Shenzhen Hongrui Optical Technology Co., Ltd.

Web Manual

HR600-AXGM-SWG20104S PoE Switch

Oct. 27, 2020

Ver. 1.0

Revision history

Date	**Version**	**Description**
Oct. 27, 2020	V 1.0	The first edition

0 Foreword

0.1 Target Audience

This manual is prepared for the installers and system administrators who are responsible for network installation, configuration and maintenance. It assumes that you've understood all network communication and management protocols, as well as the technical terms, theoretical principles, practical skills, and expertise of devices, protocols and interfaces related to networking. Work experience in Graphical User Interface (GUI), Command-line Interface, Simple Network Management Protocol (SNMP) and Web Explorer is also required.

0.2 Manual Convention

The following approaches should prevail.

GUI Convention	Description
📖 Interpretation	Describe operations and add necessary information.
⚠ Caution	Remind you of cautions as improper operations will result in data loss or equipment damage.

1 Management Software Specification

1. Layer 2 Functions			
1.1	Port Management	Enable/disable port	
		Configure speed, duplex and MTU	
		Configure flow control	
		Check port information	
1.2	Mirroring	Support the ingress and egress directions to ports	
1.3	Rate Limit	Bit rate is determined by chips.	
1.4	Port Isolation	Support port isolation configuration	
1.5	Storm Policing	Suppress the storms of broadcast, unknown unicast and multicast	
1.6	Link Aggregation	Static aggregation in manual mode	
		Dynamic aggregation in LACP mode	
1.7	VLAN	Access	
		Trunk	
		Hybrid	
1.8	MAC	Add or delete statically	
		Learn limited MAC addresses	
		Set dynamic aging time	
1.9	Spanning Tree	802.1d (STP) available	ERPS (proprietary protocol) is also available.
		802.1w (RSTP) available	
		802.1s (MSTP) available	
1.10	IGMP Snooping	Add or delete statically	
		Snoop the v1/2/3 dynamic multicast	
2. Layer 3 and Routing Functions			
2.1	Interface Configuration	VLAN interface available	
2.2	ARP	Check ARP	
2.3	Routing	Static routing	
3. Extended Functions			

2.1	ACL	Port numbers based on Source/Destination MAC, protocol type, Source/Destination IP, and L4 port.	
		Time-range management	
2.2	QoS	Classed by 802.1p (CoS)	
		Classed by DSCP	
		Classed by Source/Destination IP and port	
		Support SP, WRR and DRR scheduling algorithms	
		Support committed access rate (CAR)	
2.3	LLDP	Support Link Layer Discovery Protocol (LLDP)	
2.4	User Configuration	Add/delete a user	
2.5	Log	Login, operation, status and event logs	
2.6	Attack Resistance	DoS defense	
		Protect CPU and restrict message uploading rate	
		ARP binding (IP, MAC, Port)	
2.7	Network Diagnostics	Support Ping, Telnet and traceroute	
2.8	System Management	Unit resetting, configuration saving/restoring, upgrade, time setting, etc.	
4. Management Functions			
3.1	CLI	Manage serial port command lines	
3.2	Telnet	Remotely control Telnet	
3.3	Web	Support Layer 2 configuration	
5. Other Functions			
5.1	Support DHCP Snooping		
5.2	Support ring protection, namely the ERPS aforesaid.		
5.3	Support SNMP v1/v2c/v3		

2 Web Page Login

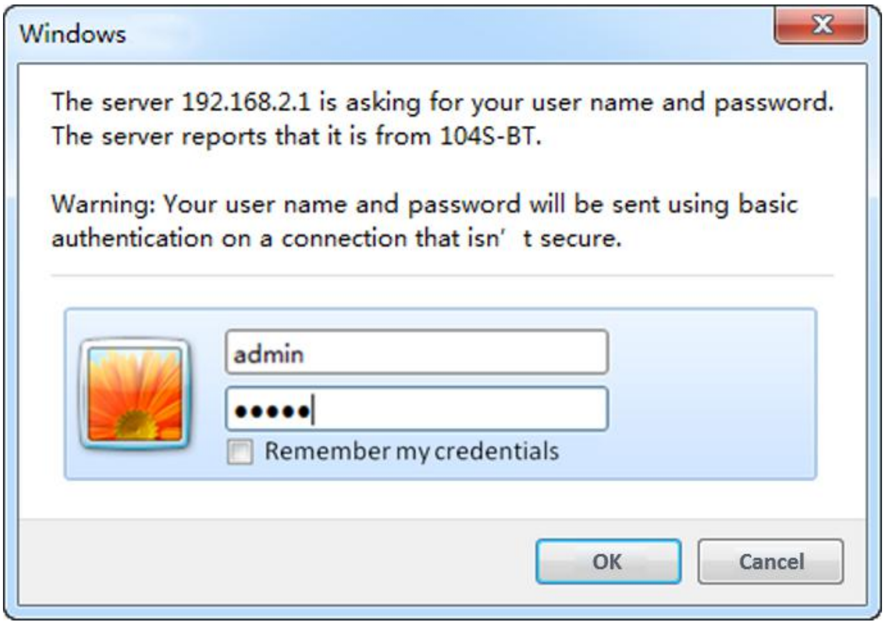
2.1 Log in the Network Management Client

Type in the default switch address: http://192.168.2.1 in the browser and click the “Enter”.

📖 Description:

Keep the IP network segment of PC consistent with that of switch but differentiate the IP address as you log in. Set PC’s IP address of 192.168.2.x and the subnet mask of 255.255.255.0 for the first login (1< x ≤254).

A login window appears as follows. Type in the default username of “**admin**” and the password of “**admin**”. Click the “Log in” to see the switch system.


Windows

The server 192.168.2.1 is asking for your user name and password. The server reports that it is from 104S-BT.

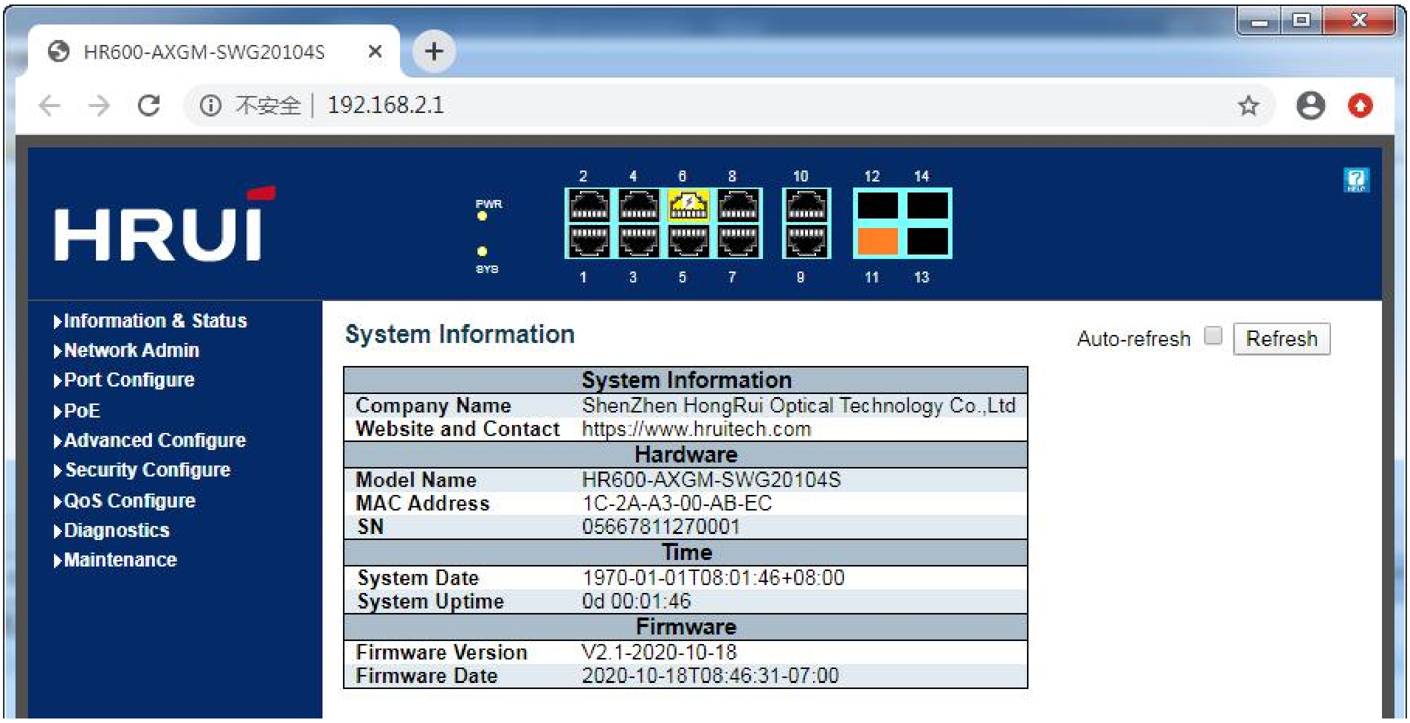
Warning: Your user name and password will be sent using basic authentication on a connection that isn’ t secure.

admin

●●●●●

□ Remember my credentials

After login, you will see:



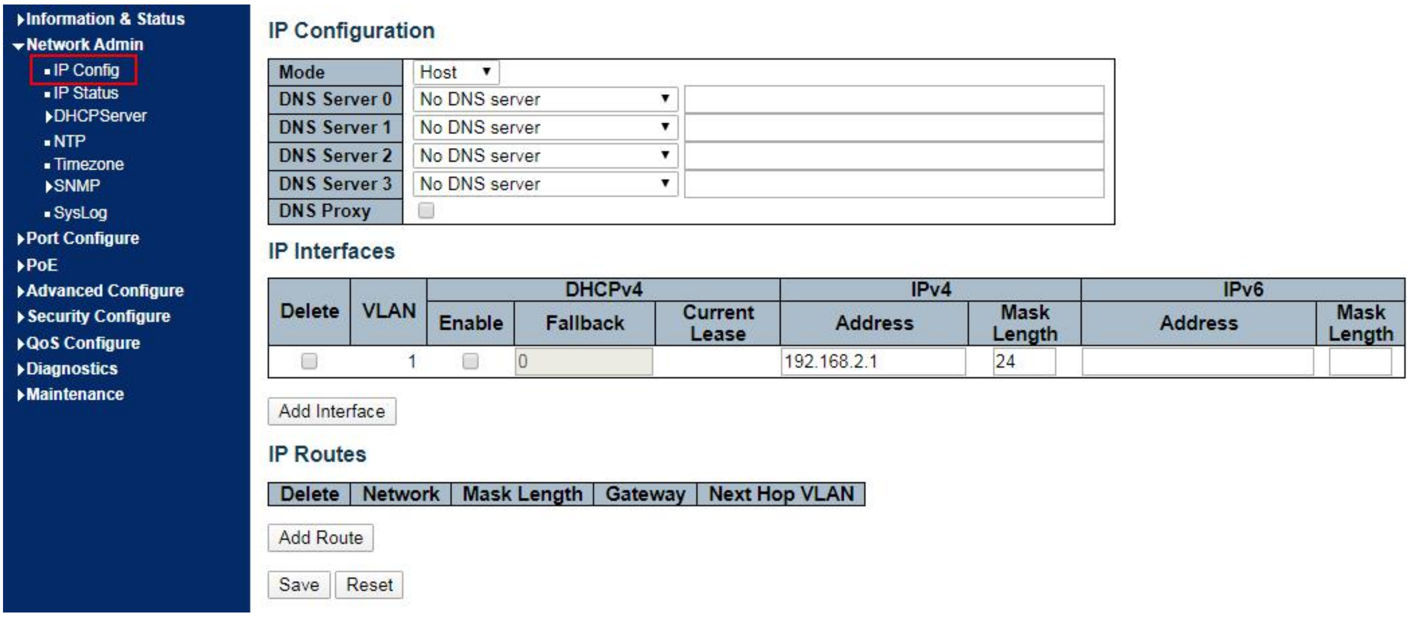
System Information

System Information	
Company Name	ShenZhen HongRui Optical Technology Co.,Ltd
Website and Contact	https://www.hruitech.com
Hardware	
Model Name	HR600-AXGM-SWG20104S
MAC Address	1C-2A-A3-00-AB-EC
SN	05667811270001
Time	
System Date	1970-01-01T08:01:46+08:00
System Uptime	0d 00:01:46
Firmware	
Firmware Version	V2.1-2020-10-18
Firmware Date	2020-10-18T08:46:31-07:00

3 Network Admin

3.1 IP Config

Click the “Network Admin-IP Config” as follows.



IP Configuration

Mode	Host ▾	
DNS Server 0	No DNS server ▾	
DNS Server 1	No DNS server ▾	
DNS Server 2	No DNS server ▾	
DNS Server 3	No DNS server ▾	
DNS Proxy	□	

IP Interfaces

Delete	VLAN	DHCPv4			IPv4		IPv6	
		Enable	Fallback	Current Lease	Address	Mask Length	Address	Mask Length
□	1	□	0		192.168.2.1	24		

IP Routes

Delete	Network	Mask Length	Gateway	Next Hop VLAN

Description about IP Config:

Configuration Items	Description
Mode	Select from Host mode and Router mode
DNS Server	Select from No DNS Server, Configurable IPv4, IPv4, From any DHCPv4 interface, and from this DHCPv4 interface
DNS Proxy	DNS Proxy
Interface Name	Display the name of system interface.
VLAN	Enter the VLAN to access and manage the switch.
IPv4 DHCP	- Enabled status refers to that VLAN interface dynamically obtains the switch IPv4 address through IPv4 DHCP Client. Otherwise the static IP configuration will take place. - Waiting time (unit: s) refers to the period when the switch tries to get dynamic IP address through DHCP. It will never time out in case of 0 second. - Current IP address is obtained through DHCP.
IPv4	- IP address: the static IPv4 address entered by a user. - IP mask: the static IPv4 subnet mask entered by a user.
IPv6	- IP address: the static IPv6 address entered by a user. - IP mask: the static IPv6 subnet mask entered by a user.
IP Routes	- Destination segment: the IPv4 address entered by a user. - IP mask: the static IPv4 subnet mask entered by a user. - Next hop address: the next IPv4 address entered by a user.

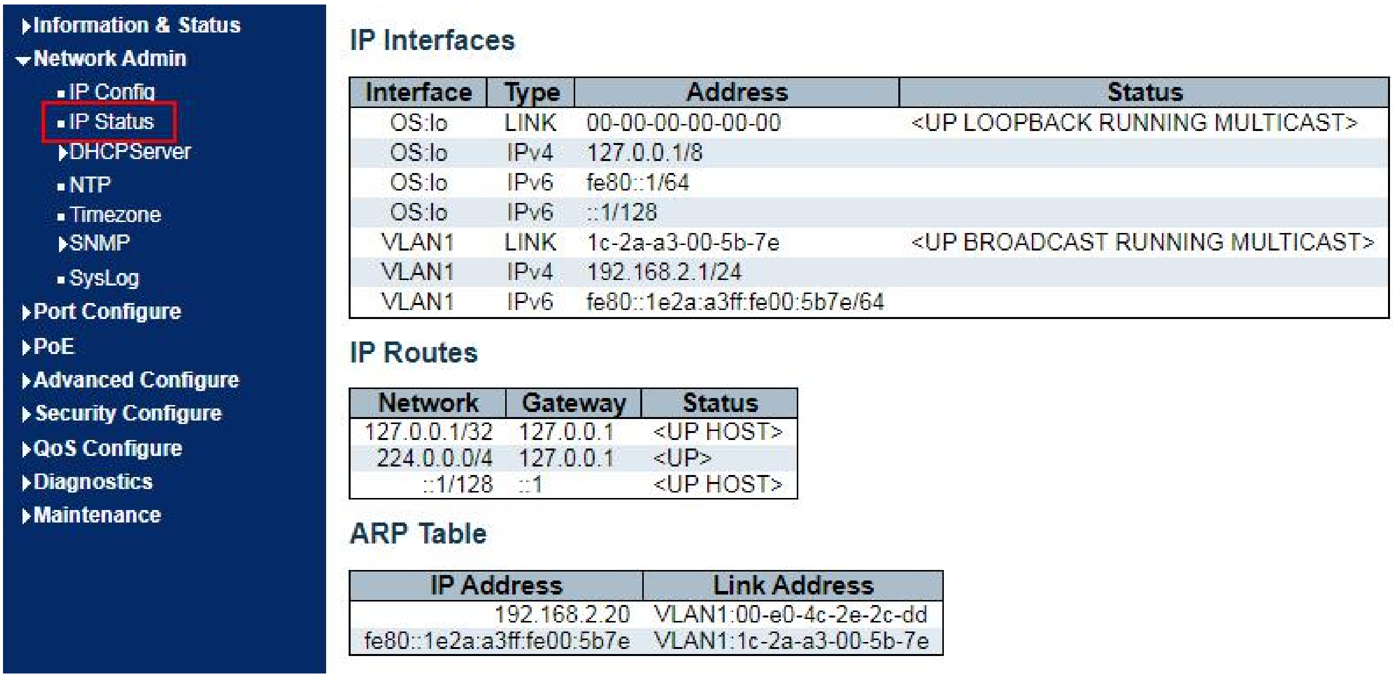
Click “Add” to create new Management VLAN and IP addresses and “Save” and finish.

🕮 Description:

Note: The switch creates VLAN1 only by default. Users who need to use other management switches should add the VLAN and related ports in the VLAN module first to realize the Layer 3 communication between VLANs.

3.2 IP Status

Click the “Network Admin-IP Status” as follows.



IP Interfaces

Interface	Type	Address	Status
OS:lo	LINK	00-00-00-00-00-00	<UP LOOPBACK RUNNING MULTICAST>
OS:lo	IPv4	127.0.0.1/8	
OS:lo	IPv6	fe80::1/64	
OS:lo	IPv6	::1/128	
VLAN1	LINK	1c-2a-a3-00-5b-7e	<UP BROADCAST RUNNING MULTICAST>
VLAN1	IPv4	192.168.2.1/24	
VLAN1	IPv6	fe80::1e2a:a3ff:fe00:5b7e/64	

IP Routes

Network	Gateway	Status
127.0.0.1/32	127.0.0.1	<UP HOST>
224.0.0.0/4	127.0.0.1	<UP>
::1/128	::1	<UP HOST>

ARP Table

IP Address	Link Address
192.168.2.20	VLAN1:00-e0-4c-2e-2c-dd
fe80::1e2a:a3ff:fe00:5b7e	VLAN1:1c-2a-a3-00-5b-7e

Description about IP Status:

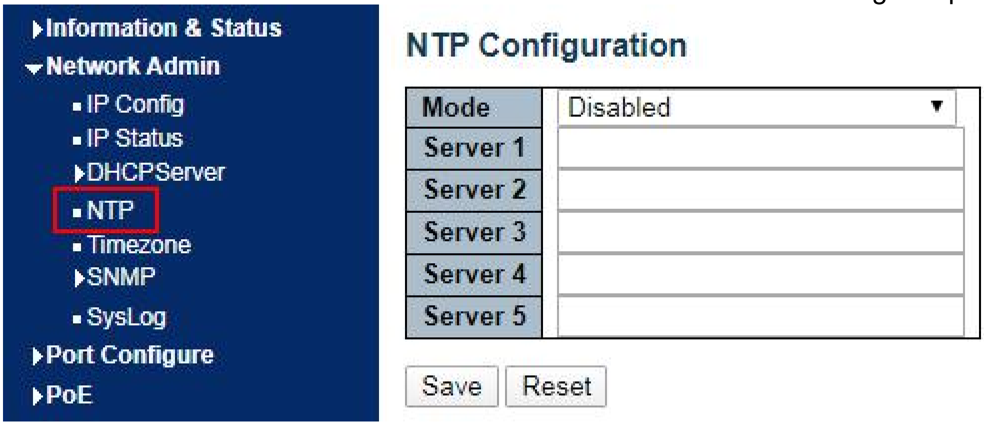
Configuration Items	Description
IP Interfaces	Check the IP Port Table
IP Routes	Check the IP Routing Table
ARP Table	Check the ARP Table

3.3 NTP

Applied for the clock synchronization between distributed time servers and clients, NTP (Network Time Protocol) is at the application layer of TCP/IP protocol family, which is realized based on IP and UDP. NTP message is transmitted through UDP with No. 123 port. Clock synchronization in all network devices will play a decisive role in the context of increasingly complex network topology. So NTP emerges since administrators' manual modification of system clock will lead to huge workload and inaccurate time.

