
Port Instance Configuration

MSTID  Config

<input type="checkbox"/>	Port	Enable Switch	Instance	Priority	Path Cost	Role	State
<input type="checkbox"/>	ge1	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge2	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge3	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge4	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge5	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge6	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge7	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge8	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge9	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge10	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge11	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge12	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge13	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge14	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge15	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge16	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge17	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge18	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge19	enable	0	128	20000000	disabled	discarding
<input type="checkbox"/>	ge20	enable	0	128	20000000	disabled	discarding

The main element configuration description of instance port 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: <ul style="list-style-type: none"> <li>Enable: participate in spanning-tree;</li> <li>Disable: not participate in spanning-tree.</li> </ul>
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

Interface Element	Description
	it is to be a root port.
Path Cost	<p>The path cost from network bridge to root bridge, defaults to 20000000. Value range: 1-200000000.</p> <p>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.</p>
Role	<p>Role</p> <ul style="list-style-type: none"> <li>• unkn: Unknown;</li> <li>• root: Root port;</li> <li>• desg: Designated port;</li> <li>• altn: Alternate port;</li> <li>• back: Backup port;</li> <li>• disa: Disable port.</li> </ul>
State	<p>Port status in spanning-tree:</p> <ul style="list-style-type: none"> <li>• Disable: Port close status;</li> <li>• Blocking: Blocked state;</li> <li>• Listening: Monitoring state.</li> <li>• Discarding: Discarding status</li> <li>• Learning: Learning state;</li> <li>• Forwarding: Forwarding state;</li> </ul>

## 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 > Global Config".

### Interface Description

Global configuration interface is as follows:



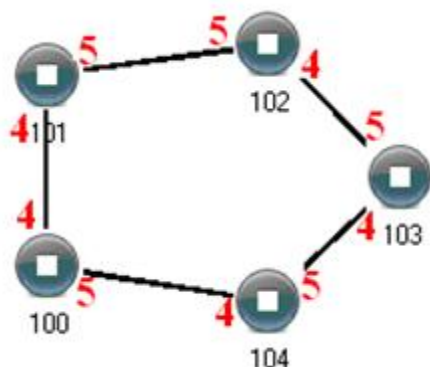
The main element configuration description of global configuration interface:

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 1-255. 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

Interface Element	Description
	identities.
Port1 State	Conduction state of ring network port 1.
Ring Port 2	<p>The network port 2 on the switch device used to form the ring network.</p> <p>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.</p>
Port2 State	Conduction state of port 2 of ring network.
Ring Type	<p>According to the requirement in the scene, user can choose different ring type.</p> <ul style="list-style-type: none"> <li>• Single: single ring, using a continuous ring to connect all device together.</li> <li>• Couple: couple ring is a redundant structure used for connecting two independent networks.</li> <li>• Chain: chain can enhance user’s flexibility in constructing all types of redundant network topology via an advanced software technology.</li> <li>• Dual-homing: two adjacent rings share one switch. User could put one switch in two different networks or two different switching equipments in one network.</li> </ul>
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	<p>Single ring supports no master station and one master and multiple slave modes (optional):</p> <ul style="list-style-type: none"> <li>• No-master station mode: When all the single-loop devices are slave stations, the single-loop structure is no-master station.</li> <li>• One-Master Multi-Slave mode: 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.</li> </ul>
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.

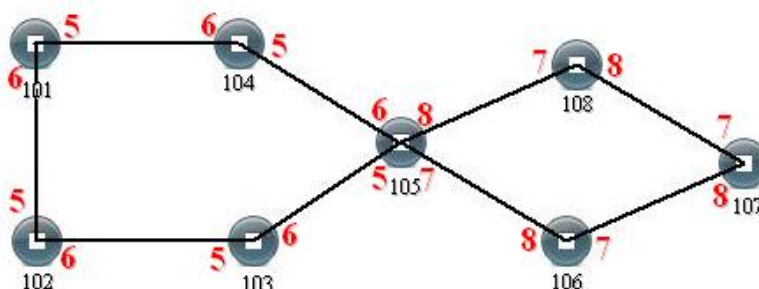
## Single Ring Configuration

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:



## 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.



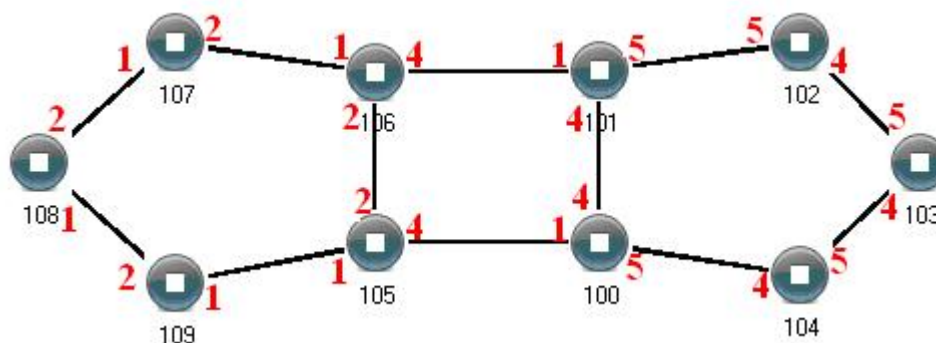
Configuration Method:

- 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:



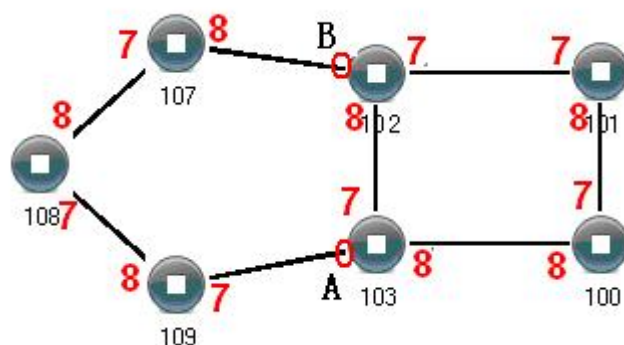
Operation method:

- 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 affect 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. 105-109 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:



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.

## 5.4.2 Ring Information

### Function Description

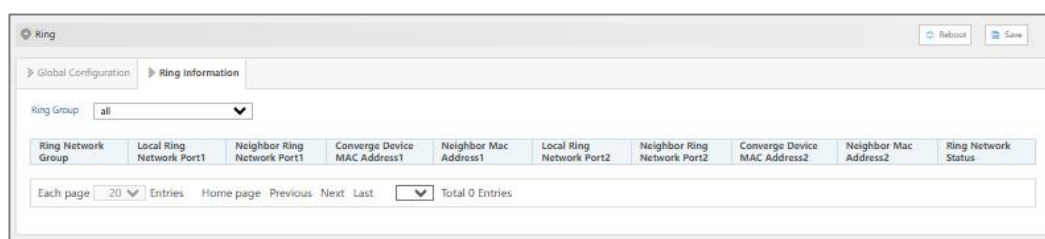
This function is provided by the system, and you can view it through the "Ring Information" page.

### Operation Path

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

### Interface Description

Ring Information interface is as follows:



The main element configuration description of Ring information interface:

Interface Element	Description
Ring 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 "console port". Console port is the port in the chain where two rings intersect.
Neighbor Ring Network	The port number of the neighbor ring network port 2, for

Interface Element	Description
Port 2	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 State	Ring network status display: <ul style="list-style-type: none"> <li>stable: indicates that the current ring network group is in a stable state;</li> <li>open: indicates that the current ring network group is in an open state.</li> </ul>

## 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

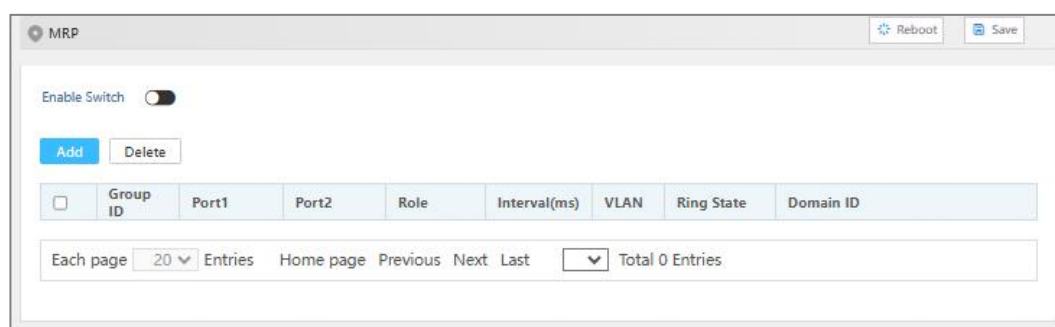
Configure MRP ring network.

### Operation Path

Open in order: "Layer 2 > MRP".

### Interface Description

MRP interface is as below:



The main element configuration descriptions of MRP interface:

Interface Element	Description
-------------------	-------------

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 1-50.
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: <ul style="list-style-type: none"> <li>• manager: media redundancy manager</li> <li>• client: media redundancy client</li> </ul>
Interval (ms)	When the MRP ring network is disconnected, the ring network reconfigures the convergence time. The options are as follows: <ul style="list-style-type: none"> <li>• 200ms</li> <li>• 500ms</li> </ul>
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.x.x.

## 5.6 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 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.

## 5.6.1 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 a RAPS (NR) message, the local port enters the Forwarding state.
- **Hold Timer**

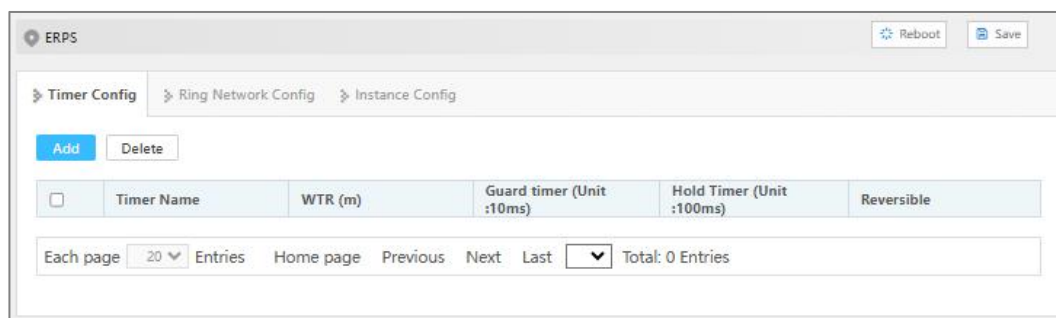
On Layer 2 networks running ERPS, there may be different requirements for protection switching. For example, on a network where multi-layer services are provided, after a server fails, users may require a period of time to rectify the server fault so that clients do not detect the fault. Users can set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

## 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: <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>

## 5.6.2 Ring Configuration

### Function Description

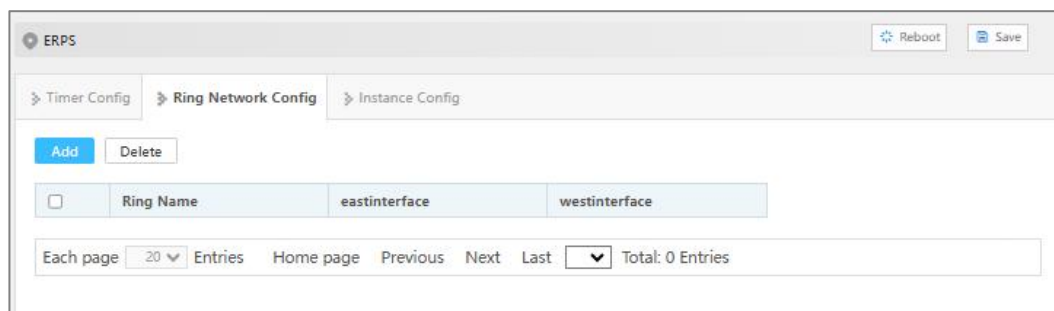
Configure ERPS ring port.

## Operation Path

Open in order: "Layer 2 > ERPS > Ring Configuration".

## Interface Description

Ring 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 (! @ _-).
eastInterface	ERPS ring port. Note: When the device is an intersecting node, only EastInterface can be configured for some ports of the sub-ring.
westInterface	ERPS ring port. Notice: <ul style="list-style-type: none"> <li>ERPS ring ports can be normal physical ports or static aggregation groups.</li> <li>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.</li> <li>ERPS ring ports can't be the same ports.</li> <li>ERPS ring ports must be trunk ports and allow the ring instance VLAN to pass.</li> </ul>

## 5.6.3 Instance Configuration

### Function Description

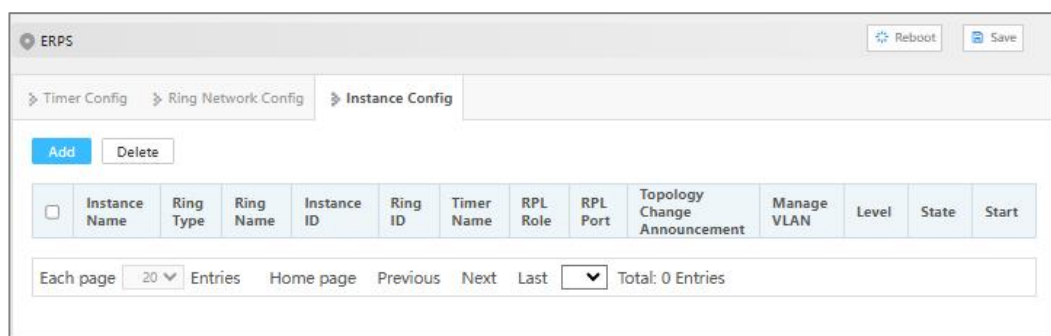
Configure ERPS ring network instance.

## Operation Path

Open in order: "Layer 2 > ERPS > Instance Configuration".

## 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: <ul style="list-style-type: none"> <li>Major-ring: main ring, closed ring.</li> <li>Sub-ring: a sub-ring, an unclosed ring, forms a multi-ring network such as an intersecting ring with the main ring.</li> </ul>
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: <ul style="list-style-type: none"> <li>By default, all VLAN in MST domain are mapped to instance 0.</li> <li>The mapping with VLAN instance can be created in spanning tree instance configuration.</li> </ul>
Ring ID	The ID of ERPS ring network, its value range is 1-239. The

Interface Element	Description
	<p>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.</p> <p>Note: ERPS ring ID will be the last byte of the MAC destination of the RAPS message.</p>
Timer Name	The name of the timer, which supports the default parameter timer or customization in the timer configuration.
RPL Role	<p>Each device in ERPS ring is called a node. The node role is decided by user configuration, they are divided into following types:</p> <ul style="list-style-type: none"> <li>• owner: owner node is responsible for blocking and unblocking the port in RPL of the node to prevent loop forming and conduct link switching.</li> <li>• 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.</li> <li>• non-owner: non-owner node is responsible for receiving and forwarding the protocol packet and data packet in the link.</li> </ul>
RPL Port	<p>Port connected by RPL link, the options are as follows:</p> <ul style="list-style-type: none"> <li>• West-interface</li> <li>• East-interface</li> </ul>
Topology Change Announcement	<p>Notify the network topology change of this ERPS ring to other ERPS rings, and the enabling status is as follows:</p> <ul style="list-style-type: none"> <li>• Enable</li> <li>• Disable</li> </ul>
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	<p>The instance statuses of ERPS are as follows:</p> <ul style="list-style-type: none"> <li>• ERPS_INIT: initial state, which is the initialized state when the protocol starts.</li> </ul>

Interface Element	Description
	<ul style="list-style-type: none"> <li>• ERPS__IDLE: idle state, it would enter this state when the ring topology is complete;</li> <li>• ERPS_FS: force-switch state, it would enter this state when force-switch command is implemented.</li> <li>• ERPS_MS: manual-switch state, it would enter this state when manual-switch command is implemented.</li> <li>• ERPS_PROTECTION: protection state, it would enter this state when the ring link has failure.</li> <li>• ERPS_PENDING: pending state, it would enter this state when the ring link has recovered from failure.</li> </ul>
Start	ERPS instance startup status: <ul style="list-style-type: none"> <li>• start</li> <li>• stop</li> </ul>

## 5.7 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, so as to manage and control the forwarding of multicast data message in the data link layer.

### 5.7.1 Global Configuration

#### Function Description

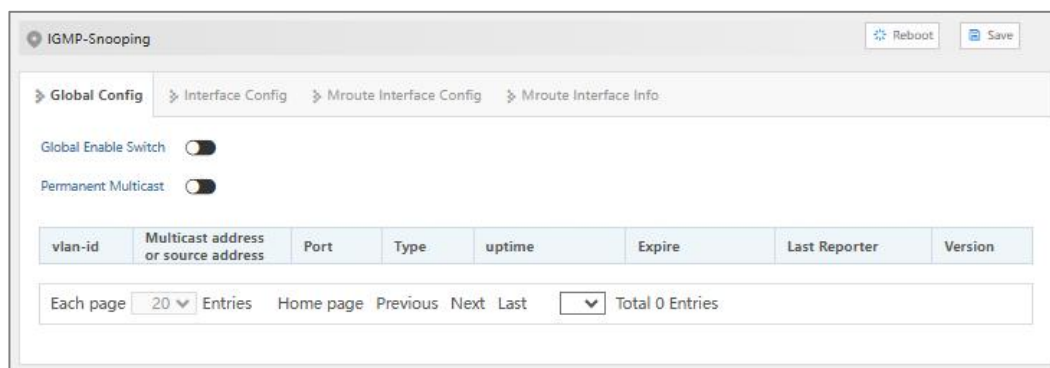
Enable/disable IGMP-Snooping and resident multicast.

#### Operation Path

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

#### Interface Description

Global configuration interface is as follows:



The main element configuration description of global configuration interface:

Interface Element		Description
Global Enable Switch	Enable	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 addresses or source address	or	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: <ul style="list-style-type: none"> <li>Remote: Dynamic grouping, joining multicast groups by sending messages through the terminal devices connected to the interface.</li> <li>Static: Static grouping, joining multicast groups by configuring ports through commands.</li> <li>Remote (static): Dynamic (static), joining multicast groups through static or dynamic means.</li> </ul>
uptime		Time that receives multicast messages.
Expire		Time when the multicast message expires. Possible display options are: <ul style="list-style-type: none"> <li>Static: Static address, multicast does not automatically expire and needs to be manually deleted or reconfigured.</li> </ul>

Interface Element	Description
	<ul style="list-style-type: none"> <li>• Permanent: Permanent multicast, even if the multicast group members change, the multicast route will not be automatically deleted.</li> <li>• 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.</li> <li>• 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.</li> </ul>
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.

## 5.7.2 Interface Configuration

### Function Description

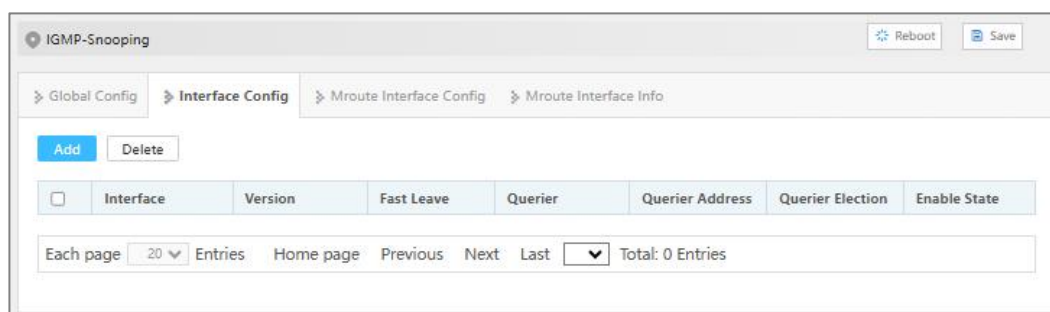
Configure parameters related to IGMP Snooping of VLANIF interface.

### 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 Element	Description
Interface	VLANIF interface, the value range is 1-4094.
Version	<p>Different versions of IGMP Snooping can handle corresponding versions of IGMP protocol. IGMP Snooping protocol version, with the following options:</p> <ul style="list-style-type: none"> <li>• 1</li> <li>• 2</li> <li>• 3</li> </ul>
Fast Leave	<p>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.</p> <p>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.</p>
Querier	<p>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.</p>
Querier Address	<p>The source IP address of IGMP Snooping querier when sending inquiry message.</p>
Querier Election	<p>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.</p>
Enable State	<p>IGMP Snooping enable status, enabling IGMP snooping on global or VLAN interface.</p> <p>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.</p>

## 5.7.3 MRoute Interface Config

### Function Description

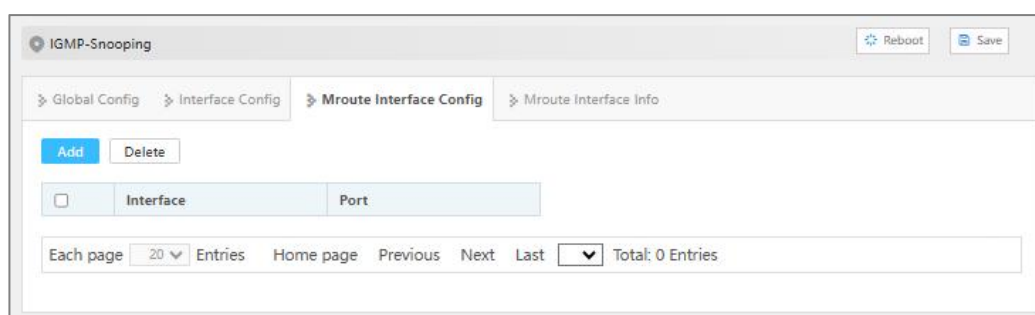
Configure multicast router ports.

### 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.

## 5.7.4 Mroute Interface Information

### Function Description

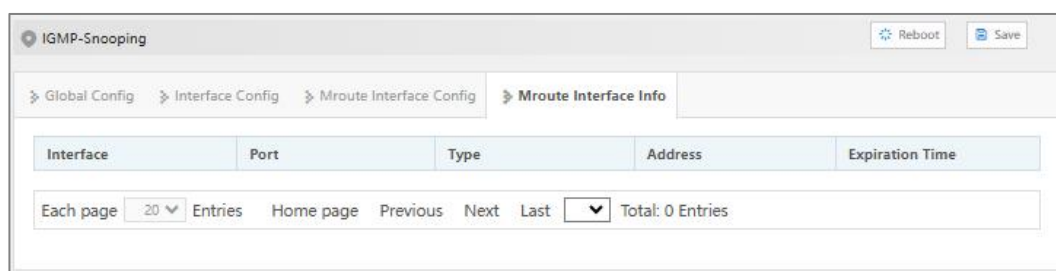
Check the router port information of IGMP Snooping in VLAN, including static router port and dynamic router port.

### Operation Path

Open in order: "Layer 2 > IGMP Snooping Configuration > Mroute Interface Information".

## Interface Description

Mroute Interface Information 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.

## 5.8 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, so as to manage and control the forwarding of multicast data message in the data link layer.

### 5.8.1 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:



The main element configuration description of global configuration interface:

Interface Element		Description
Global Enable Switch	Enable	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: <ul style="list-style-type: none"> <li>• Static: Static address, multicast does not automatically expire and needs to be manually deleted or reconfigured.</li> <li>• Permanent: Permanent multicast, even if the multicast group members change, the multicast route will not be automatically deleted.</li> <li>• 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.</li> <li>• 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.</li> </ul>

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

## 5.8.2 Interface Configuration

### Function Description

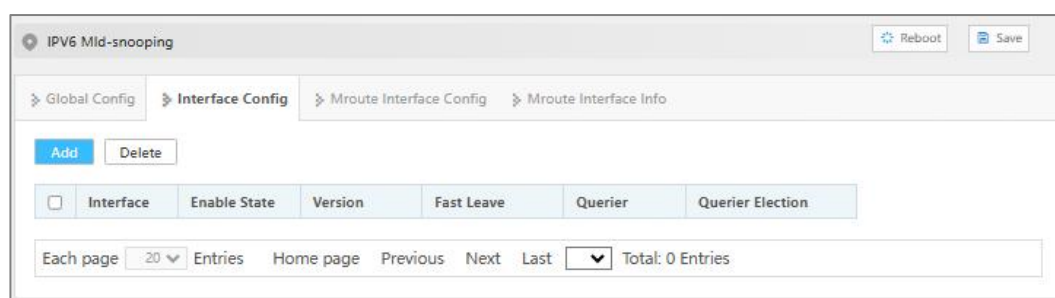
Configure parameters related to MLD Snooping of VLANIF interface.

### Operation Path

Open in order: "Layer 2 > 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: <ul style="list-style-type: none"> <li>• 1</li> <li>• 2</li> </ul>
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

Interface Element	Description
	<p>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.</p> <p>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.</p>
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.