Instructions

1. Click the "Network Admin-NTP" in the navigation bar as follows.

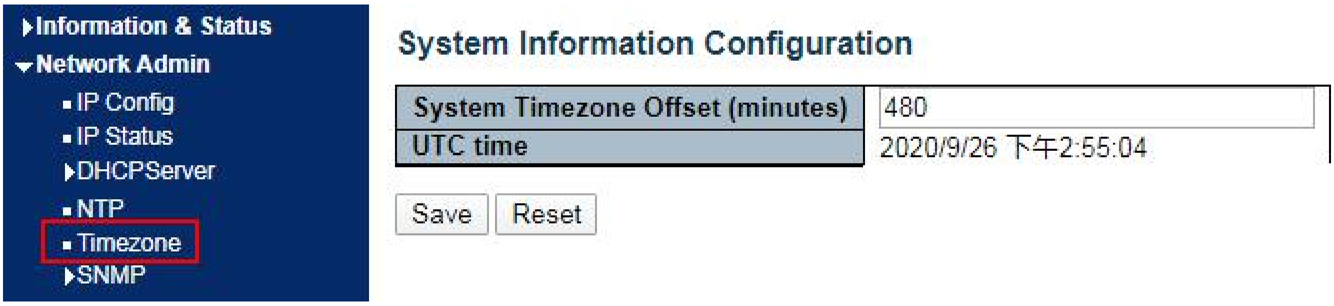


NTP Configuration

Mode	Disabled ▾
Server 1	
Server 2	
Server 3	
Server 4	
Server 5	

Configuration Items	Description
Mode	Enable or disable NTP by dropping down the list.
NTP Server	Its IP address and NTP info will be obtained from NTP servers.

1. Click the “Network Admin-Timezone” in the navigation bar as follows.



System Information Configuration

System Timezone Offset (minutes)	480
UTC time	2020/9/26 下午2:55:04

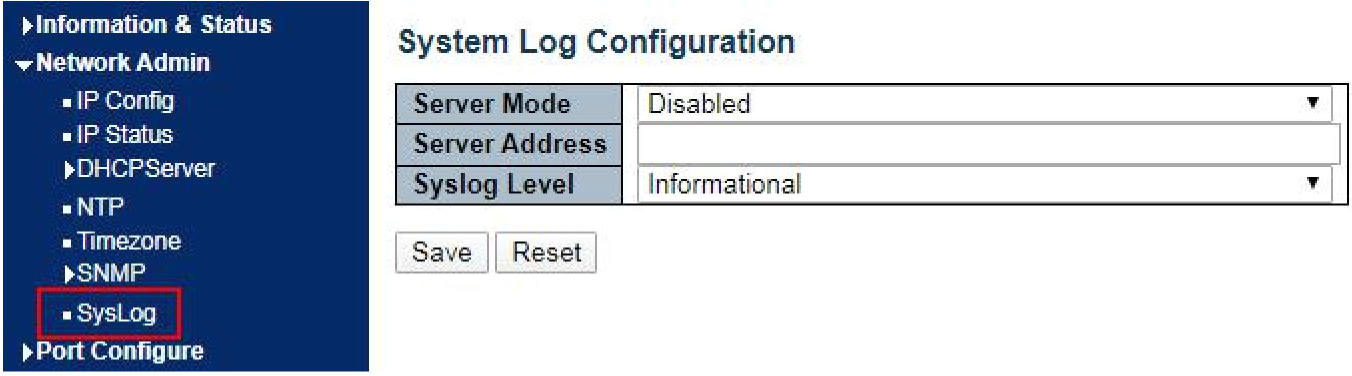
Configuration Items	Description
System Time-zone Offset (minutes)	Set the time to be modified.
UTC Time	Current Internet time

3.4 Syslog

Users can upload the switch logs to the TFTP Server.

Instructions

1. Click the “Network Admin-SysLog” as follows:



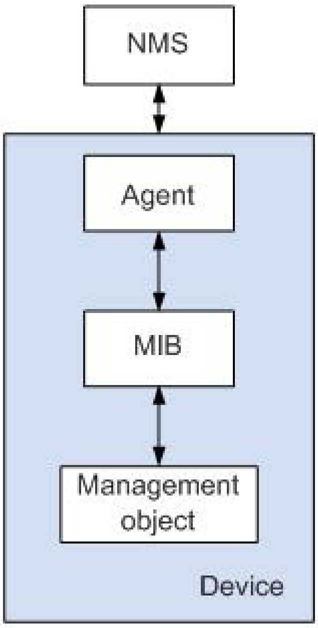
System Log Configuration

Server Mode	Disabled
Server Address	
Syslog Level	Informational

Configuration Items	Description
Mode	Enable or disable the Syslog function. The switch will send the syslogs to the specified servers if enable.
Server IP Address	IP addresses of the specified log servers
Log Levels	Specified levels including: **Info**: information, warnings and errors. **Warning**: warnings and errors. **Error**: errors.

3.5 SNMP

SNMP (Simple Network Management Protocol) is widely used in TCP/IP network. It manages devices by the central computer which operates network management software (i.e. network management workstation). SNMP is:
Simple: The polling-driving SNMP has the fundamental functionality set that is applicable to small-scale environment with fast speed and low cost. Besides, UDP-driven SNMP is compatible with most devices. Powerful: SNMP aims to ensure the management info transmission between two nodes so that administrators can retrieve, modify and troubleshoot the info easily. There are 3 common versions, namely SNMPv1, v2c and v3. Its system contains NMS (Network Management System), Agent, Management object and MIB (Management Information Base).
NMS, as the management center, will manage all devices. Each device under management includes the resident Agent, MIB and management objects. NMS interacts with the Agent running on the management object which will operate the MIB to execute NMS orders.
SNMP management model



NMS

- As the network administrator, NMS manages/monitors network devices by SNMP on its server. It can require the Agent to inquire or modify configuration item value(s). NMS can receive the Trap actively sent by the Agent to be updated with the statuses of the managed devices.

Agent

- As a agent process of the managed devices, it maintains device data and responds to the NMS requests by reporting management data. Agent will fulfill relevant orders through MIB Table and send the results back to NMS after receiving its request. Devices will take the initiative to send info related to the current statues of devices to NMS through Agent once a failure or other event occurs.

Management object

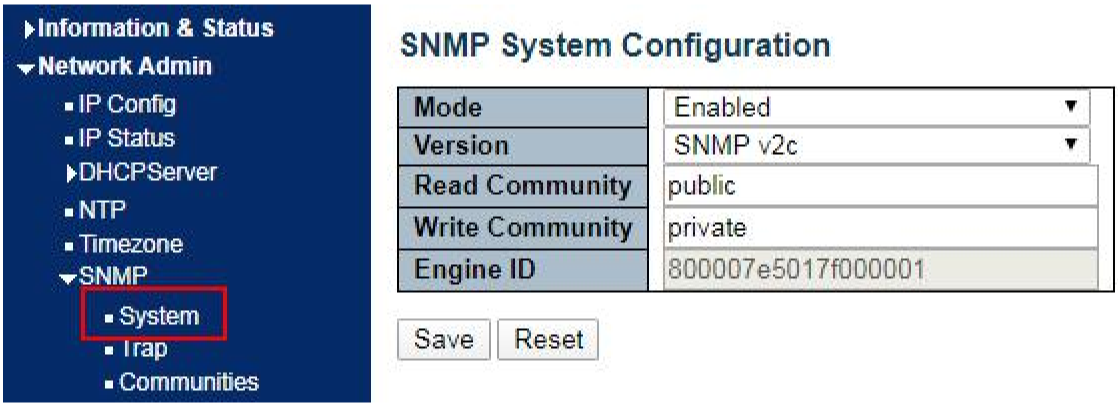
- It refers to the object under management. Each device may have more than one objects, including a piece of hardware (e.g. an interface board), partial hardware and software (e.g. routing protocol), as well as other configuration item sets.

MIB

- MIB is a database specifying the variables maintained by the management object (i.e. the info that can be inquired and set by the Agent). MIB defines the attributes of the management object, including the name, status, access right and data type. The following functions can be realized through MIB: Agent will master the instant device info by inquiring MIB, and set the status configuration items by changing MIB.

Instructions

1. Click the “Network Admin -SNMP” in the navigation tree to the “SNMP System Configuration” as follows.

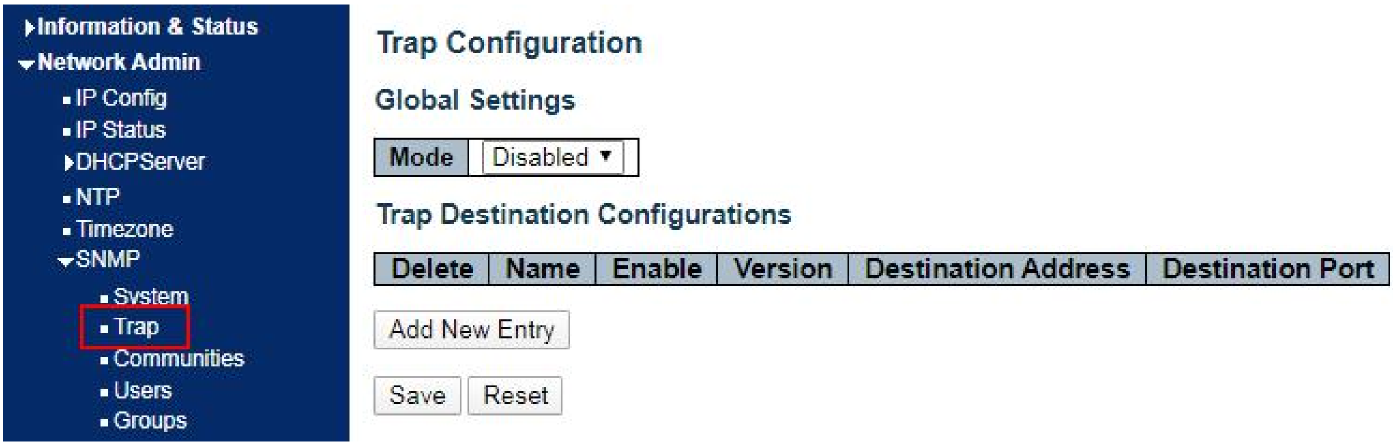


SNMP System Configuration

Mode	Enabled
Version	SNMP v2c
Read Community	public
Write Community	private
Engine ID	800007e5017f000001

Configuration Items	Description
Mode	Enable or disable SNMP functions
Version	Select SNMPv1, v2c or v3 by dropping down the list
Read Community	Authorized management site can read the MIB object, which is called "public" by default
Write Community	Authorized management site can read and modify the MIB object, which is called "private" by default

2. Users can enable and disable the SNMP Trap and SNMP authentication trap functions of the switch. Click the "Network Admin-SNMP-Trap" as follows:



Trap Configuration

Global Settings

Mode	Disabled

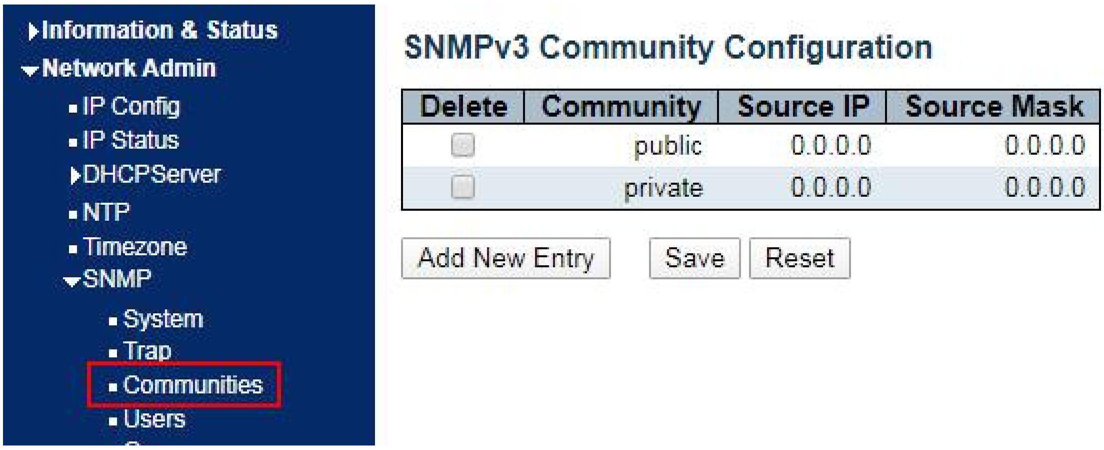
Trap Destination Configurations

Delete	Name	Enable	Version	Destination Address	Destination Port

Configuration Items	Description
Trap Name	SNMP Trap alias
Trap Mode	Enabled or disabled SNMP Trap

Trap Version	SNMPv1, v2c and v3
Trap Community	Group name of the specified SNMP Trap Community
Trap Destination IP Address	IP address of the specified SNMP Trap Server
Trap Destination UDP Port	UDP port No. of the specified SNMP Trap Server
Trap Inform/Response Mode	Enabled or disabled
Trap Inform/Response Timeout (seconds)	Period
Trap Inform/Response Retry Times	Number of times

3. Users can rename the community. Click the “Network Admin-SNMP-Communities” as follows:

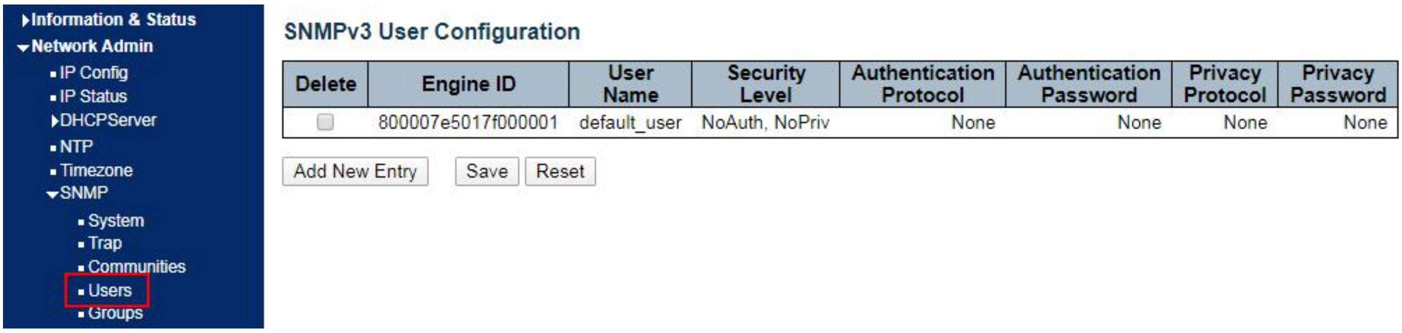


SNMPv3 Community Configuration

Delete	Community	Source IP	Source Mask
□	public	0.0.0.0	0.0.0.0
□	private	0.0.0.0	0.0.0.0

Configuration Items	Description
Community	Enter the new name
Source IP	Enter the IPv4 source address
Source Mask	Enter the IPv4 subnet mask

4. Create a SNMP v3 User and select the way of privacy. Click the “Network Admin-SNMP-Users” as follows:



SNMPv3 User Configuration

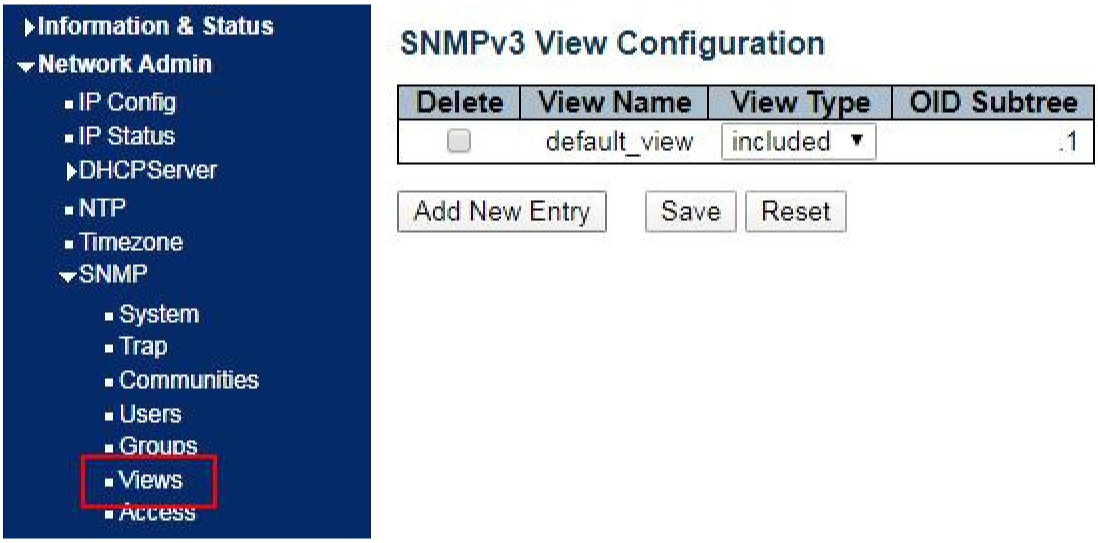
Delete	Engine ID	User Name	Security Level	Authentication Protocol	Authentication Password	Privacy Protocol	Privacy Password
□	800007e5017f000001	default_user	NoAuth, NoPriv	None	None	None	None

Configuration Items	Description

Engine ID	The default 800007e5017f000001 is recommended for the switch.
Username	Enter the new name of SNMPv3 user
Security Level	Select a method of encryption from noAuthnoPriv, authNoPriv, and authPriv by dropping down the list.
Authentication Protocol	Select a privacy protocol from MD5 or SHA by dropping down the list.
Authentication Password	Type in the privacy password
Privacy Protocol	Select a privacy protocol from DES or AES by dropping down the list.
Privacy Password	Type in the privacy password

"Save" and finish.