## 5.8.3 Mroute Interface Config

### Function Description

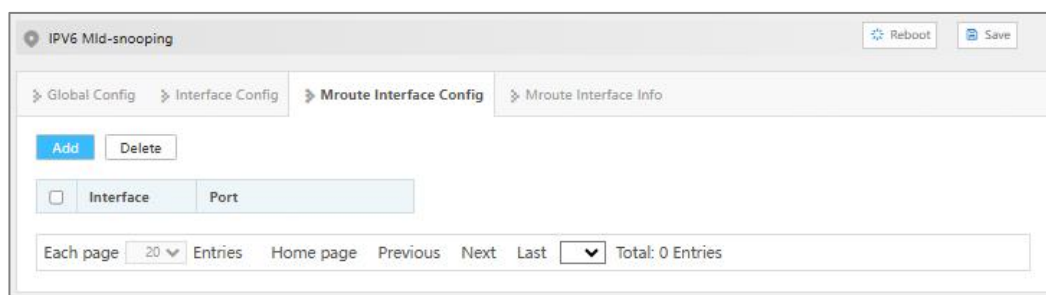
Configure multicast router ports.

### Operation Path

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

### Interface Description

Mroute Interface Config 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. 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.

## 5.8.4 Mroute Interface Info

### Function Description

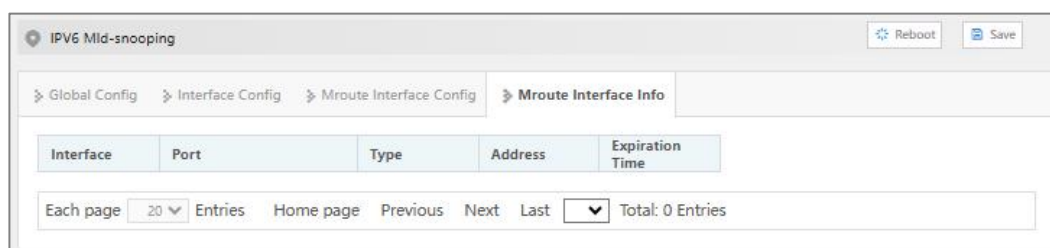
Check the router port information of MLD Snooping in VLAN, including static router port and dynamic router port.

### Operation Path

Open in order: "Layer 2 > IPv6 mld-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.

## 5.9 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.

### 5.9.1 Global Configuration

#### Function Description

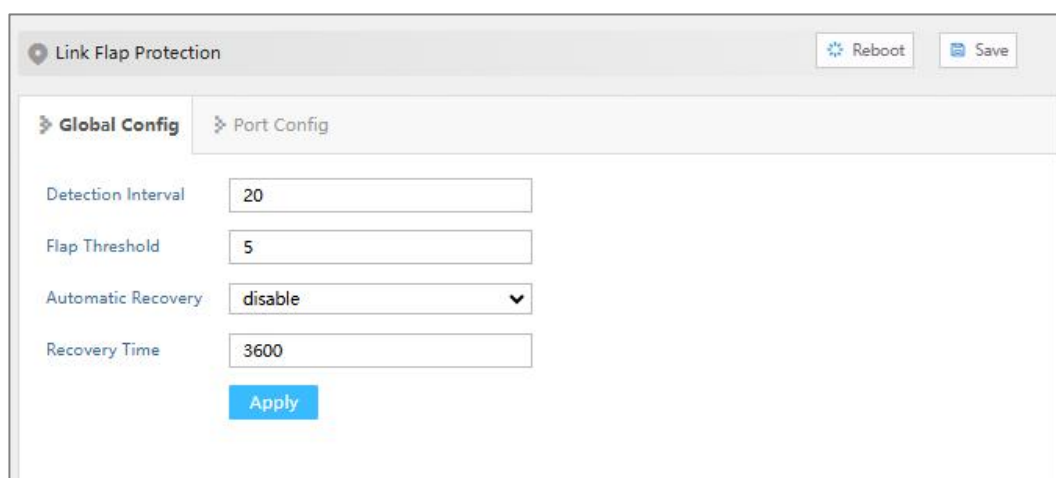
Configure relative parameters of link flapping protection.

#### Operation Path

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

#### Interface Description

Global configuration interface is as follows:



The screenshot shows the 'Link Flap Protection' configuration window. At the top right, there are 'Reboot' and 'Save' buttons. Below the title bar, there are two tabs: 'Global Config' (selected) and 'Port Config'. The 'Global Config' tab contains four configuration fields: 'Detection Interval' with a value of 20, 'Flap Threshold' with a value of 5, 'Automatic Recovery' with a dropdown menu set to 'disable', and 'Recovery Time' with a value of 3600. An 'Apply' button is located at the bottom center of the configuration area.

The main element configuration description of global configuration interface:

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.

## 5.9.2 Port Configuration

### Function Description

Enable link oscillation protection for this port.

### Operation Path

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

### Interface Description

Check port configuration interface as below:

<input type="checkbox"/>	Port	Enable State	Port State
<input type="checkbox"/>	ge1	-	down
<input type="checkbox"/>	ge2	-	down
<input type="checkbox"/>	ge3	-	down
<input type="checkbox"/>	ge4	-	down
<input type="checkbox"/>	ge5	-	down
<input type="checkbox"/>	ge6	-	down
<input type="checkbox"/>	ge7	-	down
<input type="checkbox"/>	ge8	-	down
<input type="checkbox"/>	ge9	-	down
<input type="checkbox"/>	ge10	-	down
<input type="checkbox"/>	ge11	-	down
<input type="checkbox"/>	ge12	-	down
<input type="checkbox"/>	ge13	-	down
<input type="checkbox"/>	ge14	-	down
<input type="checkbox"/>	ge15	-	down
<input type="checkbox"/>	ge16	-	down
<input type="checkbox"/>	ge17	-	down

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: <ul style="list-style-type: none"> <li>• ON: means enabled;</li> <li>• -: means disable</li> </ul>
Port State	Ethernet port connection status, display as follows: <ul style="list-style-type: none"> <li>• down: the port is not connected or forced to shutdown</li> <li>• up: port is connected.</li> </ul>

## 5.10 Port Loop 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.

## Operation Path

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

## Interface Description

Port loop detection interface is as follows:

<input type="checkbox"/>	Port	State	Protected	Port Recovery Time (s)	Protected VLAN	Loop VLAN	Stable Packet Sending Interval (s)	Packet Sending Interval (s)
<input type="checkbox"/>	ge1	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge2	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge3	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge4	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge5	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge6	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge7	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge8	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge9	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge10	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge11	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge12	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge13	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge14	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge15	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge16	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge17	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge18	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge19	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge20	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge21	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge22	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge23	Down	No	300	-	-	10	1
<input type="checkbox"/>	ge24	Up	No	300	-	-	10	1

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

Interface Element	Description
	port.
State	The connection status of this port, values are: <ul style="list-style-type: none"> <li>Down: the port is physically disconnected</li> <li>Up: the port is connected</li> <li>Shutdown: the port is closed</li> <li>No Shutdown: the port is not closed</li> </ul>
Protected	The protected status of the port can be shown as follows: <ul style="list-style-type: none"> <li>Yes</li> <li>No</li> </ul>
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 $\leq 16$ . 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.

## 5.11 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".

### 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 5-15.
Opposite Device State	The status of the opposite device is shown as follows: <ul style="list-style-type: none"> <li>UP: the opposite end device is online normally.</li> <li>DOWN: there is no response from the opposite end device, which may lead to device disconnection or link failure.</li> <li>not be detected.</li> </ul>
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.

## 5.12 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.
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 5-15.
Opposite Device State	The status of the opposite device is shown as follows: <ul style="list-style-type: none"> <li>UP: the opposite end device is online normally.</li> <li>DOWN: there is no response from the opposite end device, which may lead to device disconnection or link failure.</li> <li>not be detected.</li> </ul>
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.

## 5.13 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.

## 5.13.1 Global Configuration

### Function Description

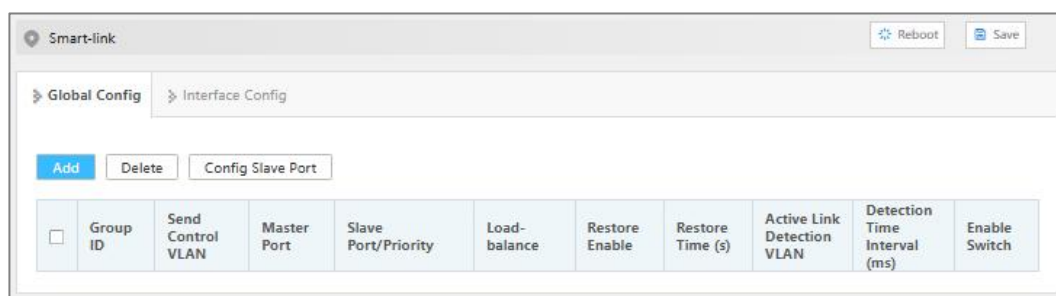
Configure Smart-link related parameters.

### Operation Path

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

### Interface Description

Global configuration interface is as follows:



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	<p>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.</p> <p>Note:</p> <ul style="list-style-type: none"> <li>If the sending control VLAN is configured, the peer device needs to configure the receiving control VLAN.</li> <li>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.</li> </ul>
Master Port	<p>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.</p> <p>Note:</p> <p>Smart Link group port cannot be used as a member port of ring network, aggregation group, etc.</p>
Slave Port/Priority	<ul style="list-style-type: none"> <li>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</li> </ul>

Interface Element	Description
	<p>slave interface will switch to the forwarding state.</p> <ul style="list-style-type: none"> <li>Priority: slave port priority level, the value range is 1-63. Smaller the priority level value is, higher the priority level is.</li> </ul>
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	<p>When the original main link recovers from faults, it will remain 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:</p> <ul style="list-style-type: none"> <li>Enable</li> <li>Disable</li> </ul>
Restore Time (s)	Failback delay time, it can inhibit Smart Link switching caused by link flash, the value range is 30~1200 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	<p>Smart Link function enable status can be displayed as follows:</p> <ul style="list-style-type: none"> <li>Enable</li> <li>Disable</li> </ul>

## 5.13.2 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:

<input type="checkbox"/>	Interface	Receive Control VLAN	Detection Response VLAN
<input type="checkbox"/>	ge1		
<input type="checkbox"/>	ge2		
<input type="checkbox"/>	ge3		
<input type="checkbox"/>	ge4		
<input type="checkbox"/>	ge5		
<input type="checkbox"/>	ge6		
<input type="checkbox"/>	ge7		
<input type="checkbox"/>	ge8		
<input type="checkbox"/>	ge9		
<input type="checkbox"/>	ge10		
<input type="checkbox"/>	ge11		
<input type="checkbox"/>	ge12		
<input type="checkbox"/>	ge13		
<input type="checkbox"/>	ge14		
<input type="checkbox"/>	ge15		
<input type="checkbox"/>	ge16		
<input type="checkbox"/>	ge17		
<input type="checkbox"/>	ge18		
<input type="checkbox"/>	ge19		
<input type="checkbox"/>	ge20		

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.

Interface Element	Description
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.

# 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

Interface Element	Description
	displayed as follows: <ul style="list-style-type: none"> <li>• Up: connection is normal.</li> <li>• Down: disconnected</li> </ul>
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 192.168.8.1/24. 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.
Interface switch	The VLANIF interface enabled status can be displayed as follows: <ul style="list-style-type: none"> <li>• enable</li> <li>• disable</li> </ul>

## 6.1.2 Loopback Interface

Loopback interface is virtual interface, and most of the platforms support using it to simulate real interface. This interface is in virtual forever UP state, which is more stable than any other physical interface. As long as the router starts, the loopback interface would be in an active state. If there are multiple routes that arrive at this loopback address, they would not be unreachable when one of the interface of the device is down. It only be invalid when the router no longer has effect.

### Function Description

Configure the parameters of loopback interface.

### Operation Path

Open in order: "IP Network > Interface > Loopback Interface".

### Interface Description

Loopback interface configuration interface is as follows:



The main element configuration description of loopback interface interface:

Interface Element	Description
Interface	The name of loopback interface, value range: loopback0 or loopback1.
State	The connection state of the loopback Interface, which can be displayed as follows: <ul style="list-style-type: none"> <li>Up</li> <li>Down</li> </ul>
Primary Address	Master IPv4 address and subnet mask of loopback interface, such as 10.1.1.0/24.
IPV6	Ipv6 address and prefix length of loopback interface, such as 1::1/127.
Enable	Loopback interface enable status can be displayed as follows: <ul style="list-style-type: none"> <li>enable</li> <li>disable</li> </ul>

## 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 Information".

### Interface Description

ARP Information interface is as follows:

Destination IP	Destination MAC	Interface	Type	Expiration Time (s)	Port
192.168.1.22	00e0.4c68.05a0	vlanif1	dynamic	1104	ge24

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: <ul style="list-style-type: none"> <li>• Static</li> <li>• Dynamic</li> </ul>
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

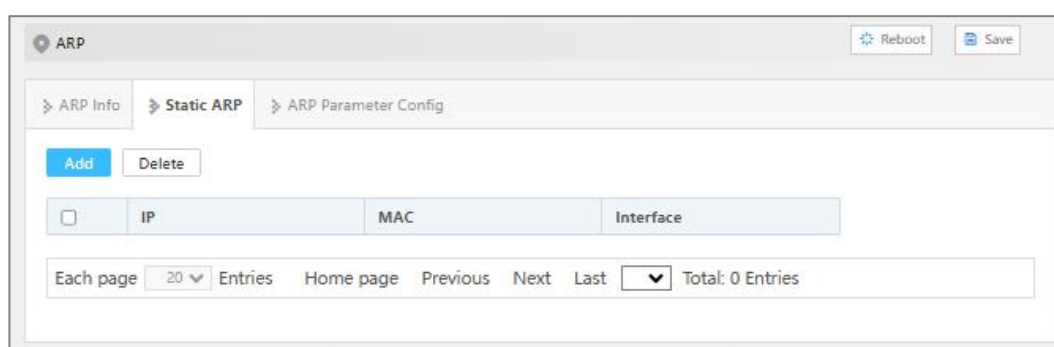
Configure static ARP entries, bind IP address and MAC address to avoid aging and prevent ARP attacks.

### Operation Path

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

### Interface Description

Static ARP interface is as follows:



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

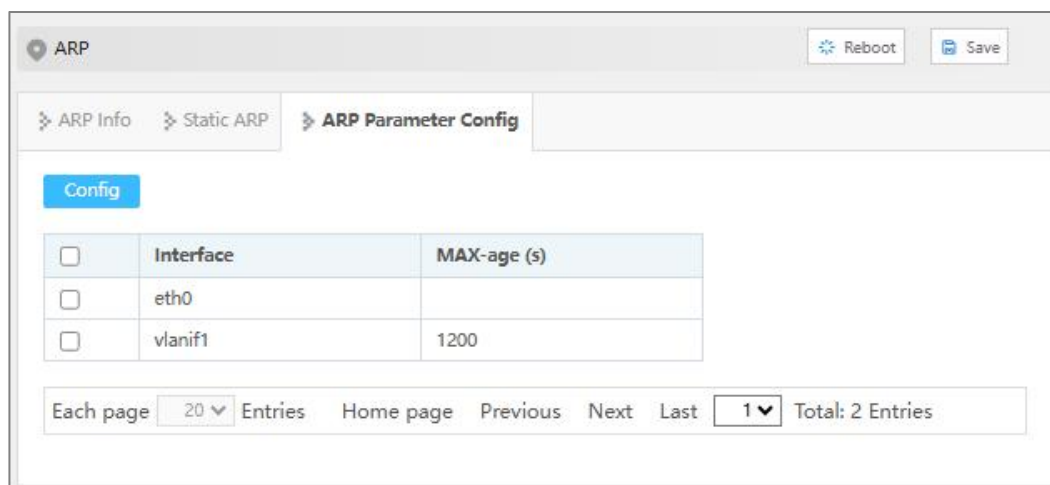
Configure the aging time of dynamic ARP.

### Operation Path

Open in order: "IP Network > ARP > ARP Parameters Configuration".

### Interface Description

ARP parameter configuration interface as follows:



The main element configuration description of ARP age-time interface:

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 1-3000 seconds.

## 6.3 NAT

NAT (Network Address Translation) is a process of translating an IP address in an IP data header into another IP address. In practical application, NAT is mainly used to realize the function of private network accessing public network. This way of using a few public IP addresses to represent more private IP addresses will help to slow down the exhaustion of available IP address space.

### Function Description

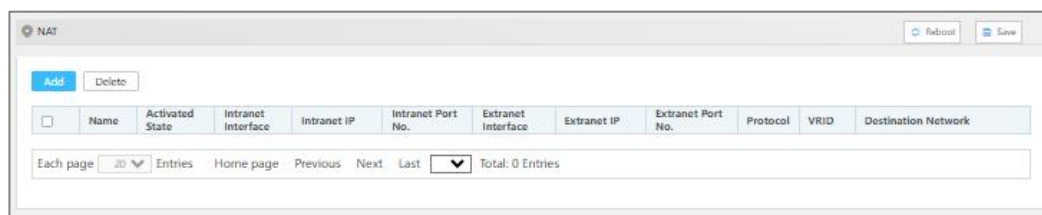
Add or delete NAT entries, and set the internal network interface and external network interface of the device.

### Operation Path

Open in order: "IP Network > NAT".

### Interface Description

NAT interface is as below:



Main elements configuration descriptions of NAT interface:

Interface Element	Description
Name	The NAT entry name, which supports 1-32 characters, consists of uppercase letters, lowercase letters, numbers or special characters (! @ _-).
Activated State	Whether NAT rule is activated or not, the status is as follows: <ul style="list-style-type: none"> <li>up</li> <li>down</li> </ul>
Intranet Interface	Connect the VLAN of the intranet device, access the IP of this VLAN, and access the public network through NAT.
Intranet IP	Intranet IP that can be mapped to external network through NAT.
Intranet Port No.	The port number of the intranet VLAN corresponding to the port mapping protocol. Note: tcp/udp :1-65535/ no filling indicates any port; all/icmp: No distinction between port numbers.
Extranet Interface	The VLAN connecting the external network device, through which the external network can access the internal network device through NAT.
Extranet IP	The external network IP mapped by the internal network IP through NAT.
Extranet Port No.	The port number of the external VLAN corresponding to the port mapping protocol. Note: tcp/udp :1-65535/ no filling indicates any port; all/icmp: No distinction between port numbers.
Protocol	Mapping port protocol, options are as follows: <ul style="list-style-type: none"> <li>All: supports tcp, udp and icmp protocol forwarding;</li> <li>tcp: supports tcp protocol forwarding;</li> <li>udp: supports udp protocol forwarding;</li> <li>icmp: supports icmp protocol forwarding.</li> </ul> Note: When all and icmp protocols are selected, it is not supported to input internal network port and external network port. please keep the internal network port and external network port blank.

Interface Element	Description
VRID	VRID is the VRRP ID, with values ranging from 1 to 255. When the devices in the VRRP backup group are configured with the NAT address pool, it is possible for both devices to perform NAT translation on the packet, resulting in a conflict. Configuring the VRID allows you to optionally specify the Master device to do the NAT conversion, effectively avoiding collisions.
Destination Network	The destination network of internal terminal device, namely the IP address and subnet mask of the destination network, such as 10.1.1.0/24.

# 7 Unicast Routing

## 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:

Destination IP address range	Destination Segment Mask Length	Protocol Type	Next Hop	Egress Interface
192.168.1.0	24	connected	-	vlanif1

Each page: 20 Entries Home page Previous Next Last 1 Total: 1 Entries

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.

Interface Element	Description
Egress Interface	Interface name.

## 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

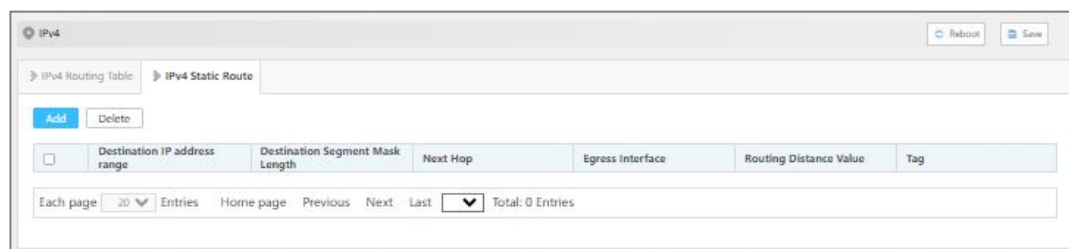
Configure IPv4 static routing.

### 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 IP address, such as destination address is 10.1.1.0.
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 192.3.3.3.
Egress Interface	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

Interface Element	Description
	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:

Destination IP address range	Destination Segment Mask Length	Protocol Type	Next Hop	Egress Interface
fe80::	64	connected	::	vlanif1

Each page 20 Entries Home page Previous Next Last 1 Total: 1 Entries

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.

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

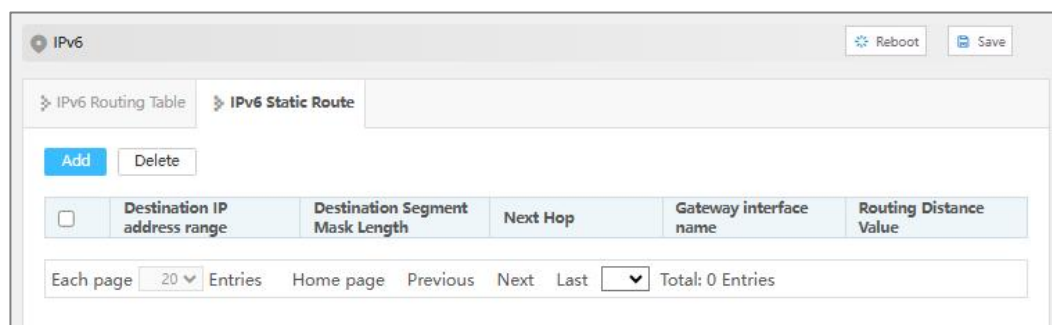
Configure IPv6 static routing.

### Operation Path

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

### Interface Description

The IPv6 static routing interface is as follows:



The main element configuration description of IPv6 static routing 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:

Interface Element	Description
	<ul style="list-style-type: none"> <li>0001:0000:0000:0000:085b:3c51:f5ff:ffdb</li> <li>0001::01</li> </ul>
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.

## 7.3 RIP

RIP (Routing Information Protocol) is a simple Interior Gateway Protocol (IGP) and mainly used in small network, such as Campus Network and Local Area Network with simple structure. RIP isn't used in more complex environment and large network.

RIP is simple to achieve and easier in configuration and maintenance than OSPF or IS-IS, so it's widely used in actual networking.

### 7.3.1 Global Configuration

#### Function Description

Configure RIP Global-Related parameters.

#### Operation Path

Open in order: "Unicast Routing > RIP > Global Configuration".

#### Interface Description

Global configuration interface is as follows:

The screenshot shows the RIP configuration window with the following settings:

- Enable Switch:
- RIP Version: 2
- Assign Default Route: enable
- Metric: 1
- Distance: 120
- Update Time: 30
- Invalid Time: 180
- Invalid Retention Time: 120
- Import External Route:
  - static
  - ospf
  - bgp
  - connected
  - isis

An 'Apply' button is located at the bottom of the configuration area.

The main element configuration description of global configuration interface:

Interface Element	Description
Enable Switch	RIP function enable switch. After enabling, the RIP related parameter configuration will appear.
RIP Version	RIP version drop-down list, the default version is RIP-2, the options of version are as follows: <ul style="list-style-type: none"> <li>• 1: RIP-1 is Classful Routing Protocol, it only supports releasing protocol message via broadcast mode, only natural network segments such as A, B and C can be identified.</li> <li>• 2: RIP-2 is a non-classified routing protocol, which is extended on the basis of RIP-1.</li> </ul> Note: Interface can only send/receive data packets of the RIP version configured.
Assign Default Route	The default route with the destination address of 0.0.0.0 is assigned to RIP routing database, which is disabled by default. The options are as follows: <ul style="list-style-type: none"> <li>• enable</li> <li>• Disable</li> </ul>
Metric	Narrow metric is equal to the number of devices from this route to the destination route, with a default value of 1 and a

Interface Element	Description
	value range of 1-15.
Distance	RIP route management distance, the default distance is 120, the value range is 1-255. When there are routes from two different routing protocols to the same destination, the smaller the management distance value of the routing protocol is, the more reliable the route obtained by the protocol is.
Update Time	<p>Routing information update time. When the timer timeout, immediately send update message, update messages are sent every 30 seconds by default. Value range is 5-2147483647 seconds.</p> <p>Note: When the routing information changes, the trigger update message is immediately sent to the neighbor device instead of waiting for the update timer timeout, thus avoiding the routing loop.</p>
Invalid Time	<p>If no routing update message is received from the neighbor within the invalid time, the route is considered unreachable. By default, it is 180 seconds, value range is 5-2147483647 seconds.</p>
Invalid Retention Time	<p>If the unreachable route does not receive an update message from the same neighbor before the invalid retention timer countdown ends, the route will be completely deleted from the RIP routing table. By default, it is 120 seconds, value range is 5-2147483647 seconds.</p>
Import External Route	<p>Introducing external routing is learning routing from other routing protocols into RIP, with the following options available:</p> <ul style="list-style-type: none"> <li>• static: static routing</li> <li>• ospf: Open Shortest Path First</li> <li>• bgp: border gateway protocol.</li> <li>• connected: connected route</li> <li>• isis: intermediate system to intermediate system IS-IS is an internal gateway protocol.</li> </ul>

## 7.3.2 Network Configuration

### Function Description

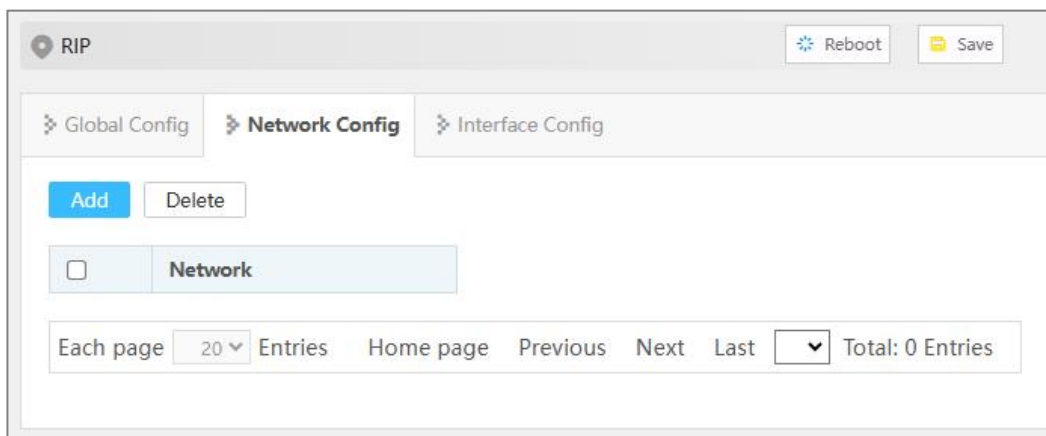
Configure RIP working network segment.

## Operation Path

Open in order: "Unicast Routing > RIP > Network Configuration".

## Interface Description

Network configuration interface is as follows:



The main element configuration description of network configuration interface:

Interface Element	Description
Network	Network segment running RIP protocol.

## 7.3.3 Interface Configuration

### Function Description

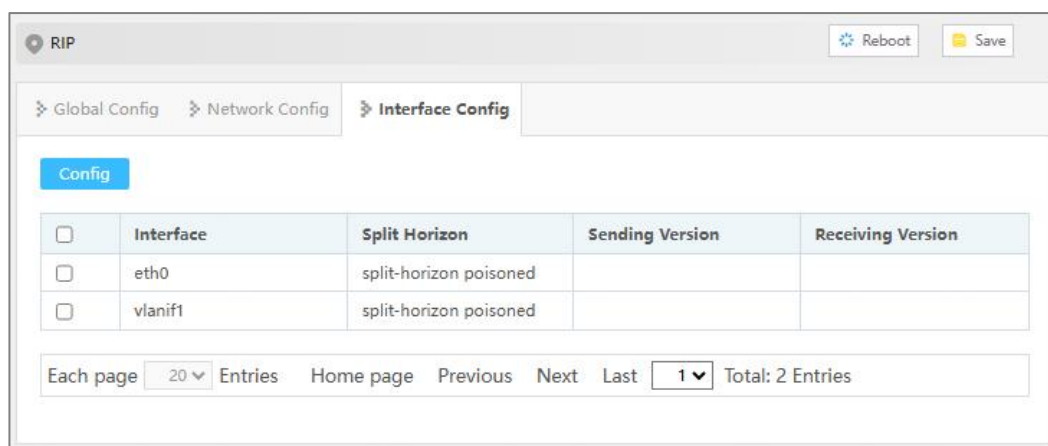
Configure RIP interface parameters.

### Operation Path

Open in order: "Unicast Routing > RIP > Interface Configuration".

### Interface Description

Interface configuration interface is as follows:



The main element configuration description of interface configuration interface:

Interface Element	Description
Interface	RIP interface information
Split Horizon	Horizontal partition. Options are as follows: <ul style="list-style-type: none"> <li>-</li> <li>Split-horizon RIP adopts the split horizon mechanism. That is, the route learned by the router from a certain interface will not be sent back to neighbor routers from that interface.</li> <li>Poison-reverse When RIP learns the route from an interface, it sets the routing metric to unreachable and sends it back to the neighbor router from the original interface.</li> </ul>
Sending Version	RIP protocol version of sending data, options are as follows: <ul style="list-style-type: none"> <li>-</li> <li>1</li> <li>2</li> <li>1 &amp; 2</li> <li>1-compatible</li> </ul>
Receiving Version	RIP protocol version of receiving data, options are as follows: <ul style="list-style-type: none"> <li>-</li> <li>1</li> <li>2</li> <li>1 &amp; 2</li> </ul>

## 7.4 RIPNG

RIPng (RIP next generation) is a simple internal gateway protocol, and an application of RIP in IPv6 network.

### 7.4.1 Global Configuration

#### Function Description

Configure RIPng global parameter.

#### Operation Path

Open in order: "Unicast Routing > RIPNG > Global Configuration".

#### Interface Description

Global configuration interface is as follows:

The screenshot shows the RIPNG Global Configuration interface. It includes the following fields and options:

- Enable Switch:** A toggle switch that is currently turned on.
- Assign Default Route:** A dropdown menu set to "disable".
- Metric:** A text input field containing the value "1".
- Distance:** A text input field containing the value "120".
- Update Time:** A text input field containing the value "30".
- Invalid Time:** A text input field containing the value "180".
- Invalid Retention Time:** A text input field containing the value "120".
- Import External Route:** A section with five unchecked checkboxes: "static", "ospfv3", "bgp", "connected", and "isis".
- Buttons:** "Reboot" and "Save" buttons are in the top right corner. An "Apply" button is at the bottom center.

The main element configuration description of global configuration interface:

Interface Element	Description
Enable Switch	RIPng enable switch, after enabling, RIPng related parameter configuration appears.
Assign Default	Publish RIPng default route (::/0) with the following options:

Interface Element	Description
Route	<ul style="list-style-type: none"> <li>• enable</li> <li>• Disable</li> </ul> <p>Note: When the destination address of the message cannot match any destination address of the routing table, the router will choose the default route to forward the message.</p>
Metric	Default metric value used when routing to RIPng with external routing protocol. The metric is equal to the number of devices from this route to the destination route, with a default value of 1 and a value range of 1-16.
Distance	RIPng route management distance, the default distance is 120, the value range is 1-255. When there are routes from two different routing protocols to the same destination, the smaller the management distance value of the routing protocol is, the more reliable the route obtained by the protocol is.
Update Time	<p>Routing information update time. When the timer timeout, immediately send update message, update messages are sent every 30 seconds by default. Value range is 5-2147483647 seconds.</p> <p>Note: When the routing information changes, the trigger update message is immediately sent to the neighbor device instead of waiting for the update timer timeout, thus avoiding the routing loop.</p>
Invalid Time	If no routing update message is received from the neighbor within the invalid time, the route is considered unreachable. By default, it is 180 seconds, value range is 5-2147483647 seconds.
Invalid Retention Time	If the unreachable route does not receive an update message from the same neighbor before the invalid retention timer countdown ends, the route will be completely deleted from the RIPng routing table. By default, it is 120 seconds, value range is 5-2147483647 seconds.
Import External Route	<p>Introducing external routing is learning routing from other routing protocols into RIPng, with the following options available:</p> <ul style="list-style-type: none"> <li>• static: static routing</li> <li>• ospfv3: OSPFv3 route</li> <li>• bgp: BGP border gateway protocol</li> </ul>

Interface Element	Description
	<ul style="list-style-type: none"> <li>connected: connected route</li> <li>isis: external gateway protocol</li> </ul>

## 7.4.2 Interface Configuration

### Function Description

Configure the interface parameters of RIPng

### Operation Path

Open in order: "Unicast Routing > RIPNG > Interface Configuration".

### Interface Description

Interface configuration interface is as follows:

The main element configuration description of interface configuration interface:

Interface Element	Description
Interface	RIPng interface information.
Enable Switch	RIPng enable status, options as follows: <ul style="list-style-type: none"> <li>Disable</li> <li>Enable</li> </ul>
Split Horizon	Horizontal partition. Options are as follows: <ul style="list-style-type: none"> <li>Split-horizon Route that RIPng learns from an interface, it won't be sent from the interface to neighbor router.</li> <li>Split-horizon poisoned When RIPng learns the route from an interface, it sets the routing metric to unreachable and sends it back to the neighbor router from the original interface.</li> </ul>

Interface Element	Description
Routing Weight	Additional routing metrics, ranging from 1 to 16. The added metric value (hop count) based on the original metric value of RIPng route can affect the route selection.

## 7.5 OSPF

The Open Shortest Path First (OSPF) protocol is link-state Interior Gateway Protocol (IGP) developed by the Internet Engineering Task Force (IETF).

OSPF Version 2 (RFC 2328) is currently used for the IPv4 protocol.

- Dividing an Autonomous System (AS) into one or more logical areas
- Advertising routes by sending Link State Advertisements (LSAs)
- Exchanging OSPF packets between devices in an OSPF area to synchronize routing information
- Encapsulating OSPF packets into IP packets and then sending the packets in unicast or multicast mode

RIP is a distance-vector routing protocol. Due to RIP's slow convergence, routing loops, and poor scalability, OSPF is now the most widely accepted and used IGP.

OSPF, as a link-state based protocol, can solve many problems faced by RIP. In addition, OSPF has the following advantages:

- Multicast packet transmission to reduce load on the switches that are not running OSPF
- Classless Inter-Domain Routing (CIDR)
- Load balancing among equal-cost routes
- Packet authentication

### 7.5.1 Global Configuration

#### Function Description

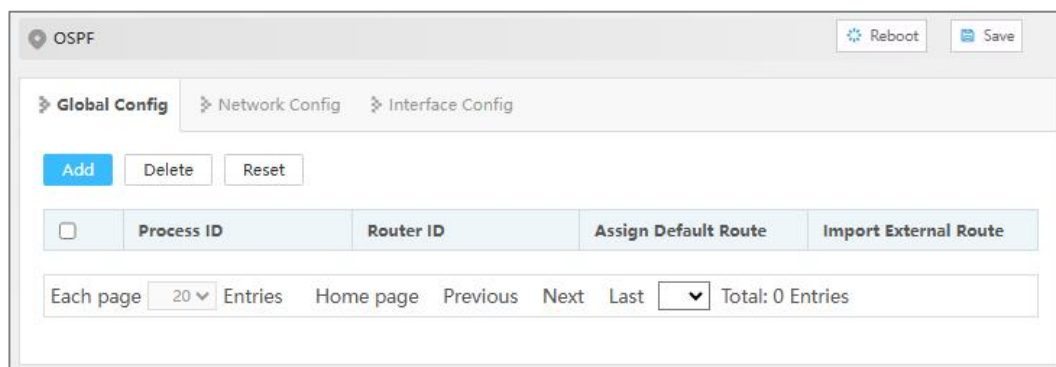
Configure OSPF process ID, router ID, default route, import external route and other information.

#### Operation Path

Open in order: "Unicast Routing > OSPF > Global Configuration".

## Interface Description

Global configuration interface is as follows:



The main element configuration description of global configuration interface:

Interface Element	Description
Process ID	The value range of OSPF process ID is 0-65535. OSPF supports multi-processes, and many different OSPF processes can run on the same router, which do not affect each other and are independent of each other. An interface of a router can only call one OSPF process.
Router ID	Router ID is used to uniquely identify a router running OSPF in the autonomous system. The format of ID is the same as that of IP address. Each OSPF router that runs OSPF has a router ID.
Assign Default Route	Default routes have all 0s as the destination address and mask. A device uses a default route to forward packets when no matching route is discovered.
Import External Route	The routes learned from other routing protocols are introduced into the OSPF routing table, which is suitable for autonomous system boundary routers. External routing describes how to select a route to a destination address other than AS. <ul style="list-style-type: none"> <li>connected: connected route</li> <li>static: static routing</li> <li>rip: RIP route</li> <li>bgp</li> <li>isis</li> </ul>

## 7.5.2 Network Configuration

### Function Description

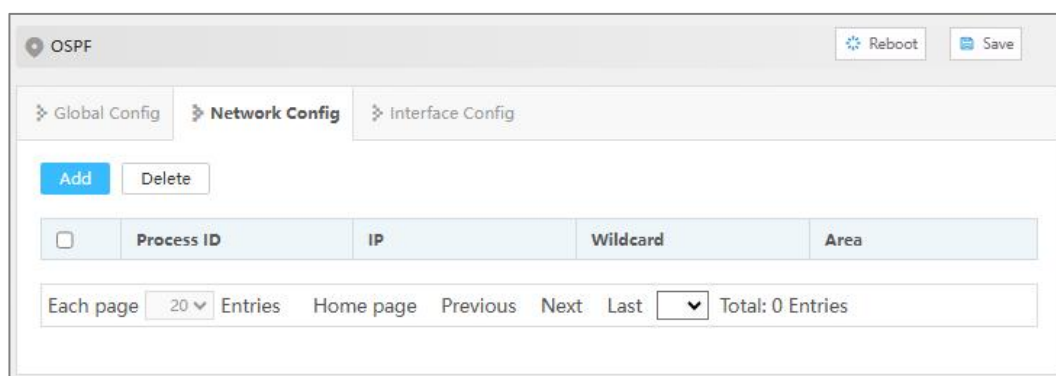
Configure the OSPF area to which each network interface of the device belongs.

### Operation Path

Open in order: "Unicast Routing > OSPF > Network Configuration".

### Interface Description

Network configuration interface is as follows:



The main element configuration description of network configuration interface:

Interface Element	Description
Process ID	The value range of OSPF process ID is 1-65535.
IP	The network address, or network address / network prefix, of the OSPF process.
Wildcard	Wildcard of the network address.
Area	Set the OSPF area to which the network interface belongs. The identification of the OSPF area supports IP address format or integer value in the range of 0-4294967295.

## 7.5.3 Interface Configuration

### Function Description

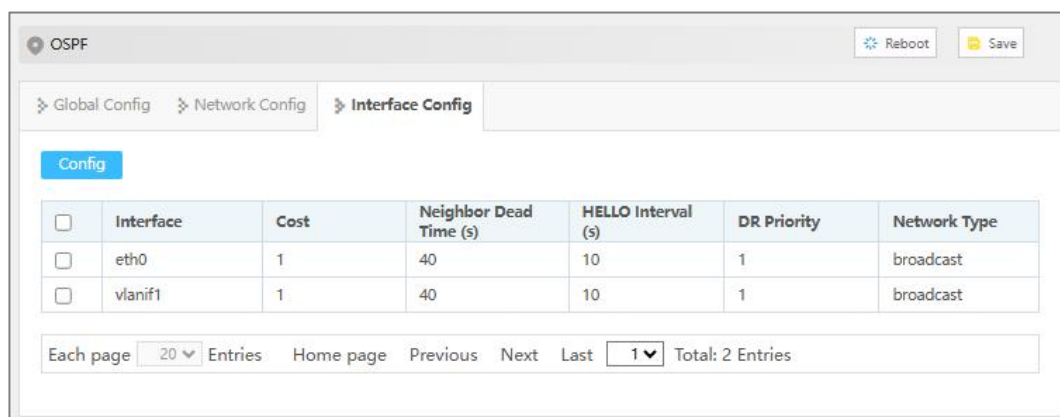
Configure the cost, expiration time, hello interval and DR priority of the device interface.

### Operation Path

Open in order: "Unicast Routing > OSPF > Interface Configuration".

## Interface Description

Interface configuration interface is as follows:



The main element configuration description of interface configuration interface:

Interface Element	Description
Interface	VLANIF interface of the device.
Cost	The cost required to run OSPF protocol on the interface. The value range is 1-65535.
Neighbor Dead Time (s)	OSPF neighbor dead time, in seconds, value range 1-65535. If the Hello message from the neighbor is not received within this time, the neighbor is considered invalid. If the failure time between two adjacent routers is different, the neighbor relationship cannot be established.
Hello Interval (s)	The time interval for the interface to send Hello message, in seconds, with a value range of 1-65535. The Hello message is periodically sent to the neighbor router to maintain the neighbor relationship and the election of DR (Designated Router) / BDR (Backup Designated Router).
DR Priority	DR priority of the interface, ranging from 1 to 255. The DR priority determines the qualification of the interface for election of DR/BDR. The higher the value, the higher the priority. High priority will be taken into account when voting rights conflict.
Network Type	The network types of OSPFv3 interface correspond to different types of link layer protocols, and the network types are as follows: <ul style="list-style-type: none"> <li>Broadcast</li> <li>Non-broadcast: non-broadcast point-to-multipoint</li> </ul>

Interface Element	Description
	NBMA type <ul style="list-style-type: none"> <li>Point-to-multipoint</li> <li>Point-to-point: point-to-point P2P type</li> </ul>

## 7.6 OSPFV3

OSPFv3 is an OSPF routing protocol running on IPv6, modified on the basis of OSPFv2, and is an independent routing protocol.

### 7.6.1 Global Configuration

#### Function Description

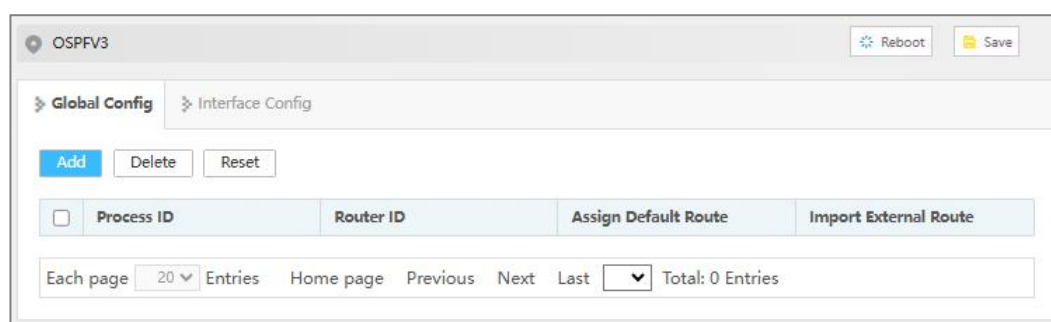
Configure OSPFv3 process ID, router ID, default route, import external route and other information.

#### Operation Path

Open in order: "Unicast Routing > OSPFV3 > Global Configuration".

#### Interface Description

Global configuration interface is as follows:



The main element configuration description of global configuration interface:

Interface Element	Description
Process ID	OSPFv3 process identification. OSPFv3 supports multiple processes. Multiple different OSPFv3 processes can be run on the same router, and they are independent of each other.
Router ID	Router ID is used to uniquely identifies an OSPF router in an AS. ID is in the same format as an IP address. Every OSPFv3 process has a router ID.

Interface Element		Description
Assign Route	Default	Default routes have all 0s as the destination address and mask. A device uses a default route to forward packets when no matching route is discovered.
Import Route	External	The routes learned from other routing protocols are introduced into the OSPFv3 routing table, which is suitable for autonomous system boundary routers. External routing describes how to select a route to a destination address other than AS. <ul style="list-style-type: none"> <li>connected: connected route</li> <li>static: static routing</li> <li>rip: RIP/RIPng route information protocol</li> <li>bgp: BGP border gateway protocol.</li> <li>isis: IS-IS intermediate system to intermediate system</li> </ul>

## 7.6.2 Interface Configuration

### Function Description

Configure the cost, expiration time, hello interval and DR priority of the device interface.

### Operation Path

Open in order: "Unicast Routing > OSPFV3 > Interface Configuration".

### Interface Description

Interface configuration interface is as follows:



The main element configuration description of interface configuration interface:

Interface Element	Description
Interface	VLANIF interface of the device.
Process ID	OSPFv3 process identification.

Interface Element	Description
Area	The ID of the OSPFv3 area, the value range is 0-4294967295 or IPv4 address format. The OSPFv3 protocol divides the autonomous system into one or more areas in a logical sense, and achieves the unification of routing information by exchanging OSPFv3 messages among devices in the areas.
Instance ID	Instance ID the interface belongs to. OSPFv3 supports multiple processes on a link, and a physical interface can be bound to multiple instances, which are distinguished by different Instance ID.
Cost	The cost required to run OSPF protocol on the interface. The value range is 1-65535.
Neighbor Dead Time (s)	OSPF neighbor dead time, in seconds, value range 1-65535. If the Hello message from the neighbor is not received within this time, the neighbor is considered invalid. If the failure time between two adjacent routers is different, the neighbor relationship cannot be established.
Hello Interval (s)	The time interval for the interface to send Hello message, in seconds, with a value range of 1-65535. The Hello message is periodically sent to the neighbor router to maintain the neighbor relationship and the election of DR (Designated Router) / BDR (Backup Designated Router).
DR Priority	DR priority of the interface, ranging from 1 to 255. The DR priority determines the qualification of the interface for election of DR/BDR. The higher the value, the higher the priority. High priority will be taken into account when voting rights conflict.
Network Type	<p>The network types of OSPFv3 interface correspond to different types of link layer protocols, and the network types are as follows:</p> <ul style="list-style-type: none"> <li>• Broadcast</li> <li>• Non-broadcast: non-broadcast point-to-multipoint NBMA type</li> <li>• Point-to-multipoint</li> <li>• Point-to-point: point-to-point P2P type</li> </ul>

## 7.7 ISIS

IS-IS (intermediate system to intermediate system) belongs to IGP (Interior Gateway Protocol) and is used in the autonomous system. IS-IS is also a link-state protocol, which uses the shortest path first (SPF) algorithm to calculate the route.

### 7.7.1 Global Configuration

#### Function Description

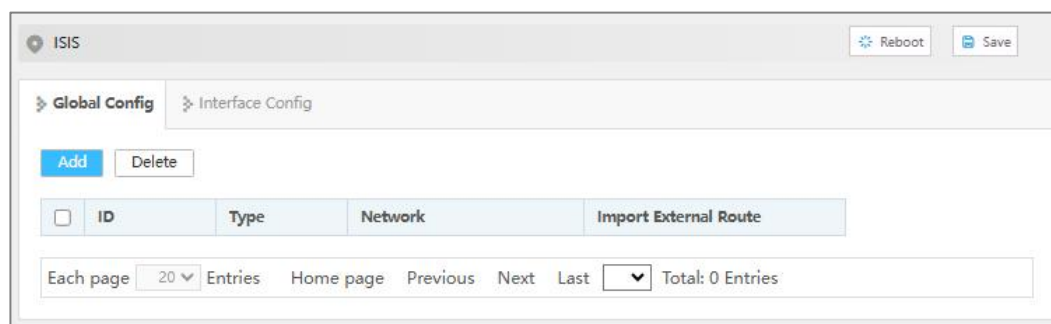
Configure IS-IS global parameter.

#### Operation Path

Open in order: "Unicast Routing > ISIS > Global Configuration".

#### Interface Description

Global configuration interface is as follows:



The main element configuration description of global configuration interface:

Interface Element	Description
ID	IS-IS process identification. IS-IS supports multi-processes, and many different IS-IS processes can run on the same router, which do not affect each other and are independent of each other.
Type	The types of IS-IS device, the options are as follows: <ul style="list-style-type: none"> <li>Level-1: The device only forms neighbor relationship with Level-1 and Level-1-2 device belonging to the same area, and is only responsible for maintaining the link state database LSDB of Level-1.</li> <li>Level-2: The device can form a neighbor relationship with Level-2 devices in the same or different areas or Level-1-2 devices in other areas, and only maintain one</li> </ul>

Interface Element	Description
	<p>Level-2 LSDB.</p> <ul style="list-style-type: none"> <li>Level-1-2: The device will establish neighbors for Level-1 and Level-2 respectively, and maintain two LSDB for Level-1 and Level-2 respectively.</li> </ul>
Network	<p>The network entity name NET (Network Entity Title) of the IS-IS process is in the format of X...X.XXXX.XXXX.XXXX.00, the front "X...X" is the area address, the middle 12 "X" is the system ID of the device, and the last "00" is SEL.</p> <p>Note:</p> <ul style="list-style-type: none"> <li>The zone address is used to uniquely identify different zones in the routing domain. All switches in the same Level-1 zone must have the same zone address, and switches in the Level-2 zone can have different zone addresses.</li> <li>In the whole area and backbone area, it is required to keep the system ID unique.</li> </ul>
Import External Route	<p>The routes learned from other routing protocols are introduced into the IS-IS routing table, which is suitable for boundary routers. Traffic in the IS-IS routing domain can reach the outside of the IS-IS routing domain.</p> <ul style="list-style-type: none"> <li>connected: connected route</li> <li>static: static routing</li> <li>ospf: Open Shortest Path First</li> <li>bgp: BGP border gateway protocol.</li> <li>rip: RIP route information protocol</li> <li>isis level-2 into level-1: route penetration from Level-2 to Level-1</li> </ul>

## 7.7.2 Interface Configuration

### Function Description

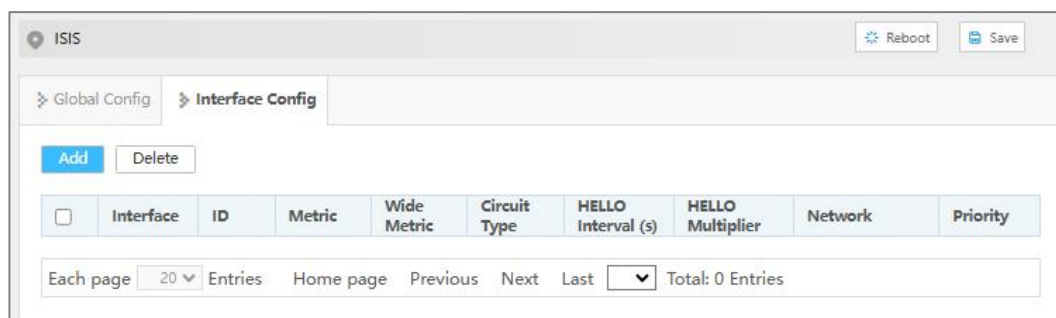
Configure the interface parameters of IS-IS.