5. Users can create a new view of SNMPv3. Click the "Network Admin-SNMP-Views" as follows:

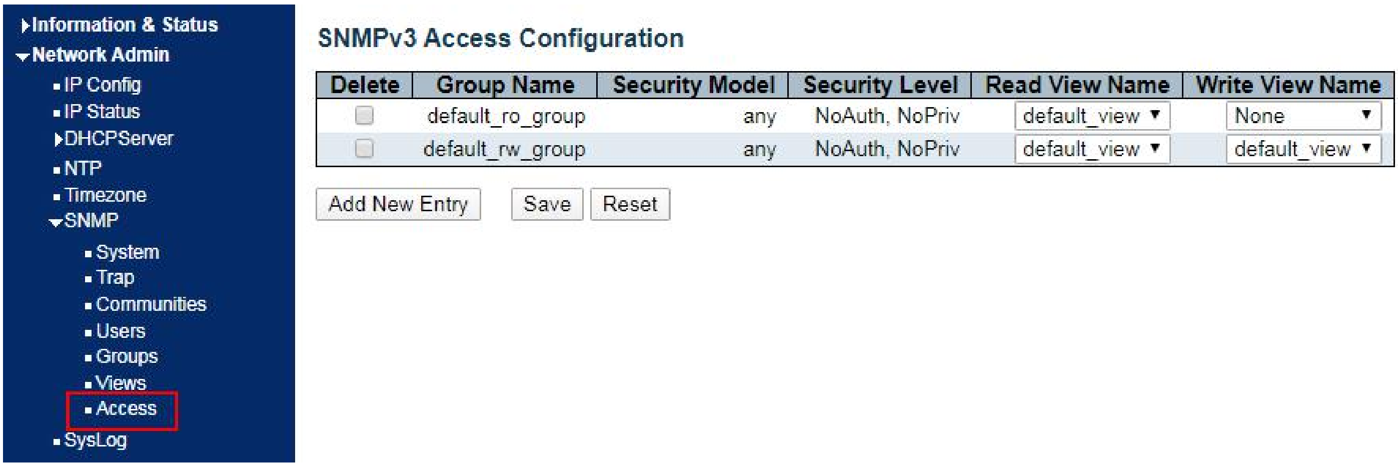


SNMPv3 View Configuration

Delete	View Name	View Type	OID Subtree
☐	default_view	included ▼	.1

Configuration Items	Description
View Name	Enter the name
View Type	Select from included and excluded by dropping down the list
OID Subtree	Enter the OID subtree, e.g. 1.2

6. Users can call the created Views through a new Access. Click the "Network Admin-SNMP-Access" as follows:

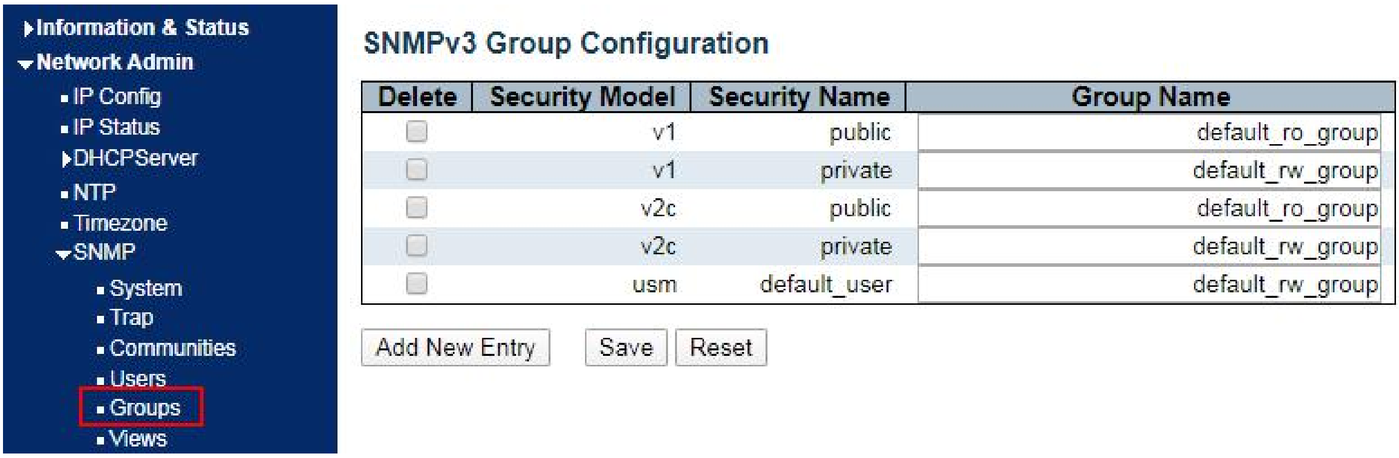


SNMPv3 Access Configuration

Delete	Group Name	Security Model	Security Level	Read View Name	Write View Name
□	default_ro_group	any	NoAuth, NoPriv	default_view ▾	None ▾
□	default_rw_group	any	NoAuth, NoPriv	default_view ▾	default_view ▾

Configuration Items	Description
Group Name	Enter the name
Security Model	Select from any, v1, v2c, and usm by dropping down the list
Security Level	Select a method of encryption from noAuthnoPriv, authNoPriv, and authPriv by dropping down the list
Read View Name	Choose a created view by dropping down the list
Write View Name	Choose a created view by dropping down the list

7. Users can call the created Users and Access through a new Group. Click the "Network Admin-SNMP-Groups" as follows:



SNMPv3 Group Configuration

Delete	Security Model	Security Name	Group Name
□	v1	public	default_ro_group
□	v1	private	default_rw_group
□	v2c	public	default_ro_group
□	v2c	private	default_rw_group
□	usm	default_user	default_rw_group

Configuration Items	Description
Security Model	Select from v1, v2c and usm by dropping down the list

Security Name	Drop down and select from the created usernames, group names (v1 v2c), and the usernames (usm)
Group Name	Enter the allowed access name

4 Port Configure

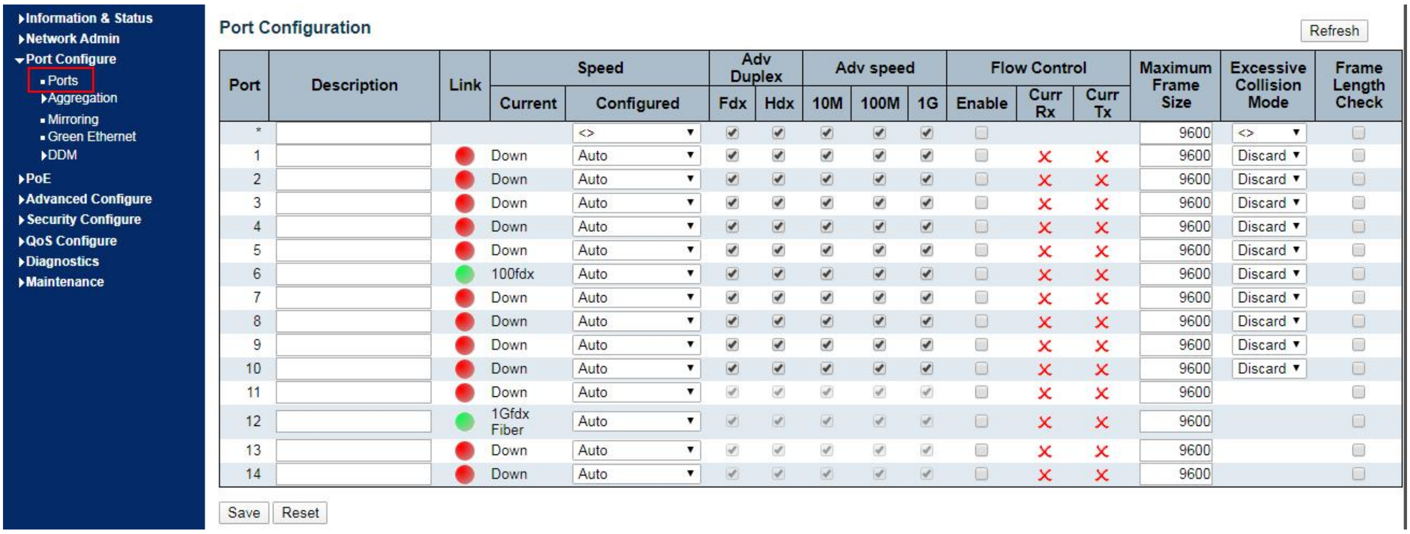
4.1 Ports

Interfaces should be identified so that users can inquire and configure Ethernet interfaces as required.

Instructions

1. Click the “Port Configure-Ports” in the navigation bar.

2. Select the data for configuration and the port description of configuration items, “Autonegotiation”, “Flow Control”, and “Maximum Frame Size” as follows.



Port Configuration

Port	Description	Link	Speed		Adv Duplex		Adv speed			Flow Control			Maximum Frame Size	Excessive Collision Mode	Frame Length Check
			Current	Configured	Fdx	Hdx	10M	100M	1G	Enable	Curr Rx	Curr Tx			
*				<>	☑	☑	☑	☑	☑	□			9600	<>	□
1		🔴	Down	Auto	☑	☑	☑	☑	☑	□	✗	✗	9600	Discard	□
2		🔴	Down	Auto	☑	☑	☑	☑	☑	□	✗	✗	9600	Discard	□
3		🔴	Down	Auto	☑	☑	☑	☑	☑	□	✗	✗	9600	Discard	□
4		🔴	Down	Auto	☑	☑	☑	☑	☑	□	✗	✗	9600	Discard	□
5		🔴	Down	Auto	☑	☑	☑	☑	☑	□	✗	✗	9600	Discard	□
6		🟢	100fdx	Auto	☑	☑	☑	☑	☑	□	✗	✗	9600	Discard	□
7		🔴	Down	Auto	☑	☑	☑	☑	☑	□	✗	✗	9600	Discard	□
8		🔴	Down	Auto	☑	☑	☑	☑	☑	□	✗	✗	9600	Discard	□
9		🔴	Down	Auto	☑	☑	☑	☑	☑	□	✗	✗	9600	Discard	□
10		🔴	Down	Auto	☑	☑	☑	☑	☑	□	✗	✗	9600	Discard	□
11		🔴	Down	Auto	☑	☑	☑	☑	☑	□	✗	✗	9600		□
12		🟢	1Gfdx Fiber	Auto	☑	☑	☑	☑	☑	□	✗	✗	9600		□
13		🔴	Down	Auto	☑	☑	☑	☑	☑	□	✗	✗	9600		□
14		🔴	Down	Auto	☑	☑	☑	☑	☑	□	✗	✗	9600		□

Configuration items are as follows.

Configuration Items	Description
Autonegotiation	Configurable autonegotiation with mandatory 10 Mb, 100 Mb and 1,000 Mb statuses. Interface rates including 10 Mbits/s, 100 Mbits/s and 1,000 Mbit/s are available to Ethernet electrical interfaces and are optional as required.

Flow Control	After it is enabled on both local network and opposite network devices, the local one will notify the other to stop sending messages in the presence of network congestion. The opposite one will execute the command temporarily to ensure zero message loss. Disable-Disabled reception and transmission of PAUSE frame; Rx (RX Pause)-To receive the PAUSE frame; Both (Rx/Tx Pause)-To receive and transmit the PAUSE frame; Tx (Tx Pause)-To transmit the PAUSE frame.
Maximum Frame Size	9,600
Enabled	Switch the ports
Port Description	Describable ports

4.2 Aggregation

Link Aggregation increases bandwidth and reliability by bundling a group of physical interfaces into a single logical interface.

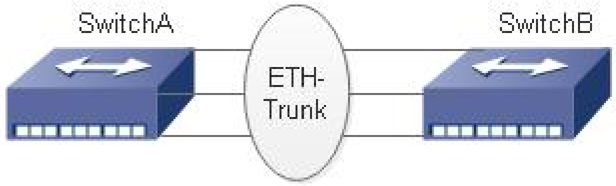
Link Aggregation Group (LAG) is a logical link bundled by multiple Ethernet links (Eth-Trunk).

Ceaselessly expanding network size increases users' demands of link bandwidth and reliability. Traditionally, high-speed interface board or the compatible equipment is usually replaced to optimize bandwidth, which is expensive and inflexible.

Link Aggregation Technology bundles multiple physical interfaces into a single logical interface without upgrading hardware. Its backup mechanism not only improves reliability, but also shares the flow load on different physical links.

As shown below, Switch A is linked with Switch B through three Ethernet links which are bundled into an Eth-Trunk logical link. Its bandwidth equals to that of the three links in total, thus broadening the bandwidth. Meanwhile, these three links back up mutually to be more reliable.

Link Aggregation diagram



Link Aggregation can meet the following demands:

Insufficient bandwidth of two switches connected with one link.

Insufficient reliability of two switches connected with one link.

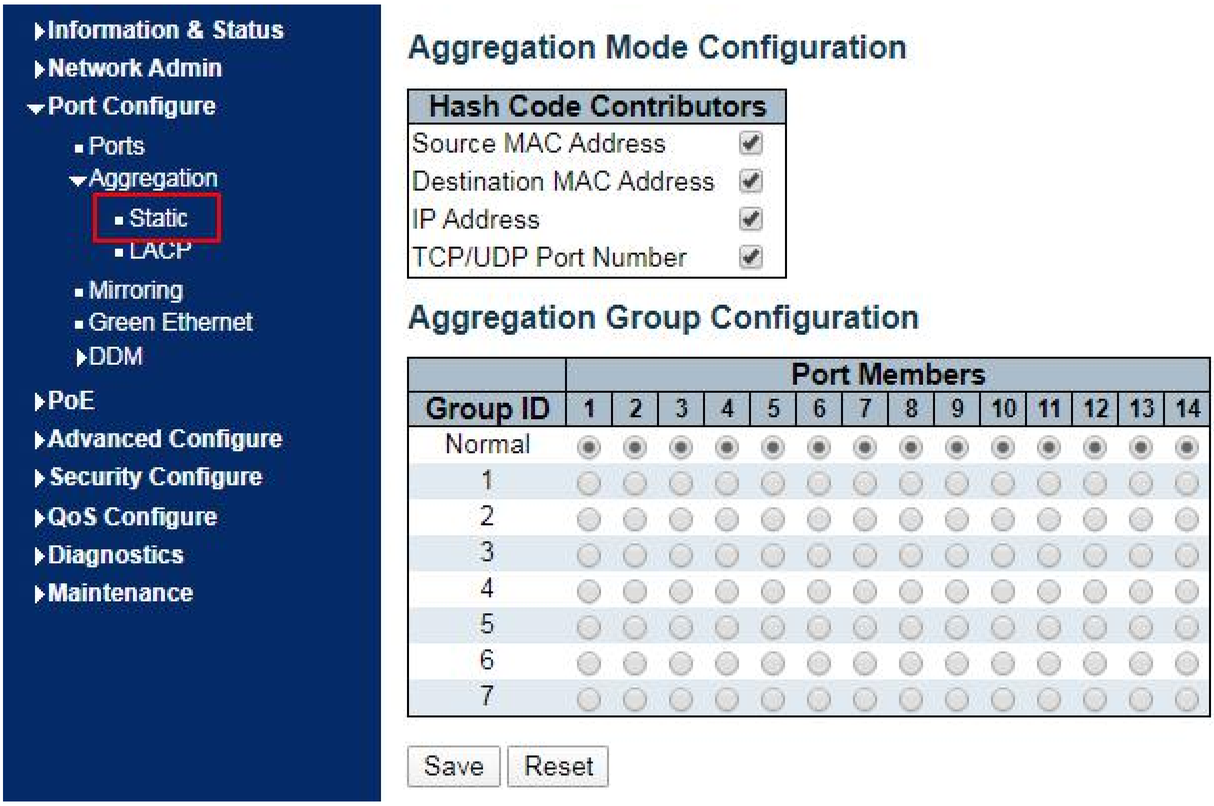
Link Aggregation can be divided into Manual Mode and LACP Mode in accordance with Link Aggregation Control Protocol (LACP) status.

In the first mode, Eth-Trunk establishment, member interface access should be added manually without LACP. It is also called the Load-sharing Mode because all links are involved in data forwarding and load sharing. In case any active link fails, LAG will average load with the remaining ones. This mode is preferred under the circumstance that two directly-connected devices require a larger link bandwidth but has no access to LACP.

4.2.1 Static

Instructions of adding a Static Link Aggregation (i.e. manual mode):

1.Click the "Port Configure-Aggregation-Static" to "Add a static link aggregation"; select a Group ID (1-16), a load-sharing method (Src Mac, Dst Mac, IP Address, TCP/UDP Port Number) and a port for aggregation; and click the "Add" option as follows.



Aggregation Mode Configuration

Hash Code Contributors	
Source MAC Address	☑
Destination MAC Address	☑
IP Address	☑
TCP/UDP Port Number	☑

Aggregation Group Configuration

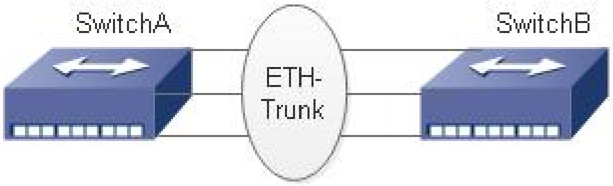
	Port Members													
Group ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Normal	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1	○	○	○	○	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Interface data are as follows

Configuration Items	Description
Group ID	There are 16 aggregation groups and LAG IDs numbering from 1 to 16.
Load-sharing Method	Src Mac, Dst Mac, IP Address, TCP/UDP Port Number
Port List	Up to 8 ports are available.