### Operation Path

Open in order: "Unicast Routing > ISIS > Interface Configuration".

### Interface Description

Interface configuration interface is as follows:



The main element configuration description of interface configuration interface:

Interface Element	Description
Interface	VLANIF interface of the device.
ID	IS-IS process identification.
Metric	Narrow metric is the default metric for calculating the cost of IS-IS interface. Default is 10, value range is 1-63.
Wide Metric	Wide metric is an extended metric for calculating the cost of IS-IS interface. Default is 10, value range is 1-16777214. Note: In the global configuration of IS-IS routing protocol, the "narrow metric" mode is adopted by default to calculate the interface cost. The "wide metric" here exists only as an information display, and the actual wide metric calculation function is not enabled.
Circuit Type	The circuit types of IS-IS device interface, the options are as follows: <ul style="list-style-type: none"> <li>Level-1: The device only forms neighbor relationship with Level-1 and Level-1-2 device belonging to the same area, and is only responsible for maintaining the link state database LSDB of Level-1.</li> <li>Level-2: The device can form a neighbor relationship with Level-2 devices in the same or different areas or Level-1-2 devices in other areas, and only maintain one Level-2 LSDB.</li> <li>Level-1-2: The device will establish neighbors for Level-1 and Level-2 respectively, and maintain two LSDB for Level-1 and Level-2 respectively.</li> </ul>
Hello Interval (s)	The time interval for the interface to send Hello message, in seconds, with a value range of 1-65535. Hello messages are periodically sent to neighbor routers to maintain the neighbor relationship.
HELLO Multiplier	The neighbor hold time is a multiple of the interval between

Interface Element	Description
	Hello messages, and the value range is 2-100. If the device at one end of the link does not receive the Hello message sent by the device at the opposite end within the neighbor holding time, it is considered that the neighbor at the opposite end is invalid.
Network	The network types of IS-IS interface correspond to different types of link layer protocols, and the network types are as follows: <ul style="list-style-type: none"> <li>Broadcast</li> <li>Point-to-point: point-to-point P2P type</li> </ul>
Priority	DIS priority of the interface, the default is 64, ranging from 1 to 127. The DIS priority determines the qualification of the interface for election of DIS. The higher the value, the higher the priority.

## 7.8 VRRP

The Virtual Router Redundancy Protocol (VRRP) groups multiple routing devices into a virtual router and uses the virtual gateway device's IP address as the default gateway address. When the gateway fails, VRRP selects a new gateway to transmit service traffic to ensure reliable communication. VRRP protocol has two versions: VRRPv2 and VRRPv3. VRRPv2 applies to only the IPv4 network, and VRRPv3 applies to IPv4 and IPv6 networks.

### Function Description

Configure IPv4 VRRP parameter.

### Operation Path

Open in order: "Unicast Routing > VRRP".

### Interface Description

VRRP interface is as below:

VRID	Layer 3 Interface	State	Virtual IP	IP Address Owner	Priority	Announcement Interval (cs)	Preemption Mode	Preemption Delay (s)	IPDT ID	Type	IPDT Priority	Enable Switch
Total: 0 Entries												

The main element configuration descriptions of VRRP interface:

Interface Element	Description
VRID	Virtual router ID, valid range is 1-255.
Layer-3 Interface	Layer 3 interface information, such as, vlanif1.
State	Current status, options as follows: <ul style="list-style-type: none"> <li>• Init</li> <li>• Master</li> <li>• Backup</li> </ul>
Virtual IP	Virtual router IP address, such as 192.168.1.253.
IP Address Owner	The IP address owner takes the virtual router IP address as the real interface address.
Priority	Priority defaults to 100, the valid range is 1-255. Note: When the IP address owner is configured, the default priority can only be 255.
Announcement interval (cs)	The Master router in the VRRP backup group will send a notification message to notify the routers in the VRRP backup group that they are working normally, unit: centisecond, valid range: 5-4095 (multiple of 5).
Preemption Mode	In the preemption mode, once the routers in the backup group find that their priority is higher than that of the current Master router, they will send VRRP announcement messages to the outside. It causes the router in the backup group to reelect the Master router and eventually replace the original Master router. Accordingly, the original Master router will become the Backup router. Preemption mode, options as follows: <ul style="list-style-type: none"> <li>• false</li> <li>• true</li> </ul>
IPDT ID	The value range of IPDT ID is 1-8.
Type	IPDT priority type, options are as follows: <ul style="list-style-type: none"> <li>• Increased: After "Track" is enabled, the VRRP priority value is equal to the original VRRP priority value plus the IPDT priority value when the IPDT link fails.</li> <li>• Reduced: After "Track" is enabled, the VRRP priority value is equal to the original VRRP priority value minus the IPDT priority value when the IPDT link fails.</li> </ul>
IPDT Priority	Port priority level, the value range is 1-253.
Enable Switch	VRRP enable status, options are as follows: <ul style="list-style-type: none"> <li>• enable</li> </ul>

Interface Element	Description
	<ul style="list-style-type: none"> <li>disable</li> </ul>

## 7.9 IPv6 VRRP

### Function Description

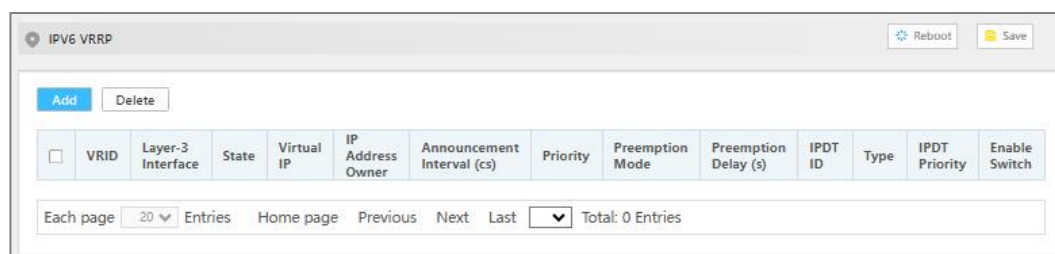
Configure IPv6 VRRP parameter.

### Operation Path

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

### Interface Description

IPv6 VRRP interface is as below:



The main elements configuration description of IPv6 VRRP interface:

Interface Element	Description
VRID	Virtual router ID, valid range is 1-255.
Layer-3 Interface	Layer 3 interface information, such as, vlanif1.
State	Current status, options are as follows: <ul style="list-style-type: none"> <li>Init</li> <li>Master</li> <li>Backup</li> </ul>
Virtual IP	Virtual routing IPv6 address, the address within the local address range of the link, such as fe80::1.
IP Address Owner	The IP address owner takes the virtual router IP address as the real interface address.
Announcement interval (cs)	The Master router in the VRRP backup group will send a notification message to notify the routers in the VRRP backup group that they are working normally, unit: centisecond, valid range: 5-4095 (multiple of 5).
Priority	Priority defaults to 100, the valid range is 1-255. Note: When the IP address owner is configured, the default priority can

Interface Element	Description
	only be 255.
Preemption Mode	<p>In the preemption mode, once the routers in the backup group find that their priority is higher than that of the current Master router, they will send VRRP announcement messages to the outside. It causes the router in the backup group to reelect the Master router and eventually replace the original Master router. Accordingly, the original Master router will become the Backup router. Preemption mode, options as follows:</p> <ul style="list-style-type: none"> <li>• false</li> <li>• true</li> </ul>
Preemption Delay (s)	Set a preemption delay for a VRRP backup group to avoid frequent primary and standby state transitions among members of the backup group. Valid range is 0-255s, the default value is 0s.
IPDT ID	<p>VRRP enable status, options as follows:</p> <ul style="list-style-type: none"> <li>• enable</li> <li>• disable</li> </ul>
Type	<p>IPDT priority type, options are as follows:</p> <ul style="list-style-type: none"> <li>• Increased: After "Track" is enabled, the VRRP priority value is equal to the original VRRP priority value plus the IPDT priority value when the IPDT link fails.</li> <li>• Reduced: After "Track" is enabled, the VRRP priority value is equal to the original VRRP priority value minus the IPDT priority value when the IPDT link fails.</li> </ul>
IPDT Priority	Port priority level, the value range is 1-253.
Enable Switch	<p>VRRP enable status, options are as follows:</p> <ul style="list-style-type: none"> <li>• enable</li> <li>• disable</li> </ul>

# 8 Multicast Routing

## 8.1 Multicast routing

### 8.1.1 Multicast Routing Switch

#### Function Description

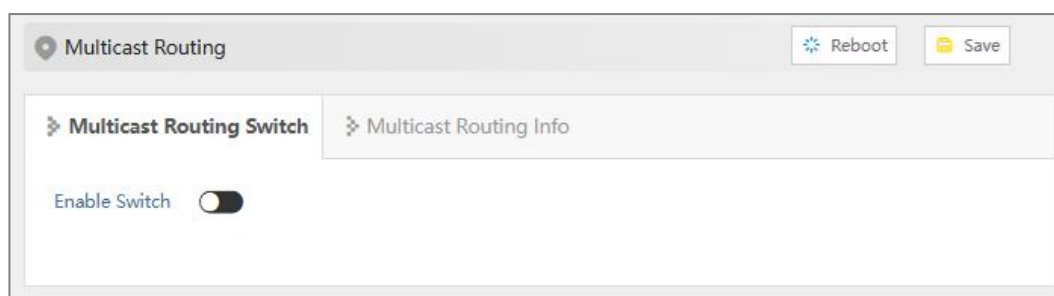
Turn on or off the layer 3 IPv4 multicast routing function.

#### Operation Path

Open in order: "Multicast Routing > Multicast Routing > Multicast Routing Switch".

#### Interface Description

The multicast routing switch interface is shown as follows:



Main elements of the multicast routing switch interface:

Interface Element	Description
Enable Switch	Click the button to enable or disable multicast routing, swipe right to enable it, swipe left to disable it.

## 8.1.2 Multicast Routing Information

### Function Description

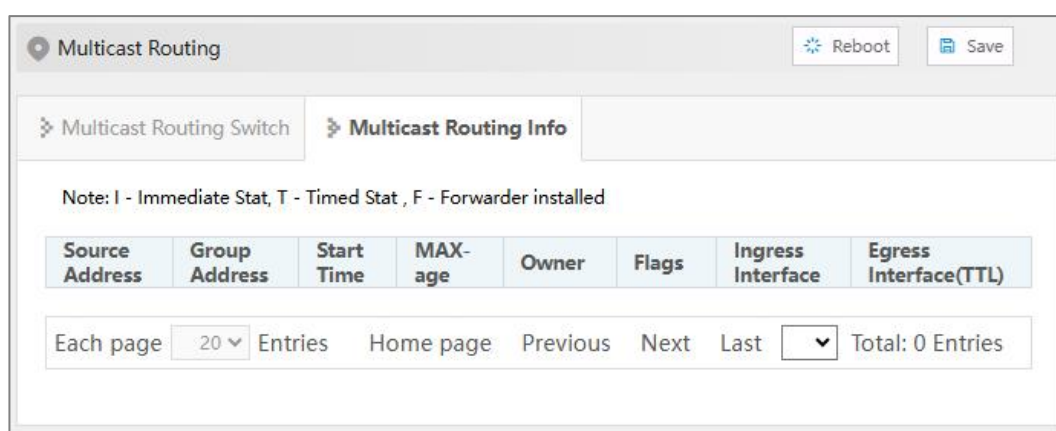
Check layer 3 multicast routing information.

### Operation Path

Open in order: "Multicast Routing > Multicast Routing > Multicast Routing Information".

### Interface Description

The multicast routing information interface is as follows:



Main elements of the multicast routing information interface:

Interface Element	Description
Source Address	Multicast source address
Multicast address	Multicast group address
Start Time	The existed time of the multicast route.
MAX-age	Multicast routing aging time.
Owner	The owner of a multicast route may be a multicast routing protocol.
Flags	Multicast routing protocol flag: <ul style="list-style-type: none"> <li>• I: Immediate Stat (Immediately the statistics)</li> <li>• T: Timed Stat (Statistics Timer)</li> <li>• F: Forwarder installed (Set to forward table)</li> </ul>
Ingress Interface	Multicast data ingress interface. The interface on the local device that receives multicast data.
Egress Interface (TTL)	Multicast data egress interface. The interface that forwards multicast data out.

## 8.2 IPv6 Multicast Routing

### 8.2.1 Multicast Routing Switch

#### Function Description

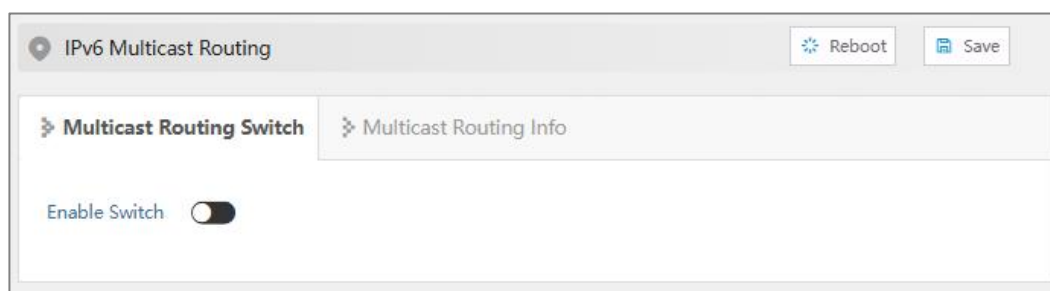
Enable IPv6 layer 3 multicast routing globally. After the multicast routing function is enabled, it can be equipped with some IPv6 layer 3 multicast protocols such as PIM(IPv6) and MLD and other IPv6 layer 3 multicast functions.

#### Operation Path

Open in order: "Multicast Routing > IPv6 Multicast Routing > Multicast Routing Switch".

#### Interface Description

The multicast routing switch interface is shown as follows:



Main elements of the multicast routing switch interface:

Interface Element	Description
Enable switch	IPv6 layer 3 multicast routing enable switch.

### 8.2.2 Multicast Routing Information

#### Function Description

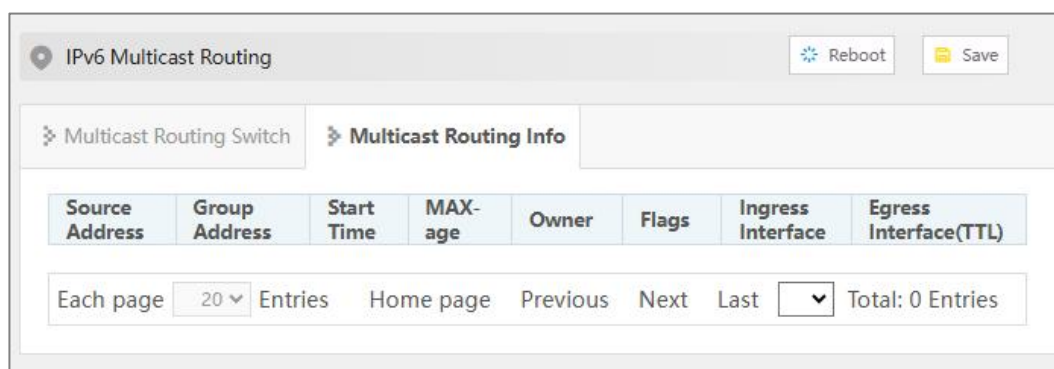
Check layer 3 multicast routing information.

#### Operation Path

Open in order: "Multicast Routing > IPV6 Multicast Routing > Multicast Routing Information".

## Interface Description

The multicast routing information interface is as follows:



Main elements of the multicast routing information interface:

Interface Element	Description
Source Address	Multicast source address
Group Address	Multicast group address
Start Time	The existed time of the multicast route.
MAX-age	Multicast routing aging time.
Owner	The owner of a multicast route may be a multicast routing protocol.
Flags	Multicast routing protocol flag: <ul style="list-style-type: none"> <li>• I: Immediate Stat (Immediately the statistics)</li> <li>• T: Timed Stat (Statistics Timer)</li> <li>• F: Forwarder installed (Set to forward table)</li> </ul>
Ingress Interface	Multicast data ingress interface. The interface on the local device that receives multicast data.
Egress Interface (TTL)	Multicast data egress interface. The interface that forwards multicast data out.

## 8.3 IGMP Snooping

### 8.3.1 Interface Configuration

#### Function Description

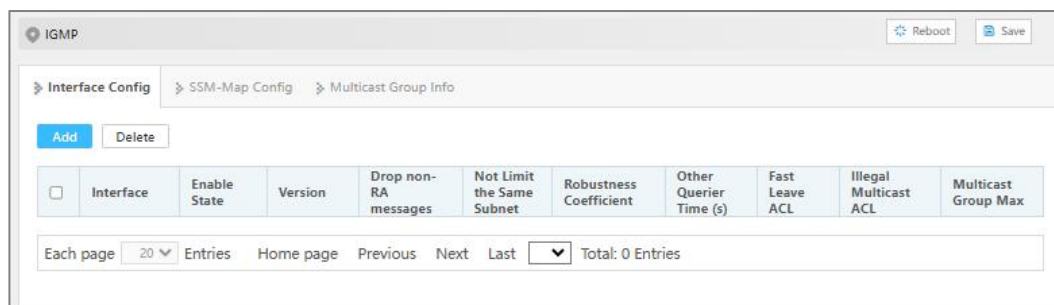
Configure the IGMP parameters of VLANIF interface.

## Operation Path

Open in order: "Multicast Routing > IGMP > Interface Configuration".

## Interface Description

Interface configuration interface is as follows:



The main element configuration description of interface configuration interface:

Interface Element	Description
Interface	Layer 3 interface, such as vlanif1.
Enable State	IGMP status: <ul style="list-style-type: none"> <li>enable</li> <li>Disable</li> </ul>
Version	IGMP version, options are: <ul style="list-style-type: none"> <li>1: IGMPv1, it defines the basic querying and reporting process of group members;</li> <li>2: IGMPv2, it adds the mechanism of polling and leaving group members on IGMPv1;</li> <li>3: IGMPv3, members are added to IGMPv2 to specify whether to receive or not to receive messages from certain multicast sources.</li> </ul>
Drop non-RA messages	RA(Router-Alert). When a network device receives a message, only the message whose destination IP address is the interface address of the device will be sent to the corresponding protocol module for processing. If the destination address of the protocol message is not the interface address of the device, check whether the IP message header carries the Router-Alert option, if so, it will be directly sent to the corresponding protocol module for processing without checking the destination address. Note: For compatibility reasons, after receiving IGMP message, the current switch will send it to IGMP protocol module for processing by default regardless of whether its IP header contains Router-Alert

Interface Element	Description
	option.
Not Limit the Same Subnet	Limit the multicast source and interface to the same subnet, otherwise the port cannot receive multicast messages.
Robustness Coefficient	Specify the robustness of the IGMP query, ranging from 2 to 7. This coefficient is used to specify the default number of times the IGMP query sends the universal group query message at startup and the number of times the IGMP query sends the specific group query message after receiving the outgoing group message.
Other Querier Time (s)	Timer time of non-inquirer. <ul style="list-style-type: none"> <li>• Before the timer expires, if the inquiry message from the inquirer is received, reset the timer;</li> <li>• Otherwise, the original inquirer is considered invalid, and a new inquirer election process is initiated.</li> </ul>
Fast Leave ACL	By default, when the interface works in IGMP v2 or v3, after receiving IGMP leave message, it will send a specific group query message to determine whether to age multicast member entries. After configuring the fast leave ACL, if the group address specified by the leave message is within the group address range specified by the ACL, the multicast member table entry can be aged immediately.
Illegal Multicast ACL	List of restricted multicast groups.
Multicast Group Max	The maximum number of multicast supported.

### 8.3.2 SSM-Map configuration

SSM (Source-Specific Multicast) requires routers to know the multicast source designated by member hosts when they join the multicast group. A host running IGMPv3 can specify multicast source addresses in IGMPv3 Report messages. However, hosts running IGMPv1 or IGMPv2 rely on the IGMP SSM mapping function to obtain the SSM service.

The mechanism of IGMP SSM Mapping is: by statically configuring SSM address Mapping rules on the router, information in IGMPv1 and IGMPv2 report packets is converted into corresponding information to provide SSM multicast service.

After the configuration of SSM Mapping rules, when the IGMP query receives the IGMPv1 or IGMPv2 report packets from the member host, it first checks the multicast group addresses carried in the paper, and then processes them separately according to the different inspection results.

- If the Multicast group is within the range of ANY-Source Multicast, then only ASM services are provided.
- If the multicast group is within the SSM group address range (the default is 232.0.0.0 ~ 232.255.255.255):
  - If the router does not have the SSM Mapping rule corresponding to the multicast group, the SSM service cannot be provided and the article is discarded.
  - If there are SSM Mapping rules corresponding to the multicast group on the router, according to the rules, the information contained in the report packet (member, multicast group) will be mapped to (multicast group, INCLUDE, member) information, and SSM service will be provided.

## Function Description

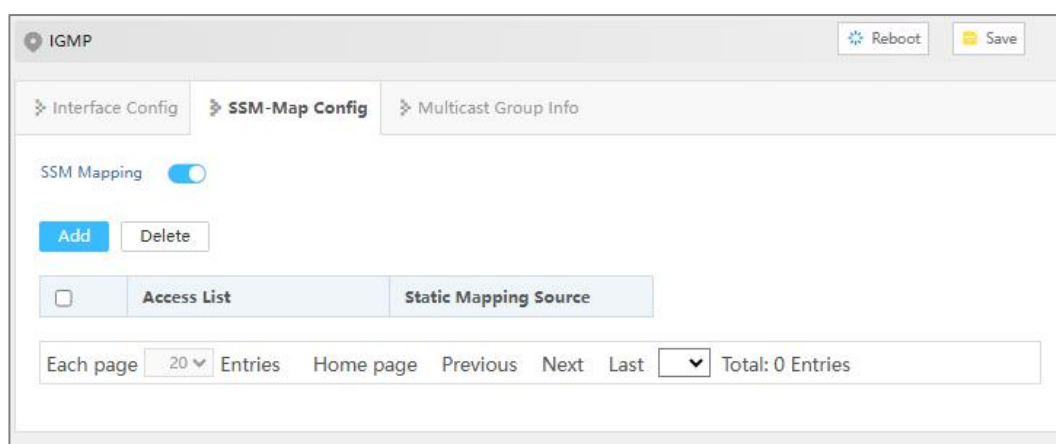
Configure SSM Mapping rule.

## Operation Path

Open in order: "Multicast Routing > IGMP > SSM-Map Configuration".

## Interface Description

The SSM-Map configuration interface is as follows:



Main element configuration description of SSM-Map configuration interface:

Interface Element	Description
SSM Mapping	IGMP SSM Mapping Enable switch.
Access List	Access list.
Static Mapping Source	The specified multicast source address in the access list.

### 8.3.3 Multicast Group Information

#### Function Description

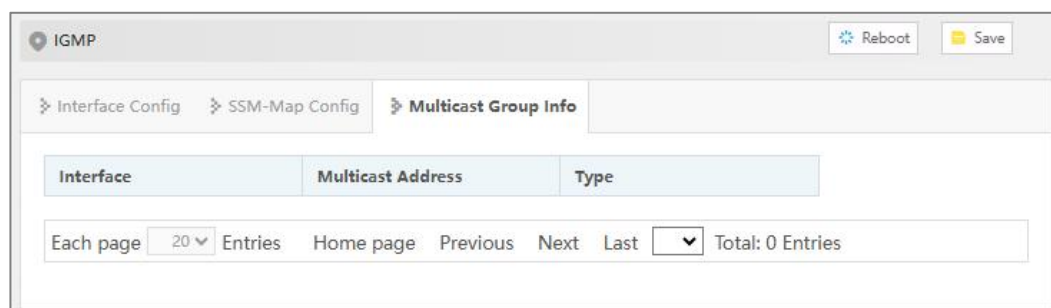
Display the multicast information received by the device interface.

#### Operation Path

Open in order: "Multicast Routing > IGMP > Multicast Group Information".

#### Interface Description

The multicast group information interface is as follows:



Main element configuration description of multicast group information interface:

Interface Element	Description
Interface	Ethernet port.
Multicast Address	The multicast address received by the interface.
Type	Multicast type: <ul style="list-style-type: none"> <li>dynamic</li> <li>static</li> </ul>

## 8.4 IPv6 MLD

MLD (Multicast Listener Discovery) is a protocol responsible for IPv6 multicast member management, which is used to establish and maintain the multicast group member relationship between IPv6 member hosts and their immediate neighboring multicast routers. MLD realizes the group member management function by interacting MLD messages between member hosts and multicast routers, and the MLD messages are encapsulated in IPv6 messages.

### 8.4.1 Interface Configuration

#### Function Description

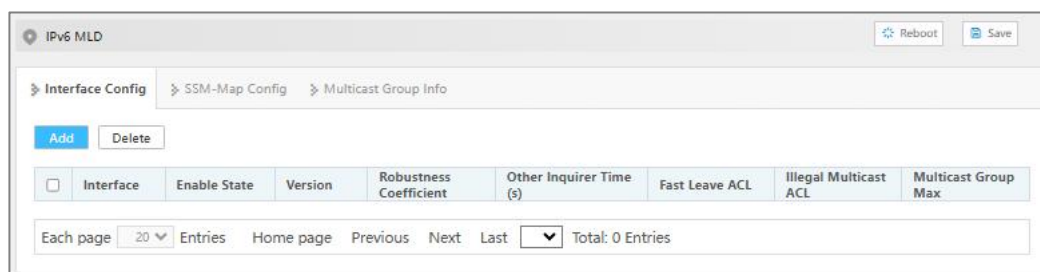
Configure MLD parameters of VLANIF interface.

#### Operation Path

Open in order: "Multicast Routing > IPv6 MLD > Interface Configuration".

#### Interface Description

Interface configuration interface is as follows:



The main element configuration description of interface configuration interface:

Interface Element	Description
Interface	Layer 3 interface, such as vlanif1.
Enable State	The MLD enabled status can be displayed as follows: <ul style="list-style-type: none"> <li>enable</li> <li>Disable</li> </ul>
Version	MLD version, options are: <ul style="list-style-type: none"> <li>1: the working mechanism of MLDv1 is the same as that of IGMPv2.</li> <li>2. based on MLDv1, the main function of MLDv2 is that member hosts can specify whether to receive or not to receive messages from some multicast sources,</li> </ul>

Interface Element	Description
	corresponding to IGMPv3.
Robustness Coefficient	Specify the robustness of the MLD query, ranging from 2 to 7. This coefficient is used to specify the default number of times the IGMP query sends the universal group query message at startup and the number of times the IGMP query sends the specific group query message after receiving the outgoing group message.
Other Inquirer Time (s)	Live time of other queriers If the non-inquirer fails to receive the inquiry message within the "life time of other MLD inquirers", the inquirer will be deemed invalid and the inquirer election will be automatically initiated.
Fast Leave ACL	By default, after receiving MLD leave message, it will send a specific group query message to determine whether to age multicast member entries. After configuring the fast leave ACL, if the group address specified by the leave message is within the group address range specified by the ACL, the multicast member table entry can be aged immediately.
Illegal Multicast ACL	List of restricted multicast groups.
Multicast Group Max	The maximum number of multicast supported.

## 8.4.2 SSM-Map Configuration

SSM (Source-Specific Multicast) requires routers to know the multicast source designated by member hosts when they join the multicast group. A host running MLDv2 can specify multicast source addresses in MLDv2 Report messages. However, in some cases, member hosts can only run MLDv1. In order to enable them to use SSM services, the router needs to provide MLD SSM Mapping function.

### Function Description

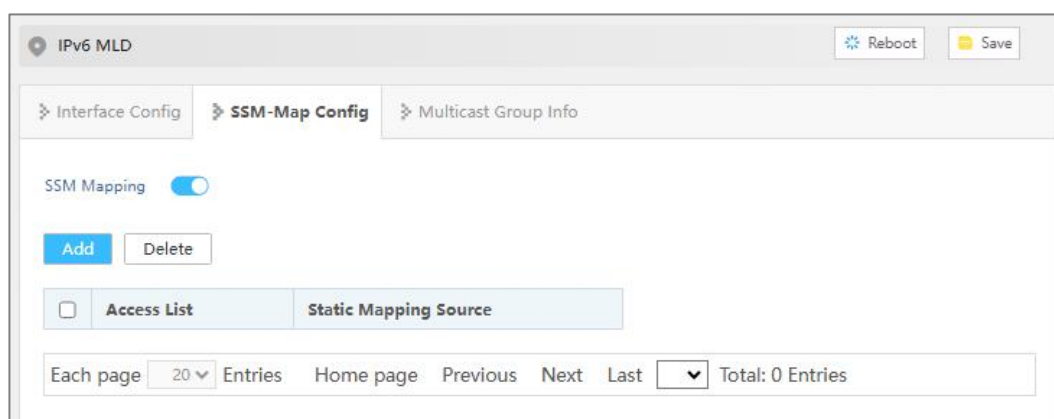
Configure MLD SSM Mapping rules.

### Operation Path

Open in order: "Multicast Routing > IPv6 MLD > SSM-Map Configuration".

## Interface Description

The SSM-Map configuration interface is as follows:



Main element configuration description of SSM-Map configuration interface:

Interface Element	Description
SSM Mapping	MLD SSM Mapping enable switch.
Access List	Access list.
Static Mapping Source	The specified multicast source IPv6 address in the access list.

## 8.4.3 Multicast Group Information

### Function Description

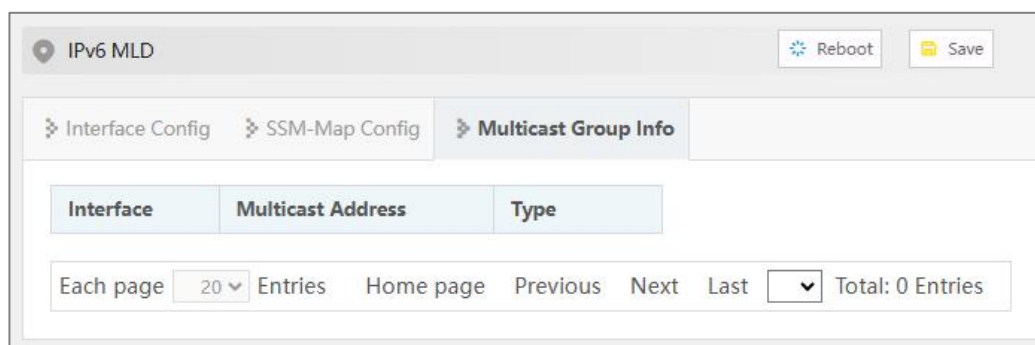
Display the multicast information received by the device interface.

### Operation Path

Open in order: "Multicast Routing > IPv6 MLD > Multicast Group Information".

### Interface Description

The multicast group information interface is as follows:



Main element configuration description of multicast group information interface:

Interface Element	Description
Interface	Ethernet port.
Multicast Address	The multicast address received by the interface.
Type	Multicast type: <ul style="list-style-type: none"> <li>dynamic</li> <li>static</li> </ul>

## 8.5 PIM-SM

PIM (Protocol Independent Multicast) is unrelated to unicast routing protocol, it uses the routing information of unicast routing table to perform RPF (Reverse Path Forwarding) check on multicast messages, and creates multicast routing table entries after passing the check, thus forwarding multicast messages.

PIM protocol include: PIM-DM (PIM-Dense Mode) and PIM-SM (PIM-Sparse Mode).

PIM-SM is a multicast routing protocol in sparse mode, which uses "Pull mode" to transmit multicast data. It is usually suitable for large and medium-sized networks with relatively scattered multicast group members and a wide range. Its basic principle is as follows:

- PIM-SM assumes that all hosts do not need to receive multicast data, but only forward it to the hosts that explicitly propose that they need multicast data. The core task of PIM-SM to realize multicast forwarding is to construct and maintain RPT (Rendezvous Point Tree). RPT selects a router in PIM domain as a common root node RP (Rendezvous Point), and multicast data is forwarded to receivers along RPT through RP.
- The router connecting the receiver sends a Join Message to the RP corresponding to a multicast group, and the message is delivered to the RP hop

by hop, and the path it passes forms a branch of RPT;

- If a multicast source wants to send multicast data to a multicast group, the DR(Designated Router (DR) on the multicast source side is responsible for registering with the RP, and sending a Register Message to the RP by unicast, which triggers the establishment of SPT after reaching the RP. After that, the multicast source sends the multicast data to RP along SPT. When the multicast data reaches RP, it is copied and sent to the receiver along RPT.

The working mechanism of PIM-SM can be summarized as follows:

- Neighbor Discovery
- DR election
- RP Discovery
- Construct RPT
- Multicast source note
- SPT Switchover
- Assertion

## 8.5.1 Global Configuration

### Function Description

Configure global parameters of PIM-SM.

### Operation Path

Open in order: "Multicast Routing > PM-SM > Global Configuration".

### Interface Description

Global configuration interface is as follows:

PIM-SM
Reboot
Save

Global Config
Static RP Config
Interface C-RP Config
Interface Config

Ignore CRP Priority	<input type="text" value="disable"/>
RP Reachability Check	<input type="text" value="disable"/>
SPT Switch	<input type="text" value="disable"/>
Join/Prune Interval	<input type="text" value="60"/>
Registration Suppression Time	<input type="text" value="60"/>
KAT Aging	<input type="text" value="185"/>
Illegal Message ACL	<input type="text"/>
C-BSR	<input type="text" value="-"/>
Message Rate	<input type="text"/>
Register Message Interface/IP	<input type="text" value="ip"/>
Register Message IP	<input type="text"/>
Stay Connected	<input type="text" value="210"/>

The main element configuration description of global configuration interface:

Interface Element	Description
Ignore CRP Priority	When selecting the RP corresponding to multicast, whether to ignore the priority of CRP and choose according to IP address. The one with the larger IP address is elected.
RP Reachability Check	Whether it is necessary to check the reachability of RP when sending the registration message; if it is not, it means that it cannot be registered.
SPT Switch	RP is a necessary transit station for all multicast messages. when the multicast message rate gradually increases, it will create a huge burden on RP. PIM-SM allows RP or group member DR to reduce the burden of RP by triggering SPT switching.
Join/Prune Interval	Time interval for PIM router to send join/pruning messages.
Registration Suppression Time	The time interval from receiving the registration stop message to resend the registration message, the value range is 1~65535s.

Interface Element	Description
KAT Aging	The aging time of KAT timer after receiving the registration message ranges from 1 to 65535 in seconds. Note: By default, after receiving the registration message, the aging time of KAT timer = registration inhibition time * 3+registration detection time.
Illegal Message ACL	Configure illegal neighbor source address range. Note: By default, there are no restrictions on the neighbor source addresses that an interface can learn from.
C-BSR	C-BSR interface configuration. <ul style="list-style-type: none"> <li>vlanif: vlanif interface</li> <li>loopback: loopback interface</li> </ul>
Message Rate	The rate of receiving and processing multicast service messages ranges from 1 to 65535, and the unit is one/second.
Register Message Interface / IP	The VLAN interface, source IP address or loopback interface that sends the registration message.
Register Message IP	The source IP address of the registered message.
Stay Connected	Multicast source lifetime, ranging from 60-65535 seconds.

## 8.5.2 Static RP Configuration

### Function Description

Set static RP manually.

### Operation Path

Open in order: "Multicast Routing > PIM-SM > Static RP Configuration".

### Interface Description

Static RP configuration interface is as follows:



The main element configuration description of static RP configuration interface:

Interface Element	Description
IP	<p>Configure the IP address of the static RP.</p> <p>Note:</p> <ul style="list-style-type: none"> <li>The address must be a legal unicast IP address, and should not be configured as the address of the 127.0.0.0/8 network segment.</li> <li>When there is only one RP in the network, static RP can be manually configured instead of dynamic RP, which can avoid the frequent information interaction between C-RP and BSR occupying bandwidth.</li> </ul>

## 8.5.3 C-RP Configuration of Interface

### Function Description

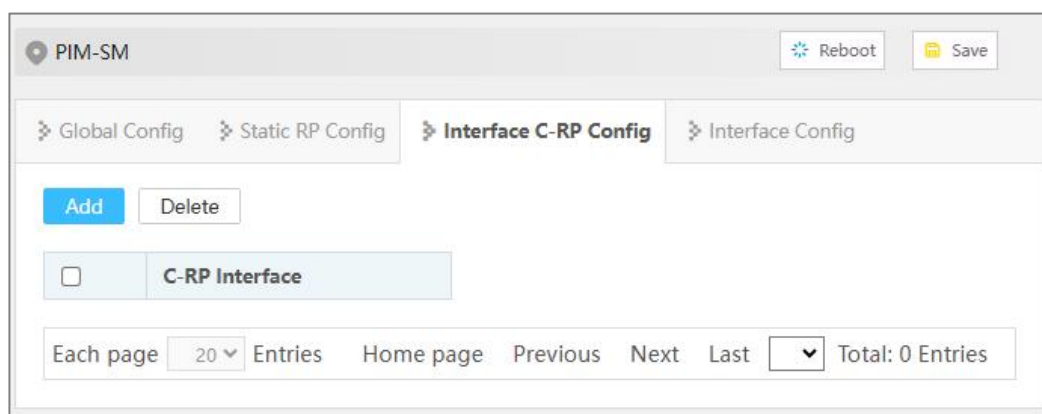
Add and delete C-RP interfaces.

### Operation Path

Open in order: "Multicast Routing > PM-SM > Interface C-RP Configuration".

### Interface Description

The interface C-RP configuration interface is as follows:



Main element configuration description of interface C-RP configuration interface:

Interface Element	Description
C-RP Interface	To configure the C-RP interface: <ul style="list-style-type: none"> <li>• vlanif: vlanif interface</li> <li>• loopback: loopback interface</li> </ul>

## 8.5.4 Interface Configuration

### Function Description

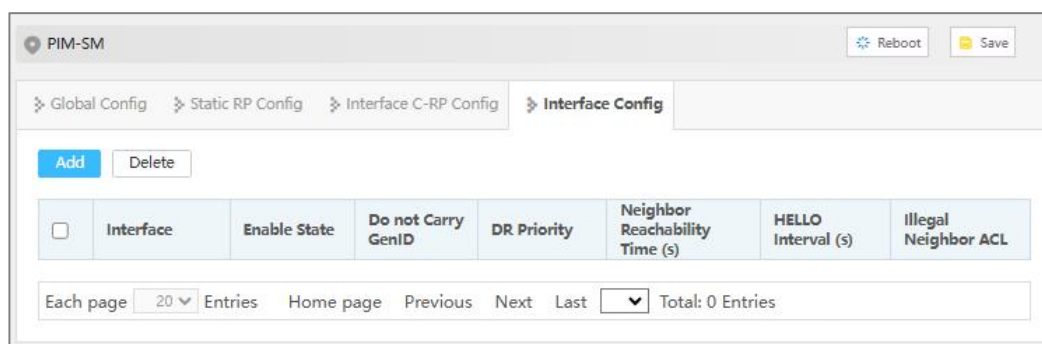
Set interface PIM-SM parameters.

### Operation Path

Open in order: "Multicast Routing > PM-SM > Interface Configuration".

### Interface Description

Interface configuration interface is as follows:



The main element configuration description of interface configuration interface:

Interface Element	Description
Interface	Configure interface:

Interface Element	Description
	<ul style="list-style-type: none"> <li>vlanif: vlanif interface</li> <li>loopback: loopback interface</li> </ul>
Enable State	<p>The interface is configured to send hello messages without carrying GenID information.</p> <p>Note: GenID is a random value at the initial creation of the interface to identify unique interface information. With this information, users can detect whether the neighbor device has been restarted.</p>
Do not Carry GenID	<p>Specify the priority of running for DR from 0 to 4294967294.</p> <p>Note: The higher the value, the higher the priority.</p>
DR Priority	<p>Specify the time to keep PIM neighbor reachable, the value range is 1 ~ 65535, and the unit is seconds.</p> <p>Note: If specified as 65535 seconds, the PIM neighbor is always reachable.</p>
Neighbor Reachability Time (s)	<p>Time period for sending Hello messages between PIM routers.</p>
Hello Interval (s)	<p>Illegal neighbor source address range.</p>

## 8.6 PIM-DM

PIM-DM is a multicast routing protocol in dense mode, which uses "Push mode" to transmit multicast data. It is usually suitable for small networks with relatively dense multicast group members. Its basic principle is as follows:

- PIM-DM assumes that each subnet in the network has at least one multicast group member, so multicast data will be Flooding to all nodes in the network. Then, PIM-DM prune the branches without multicast data forwarding, leaving only the branches containing receivers. This "Flooding-Prune" phenomenon occurs periodically, and the pruned branches can also be restored to forwarding status periodically.
- In order to reduce the time required for the node to return to the forwarding state when the multicast group members appear on the branched node, PIM-DM actively resumes its forwarding of multicast data by using the Graft mechanism.

Generally speaking, the forwarding path of data packets in dense mode is a Source Tree (a forwarding tree with multicast source as its root and multicast group members

as its branches and leaves). Source Tree is also called SPT (Shortest Path Tree) because it uses the shortest path from multicast source to receiver.

The working mechanism of PIM-DM can be summarized as follows:

- Neighbor Discovery
- Build SPT
- Graft
- Assertion

## Function Description

Configure PIM-DM parameters.

## Operation Path

Open in order: "Multicast Routing > PIM-DM".

## Interface Description

PIM-DM interface is as below:

Main elements configuration descriptions of PIM-DM interface:

Interface Element	Description
Interface	Configure interface: <ul style="list-style-type: none"> <li>• vlanif: vlanif interface</li> <li>• loopback: loopback interface</li> </ul>
Enable State	Enable status of interface PIM-DM.
Do not Carry GenID	The interface is configured to send hello messages without carrying GenID information. Note: GenID is a random value at the initial creation of the interface to identify unique interface information. With this information, users can detect whether the neighbor device has been restarted.
DR Priority	Specify the priority of running for DR from 0 to 4294967294. Note: The higher the value, the higher the priority.
Neighbor Reachability Time (s)	Specify the time to keep PIM neighbor reachable, the value range is 1 ~ 65535, and the unit is seconds. Note: If specified as 65535 seconds, the PIM neighbor is always

Interface Element	Description
	reachable.
Hello Interval (s)	Time period for sending Hello messages between PIM routers.
State Refresh (s)	The time interval for refreshing the pruning timer status, which can prevent the clipped interface from resuming forwarding due to the timeout of pruning timer, the value range is 1-100 seconds.
Prune Message Delay (ms)	The delay time of transmitting Prune message on the shared network segment, which ranges from 0 to 32767 milliseconds.
Illegal Neighbor ACL	Illegal neighbor source address range.

## 8.7 IPv6-PIM-SM

### 8.7.1 Global Configuration

#### Function Description

Configure global parameters of IPv6-PIM-SM.

#### Operation Path

Open in order: "Multicast Routing > IPv6-PIM-SM > Global Configuration".

#### Interface Description

Global configuration interface is as follows:

IPv6-PIM-SM
Reboot
Save

Global Config
Static RP Config
crp Config
Interface Config

Ignore CRP Priority

RP Reachability Check

SPT Switch

Join Prune Interval

Registration Suppression Time

KAT Aging

Illegal Message ACL

C-BSR

Message Rate

Register message interface /IP

Register Message IP

[Apply](#)

The main element configuration description of global configuration interface:

Interface Element	Description
Ignore CRP Priority	When selecting the RP corresponding to multicast, whether to ignore the priority of CRP and choose according to IP address. The one with the larger IP address is elected.
RP Reachability Check	Whether it is necessary to check the reachability of RP when sending the registration message; if it is not, it means that it cannot be registered.
SPT Switch	RP is a necessary transit station for all multicast messages. when the multicast message rate gradually increases, it will create a huge burden on RP. PIM-SM allows RP or group member DR to reduce the burden of RP by triggering SPT switching.
Join/Prune Interval	Time interval for PIM router to send join/pruning messages.
Registration Suppression Time	The time interval from receiving the registration stop message to resend the registration message, the value range is 1 ~ 65535s.
KAT Aging	The aging time of KAT timer after receiving the registration message ranges from 1 to 65535 in seconds.

Interface Element	Description
	Note: By default, after receiving the registration message, the aging time of KAT timer = registration inhibition time * 3+registration detection time.
Illegal Message ACL	Configure illegal neighbor source address range. Note: By default, there are no restrictions on the neighbor source addresses that an interface can learn from.
C-BSR	C-BSR interface configuration. <ul style="list-style-type: none"> <li>vlanif: vlanif interface</li> <li>loopback: loopback interface</li> </ul>
Message Rate	The rate of receiving and processing multicast service messages ranges from 1 to 65535, and the unit is one/second.
Register message interface / IP	The VLAN interface, source IP address or loopback interface that sends the registration message.
Register Message IP	The source IP address of the registered message.

## 8.7.2 Static RP Configuration

### Function Description

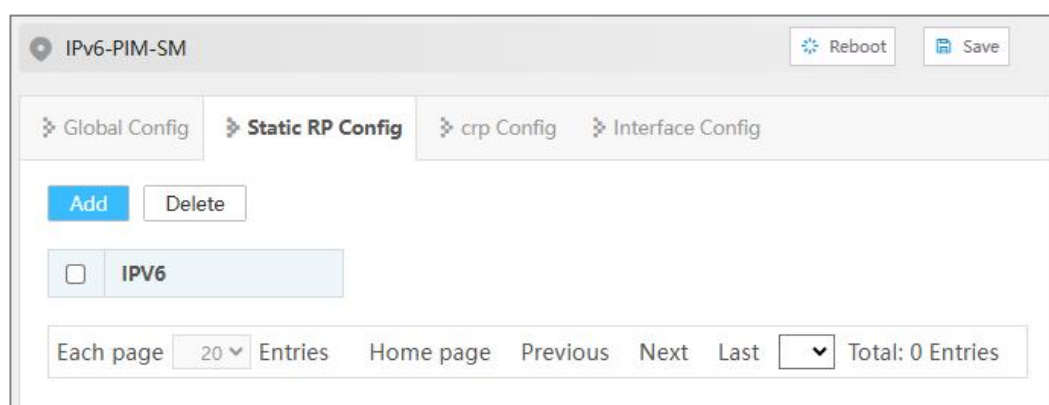
Set static RP manually.

### Operation Path

Open in order: "Multicast Routing > IPv6-PIM-SM > Static RP Configuration".

### Interface Description

Static RP configuration interface is as follows:



The main element configuration description of static RP configuration interface:

Interface Element	Description
IPv6	Configure the IPv6 address of the static RP. Note: When there is only one RP in the network, static RP can be manually configured instead of dynamic RP, which can avoid the frequent information interaction between C-RP and BSR occupying bandwidth.

## 8.7.3 C-RP Configuration

### Function Description

Add and delete C-RP interfaces.

### Operation Path

Open in order: "Multicast Routing > IPv6-PIM-SM > C-RP Configuration".

### Interface Description

The C-RP configuration interface is as follows:



Main element configuration description of interface C-RP configuration interface:

Interface Element	Description
C-RP Interface	To configure the C-RP interface: <ul style="list-style-type: none"> <li>vlanif: vlanif interface</li> </ul>

## 8.7.4 Interface Configuration

### Function Description

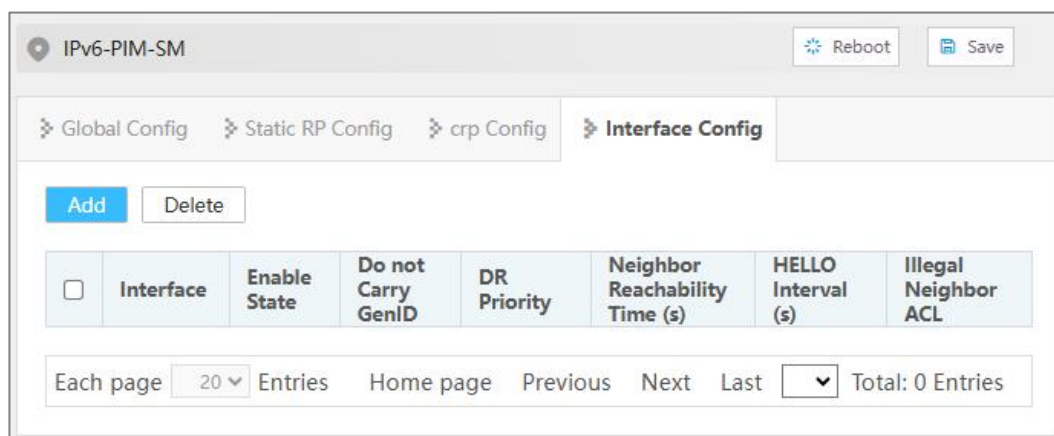
Set interface IPv6-PIM-SM parameters.