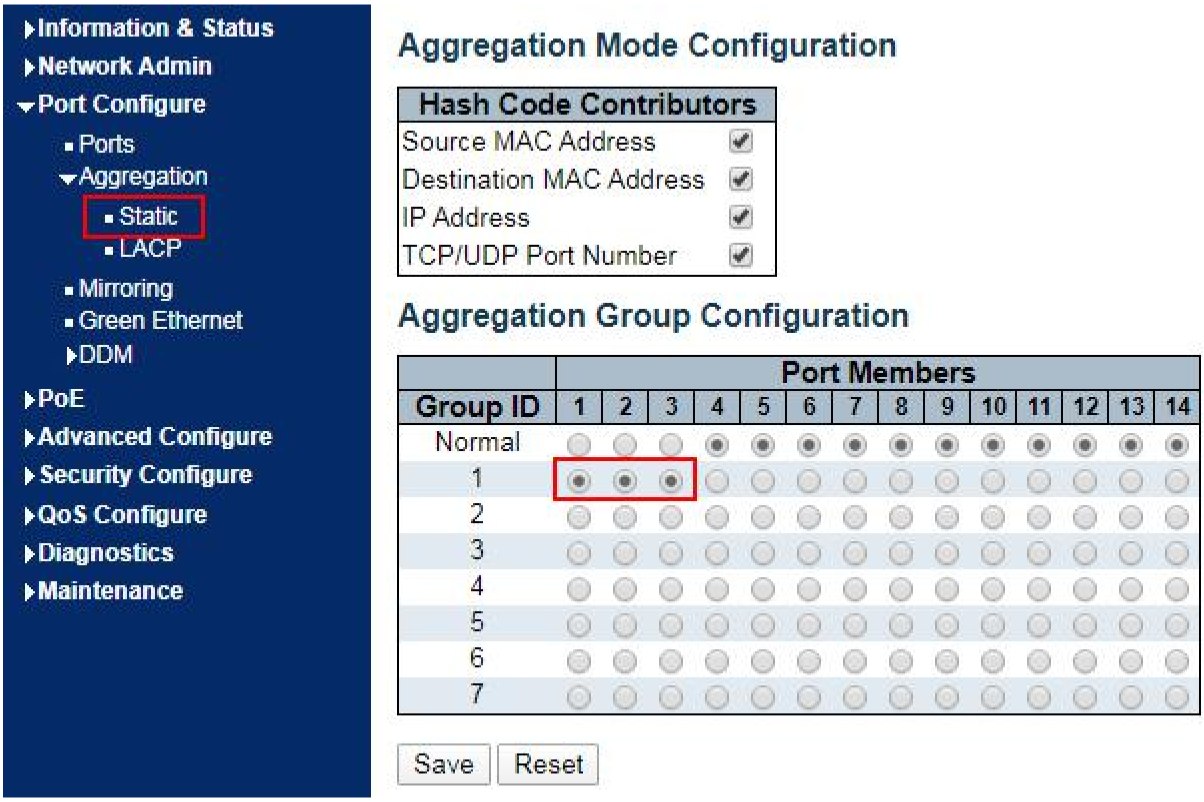
Illustrations

Ethernet Switch A aggregates 3 ports from GE1 to GE3 to Switch B, so as to share the load of each member port. The following configurations are exampled by means of static aggregation.



Instructions

1. Similar to the step of Switch B configuration, Switch A creates an Eth-Trunk interface and accesses member interfaces, in order to broaden link bandwidth. Click the “Port Configure-Aggregation-Static” to “Add a static link aggregation” to select the Group ID “1”, a load-sharing mode (Src Mac, Dst Mac, IP Address), and a port to be aggregated (GE1-1, GE1-2, and GE1-3) as follows.



Aggregation Mode Configuration

Hash Code Contributors	
Source MAC Address	☑
Destination MAC Address	☑
IP Address	☑
TCP/UDP Port Number	☑

Aggregation Group Configuration

	Port Members													
Group ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Normal	○	○	○	●	●	●	●	●	●	●	●	●	●	●
1	●	●	●	○	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○	○	○	○	○

4.2.2 LACP

Dynamic Link Aggregation

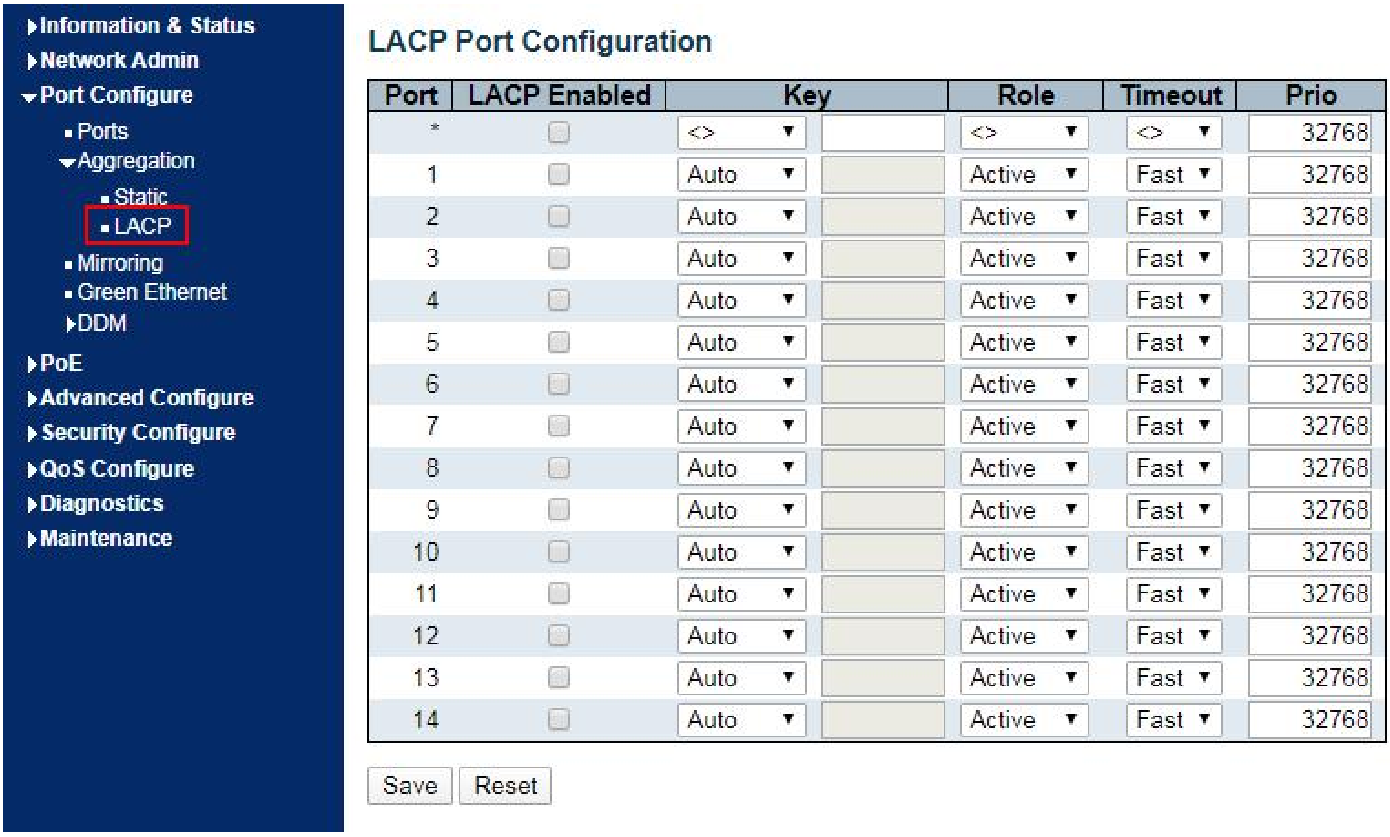
LACP (Link Aggregation Control Protocol), based on IEEE 802.3ad Standard, dynamically aggregates and disaggregates links. LACP exchanges info with the opposite network device through LACPDU (Link Aggregation Control Protocol Data Unit).

After a port uses LACP, it will inform the opposite network device of system priority, system MAC, port priority and No., and operation Key by sending a LACPDU. The opposite device will compare such info with that saved by other ports after receiving it, thus reaching an agreement on port participation in or quitting from a dynamic aggregation.

Dynamic LACP aggregation is automatically created or deleted by system, that is, internal ports can be added or removed by themselves. Only the ports connected to a same device with the same rate, duplex, and basic configuration can be aggregated.

Instructions for adding a dynamic link aggregation:

1. Click the “Port Configure-Aggregation-LACP” in the navigation bar to select a port, a type (LACP), a mode (Active or Passive), and a port priority (from 0-65,535, with 32,768 by default) as follows.



LACP Port Configuration

Port	LACP Enabled	Key		Role	Timeout	Prio
*	☐	<>		<>	<>	32768
1	☐	Auto		Active	Fast	32768
2	☐	Auto		Active	Fast	32768
3	☐	Auto		Active	Fast	32768
4	☐	Auto		Active	Fast	32768
5	☐	Auto		Active	Fast	32768
6	☐	Auto		Active	Fast	32768
7	☐	Auto		Active	Fast	32768
8	☐	Auto		Active	Fast	32768
9	☐	Auto		Active	Fast	32768
10	☐	Auto		Active	Fast	32768
11	☐	Auto		Active	Fast	32768
12	☐	Auto		Active	Fast	32768
13	☐	Auto		Active	Fast	32768
14	☐	Auto		Active	Fast	32768

Interface data are as follows

Configuration Items	Description
LACP Enabled	Enabled and Disabled
Mode	Active or Passive Passive Port sends LACP packets manually and responds to the packets sent by the opposite network device only. Active Port sends LACP data package automatically. The links with one or two active LACP ports can be dynamically aggregated. However, it won’t occur to two connected passive LACP ports since both of them are waiting for the packet from the other side.

Port Priority	LACP will determine the group member of dynamic aggregation based on the port ID priority. Among them, device ID consists of 2-byte system priority and 6-byte system MAC. In other words, a device ID is made up of the system priority and MAC. Compare the system priority first and the system MAC address next if they are the same. One with smaller value will be preferred. Scope: 0 to 65,535, with 32,768 by default.
Key	Auto and Manual Modes

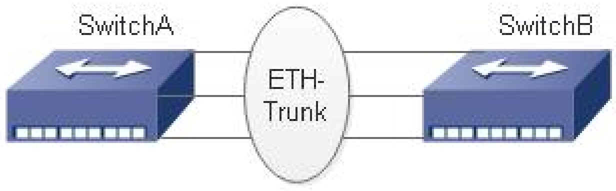
🕮 Description:

Please make sure that there is no member interface access to Eth-Trunk before changing its work pattern, otherwise it won’t be changed.

Work patterns of the local and opposite network devices should be the same.

Illustrations

Ethernet Switch A aggregates 3 ports from GE1 to GE3 to Switch B, so as to share the load of each member port. The following configurations are exampled by means of dynamic aggregation.



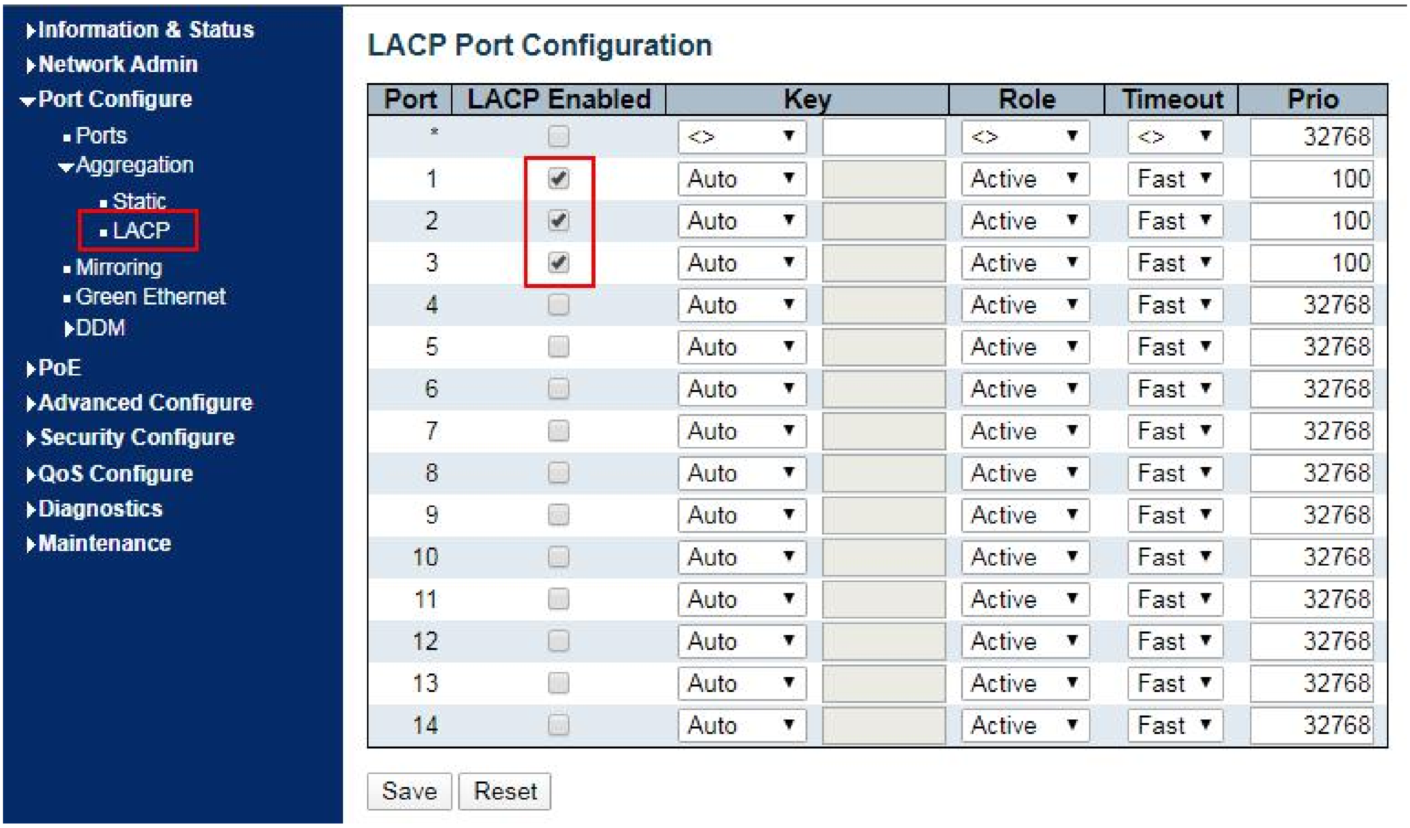
Instructions

🕮 Description:

The followings are configuration of Switch A only, which should stay the same with those of Switch B to aggregate ports.

Instructions

1. Set the system priority to Level 100 on Switch A to serve as the LACP active port. Click the “Port Configure-Aggregation-LACP” in the navigation bar to set the priority to “100” as follows.

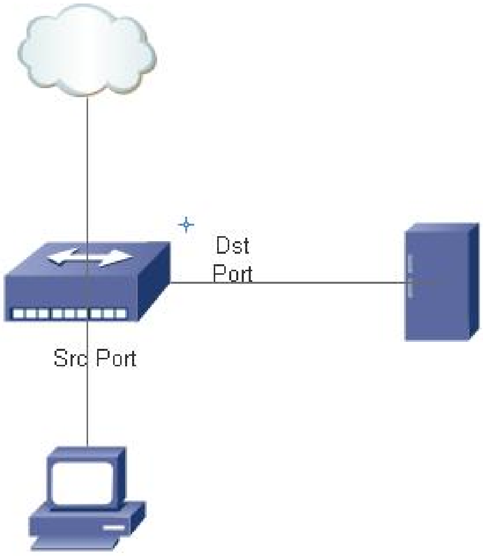


LACP Port Configuration

Port	LACP Enabled	Key		Role	Timeout	Prio
*	☐	<>		<>	<>	32768
1	☑	Auto		Active	Fast	100
2	☑	Auto		Active	Fast	100
3	☑	Auto		Active	Fast	100
4	☐	Auto		Active	Fast	32768
5	☐	Auto		Active	Fast	32768
6	☐	Auto		Active	Fast	32768
7	☐	Auto		Active	Fast	32768
8	☐	Auto		Active	Fast	32768
9	☐	Auto		Active	Fast	32768
10	☐	Auto		Active	Fast	32768
11	☐	Auto		Active	Fast	32768
12	☐	Auto		Active	Fast	32768
13	☐	Auto		Active	Fast	32768
14	☐	Auto		Active	Fast	32768

4.3 Mirroring

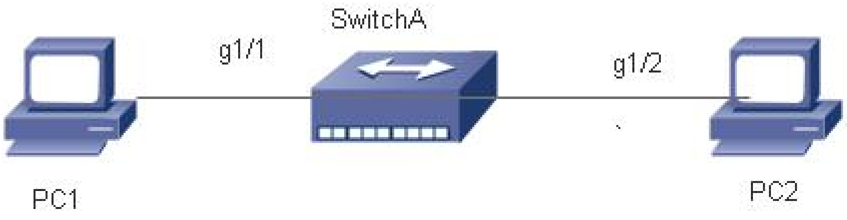
Port Mirroring copies the message of a specified switch port to a destination port. The copied port is the Source Port, and the copying port is the Destination Port. Destination Port will make use of data inspection devices for users to analyze the received messages to monitor and troubleshoot the network as follows:



Configuration example

PC1 accesses Switch A through interface GE1-1, and PC2 is directly connected to interface GE1-2.

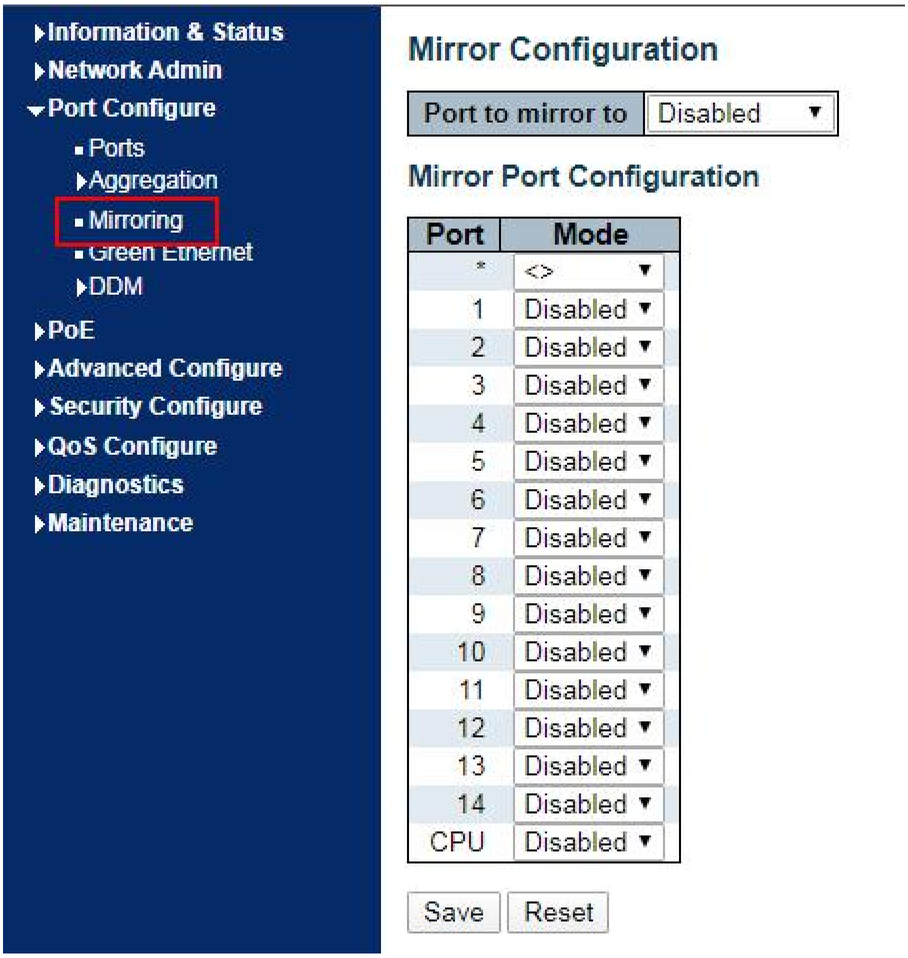
Users intend to monitor the messages sent from PC2 to PC1 by relevant devices.