## Operation Path

Open in order: "Multicast Routing > IPv6-PIM-SM > Interface Configuration".

## Interface Description

Interface configuration interface is as follows:



The main element configuration description of interface configuration interface:

Interface Element	Description
Interface	Configure interface: <ul style="list-style-type: none"> <li>vlanif: vlanif interface</li> </ul>
Enable State	PIM-SM status. <ul style="list-style-type: none"> <li>enable</li> <li>disable</li> </ul>
Do not Carry GenID	The interface is configured to send hello messages without carrying GenID information. Note: GenID is a random value at the initial creation of the interface to identify unique interface information. With this information, users can detect whether the neighbor device has been restarted.
DR Priority	Specify the priority of running for DR from 0 to 4294967294. Note: The higher the value, the higher the priority.
Neighbor Reachability Time (s)	Specify the time to keep PIM neighbor reachable, the value range is 1 ~ 65535, and the unit is seconds. Note: If specified as 65535 seconds, the PIM neighbor is always reachable.
Hello Interval (s)	Time period for sending Hello messages between PIM routers.
Illegal Neighbor ACL	Illegal neighbor source address range.

## 8.8 Enable IPv6 PIM-DM

### Function Description

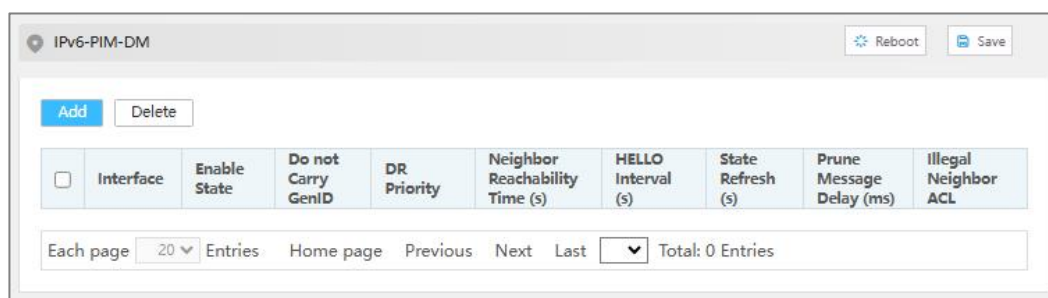
Configure IPv6-PIM-DM parameter.

### Operation Path

Open in order: "Multicast Routing > IPv6-PIM-DM".

### Interface Description

IPv6-PIM-DM interface is as below:



Main elements configuration descriptions of IPv6-PIM-DM interface:

Interface Element	Description
Interface	Configure interface: <ul style="list-style-type: none"> <li>vlanif: vlanif interface</li> </ul>
Enable State	Enable status of interface PIM-DM.
Do not Carry GenID	The interface is configured to send hello messages without carrying GenID information. Note: GenID is a random value at the initial creation of the interface to identify unique interface information. With this information, users can detect whether the neighbor device has been restarted.
DR Priority	Specify the priority of running for DR from 0 to 4294967294. Note: The higher the value, the higher the priority.
Neighbor Reachability Time (s)	Specify the time to keep PIM neighbor reachable, the value range is 1 ~ 65535, and the unit is seconds. Note: If specified as 65535 seconds, the PIM neighbor is always reachable.
Hello Interval (s)	Time period for sending Hello messages between PIM routers.
State Refresh (s)	The time interval for refreshing the pruning timer status, which can prevent the clipped interface from resuming forwarding due to the timeout of pruning timer, the value

Interface Element	Description
	range is 1-100 seconds.
Prune Message Delay (ms)	The delay time of transmitting Prune message on the shared network segment, which ranges from 0 to 32767 milliseconds.
Illegal Neighbor ACL	Illegal neighbor source address range.

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# 9 Network Management

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## 9.1 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 message. 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.

### 9.1.1 ACL Effective Period Configuration

#### Function Description

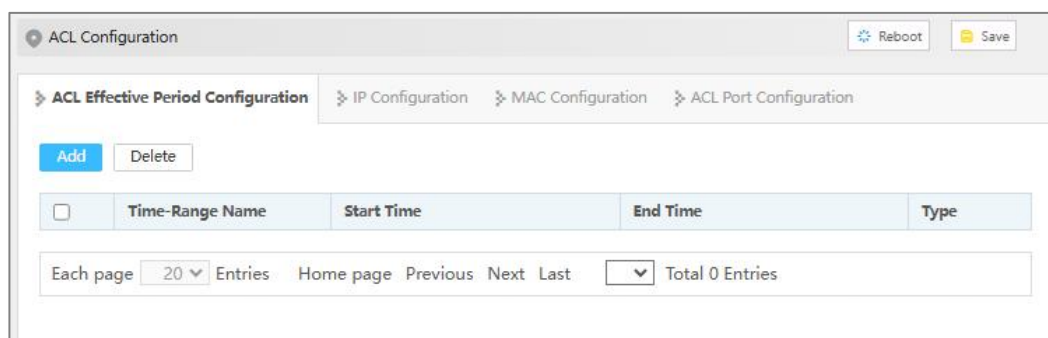
On the "ACL Effective Period Configuration" page, you can configure the effective period of ACL rules.

#### Operation Path

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

#### Interface Description

ACL Effective Period Configuration interface is as follows:



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: <ul style="list-style-type: none"> <li>• Absolute Time;</li> <li>• Cycle time.</li> </ul>
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:

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

Interface Element	Description
Time-Range Name	<p>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:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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).</li> </ul>
Time Type	<p>Time type options are as follows:</p> <ul style="list-style-type: none"> <li>• Absolute Time;</li> <li>• Cycle time.</li> </ul>
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:

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: <ul style="list-style-type: none"> <li>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.</li> <li>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).</li> </ul>
Time Type	Time type options are as follows: <ul style="list-style-type: none"> <li>Absolute Time;</li> <li>Cycle time.</li> </ul>
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: <ul style="list-style-type: none"> <li>Monday</li> <li>Tuesday</li> </ul>

Interface Element	Description
	<ul style="list-style-type: none"> <li>• Wednesday</li> <li>• Thursday</li> <li>• Friday</li> <li>• Saturday</li> <li>• Sunday</li> <li>• every day</li> <li>• non-working day</li> <li>• workday</li> </ul>

## 9.1.2 IP Configuration

### Function Description

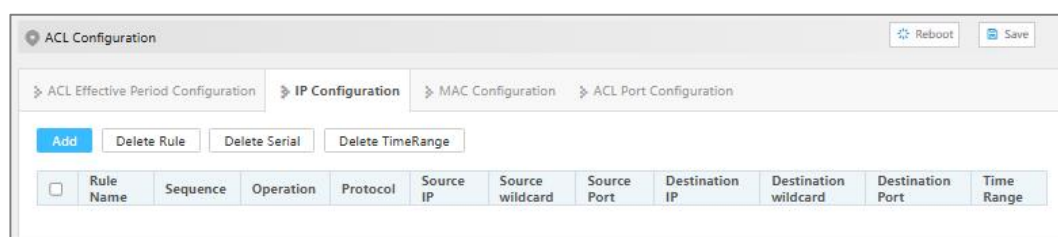
On the "IP ACL Configuration" page, user can configure IP ACL rule. Users can assign numbers to ACLs when creating them, and different numbers correspond to different types of ACLs. At the same time, in order to facilitate memory and identification, users can also create named ACLs, that is, when creating 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" button to delete specified entries in batches.
Delete Serial	Check rule entry and click "Delete sequence" button to delete specified entries in batches.

Interface Element	Description
Delete TimeRange	Clear rule entries that have already been bound to TimeRange.
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 screenshot shows a dialog box titled "Add" with a close button (X) in the top right corner. The dialog contains the following fields and controls:

- Rule Type:** A dropdown menu with "Number" selected.
- Rule Name:** A text input field.
- Operation:** A dropdown menu with "permit" selected.
- Protocol:** Two dropdown menus, both with "any" selected.
- Source IP:** A dropdown menu with "any" selected and a text input field.
- Source wildcard:** A text input field.
- Destination IP:** A dropdown menu with "any" selected and a text input field.
- Destination wildcard:** A text input field.
- Time Range:** A text input field.
- OK:** A blue button at the bottom center.

The main elements configuration description of “Add” interface:

Interface Element	Description
Rule Type	<p>The drop-down list of IP rule type. The options are:</p> <ul style="list-style-type: none"> <li>• Name: ACL is identified by name instead of number.</li> <li>• Number: When creating an ACL, specify a unique number to identify the ACL.</li> </ul>
Rule Name	<p>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.</p> <p>Note:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul>
Operation	<p>The action drop-down list of ACL rules. The options are:</p> <ul style="list-style-type: none"> <li>• Permit</li> <li>• Deny</li> </ul>
Protocol	<p>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.</p>
Source IP	<p>The source IP address information of the packet, such as 192.168.1.1. No input indicates any IP address.</p>
Source wildcard	<p>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".</p>
Destination IP	<p>The destination IP address information of the packet, such as 192.168.1.1. No input indicates any IP address.</p>
Destination wildcard	<p>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".</p>

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

## 9.1.3 MAC Configuration

### Function Description

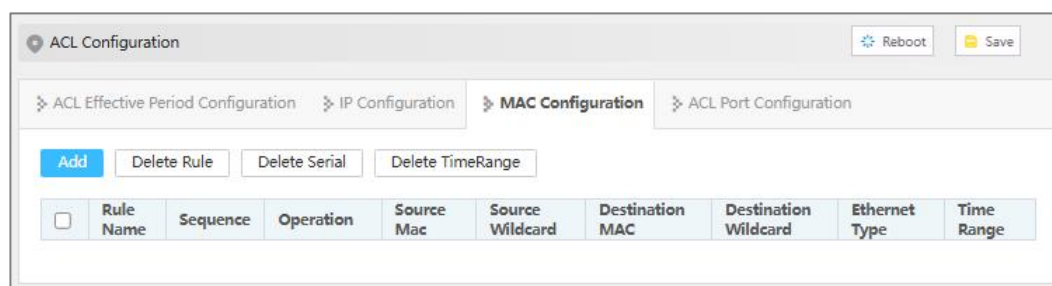
On the “MAC Configuration” page, you can create MAC rules. The layer-2 ACL uses the Ethernet header information of the message to define rules, such as according to the source MAC (Media Access Control) address, destination MAC address, etc.

### 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.

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: <ul style="list-style-type: none"> <li>Permit</li> <li>Deny</li> </ul>
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"

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.

## 9.1.4 ACL Ports 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:

The screenshot shows the 'ACL Configuration' window with the 'ACL Port Configuration' tab selected. A 'Config' button is visible above the table. The table has three columns: 'Port', 'IP Access List', and 'MAC Access List'. Each row represents a port from ge1 to ge24, with checkboxes in the first column.

<input type="checkbox"/>	Port	IP Access List	MAC Access List
<input type="checkbox"/>	ge1		
<input type="checkbox"/>	ge2		
<input type="checkbox"/>	ge3		
<input type="checkbox"/>	ge4		
<input type="checkbox"/>	ge5		
<input type="checkbox"/>	ge6		
<input type="checkbox"/>	ge7		
<input type="checkbox"/>	ge8		
<input type="checkbox"/>	ge9		
<input type="checkbox"/>	ge10		
<input type="checkbox"/>	ge11		
<input type="checkbox"/>	ge12		
<input type="checkbox"/>	ge13		
<input type="checkbox"/>	ge14		
<input type="checkbox"/>	ge15		
<input type="checkbox"/>	ge16		
<input type="checkbox"/>	ge17		
<input type="checkbox"/>	ge18		
<input type="checkbox"/>	ge19		
<input type="checkbox"/>	ge20		
<input type="checkbox"/>	ge21		
<input type="checkbox"/>	ge22		
<input type="checkbox"/>	ge23		
<input type="checkbox"/>	ge24		

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: <ul style="list-style-type: none"> <li>In: data ingress direction;</li> <li>Out: data egress direction.</li> </ul>
MAC Access List	The port supports MAC ACL rules and supports "in": data ingress direction.

## 9.2 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.

## 9.2.1 SNMP switch

### Function Description

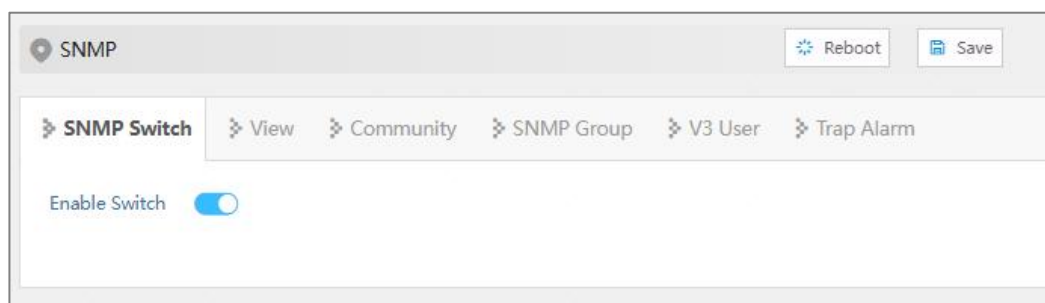
Enable/disable SNMP function.

### 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.

## 9.2.2 View

### Function Description

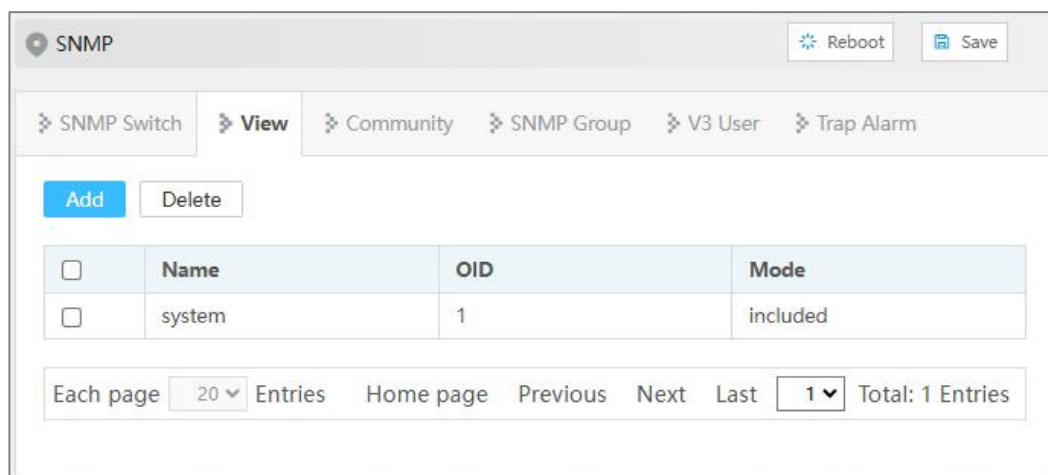
Add/delete SNMP view.

## Operation Path

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

## Interface Description

View interface is as below:



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: <ul style="list-style-type: none"> <li>OID object identifier, a component node of MIB, uniquely identified by a string of numbers that represent the path.</li> <li>The information of OID could be viewed via the third-party software MG-SOFT MIB Browser.</li> </ul>
Mode	Node OID dealing method, options as below: <ul style="list-style-type: none"> <li>Included: It contains all objects under the node subtree;</li> <li>Excluded: Eliminate all objects beyond the node subtree.</li> </ul>

## 9.2.3 Community

### Function Description

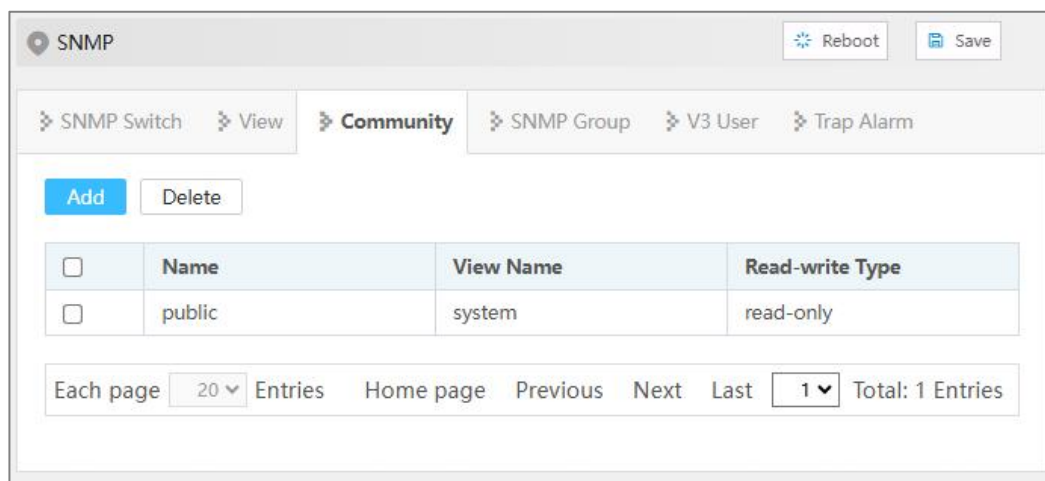
Add/delete SNMP community. Define MIB view that community name can access, set MIB object access privilege of community name as read-write privilege or read-only privilege.

## Operation Path

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

## Interface Description

Community interface is as below:



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: <ul style="list-style-type: none"> <li>• Read only</li> <li>• Read and write</li> </ul>

## 9.2.4 SNMP Group

### Function Description

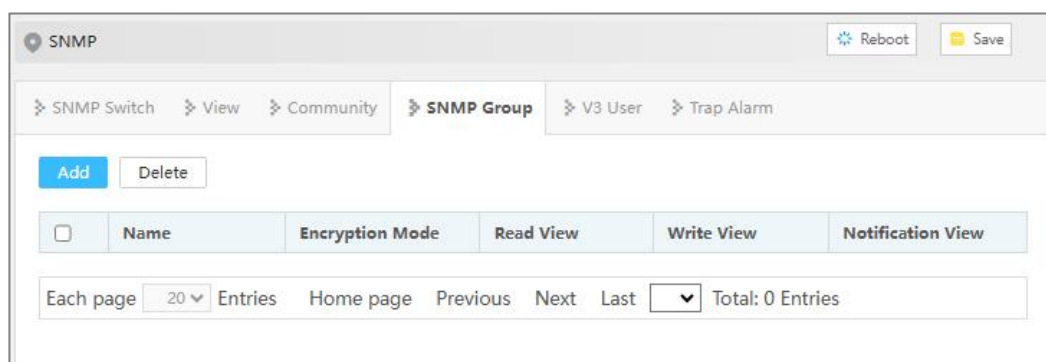
Configure a new SNMP group and set the secure mode and corresponding SNMP view of the SNMP group.

### Operation Path

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

## Interface Description

SNMP Group interface is as follows:



Main elements configuration description of SNMP Group interface:

Interface Element	Description
Name	SNMP group name, ranging from 1 to 32 bytes.
Encryption Mode	Whether to authenticate and encrypt the message, values: <ul style="list-style-type: none"> <li>• auth: indicates that the message is authenticated but not encrypted;</li> <li>• noauth: indicates that the message is neither authenticated nor encrypted;</li> <li>• priv: indicates that the message is authenticated and encrypted.</li> </ul>
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.

## 9.2.5 V3 User

### Function Description

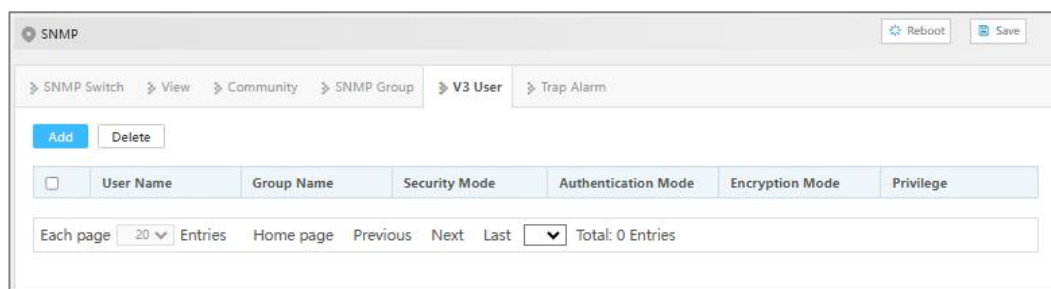
SNMPv3 adopts User-Based Security Model (USM) authentication mechanism. Network manager can configure authentication and encryption function. Authentication is used to verify the validity of the packet sender and prevent unauthorized users from accessing it. Encryption encrypts the transmission packet 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 Users".

## 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 bytes. 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: <ul style="list-style-type: none"> <li>• auth: indicates that the message is authenticated but not encrypted;</li> <li>• noauth: indicates that the message is neither authenticated nor encrypted;</li> <li>• priv: indicates that the message is authenticated and encrypted.</li> </ul>
Authentication Mode	Authentication mode type, acceptable value: <ul style="list-style-type: none"> <li>• Md5: Information abstract algorithm 5;</li> <li>• Sha: Secure hash algorithm.</li> </ul>
Encryption Mode	V3 user data encryption algorithm, options as follows: <ul style="list-style-type: none"> <li>• Des: Adopt data encryption algorithm;</li> <li>• Aes: Adopt advanced encryption standard.</li> </ul>
Privilege	User protocol type, the options are as follows: <ul style="list-style-type: none"> <li>• 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;</li> <li>• rw: Read and write permission, allowing users to get and</li> </ul>

Interface Element	Description
	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 disabling functions, etc.

## 9.2.6 Trap Alarm

### Function Description

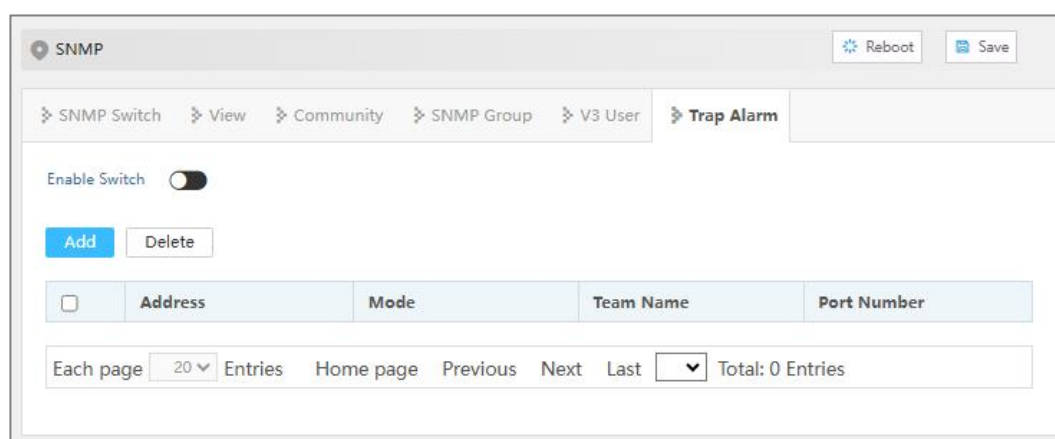
Base on TCP/IP protocol, SNMP usually adopts UDP port 161 (SNMP) and 162 (SNMP-traps), SNMP protocol agent exists in the network device and adopts information specific to the device (MIBs) as the device interface; these network devices can be monitored or controlled via Agent. When a trap event occurs, 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 is 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 alarm information, such as PC.

Interface Element	Description
Mode	SNMP management device version, options are as below: <ul style="list-style-type: none"> <li>• 1</li> <li>• 2c</li> <li>• 3</li> </ul>
Team Name	Group name.
Port Number	Port number of Trap, it defaults to 162, the value range is 0~65535.

## 9.3 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.

### 9.3.1 Event

#### Function Description

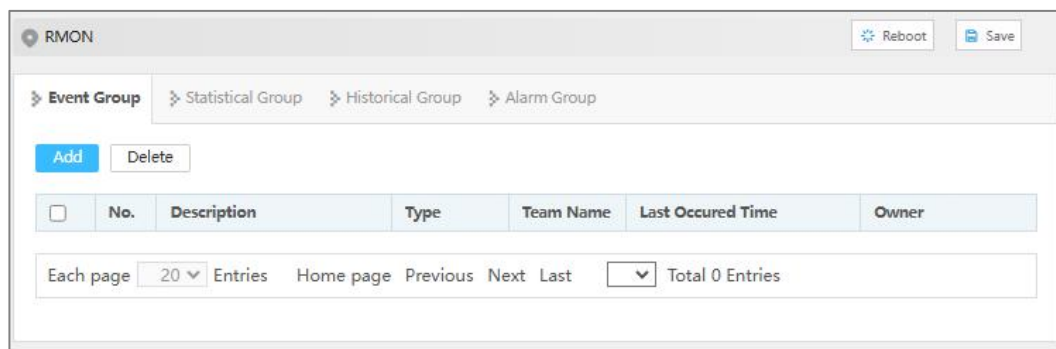
On the "Event" page, user can add, delete or check the configuration information of event.