Instructions

1. Click the “Port Configure-Mirroring” in the navigation bar to select a session ID.

2. Check the source port GE1-2, select the destination port GE1-1 and the “Enabled” mode, and add them as follows.



Mirror Configuration

Port to mirror to: Disabled

Mirror Port Configuration

Port	Mode
*	<>
1	Disabled
2	Disabled
3	Disabled
4	Disabled
5	Disabled
6	Disabled
7	Disabled
8	Disabled
9	Disabled
10	Disabled
11	Disabled
12	Disabled
13	Disabled
14	Disabled
CPU	Disabled

Interface data are as follows

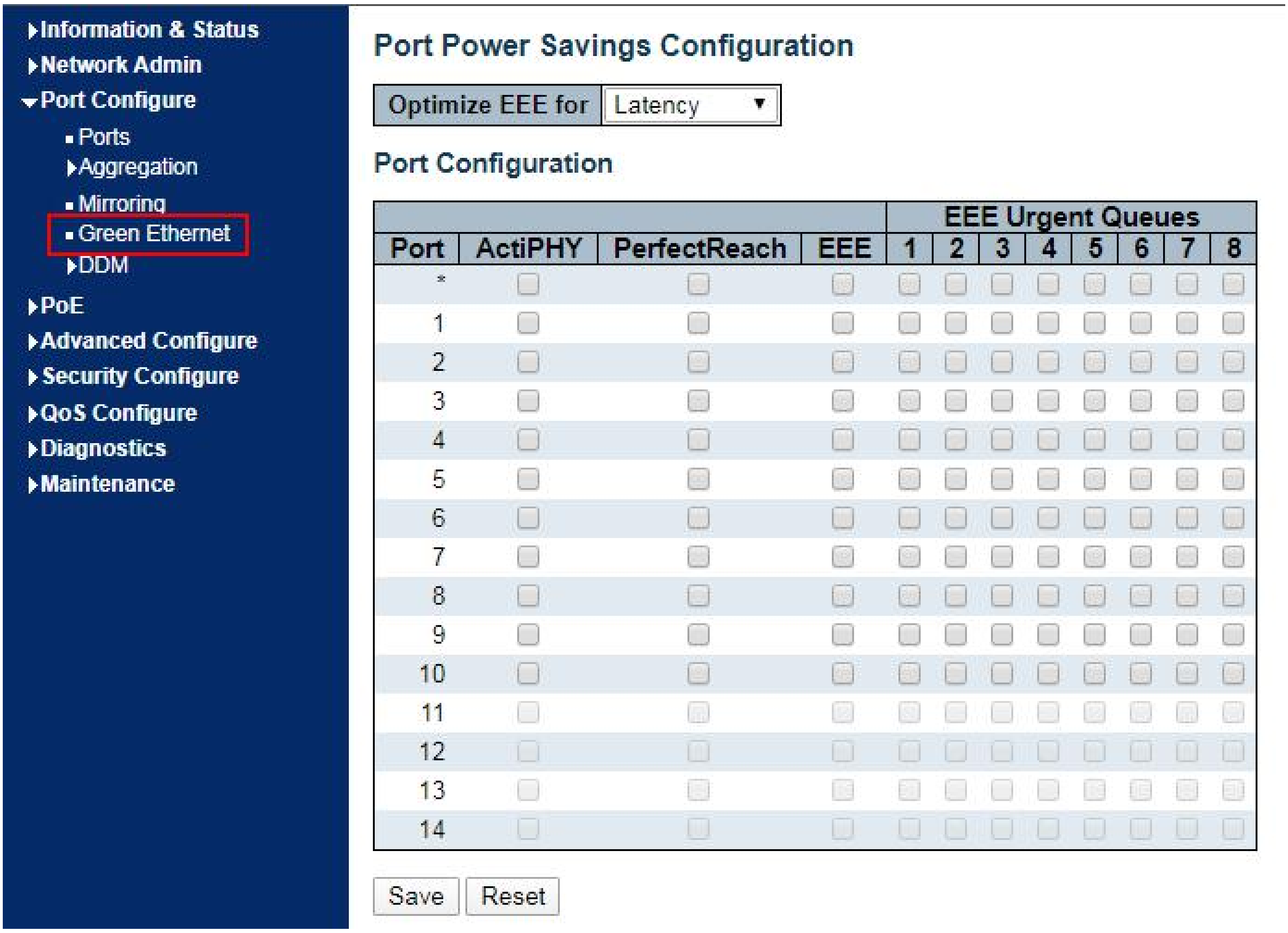
Configuration Items	Description
Source Port	Multiple ports are available.

Destination Port	Only one port can be selected, excluding link sink port and source port.
Direction	Tx “Mirroring Ingress Port”: any received message will be mirrored to the destination port. Rx “Mirroring Egress Port”: any sent message will be mirrored to the destination port. Enable “Mirror Ingress/Egress Port” mirrors all sent and received messages to the destination port.

4.4 Green Ethernet

Port power will be turned down in case of zero or less flow.

Click the “Port Configure-Green Ethernet” as follows:



Port Power Savings Configuration

Optimize EEE for: Latency

Port Configuration

				EEE Urgent Queues							
Port	ActiPHY	PerfectReach	EEE	1	2	3	4	5	6	7	8
*	□	□	□	□	□	□	□	□	□	□	□
1	□	□	□	□	□	□	□	□	□	□	□
2	□	□	□	□	□	□	□	□	□	□	□
3	□	□	□	□	□	□	□	□	□	□	□
4	□	□	□	□	□	□	□	□	□	□	□
5	□	□	□	□	□	□	□	□	□	□	□
6	□	□	□	□	□	□	□	□	□	□	□
7	□	□	□	□	□	□	□	□	□	□	□
8	□	□	□	□	□	□	□	□	□	□	□
9	□	□	□	□	□	□	□	□	□	□	□
10	□	□	□	□	□	□	□	□	□	□	□
11	□	□	□	□	□	□	□	□	□	□	□
12	□	□	□	□	□	□	□	□	□	□	□
13	□	□	□	□	□	□	□	□	□	□	□
14	□	□	□	□	□	□	□	□	□	□	□

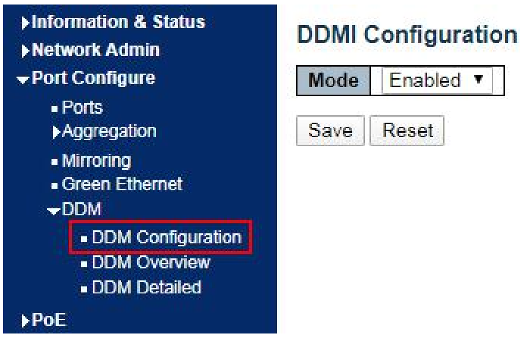
Interface data are as follows

Configuration Items	Description
Optimize EEE for	Select from power and latency
Port Configuration	Select from “ActiPHY, PerfectReach, EEE, and EEE Urgent Queues”

4.5 DDM

DDM can view the info of the optical module.

1. Click the “Port Configure-DDM-DDMI Configuration” as follows:



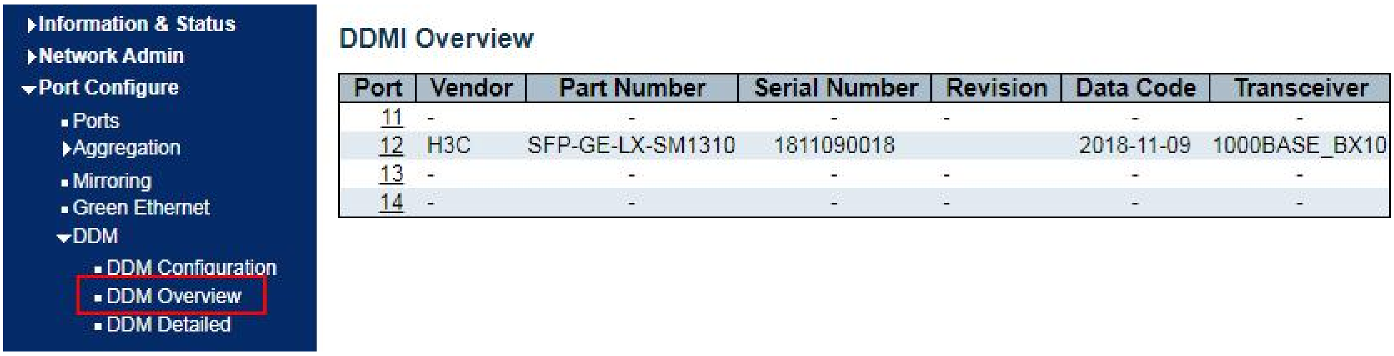
DDMI Configuration

Mode: Enabled

Interface data are as follows

Configuration Items	Description
DDMI Configuration	Enabled and Disabled

2. Click the “Port Configure-DDM-DDMI Overview” as follows:



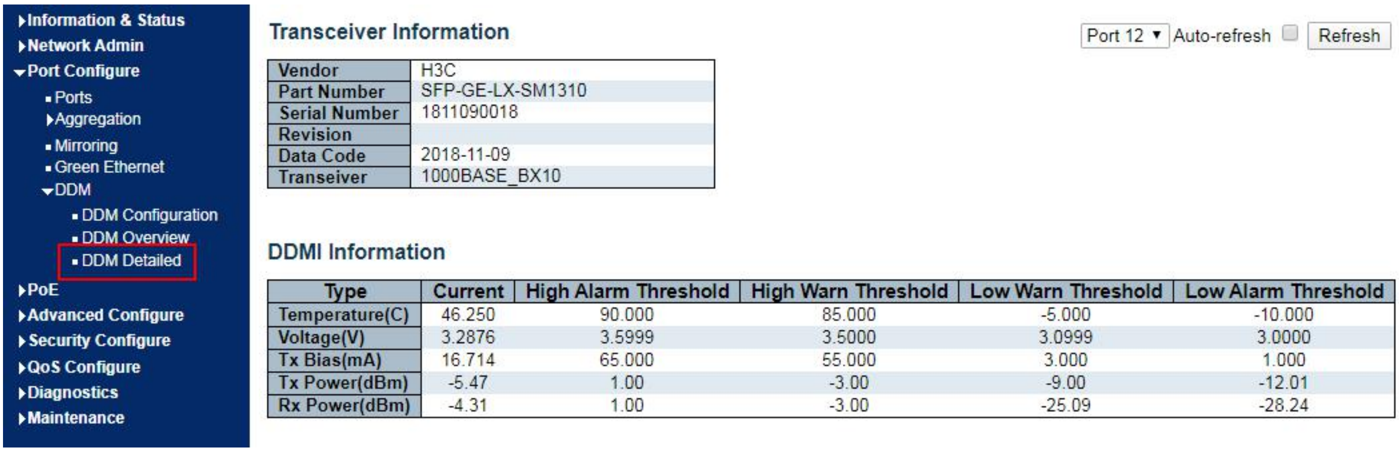
DDMI Overview

Port	Vendor	Part Number	Serial Number	Revision	Data Code	Transceiver
11	-	-	-	-	-	-
12	H3C	SFP-GE-LX-SM1310	1811090018		2018-11-09	1000BASE_BX10
13	-	-	-	-	-	-
14	-	-	-	-	-	-

Interface data are as follows

Configuration Items	Description
DDMI Overview	Display the info of “Port, Vendor, Part Number, Serial Number, Revision, Data Code, and Transceiver”

3. Click the “Port Configure-DDM-DDM Detailed” as follows:



Transceiver Information

Vendor	H3C
Part Number	SFP-GE-LX-SM1310
Serial Number	1811090018
Revision	
Data Code	2018-11-09
Transeiver	1000BASE_BX10

DDMI Information

Type	Current	High Alarm Threshold	High Warn Threshold	Low Warn Threshold	Low Alarm Threshold
Temperature(C)	46.250	90.000	85.000	-5.000	-10.000
Voltage(V)	3.2876	3.5999	3.5000	3.0999	3.0000
Tx Bias(mA)	16.714	65.000	55.000	3.000	1.000
Tx Power(dBm)	-5.47	1.00	-3.00	-9.00	-12.01
Rx Power(dBm)	-4.31	1.00	-3.00	-25.09	-28.24

Interface data are as follows

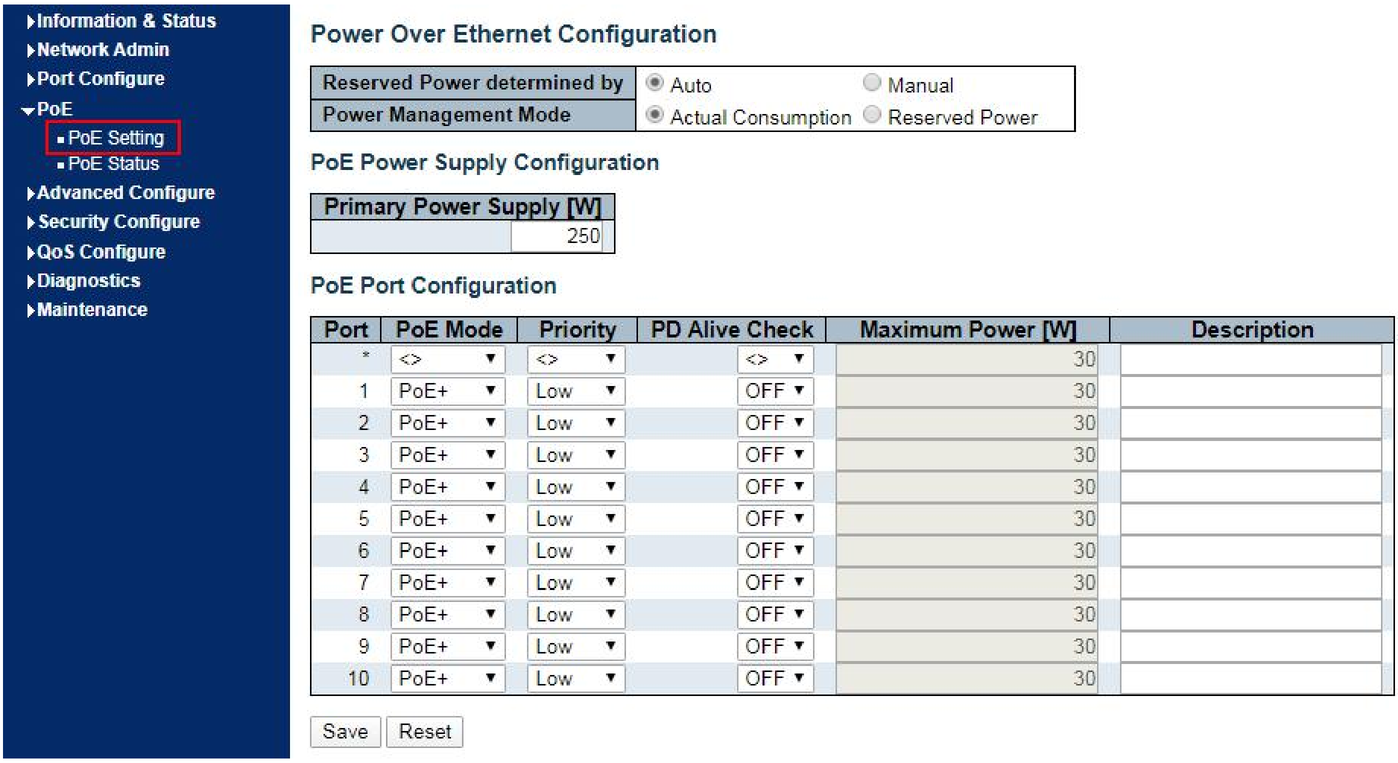
Configuration Items	Description
DDMI Detailed	Display the info of “Transceiver Information and DDMI Information”

5 PoE

PoE (Power over Ethernet) transmits data signal for the terminals based on IP (e.g. IP phone, WAP, and IP camera) and supplies the devices with direct current, without changing the existing Cat-5 network cabling status. It ensures safe structured cabling and normal network operation to minimize the cost.

5.1 PoE Setting

1. Click the “PoE- PoE Setting” in the navigation bar as follows.



Power Over Ethernet Configuration

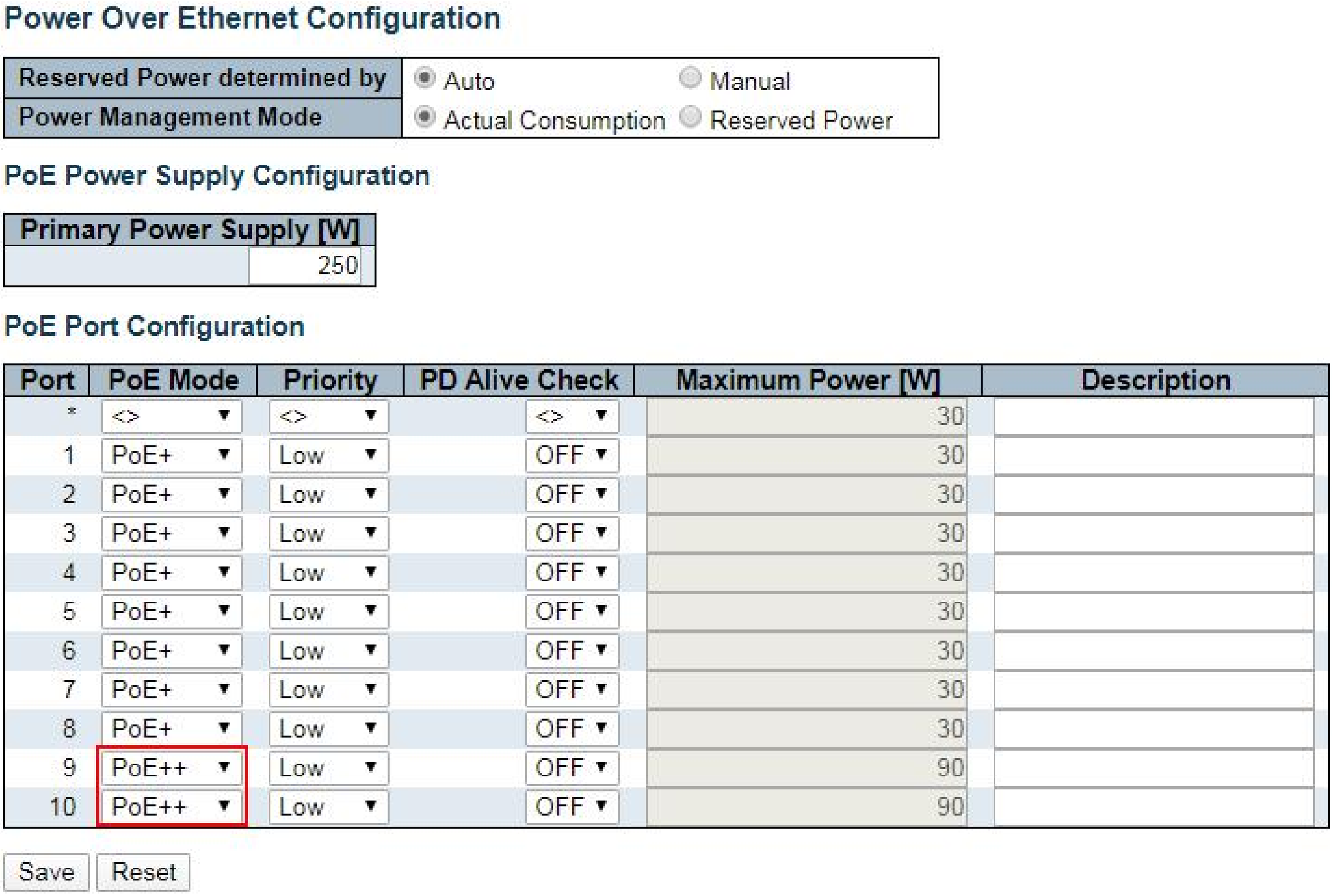
Reserved Power determined by	● Auto	○ Manual
Power Management Mode	● Actual Consumption	○ Reserved Power

PoE Power Supply Configuration

Primary Power Supply [W]
250

PoE Port Configuration

Port	PoE Mode	Priority	PD Alive Check	Maximum Power [W]	Description
*	<>	<>	<>	30	
1	PoE+	Low	OFF	30	
2	PoE+	Low	OFF	30	
3	PoE+	Low	OFF	30	
4	PoE+	Low	OFF	30	
5	PoE+	Low	OFF	30	
6	PoE+	Low	OFF	30	
7	PoE+	Low	OFF	30	
8	PoE+	Low	OFF	30	
9	PoE+	Low	OFF	30	
10	PoE+	Low	OFF	30	



Power Over Ethernet Configuration

Reserved Power determined by	● Auto	○ Manual
Power Management Mode	● Actual Consumption	○ Reserved Power

PoE Power Supply Configuration

Primary Power Supply [W]
250

PoE Port Configuration

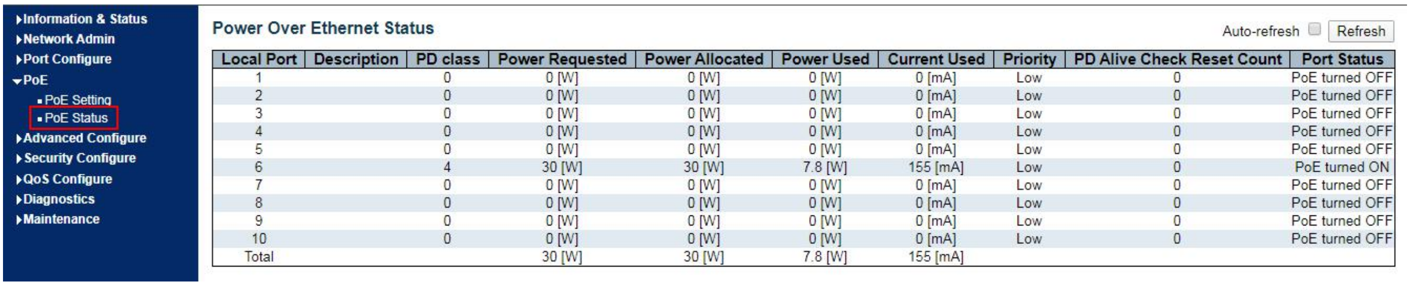
Port	PoE Mode	Priority	PD Alive Check	Maximum Power [W]	Description
*	<>	<>	<>	30	
1	PoE+	Low	OFF	30	
2	PoE+	Low	OFF	30	
3	PoE+	Low	OFF	30	
4	PoE+	Low	OFF	30	
5	PoE+	Low	OFF	30	
6	PoE+	Low	OFF	30	
7	PoE+	Low	OFF	30	
8	PoE+	Low	OFF	30	
9	PoE++	Low	OFF	90	
10	PoE++	Low	OFF	90	

Interface data are as follows

Configuration Items	Description
Power Reserve Mode	Two modes are available in this switch: Auto distribution: Switch port allocates the max power automatically subject to the inspected PD Class. Please refer to the definitions of 802.3af/802.3at in the corresponding power table. Manual distribution: The max reserved power will be defined by users.
Power Management Mode	Two modes are available in this switch: 1. Actual consumption: In this work pattern, the port with the lowest priority will be turned off when the actual consumed power is more than the rated power of switch. The port with the highest priority will be turned off if all priorities are at the same level. 2. Reserved power: In this work pattern, the port with a new PD device will be disabled when the max reserved power of all ports exceeds the rated power of the switch.
Max (Rated) Power Supply	Users can set the max power (120W by factory default) by themselves.
PoE Mode	The switch supports 802.3af (PoE) and 802.3at (PoE+) modes. And 802.3at is the factory default.
Priority	Specify the priority of PoE port from low to high (Low, High, Critical)
Maximum Power (W)	“Manual Allocation” mode for power reservation specifies the max power supply of the port.

5.2 PoE Status

1. Click the “PoE-PoE Status” as follows.



Power Over Ethernet Status

Local Port	Description	PD class	Power Requested	Power Allocated	Power Used	Current Used	Priority	PD Alive Check Reset Count	Port Status
1		0	0 [W]	0 [W]	0 [W]	0 [mA]	Low	0	PoE turned OFF
2		0	0 [W]	0 [W]	0 [W]	0 [mA]	Low	0	PoE turned OFF
3		0	0 [W]	0 [W]	0 [W]	0 [mA]	Low	0	PoE turned OFF
4		0	0 [W]	0 [W]	0 [W]	0 [mA]	Low	0	PoE turned OFF
5		0	0 [W]	0 [W]	0 [W]	0 [mA]	Low	0	PoE turned OFF
6		4	30 [W]	30 [W]	7.8 [W]	155 [mA]	Low	0	PoE turned ON
7		0	0 [W]	0 [W]	0 [W]	0 [mA]	Low	0	PoE turned OFF
8		0	0 [W]	0 [W]	0 [W]	0 [mA]	Low	0	PoE turned OFF
9		0	0 [W]	0 [W]	0 [W]	0 [mA]	Low	0	PoE turned OFF
10		0	0 [W]	0 [W]	0 [W]	0 [mA]	Low	0	PoE turned OFF
Total			30 [W]	30 [W]	7.8 [W]	155 [mA]			

Interface data are as follows

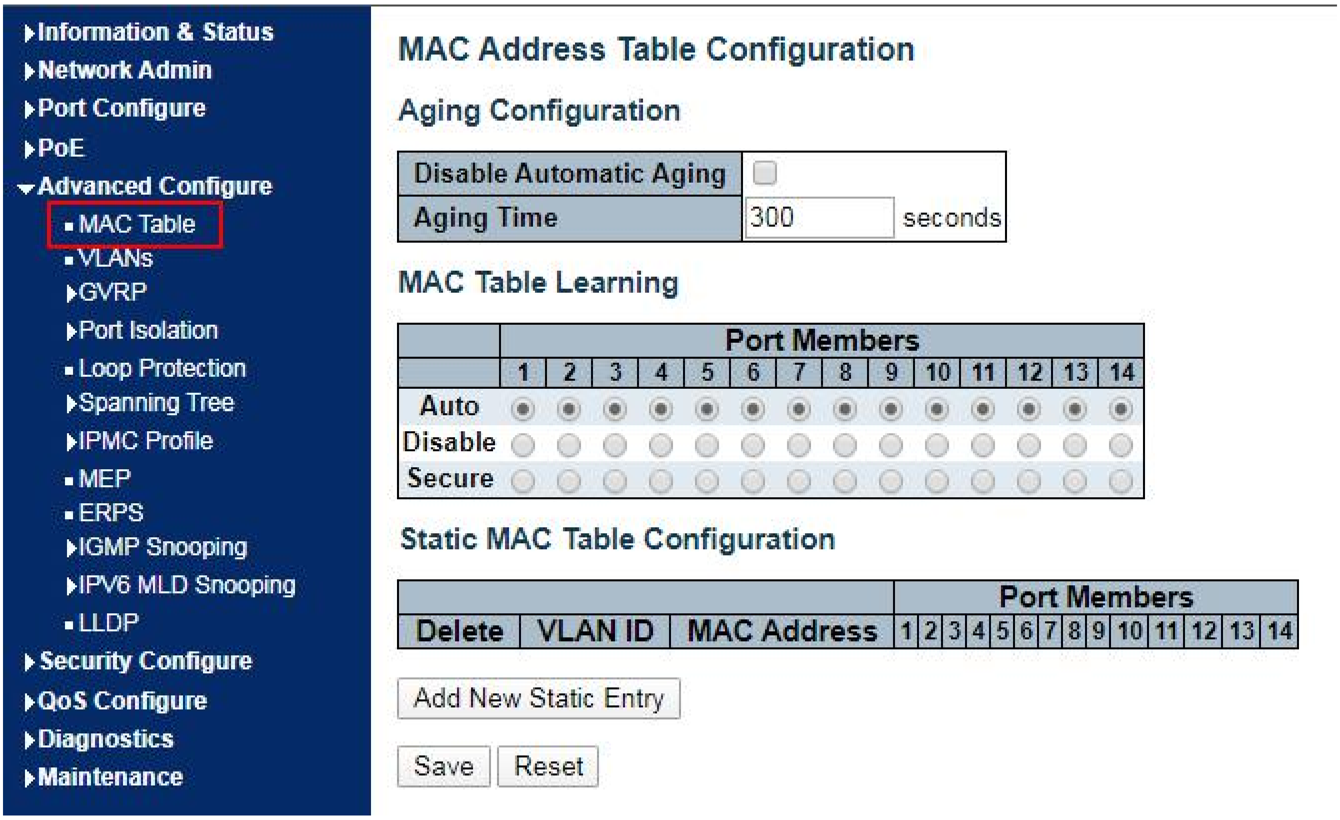
Configuration Items	Description

Power Over Ethernet Status	Display the info of "Local Port, Description, PD Class, Power Requested, Power Allocated, Power Used, Current Used, Priority, and Port Status"

6 Advanced Configure

6 .1 MAC Table

Users can adjust the configurations related to MAC address in the switch.
Click the "Advanced Configure-MAC Table" as follows:



MAC Address Table Configuration

Aging Configuration

Disable Automatic Aging	□
Aging Time	300 seconds

MAC Table Learning

	Port Members													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Auto	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Disable	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Secure	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Static MAC Table Configuration

			Port Members													
Delete	VLAN ID	MAC Address	1	2	3	4	5	6	7	8	9	10	11	12	13	14

Interface data are as follows

Configuration Items	Description
Disable Automatic Aging	The dynamic MAC address learned by the switch won't age automatically if this option is checked.
Aging Time	The dynamic MAC address learned by the switch will automatically age after 300s by factory default. The period ranges from 10s to 1,000,000s.

Learn the MAC Address Table	The switch is compatible with 3 learning modes of MAC address: Auto mode: ports will learn the MAC address automatically; Disabled mode: ports won’t learn MAC address; Safe mode: ports forward the data flow of the configured static (source) MAC addresses.

6.2 VLANS

VLAN is formulated without the restrictions of physical locations, which means the hosts in a same VLAN can be placed separately. As shown below, each VLAN, as a broadcast domain, divides a physical LAN into several logical LANs. Hosts can exchange messages in a traditional communication way. For those in different VLANs, devices such as routers or Layer 3 switches are necessary.

VLAN is superior to the traditional Ethernet in terms of:

Broadcast domain coverage: the broadcast message in a LAN is limited in a VLAN to save the bandwidth and handle the network-related issues more efficiently.

LAN secuirty: VLAN hosts fail to communicate with each other since the messages are separated by the broadcast domain in the data link layer. They need a router or a Layer 3 switch for Layer 3 forwarding.

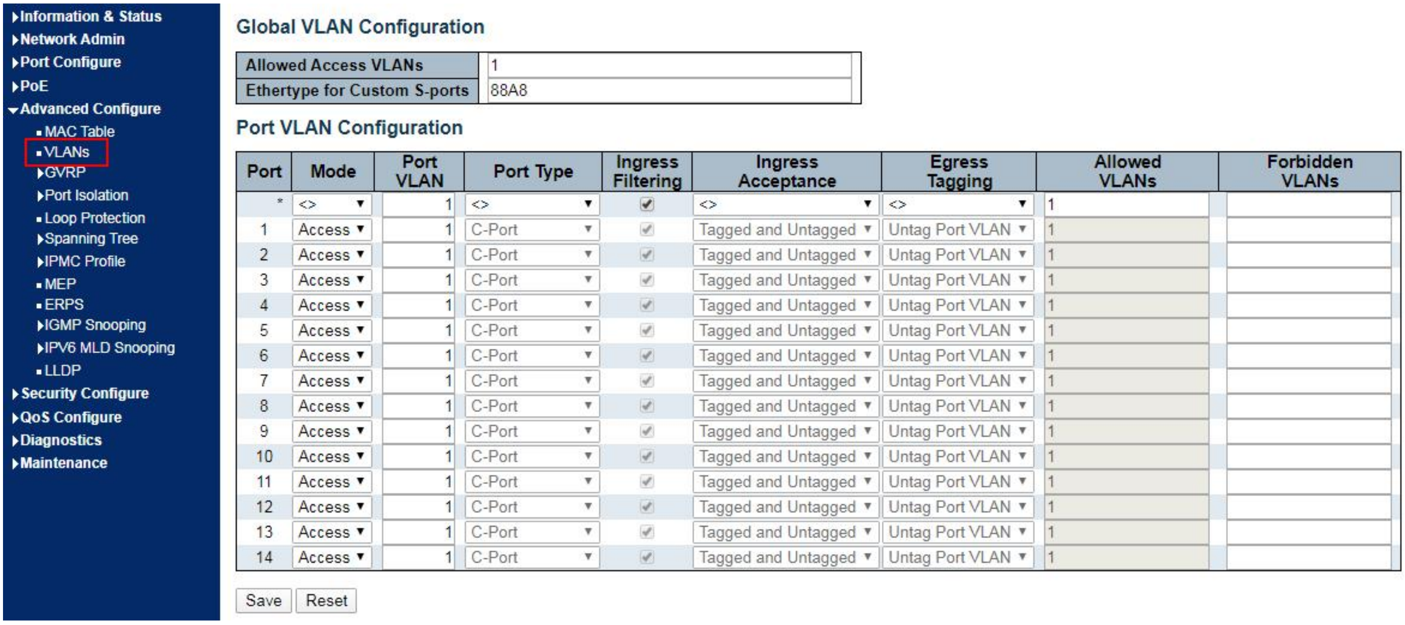
Flexibility of creating a virtual working team: VLAN can create a virtual working team beyond the control of physical network. Users have access to the network without changing the configuration if their physical locations are moving within the scope.

This management switch supports VLAN types based on IEEE 802.1Q, protocols, MAC, and ports. For default configuration, 802.1Q VLAN mode should be adopted.

Port-based VLAN is divided subject to a switch’s interface No. Network administrator give each switch interface a different PVID, namely a port default VLAN. If a data frame without a VLAN tag flows into a switch interface with a PVID, it will be marked with the same PVID, or it will get rid of an additional tag even though the interface has a PVID.

The solution to a VLAN frame depends on the interface type, which eases member definition but re-configures VLAN in case of member mobility.

1. Click the “Advanced Configure-VLANs” as follows.



Global VLAN Configuration

Allowed Access VLANs	1
Ethertype for Custom S-ports	88A8

Port VLAN Configuration

Port	Mode	Port VLAN	Port Type	Ingress Filtering	Ingress Acceptance	Egress Tagging	Allowed VLANs	Forbidden VLANs
*	<>	1	<>	☑	<>	<>	1	
1	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1	
2	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1	
3	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1	
4	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1	
5	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1	
6	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1	
7	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1	
8	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1	
9	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1	
10	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1	
11	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1	
12	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1	
13	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1	
14	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1	

Interface data are as follows.

Configuration Items	Description
Allowed Access VLANs	Display the ID List of allowed access VLANs, with VLAN 1 by factory default. Add an ID for a new VLAN.
Ethertype for Custom S-ports	This field specifies the Ethertype/TPID (specified in hexadecimal) used for Custom S-ports. The setting is in force for all ports whose Port Type is set to S-Custom-Port.
Mode	The port mode (default is Access) determines the fundamental behavior of the port in question. A port can be in one of three modes as described below. Whenever a particular mode is selected, the remaining fields in that row will be either grayed out or made changeable depending on the mode in question. Grayed out fields show the value that the port will get when the mode is applied. Access: Access ports are normally used to connect to end stations. Access ports have the following characteristics: • Member of exactly one VLAN, the Port VLAN (a.k.a. Access VLAN), which by default is 1 • Accepts untagged and C-tagged frames • Discards all frames that are not classified to the Access VLAN • On egress all frames classified to the Access VLAN are transmitted untagged. Other (dynamically added VLANs) are transmitted tagged Trunk: Trunk ports can carry flow on multiple VLANs simultaneously, and are normally

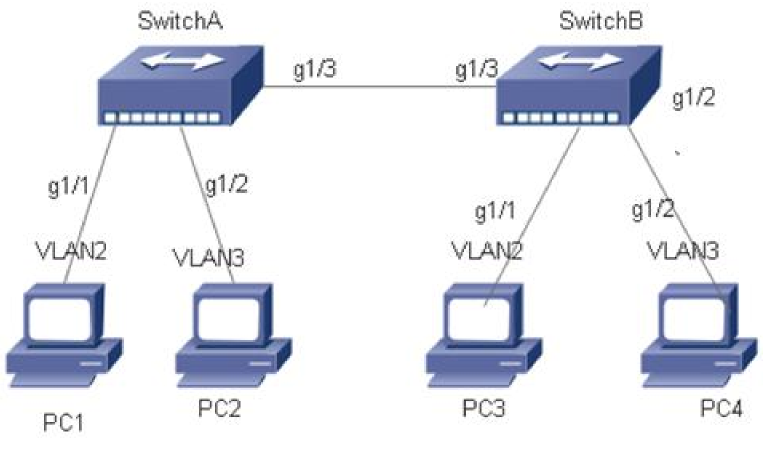
	used to connect to other switches. Trunk ports have the following characteristics: • By default, a trunk port is member of all VLANs (1-4094). • The VLANs that a trunk port is member of may be limited by the use of Allowed VLANs. • Frames classified to a VLAN that the port is not a member of are discarded. • By default, all frames but frames classified to the Port VLAN (a.k.a. Native VLAN) get tagged on egress. Frames classified to the Port VLAN do not get C-tagged on egress. • Egress tagging can be changed to tag all frames, in which case only tagged frames are accepted on ingress. Hybrid: Hybrid ports resemble trunk ports in many ways, but adds additional port configuration features. In addition to the characteristics described for trunk ports, hybrid ports have these abilities: • Can be configured to be VLAN tag unaware or, C-tag aware, S-tag aware, or S-custom-tag aware; • Ingress filtering can be controlled; • Ingress acceptance of frames and configuration of egress tagging can be configured independently;
Port VLAN	Determines the port's VLAN ID (a.k.a. PVID). Allowed VLANs are in the range 1 through 4094, default being 1. On ingress, frames get classified to the Port VLAN if the port is configured as VLAN unaware, the frame is untagged, or VLAN awareness is enabled on the port, but the frame is priority tagged (VLAN ID = 0). On egress, frames classified to the Port VLAN do not get tagged if Egress Tagging configuration is set to untag Port VLAN. The Port VLAN is called an "Access VLAN" for ports in Access mode and Native VLAN for ports in Trunk or Hybrid mode.
Port Type	Ports in hybrid mode allow for changing the port type, that is, whether a frame's VLAN tag is used to classify the frame on ingress to a particular VLAN, and if so, which TPID it reacts on. Likewise, on egress, the Port Type determines the TPID of the tag, if a tag is required. Unaware: On ingress, all frames, whether carrying a VLAN tag or not, get classified to the Port VLAN, and possible tags are not removed on egress.