#### Operation Path

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

#### Interface Description

Event group interface is as below:



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: <ul style="list-style-type: none"> <li>log: Record the event in the log table when the event is triggered;</li> <li>trap: Send Trap information to management station for informing the occurring of event when the event is triggered;</li> <li>Log, trap: Record the event in the log table and produce a trap information when the event is triggered.</li> </ul>
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.

## 9.3.2 Statistical

### Function Description

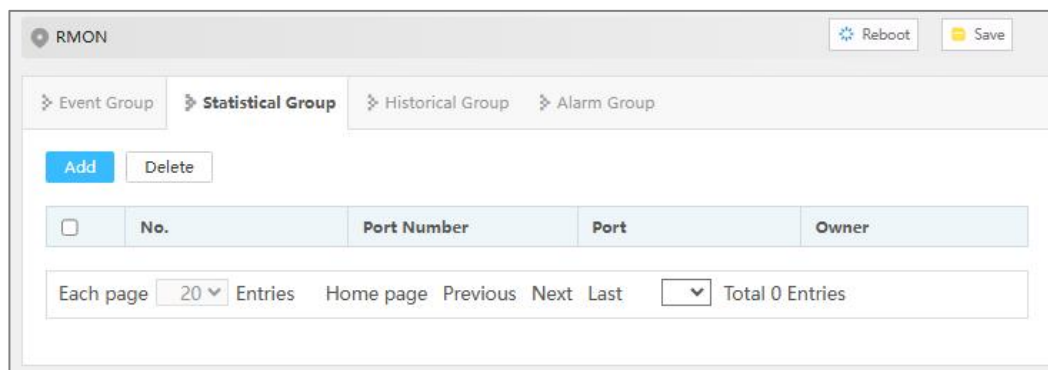
On the "Statistical" page, user can add, delete or check the configuration information of statistical.

### Operation Path

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

## 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.

## 9.3.3 History

### Function Description

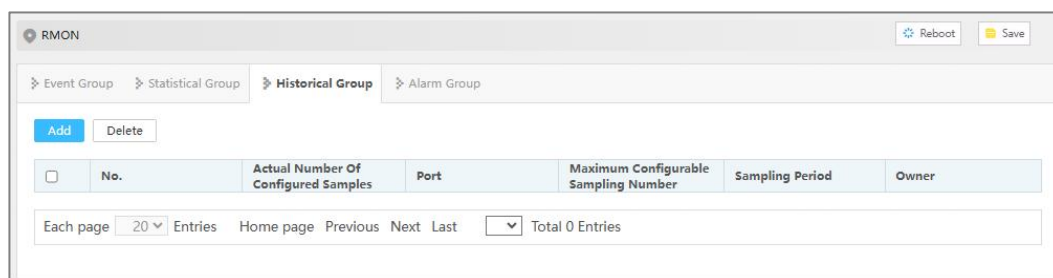
On the "History" page, user can add, delete or check the configuration information of history.

### Operation Path

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

### Interface Description

Historical group interface is as below:



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.

## 9.3.4 Alarm

### 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;

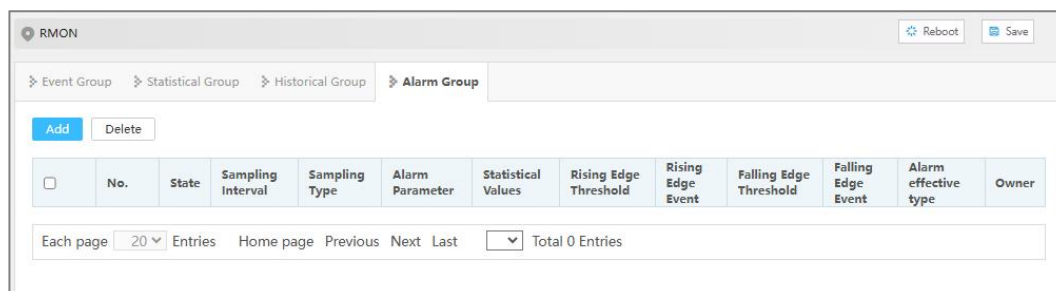
- When monitoring MIB object reaches or surpasses the rising threshold value, it will trigger corresponding event of rising event index;
- When monitoring MIB object reaches or surpasses declining threshold value, it will trigger corresponding event of declining event index;

### Operation Path

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

## 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 1-4294967295, unit: second.
Sampling Type	Two sampling methods, options as follows: <ul style="list-style-type: none"> <li>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;</li> <li>Delta: When alarm variable value reaches alarm threshold value during each sampling, an alarm is triggered.</li> </ul>
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

Interface Element	Description
Threshold	between 1-12147483647. 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: <ul style="list-style-type: none"> <li>• Rising edge effective</li> <li>• Falling edge effective</li> <li>• Both the rising and falling edges are effective</li> </ul>
Owner	The creator of the table entry.
Operation	Check the entry and click the "Delete" button to delete it.

## 9.4 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.

### 9.4.1 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:

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.

## 9.4.2 Port Configuration

### Function Description

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

### Operation Path

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

### Interface Description

Check port configuration interface as below:

LLDP
Reboot
Save

Global Config
Port Config
Neighbor Info

Port Type Selection none Config

<input type="checkbox"/>	Port	State	Enable State	Config IP
<input type="checkbox"/>	ge1	down	txrx	192.168.1.254
<input type="checkbox"/>	ge2	down	txrx	192.168.1.254
<input type="checkbox"/>	ge3	down	txrx	192.168.1.254
<input type="checkbox"/>	ge4	down	txrx	192.168.1.254
<input type="checkbox"/>	ge5	down	txrx	192.168.1.254
<input type="checkbox"/>	ge6	down	txrx	192.168.1.254
<input type="checkbox"/>	ge7	down	txrx	192.168.1.254
<input type="checkbox"/>	ge8	down	txrx	192.168.1.254
<input type="checkbox"/>	ge9	down	txrx	192.168.1.254
<input type="checkbox"/>	ge10	down	txrx	192.168.1.254
<input type="checkbox"/>	ge11	down	txrx	192.168.1.254
<input type="checkbox"/>	ge12	down	txrx	192.168.1.254
<input type="checkbox"/>	ge13	down	txrx	192.168.1.254
<input type="checkbox"/>	ge14	down	txrx	192.168.1.254
<input type="checkbox"/>	ge15	down	txrx	192.168.1.254
<input type="checkbox"/>	ge16	down	txrx	192.168.1.254
<input type="checkbox"/>	ge17	down	txrx	192.168.1.254
<input type="checkbox"/>	ge18	down	txrx	192.168.1.254

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: <ul style="list-style-type: none"> <li>down: port is disconnected</li> <li>up: port is connected</li> </ul>
Enable State	The options of LLDP working states of device port are as follows: <ul style="list-style-type: none"> <li>txonly: working mode is Tx, only sending and not receiving LLDP message.</li> <li>rxonly: working mode Rx, only receiving and not sending LLDP message.</li> <li>txrx: working mode is TxRx, both sending and receiving LLDP message.</li> </ul>

Interface Element	Description
	<ul style="list-style-type: none"> <li>disable: the working mode is Disable, neither receiving nor sending LLDP message.</li> </ul> <p>Note: By default, the working mode of LLDP is TxRx when global LLDP is enabled.</p>
Config IP	<p>Corresponding LLDP management IP address of the port.</p> <p>Note:</p> <ul style="list-style-type: none"> <li>LLDP management address is the address to be marked and managed by network management system. Management address can definitely 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 LLDP message and sent to adjacent nodes.</li> <li>The management address released by the port in the LLDP message defaults to the main IP address of the smallest VLAN <math>v</math> 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.</li> </ul>

### 9.4.3 Neighbor Information

#### Function Description

View neighbor-related information.

#### Operation Path

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

#### 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.

Interface Element	Description
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.

## 9.5 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.

### 9.5.1 DHCP Switch

#### Function Description

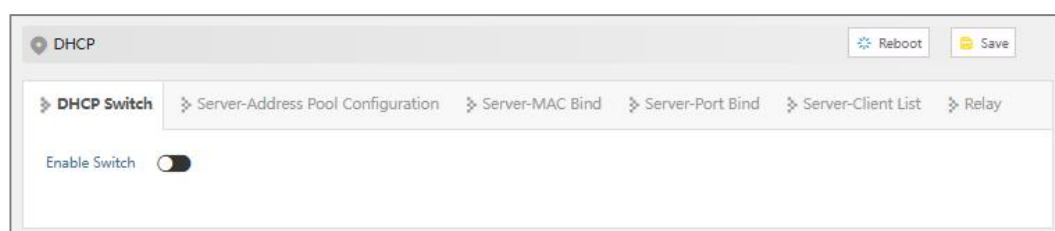
Enable/Disable DHCP Server.

#### 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.

## 9.5.2 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.

### Function Description

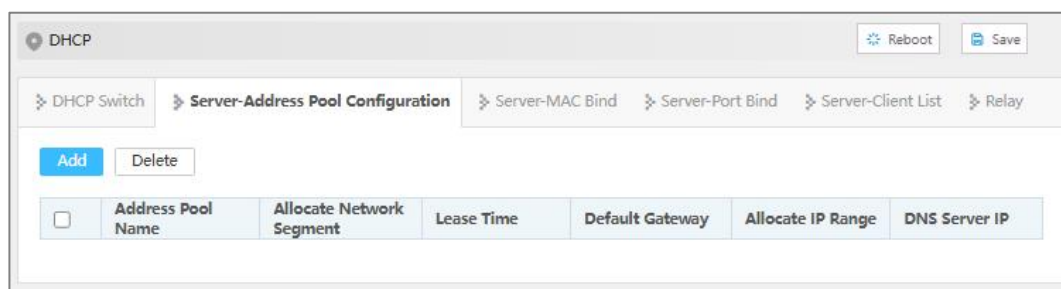
Add, delete the address pool and check the configuration information of address pool.

### 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: 192.168.0.1/24.
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: 192.168.1.0/24
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.

Interface Element	Description
DNS Server IP	IP address of DNS server.

### 9.5.3 Server-MAC Binding

#### Function Description

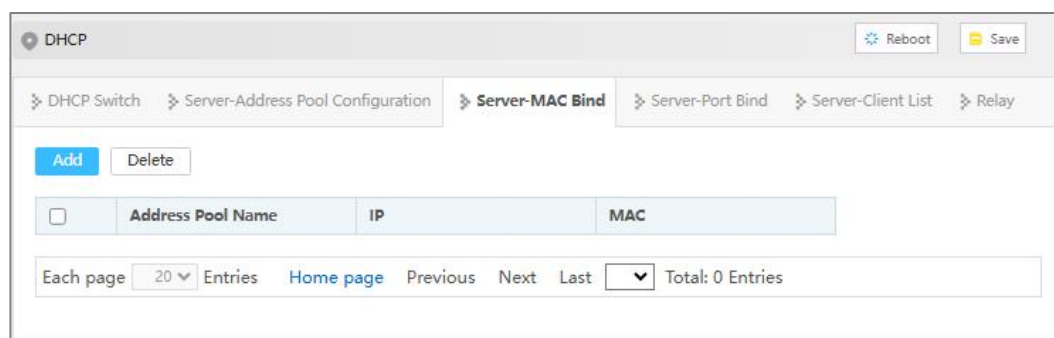
Bind the IP address assigned by the address pool to the MAC address of the device.

#### 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.

### 9.5.4 Server-Port Binding

#### Function Description

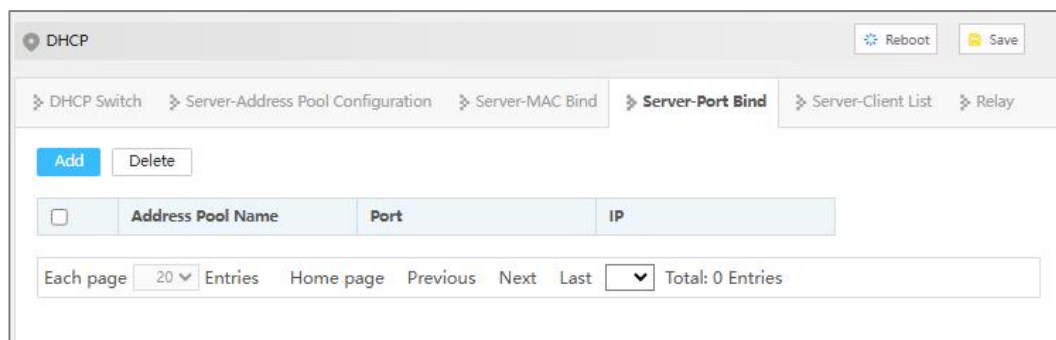
The IP address that can be assigned by the binding port.

#### Operation Path

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

## Interface Description

Server-Port binding interface is as follows:



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.

## 9.5.5 Server-Client List

### Function Description

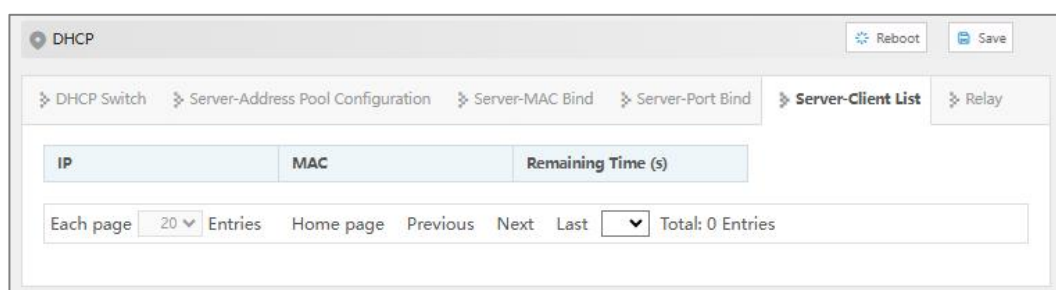
Check the information of DHCP client.

### 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.

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

## 9.5.6 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

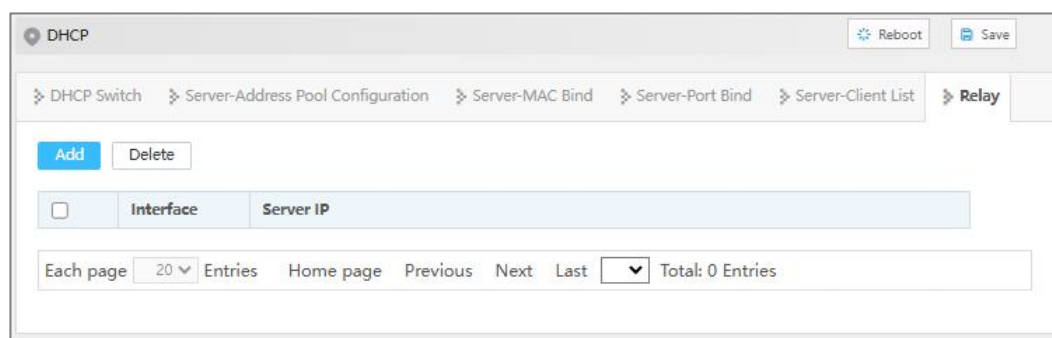
Configure the related parameters of the Relay interface.

### 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.

## 9.6 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 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).

## 9.6.1 Global Configuration

### Function Description

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

### Operation Path

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

### 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.

## 9.6.2 VLAN Enable Configuration

### Function Description

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

### Operation Path

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

### Interface Description

The Vlan enable configuration interface is as follows:

Main elements configuration description of Vlan enabled configuration interface:

Interface Element	Description
VLAN ID	The VLAN number.
DHCP Snooping	Enable status of DHCP Snooping. <ul style="list-style-type: none"> <li>enable</li> <li>disalbe</li> </ul>

## 9.6.3 Binding Configuration

### Function Description

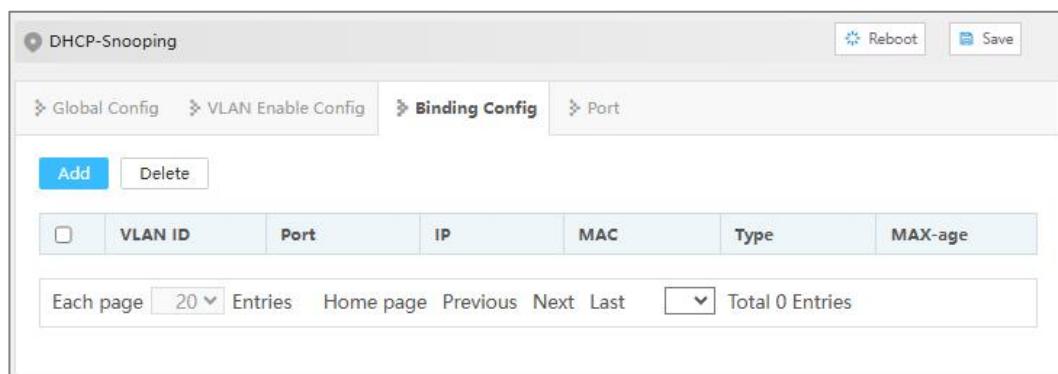
On the Binding Configuration page, user can bind ports, IP addresses and MAC addresses.

### Operation Path

Open in order: "Network > DHCP Snooping > Bind Configuration".

### Interface Description

The binding configuration interface is as follows:



Main elements configuration description of Binding configuration interface:

Interface Element	Description
VLAN ID	Binding VLAN ID information, for example: 1-4096.
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: <ul style="list-style-type: none"> <li>• Static Configuration</li> <li>• Dynamic</li> </ul>
MAX-age	Port aging time.

## 9.6.4 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 Configuration".

### Interface Description

Check port configuration interface as below:

The screenshot shows the DHCP Snooping configuration interface. The breadcrumb navigation is: Global Config > VLAN Enable Config > Binding Config > Port. The table below represents the configuration for each port.

Port	Trust Enable	Message Rate(pps)	Option 82 Check	Option 82 Strategy	circuitType	Circuit ID	remoteType	Remote ID	SubscriberType	Subscriber ID
ge1	disable	unlimited	disable	-	-	-	-	-	-	-
ge2	disable	unlimited	disable	-	-	-	-	-	-	-
ge3	disable	unlimited	disable	-	-	-	-	-	-	-
ge4	disable	unlimited	disable	-	-	-	-	-	-	-
ge5	disable	unlimited	disable	-	-	-	-	-	-	-
ge6	disable	unlimited	disable	-	-	-	-	-	-	-
ge7	disable	unlimited	disable	-	-	-	-	-	-	-
ge8	disable	unlimited	disable	-	-	-	-	-	-	-
ge9	disable	unlimited	disable	-	-	-	-	-	-	-
ge10	disable	unlimited	disable	-	-	-	-	-	-	-
ge11	disable	unlimited	disable	-	-	-	-	-	-	-
ge12	disable	unlimited	disable	-	-	-	-	-	-	-
ge13	disable	unlimited	disable	-	-	-	-	-	-	-
ge14	disable	unlimited	disable	-	-	-	-	-	-	-
ge15	disable	unlimited	disable	-	-	-	-	-	-	-
ge16	disable	unlimited	disable	-	-	-	-	-	-	-
ge17	disable	unlimited	disable	-	-	-	-	-	-	-
ge18	disable	unlimited	disable	-	-	-	-	-	-	-
ge19	disable	unlimited	disable	-	-	-	-	-	-	-
ge20	disable	unlimited	disable	-	-	-	-	-	-	-
ge21	disable	unlimited	disable	-	-	-	-	-	-	-
ge22	disable	unlimited	disable	-	-	-	-	-	-	-
ge23	disable	unlimited	disable	-	-	-	-	-	-	-
ge24	disable	unlimited	disable	-	-	-	-	-	-	-
xe1	disable	unlimited	disable	-	-	-	-	-	-	-
xe2	disable	unlimited	disable	-	-	-	-	-	-	-
xe3	disable	unlimited	disable	-	-	-	-	-	-	-
xe4	disable	unlimited	disable	-	-	-	-	-	-	-

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 (s), 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: <ul style="list-style-type: none"> <li>Drop: Discard messages.</li> <li>Keep: Adopt different modes to fill Option 82, replace prime Option 82 in message and forward, filling modes will be described as below.</li> <li>Replace: Keep Option 82 in messages unchanged and forward.</li> </ul>
Circuit Type	Circuit ID sub-option filling type, options as follows: <ul style="list-style-type: none"> <li>Normal: Normal mode;</li> <li>String: Detailed mode.</li> </ul>
Circuit ID	The filling content of the circuit ID sub-option supports ASCII and HEX formats.

Interface Element	Description
	Note: <ul style="list-style-type: none"> <li>• The input length is limited between 2 and 64;</li> <li>• When Hex is selected, the input content is a combination of uppercase and lowercase letters and numbers.</li> <li>• When ASCII is selected, the content is not limited.</li> </ul>
Remote Type	Remote ID sub-option filling type, options as follows: <ul style="list-style-type: none"> <li>• Normal: Normal mode;</li> <li>• Sysname: Directly adopt device system name to fill Option 82;</li> <li>• String: Detailed mode.</li> </ul>
Remote ID	The filling content of the remote ID sub-option supports ASCII and HEX formats.           Note: <ul style="list-style-type: none"> <li>• The input length is limited between 2 and 64;</li> <li>• When Hex is selected, the input content is a combination of uppercase and lowercase letters and numbers.</li> <li>• When ASCII is selected, the content is not limited.</li> </ul>
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: <ul style="list-style-type: none"> <li>• The input length is limited between 2 and 64;</li> <li>• When Hex is selected, the input content is a combination of uppercase and lowercase letters and numbers.</li> <li>• When ASCII is selected, the content is not limited.</li> </ul>

# 10 System Maintenance

## 10.1 Network Diagnosis

### 10.1.1 Ping

#### Function Description

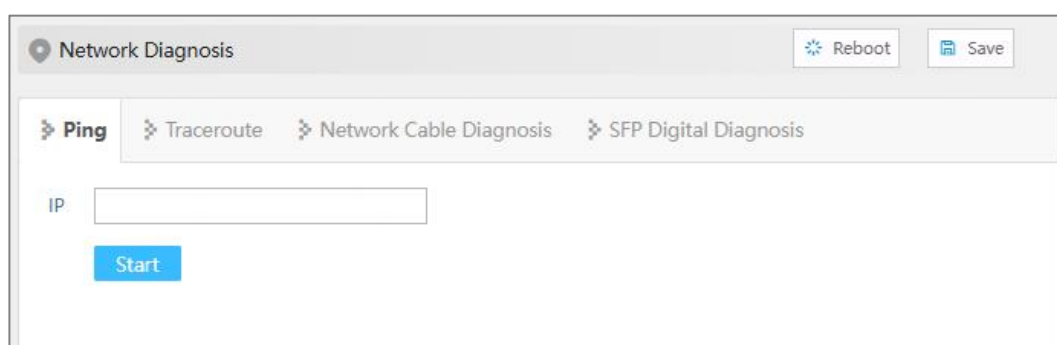
Ping is used to check whether the network is open or network connection speed. The Ping command uses the uniqueness of the IP address on the network to send a packet to the target IP address, and then asks to return a packet of the same size to determine whether the network is connected and what the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

Interface Element	Description
	intercommunity to other devices via the ping command.

## 10.1.2 Traceroute

### Function Description

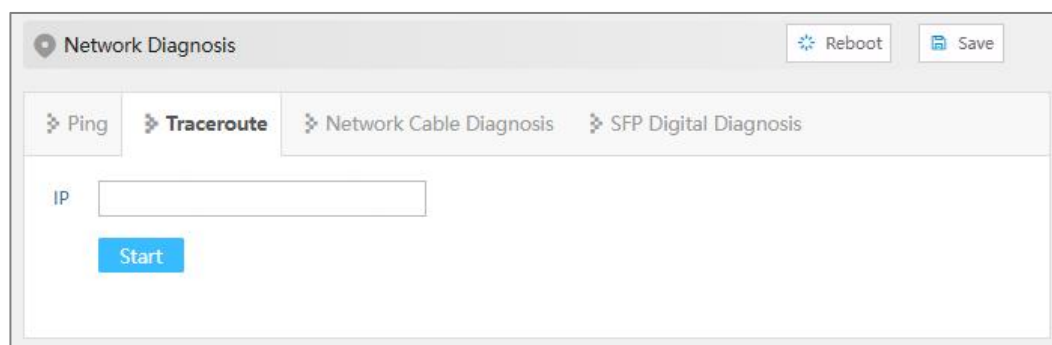
Test the network situation between the switch and the target host. Traceroute measures how long it takes by sending small packets to the destination device until they return. Each device on a path Traceroute returns three test results. Output result includes each test time (ms), device name (if exists)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

## 10.1.3 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

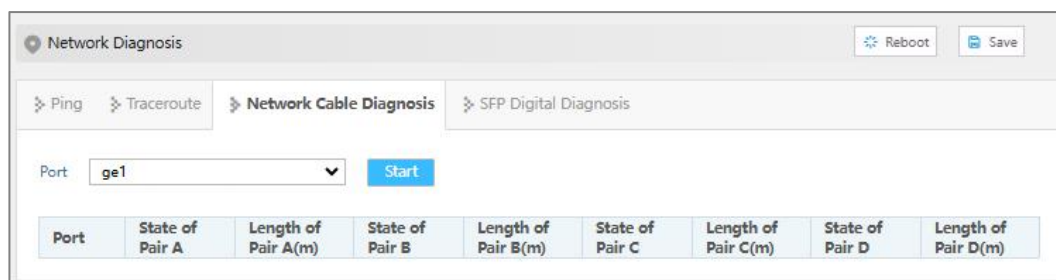
- The accuracy of detecting cable length is about 5 meters, and the test results are for reference only. The test results of different types or different manufacturers may be different.
- When testing, it will affect the normal use of the interface business in a short time, and may also cause the interface 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.