	C-Port: On ingress, frames with a VLAN tag with TPID = 0x8100 get classified to the VLAN ID embedded in the tag. If a frame is untagged or priority tagged, the frame gets classified to the Port VLAN. If frames must be tagged on egress, they will be tagged with a C-tag. S-Port: On ingress, frames with a VLAN tag with TPID = 0x8100 or 0x88A8 get classified to the VLAN ID embedded in the tag. If a frame is untagged or priority tagged, the frame gets classified to the Port VLAN. If frames must be tagged on egress, they will be tagged with an S-tag. S-Custom-Port: On ingress, frames with a VLAN tag with a TPID = 0x8100 or equal to the Ethertype configured for Custom-S ports get classified to the VLAN ID embedded in the tag. If a frame is untagged or priority tagged, the frame gets classified to the Port VLAN. If frames must be tagged on egress, they will be tagged with the custom S-tag.
Ingress Filter	Hybrid ports allow for changing ingress filtering. Access and Trunk ports always have ingress filtering enabled. If ingress filtering is enabled (checkbox is checked), frames classified to a VLAN that the port is not a member of get discarded. If ingress filtering is enabled (checkbox is checked), frames classified to a VLAN that the port is not a member of get discarded. However, the port will never transmit frames classified to VLANs that it is not a member of。
Ingress Acceptance	Hybrid ports allow for changing the type of frames that are accepted on ingress. Tagged and Untagged Both tagged and untagged frames are accepted. Tagged Only Only tagged frames are accepted on ingress. Untagged frames are discarded. Untagged Only Only untagged frames are accepted on ingress. Tagged frames are discarded.
Egress Tagging	Ports in Trunk and Hybrid mode may control the tagging of frames on egress. Untag Port VLAN Frames classified to the Port VLAN are transmitted untagged. Other frames are transmitted with the relevant tag. Tag All

	All frames, whether classified to the Port VLAN or not, are transmitted with a tag. Untag All All frames, whether classified to the Port VLAN or not, are transmitted without a tag. This option is only available for ports in Hybrid mode.
Allowed VLANs	Ports in Trunk and Hybrid mode may control which VLANs they are allowed to become members of. Access ports can only be member of one VLAN, the Access VLAN. The field's syntax is identical to the syntax used in the Enabled VLANs field. By default, a Trunk or Hybrid port will become member of all VLANs, and is therefore set to 1-4094. The field may be left empty, which means that the port will not become member of any VLANs.
Forbidden VLANs	A port may be configured to never be member of one or more VLANs. This is particularly useful when dynamic VLAN protocols like MVRP and GVRP must be prevented from dynamically adding ports to VLANs. The trick is to mark such VLANs as forbidden on the port in question. The syntax is identical to the syntax used in the Enabled VLANs field. By default, the field is left blank, which means that the port may become a member of all possible VLANs.
Non-static port	Click the radio button and specify the port as a non-static port. Click the "Select all" to check all ports.

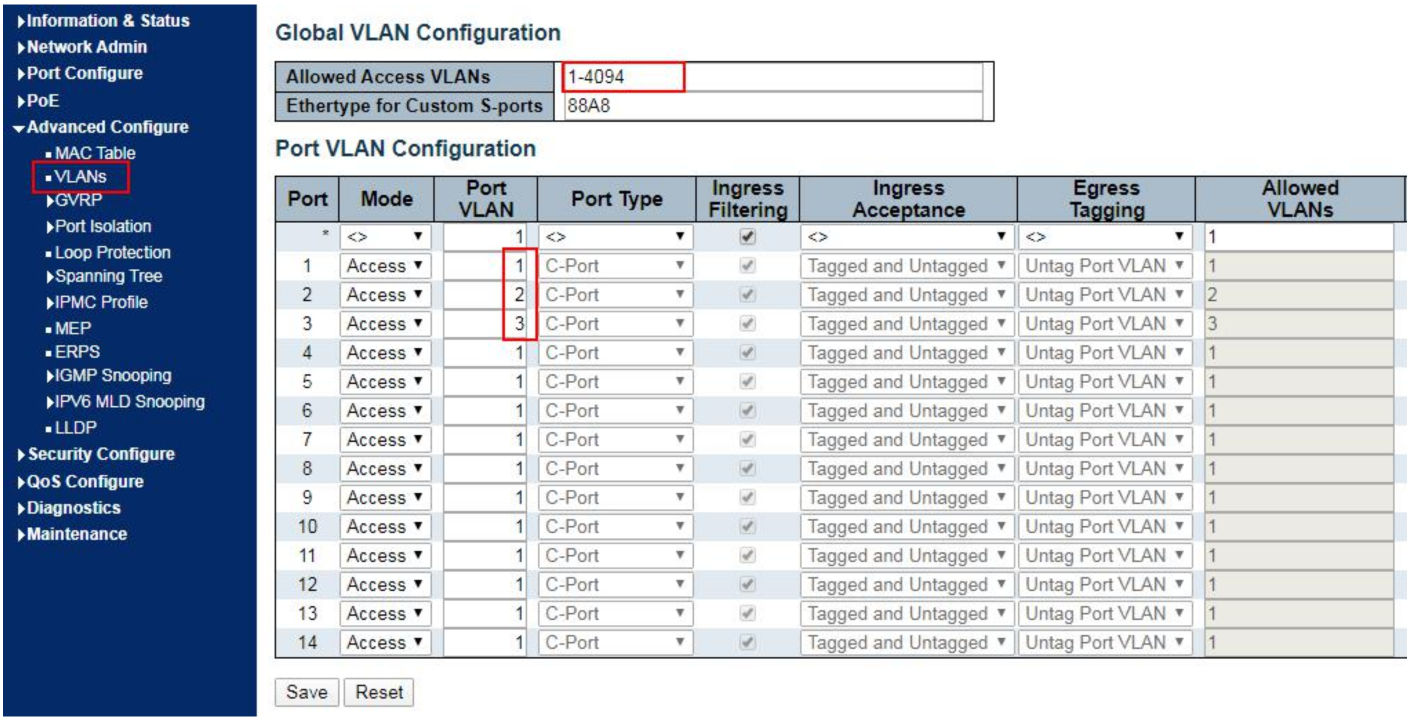
Configuration illustration

Connection interfaces and 2 VLANs should be added to support the user communication in VLAN 2 and 3 of the links between Switch A and Switch B. That is, VALN 2 and 3 should be added and the GE1-3 Ethernet Interfaces of Switch A and Switch B should be configured.



Instructions：

1. Create VLAN 2 and 3 in Switch A, add VLANs to the user interfaces, and set the GE1-3 in the trunk mode. With similar steps of Switch B, please click the "Advanced Configure-VLANs" in the navigation tree, fill in relevant items, and save the configuration as follows.



Global VLAN Configuration

Allowed Access VLANs	1-4094
Ethertype for Custom S-ports	88A8

Port VLAN Configuration

Port	Mode	Port VLAN	Port Type	Ingress Filtering	Ingress Acceptance	Egress Tagging	Allowed VLANs
*	<>	1	<>	☑	<>	<>	1
1	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1
2	Access	2	C-Port	☑	Tagged and Untagged	Untag Port VLAN	2
3	Access	3	C-Port	☑	Tagged and Untagged	Untag Port VLAN	3
4	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1
5	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1
6	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1
7	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1
8	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1
9	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1
10	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1
11	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1
12	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1
13	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1
14	Access	1	C-Port	☑	Tagged and Untagged	Untag Port VLAN	1

2. Configure the type of Switch A's interface connected to Switch B, as well as the passed VLAN. With similar steps of Switch B, please click the "Advanced Configure-VLANs" in the navigation tree, fill in relevant items, and save the configuration as follows. The following shows how to add a VLAN 2, which is similar to the steps of adding VLAN 3.

3. Verify the configuration result

Configure User 1 and 2 in a same segment like 192.168.100.0/24; and configure User 3 and 4 in a same segment like 192.168.200.0/24.

User 1 and 2 can ping each other, but they cannot ping User 3 or 4, vice versa.

6.3 GVRP

GVRP VLAN registration protocol is an application of general attribute registration protocol, which provides 802.1Q compatible VLAN pruning function and dynamic VLAN establishment on 802.1Q trunk port trunk port.

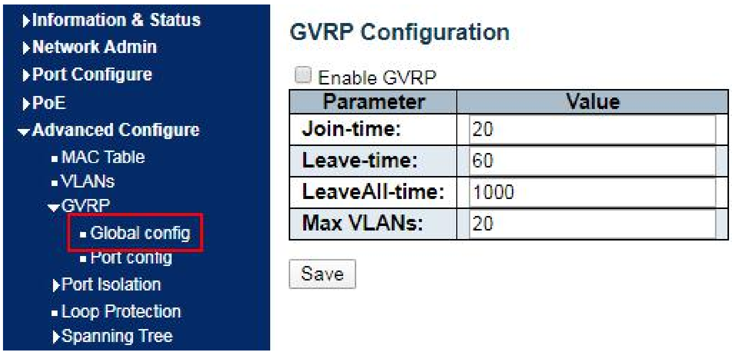
GVRP switches can exchange VLAN configuration information with each other, cut unnecessary broadcast and unknown unicast traffic, and create and manage VLAN dynamically on switches connected through 802.1Q trunk.

GID and GIP are used in GVRP, which provide the general state mechanism description and information dissemination mechanism for GARP based applications respectively. GVRP only runs on 802.1Q trunk links. GVRP cuts off the trunk link so that only the active VLAN is transmitted on the trunk connection. Before GVRP adds a VLAN to the trunk line, it first receives the join information from the switch. GVRP update information and timer can be changed. The GVRP ports have a variety of operating modes to control how they tailor VLANs. GVRP can dynamically add and manage VLAN for VLAN database

GVRP supports the propagation of VLAN information between devices. In GVRP, the VLAN information of a switch can be configured manually, and all other switches in the network can dynamically understand the VLANs. The terminal node can access any switch and connect to the required VLAN. In order to use GVRP, a GVRP compatible network interface card (NIC) should be installed. GVRP compatible NIC can be configured to join the required VLAN, and then access to a GVRP enabled switch. The communication connection between NIC and switch is established, and VLAN connectivity is realized between NIC and switch.

Global config

1. Click the “Advanced Configure-GVRP-Global config”, enable function and set parameter, and save it as follows.



GVRP Configuration

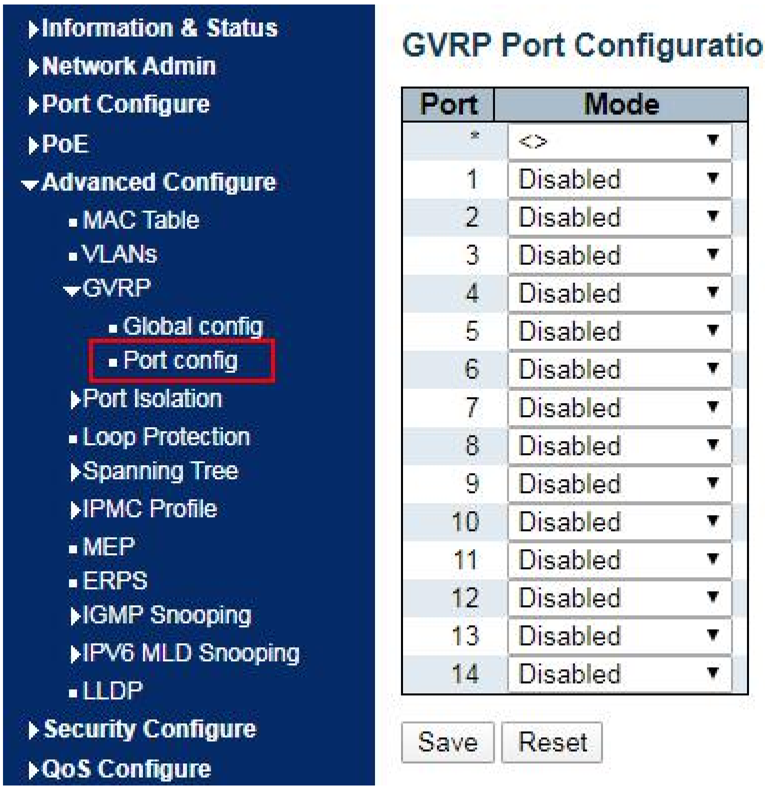
□ Enable GVRP

Parameter	Value
Join-time:	20
Leave-time:	60
LeaveAll-time:	1000
Max VLANs:	20

Save

Port config

1. Click the “Advanced Configure-GVRP-Port config”, enable port function, and save it as follows.



GVRP Port Configuration

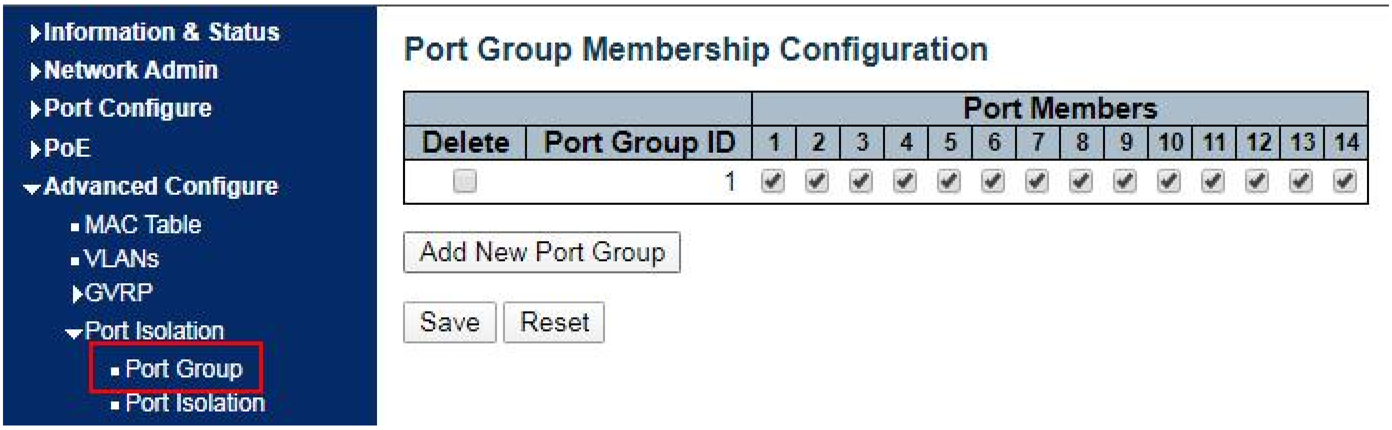
Port	Mode
*	<>
1	Disabled
2	Disabled
3	Disabled
4	Disabled
5	Disabled
6	Disabled
7	Disabled
8	Disabled
9	Disabled
10	Disabled
11	Disabled
12	Disabled
13	Disabled
14	Disabled

6.4 Port Isolation

Port Group

One port can be subordinate to multiple port groups at the same time. Any two ports can forward data flow if they are in a same group.

1. Click the “Advanced Configure-Port Isolation”, check the port to build an isolation group, and save it as follows.



Port Group Membership Configuration

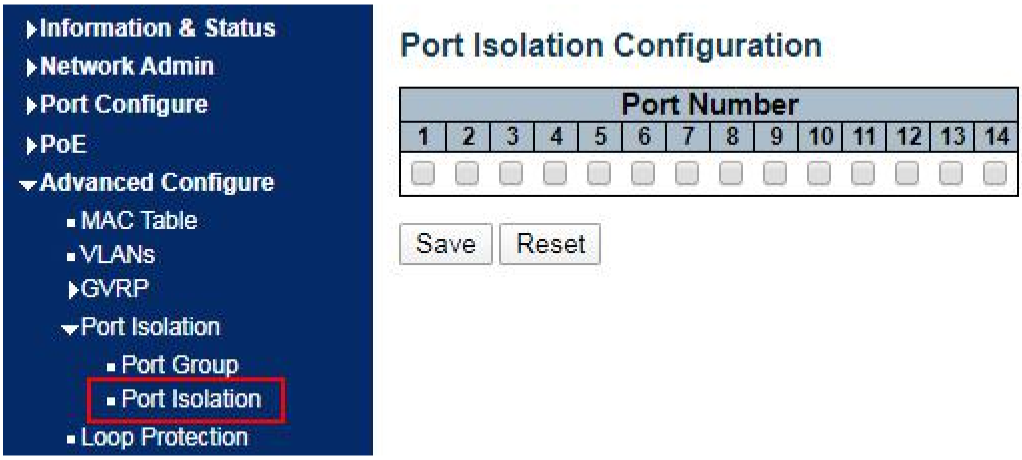
		Port Members													
Delete	Port Group ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14
☐	1	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑

Port Isolation

The interfaces in a same group will be isolated from each other, which will not occur to those in different groups.

Instructions

1. Click the “Advanced Configure-Port Isolation”, check the port to build an isolation group, and save it as follows.

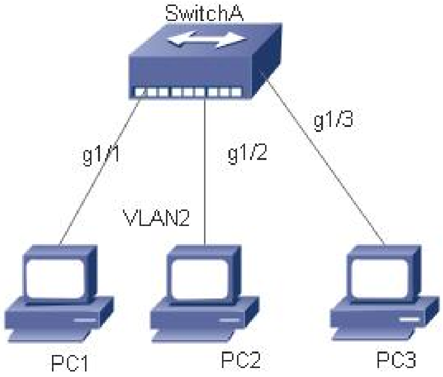


Port Isolation Configuration

Port Number													
1	2	3	4	5	6	7	8	9	10	11	12	13	14
□	□	□	□	□	□	□	□	□	□	□	□	□	□

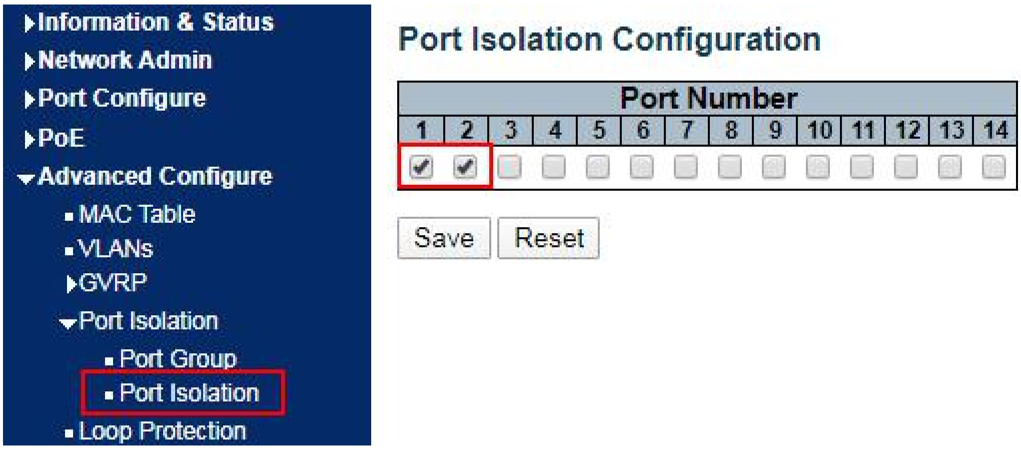
The following example shows that PC1, 2 and 3 are subordinate to VLAN 1. Users aim to block the access between PC1 and 2 in VLAN 1, but allow access between PC1 and 3, as well as PC2 and 3.