## 10.1.4 SFP Digital Diagnosis

### Function Description

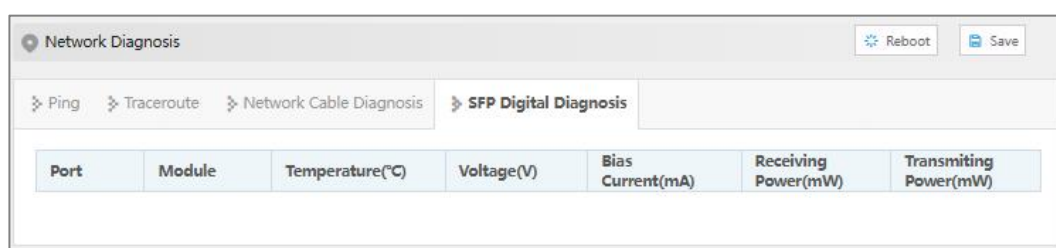
Monitor SFP parameters in real time. This function has greatly facilitated the troubleshooting process of optical fiber link and the cost of on-site debugging.

### Operation Path

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

### Interface Description

The SFP digital diagnostic interface is as follows:



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 (°C)	This device's SFP temperature. Its unit is °C. The working temperature of SFP module should not exceed the normal working temperature range of the module;
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.

## 10.2 Time

### 10.2.1 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".

#### 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.

Interface Element	Description
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.

## 10.2.2 Time Configuration

### Function Description

Configure device time

### Operation Path

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

### Interface Description

Time settings interface is as follows:

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.

## 10.3 Alarm

### 10.3.1 Alarm Trigger

#### Function Description

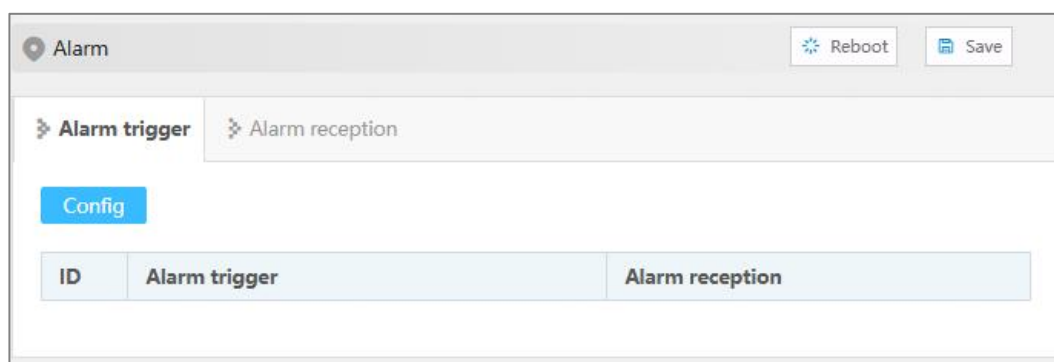
The device system provides multiple alarm trigger sources, including port status, abnormal temperature, power failure, and excessive network load. When these trigger sources are activated, users can trigger the alarm by configuring LED indicator, relay, Trap message or email alarm mode, so as to respond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



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, relay, Trap and mail.

## 10.3.1.1 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:

Alarm

Reboot Save

Port Temperature Network load

Return

Alarm mode  LED  Relay  Trap  E-mail

Port	Enable	State
ge1	Disable	down
ge2	Disable	down
ge3	Disable	down
ge4	Disable	down
ge5	Disable	down
ge6	Disable	down
ge7	Disable	down
ge8	Disable	down
ge9	Disable	down
ge10	Disable	down
ge11	Disable	down
ge12	Disable	down

Apply

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: <ul style="list-style-type: none"> <li>link</li> </ul>

Interface Element	Description
	<ul style="list-style-type: none"> <li>• down</li> </ul>
Enable	Port alarm function status, options as follows: <ul style="list-style-type: none"> <li>• Enable</li> <li>• Disable</li> </ul> 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: <ul style="list-style-type: none"> <li>• LED</li> <li>• Relay</li> <li>• Trap</li> <li>• E-mail</li> </ul> Note: If checked, the LED indicator, relay, Trap message or email alarm mode will be turned on to trigger the alarm.

### 10.3.1.2 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	<p>Temperature alarm switch status, with options:</p> <ul style="list-style-type: none"> <li>• Enable</li> <li>• Disable</li> </ul> <p>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.</p>
Alarm mode	<p>Alarm mode of temperature alarm, with options:</p> <ul style="list-style-type: none"> <li>• LED</li> <li>• Relay</li> <li>• Trap</li> <li>• E-mail</li> </ul> <p>Note: If checked, the LED indicator, relay, Trap message or email alarm mode will be turned on to trigger the alarm.</p>
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.

### 10.3.1.3 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:

Alarm mode  LED  Relay  Trap  E-mail

Port	Trigger	Upper limit	Current load	State
ge1	Disable ▼	80 %	0%	down
ge2	Disable ▼	80 %	0%	down
ge3	Disable ▼	80 %	0%	down
ge4	Disable ▼	80 %	0%	down
ge5	Disable ▼	80 %	0%	down
ge6	Disable ▼	80 %	0%	down
ge7	Disable ▼	80 %	0%	down
ge8	Disable ▼	80 %	0%	down
ge9	Disable ▼	80 %	0%	down
ge10	Disable ▼	80 %	0%	down
ge11	Disable ▼	80 %	0%	down
ge12	Disable ▼	80 %	0%	down

Apply

The main element configuration description of network load alarm interface:

Interface Element	Description
Alarm mode	Alarm mode of network load alarm, with options: <ul style="list-style-type: none"> <li>• LED</li> <li>• Relay</li> <li>• Trap</li> </ul>

Interface Element	Description
	<ul style="list-style-type: none"> <li>E-mail</li> </ul> <p>Note: If checked, the LED indicator, relay, Trap message or email alarm mode will be turned on to trigger the alarm.</p>
Port	The corresponding port name of the device Ethernet port.
Trigger	<p>Network load alarm switch status, with options:</p> <ul style="list-style-type: none"> <li>Enable</li> <li>Disable</li> </ul> <p>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.</p>
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.
State	<p>Port link status, display items as follows:</p> <ul style="list-style-type: none"> <li>Link</li> <li>down</li> </ul>

## 10.3.2 Alarm Reception

### Function Description

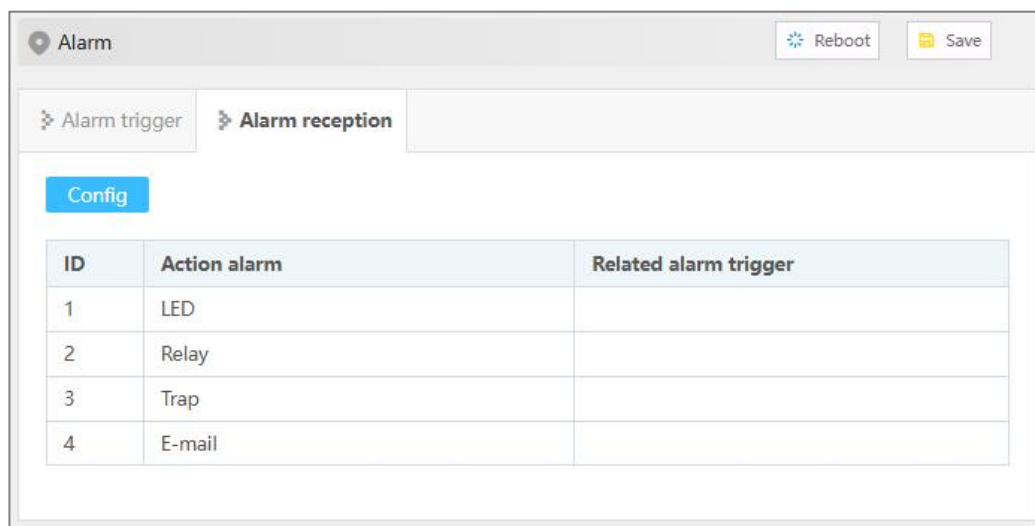
Users can check the configured LED indicator, relay, Trap or email alarm modes, so as to know the different alarm modes of the device in time.

### 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, relay, Trap and mail.
Related alarm trigger	Device alarm triggers include port, temperature, power supply and network load.

### 10.3.2.1 Trap Settings

#### 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 settings interface is as follows:



The main element configuration description of Trap settings 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: <ul style="list-style-type: none"> <li>v1</li> <li>v2c</li> </ul>
Group name	Group name.
Port number	The corresponding port name of the device Ethernet port.

### 10.3.2.2 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:

<input type="checkbox"/>	Enabled state	Mail server	Receiver address	Sender address	Port No.	TLS	Authentication	Email login address	Email login password
<input type="checkbox"/>	disable					off	off		

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	<p>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.</p> <p>The operation of "TLS" is as follows:</p> <ul style="list-style-type: none"> <li>• Off: disable TLS encryption protocol;</li> <li>• On: enable TLS encryption protocol.</li> </ul>
Authentication	<p>Authentication refers to whether to verify the mailbox password.</p> <p>The operation of "Authentication" is as follows:</p> <ul style="list-style-type: none"> <li>• Off: disable the verification email password;</li> <li>• On: enable the verification email password.</li> </ul>
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.

## 10.4 Configuration File Management

### 10.4.1 Current configuration

#### Function Description

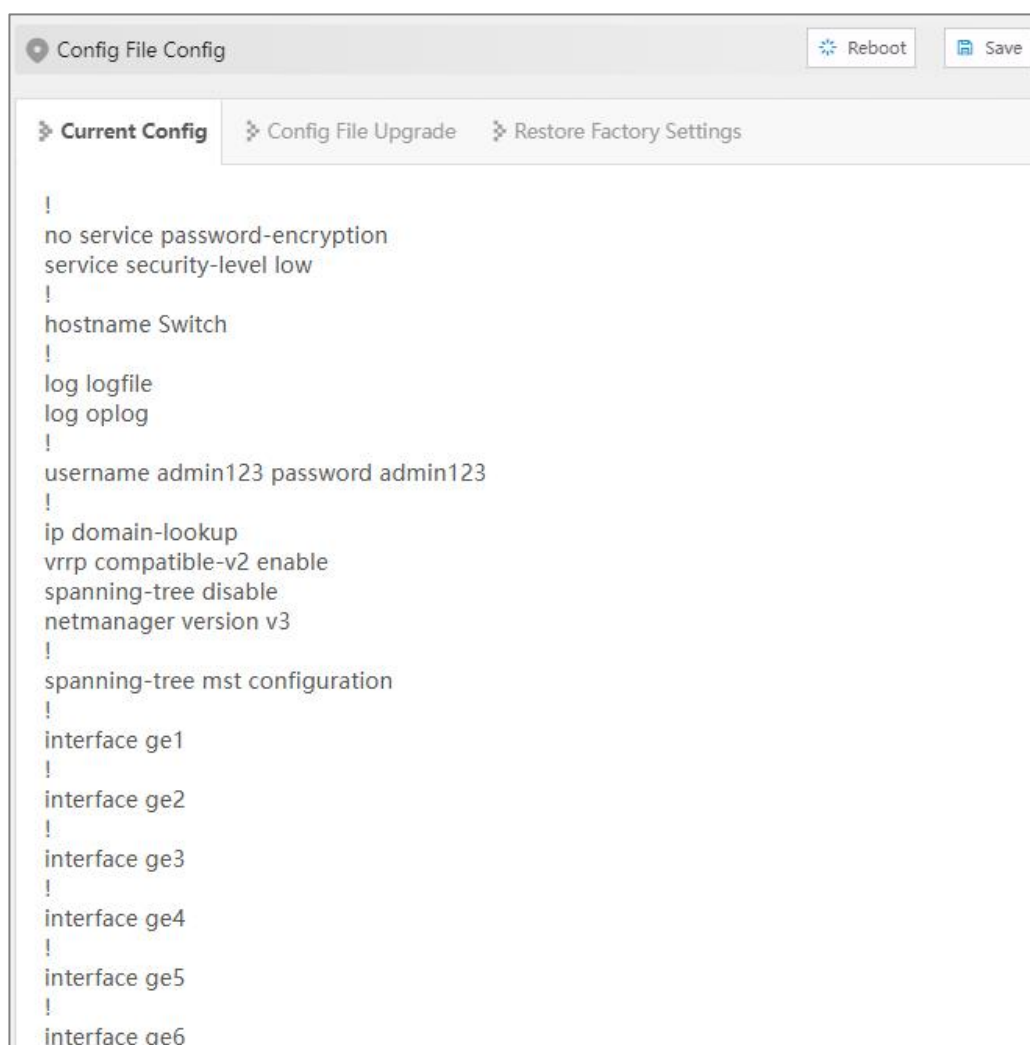
Check current configuration information.

#### Operation Path

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

#### Interface Description

The current configuration interface is as follows:



```
Config File Config [Reboot] [Save]
└─ Current Config  Config File Upgrade  Restore Factory Settings
!
no service password-encryption
service security-level low
!
hostname Switch
!
log logfile
log oplog
!
username admin123 password admin123
!
ip domain-lookup
vrrp compatible-v2 enable
spanning-tree disable
netmanager version v3
!
spanning-tree mst configuration
!
interface ge1
!
interface ge2
!
interface ge3
!
interface ge4
!
interface ge5
!
interface ge6
```

## 10.4.2 Configuration File Update

### Function Description

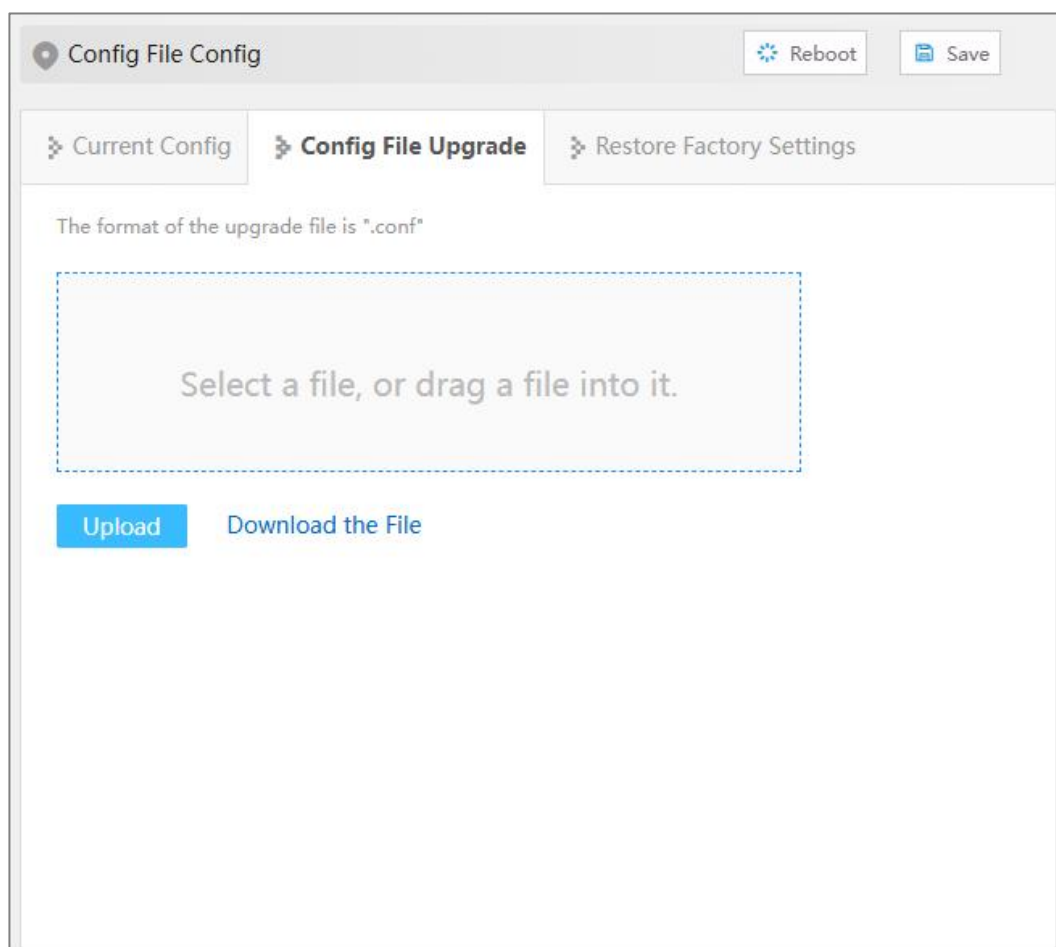
Upload and upload configuration file.

### 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.
Upload	After selecting the uploaded configuration file, click the "Upload" button to start uploading the configuration.
Download the File	Click to download the configuration file of the current device.

Interface Element	Description
	The default file name is "device.conf".

### 10.4.3 Restore Factory Settings

#### Function Description

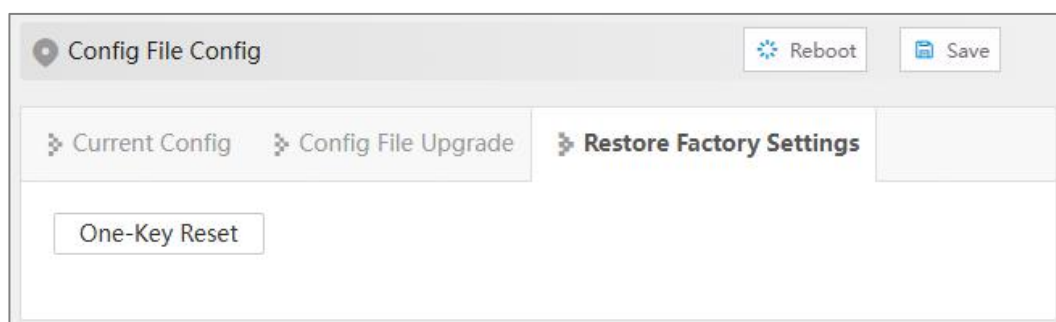
Restore device to factory settings.

#### Operation Path

Open in order: "System management > Configure Management > Restore Factory Setting".

#### 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.

## 10.5 Software Upgrade

#### Function Description

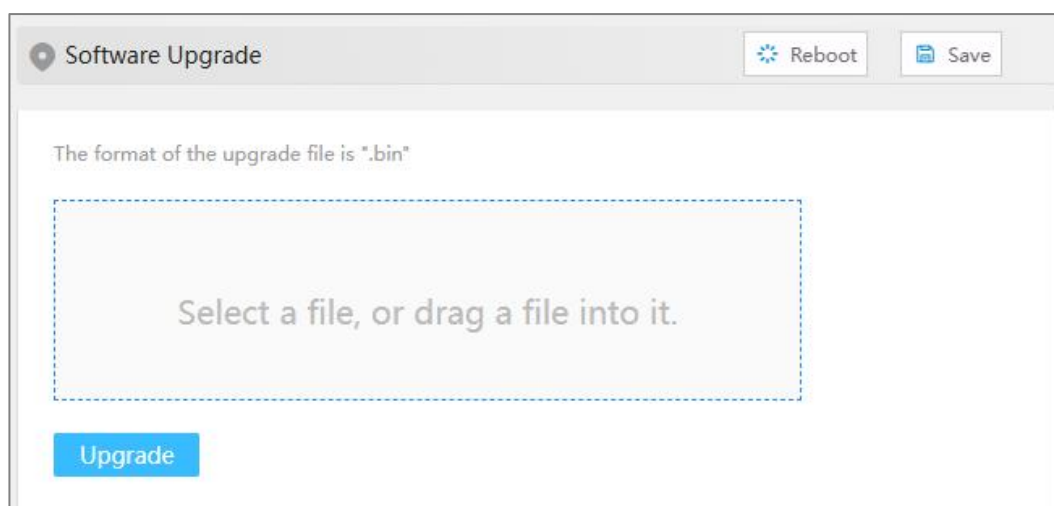
Update and upgrade the device program.

#### Operation Path

Open in order: "System > Software Upgrade".

#### Interface Description

The software update interface is as follows:



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.
Upgrade	After selecting the upgraded files, click the "Upgrade" button to start the upgrade process. Note: Generally, upgrade firmware is in ".bin" format.

## 10.6 Log Information

### 10.6.1 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.

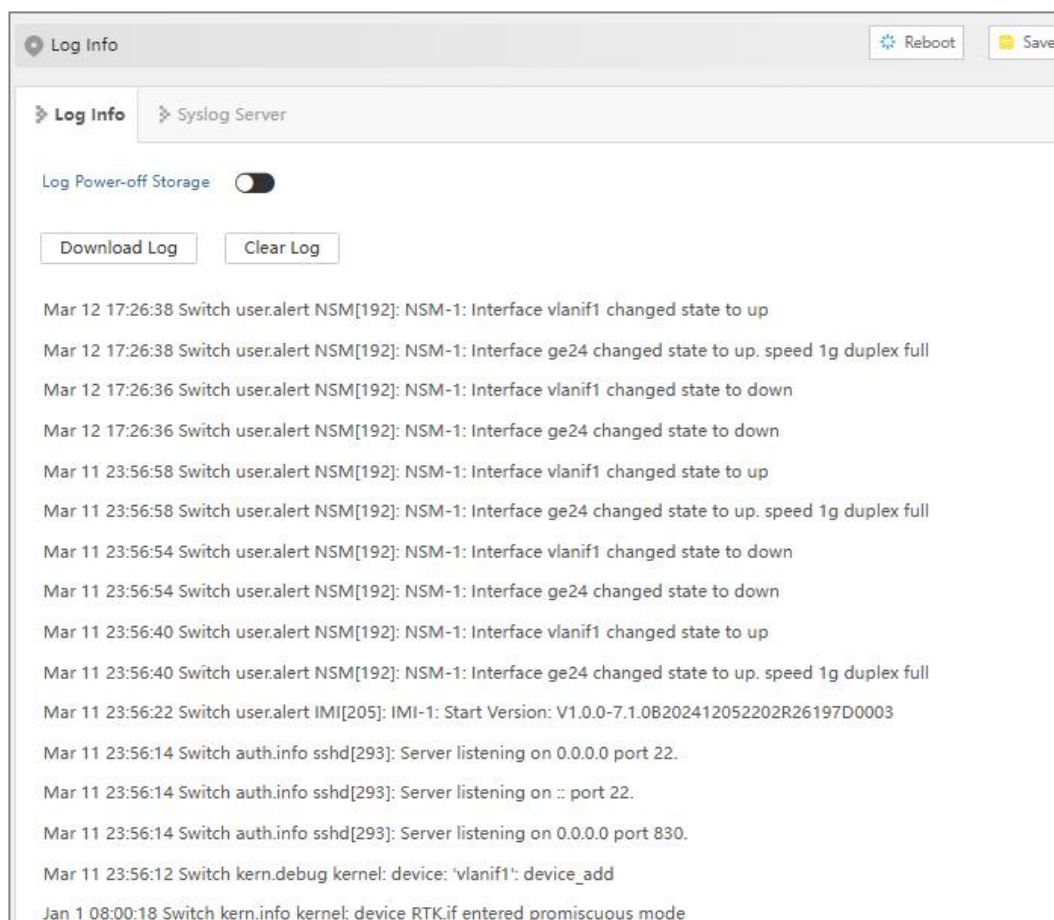
- User log: records user operations and system operation information.
- Security log: records information including account management, protocol, anti-attack and status.
- Diagnostic log: records information that assists in problem identification.

#### Operation Path

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

## Interface Description

Log information interface is as follows:



Main elements configuration description of log information interface:

Interface Element	Description
Log Power-off Storage	Log information is stored in FLASH, log information will not be lost after power failure.
Download Log	Click the "Download Log" button to download the current log information to the local.
Clear Log	Click the "Clear Log" button to clear the current log information record.

## 10.6.2 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 Information > Syslog Server".

### Interface Description

The Syslog server interface is as follows:

Syslog server interface main elements configuration instructions:

Interface Element	Description
Syslog Server	<p>IP address of Syslog server</p> <p>Note:</p> <ul style="list-style-type: none"> <li>Supports port configuration and the input format is IP: port, for example: 192.168.1.1:80.</li> <li>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.</li> </ul>

## 11.1 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 BlueEyes\_II 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 BlueEyes\_II software?**

Both configurations are the same, without conflict.

## 11.2 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

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.

## 11.3 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.

**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.