Networking diagram of port isolation configuration example



Instructions

1. For GE1-1 and GE1-2 port isolation configuration, click the “Port Configure-Port Isolation-Port Isolation”, check the port GE1-1 and GE1-2 to build an isolation group, and save it as follows.



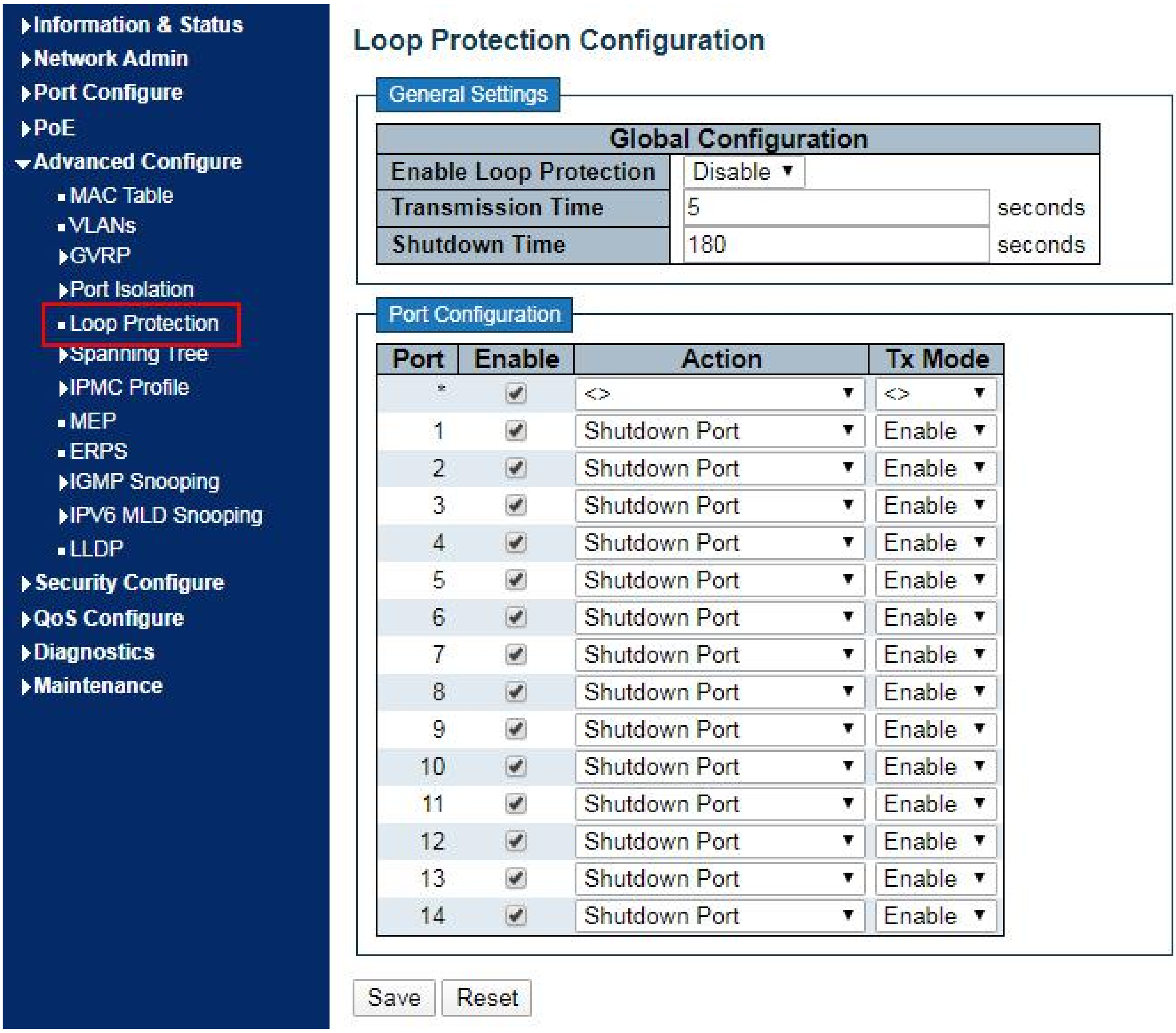
Port Isolation Configuration

Port Number													
1	2	3	4	5	6	7	8	9	10	11	12	13	14
☑	☑	□	□	□	□	□	□	□	□	□	□	□	□

2. Verify the configuration results
# Neither PC1 nor PC2 can ping each other.
PC1 and PC3 can ping each other.
PC2 and PC3 can ping each other.

6.5 Loop Protection

Loop Protection is configured as follows: it enables the global ring network and disables the configuration of switch ports so that users can modify the inspection intervals and the port shutdown time. It configures the loops of one or more ports and determines whether to adopt auto inspection mode or not under the circumstance of enabling the global ring network. There are 3 ways to handle when a ring network is detected by ports: disabling the ports, disabling the ports while keeping logs, and keeping logs only;
Click the “Advanced Configure-Loop Protection” as follows.



Loop Protection Configuration

General Settings

Global Configuration		
Enable Loop Protection	Disable	
Transmission Time	5	seconds
Shutdown Time	180	seconds

Port Configuration

Port	Enable	Action	Tx Mode
*	☑	<>	<>
1	☑	Shutdown Port	Enable
2	☑	Shutdown Port	Enable
3	☑	Shutdown Port	Enable
4	☑	Shutdown Port	Enable
5	☑	Shutdown Port	Enable
6	☑	Shutdown Port	Enable
7	☑	Shutdown Port	Enable
8	☑	Shutdown Port	Enable
9	☑	Shutdown Port	Enable
10	☑	Shutdown Port	Enable
11	☑	Shutdown Port	Enable
12	☑	Shutdown Port	Enable
13	☑	Shutdown Port	Enable
14	☑	Shutdown Port	Enable

Interface data are as follows.

Configuration Items	Description
General Settings	Select from Enable Loop Protection, Transmission Time, and Shutdown Time
Port Configuration	Select from Enable, Action and Tx Mode

6.6 Spanning Tree

In order to backup the links and enhance network reliability, switching Ethernet usually makes use of redundant links. However, such links will generate loops on the switching network, leading to broadcast storm, unstable MAC address list and other failures, thus worsening users' communication quality, or even interrupting the communication. As a result, STP (Spanning Tree Protocol) emerges.

Same with how other protocols are developed, from the original STP defined in IEEE 802.1D, to the RSTP (Rapid Spanning Tree Protocol) defined in IEEE 802.1W, and to the MSTP (Multiple Spanning Tree Protocol) defined in the recent IEEE 802.1S, STP keeps upgrading.

MSTP is compatible with RSTP and STP while RSTP is compatible with STP. The contrasts among these 3 protocols are as follows.

The contrasts among 3 protocols:

STP	Features	Application
STP	A loop-free tree is formed as the solution to broadcast storm and redundant backups. It converges slowly.	All VLANs share a same spanning tree without the discrimination for user or business flow.
RSTP	A loop-free tree is formed as the solution to broadcast storm and redundant backups. It converges rapidly.	
MSTP	A loop-free tree is formed as the solution to broadcast storm and redundant backups. It converges rapidly. Spanning trees balance the load among VLANs. Flow of different VLANs will be forwarded subject to paths.	User flow and business flow should be distinguished for the purpose of load sharing. Different VLANs forward flow through separate spanning trees.

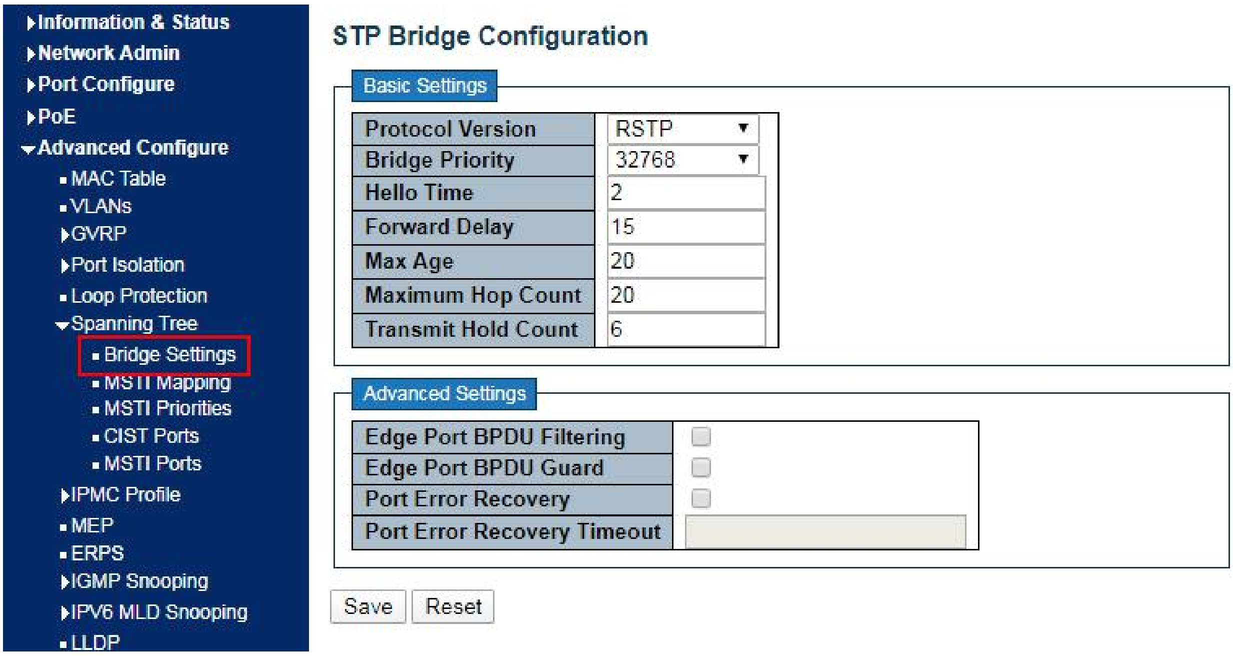
After STP is deployed, it will calculate the network loops with topology, thus achieving:

- Loop elimination: eliminate the possible communication loops in the network by blocking redundant links.
- Link backups: activate the redundant links to restore network connectivity if the active paths fail.

6.6.1 Bridge Configuration

Users can configure the global items of STP Bridge in this page.

Click the “Advanced Configure-Spanning Tree-Bridge Settings” as follows:



STP Bridge Configuration

Basic Settings

Protocol Version	RSTP ▾
Bridge Priority	32768 ▾
Hello Time	2
Forward Delay	15
Max Age	20
Maximum Hop Count	20
Transmit Hold Count	6

Advanced Settings

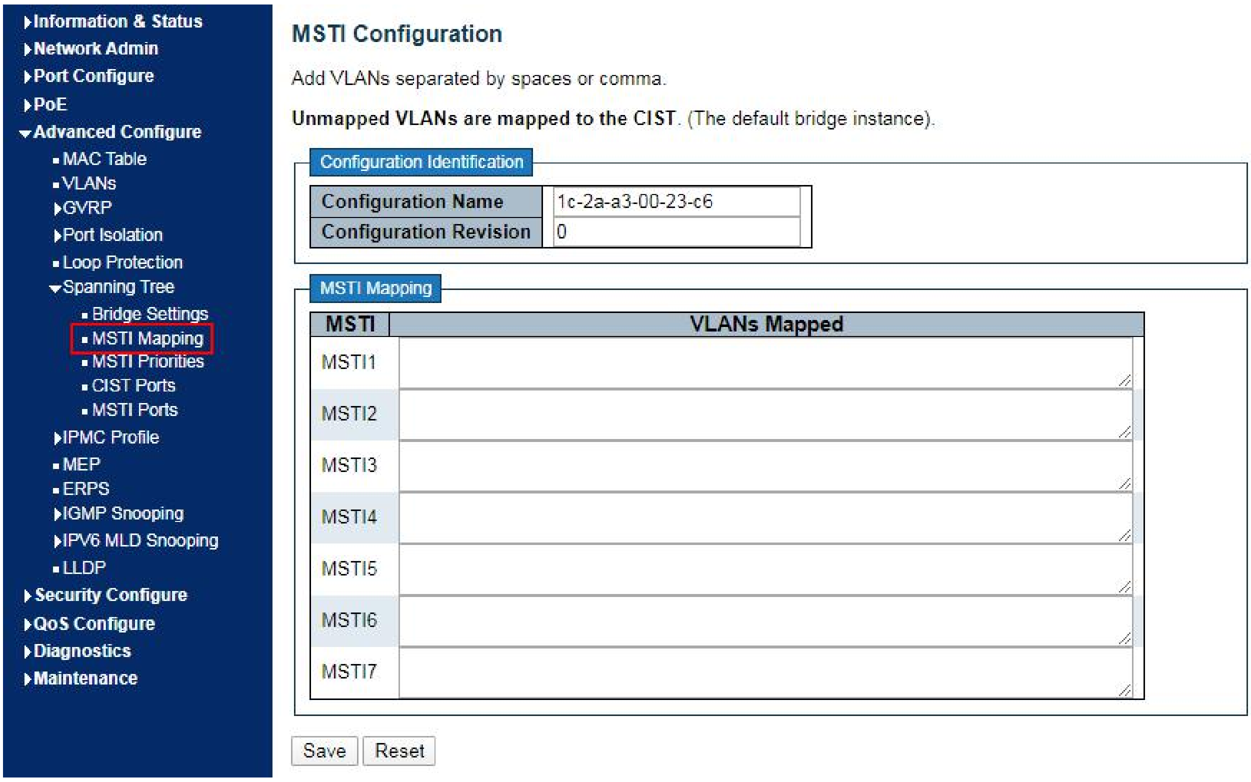
Edge Port BPDU Filtering	□
Edge Port BPDU Guard	□
Port Error Recovery	□
Port Error Recovery Timeout	

Interface data are as follows.

Configuration Items	Description
Protocol Ver.	Select the STP Ver. to be executed on the switch by dropping down the list from: STP-to globally set an STP on the switch. RSTP-to globally set a RSTP on the switch. MSTP-to globally set an MSTP on the switch.
Bridge Priority	Control the bridge priority. Lower numeric values have better priority. The bridge priority plus the MSTI instance number, concatenated with the 6-byte MAC address of the switch forms a Bridge Identifier.
Forward Delay (4-30s)	It ranges from 4s to 30s, with 15s by default.
Max Age (6-40s)	Max aging time is set to keep old information away from endless loop in redundant paths and to prevent the effective spread of new information. The aging time is 20s by default.
Max hops (6-40)	Set the hops between devices in the spanning tree area before the BPDU (Bridge Protocol Data Unit) packet sent by the switch is discarded. Hops will be reduced by one each time when a packet flows through a switch. Users can set the number of hops from 6 to 40, with 20 by default.
Transmit Hold Count (1-10)	Set the max number of Hello packets to be transmitted at each interval, ranging from 1 to 10, with 6 by default.

6.6.2 MSTI Mapping

Click the “Advanced Configure-Spanning Tree-MSTI Mapping” as follows:



MSTI Configuration

Add VLANs separated by spaces or comma.

Unmapped VLANs are mapped to the CIST. (The default bridge instance).

Configuration Identification

Configuration Name	1c-2a-a3-00-23-c6
Configuration Revision	0

MSTI Mapping

MSTI	VLANs Mapped
MSTI1	
MSTI2	
MSTI3	
MSTI4	
MSTI5	
MSTI6	
MSTI7	

Interface data are as follows.

Configuration Items	Description
Configuration Name	Configure the MSTP domain name
Configuration Revision	Configuration the revision
MSTI Mapping	Enter the VLAN to be mapped

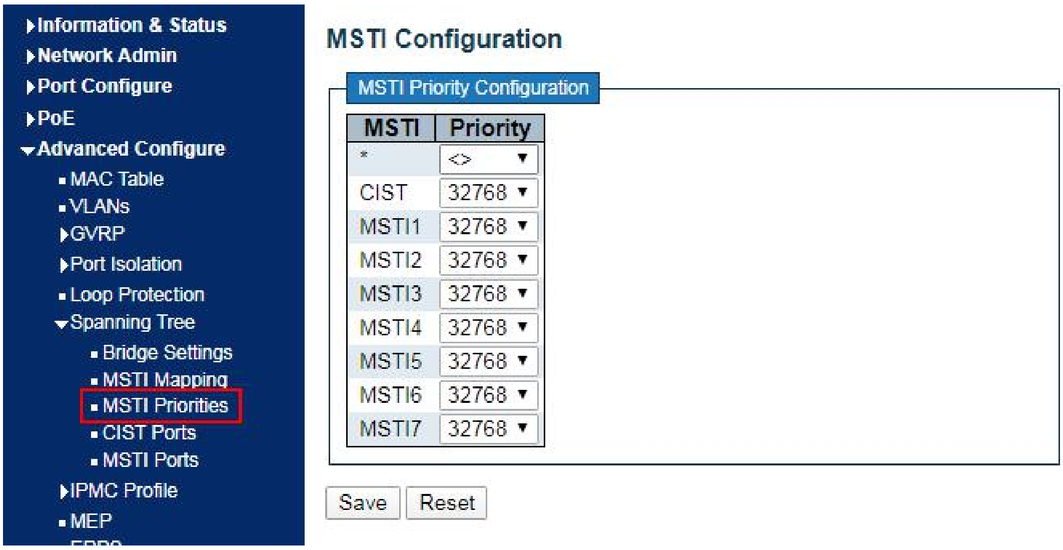
Description:

An instance is a group of VLANs that reduces communication cost and resource utilization rate. Each instance, independently calculated with topology, can balance the load. VLANs with the same topology can be mapped to a same instance, and they are forwarded according to the port status in corresponding MSTP instances.

In simple terms, one or more VLANs are mapped to a spanning tree in the MSTP instances at a time.

6.6.3 MSTI Priorities

Click the “Advanced Configure-Spanning Tree-MSTI Priorities” as follows:



MSTI Configuration

MSTI Priority Configuration

MSTI	Priority
*	<>
CIST	32768
MSTI1	32768
MSTI2	32768
MSTI3	32768
MSTI4	32768
MSTI5	32768
MSTI6	32768
MSTI7	32768

Interface data are as follows.

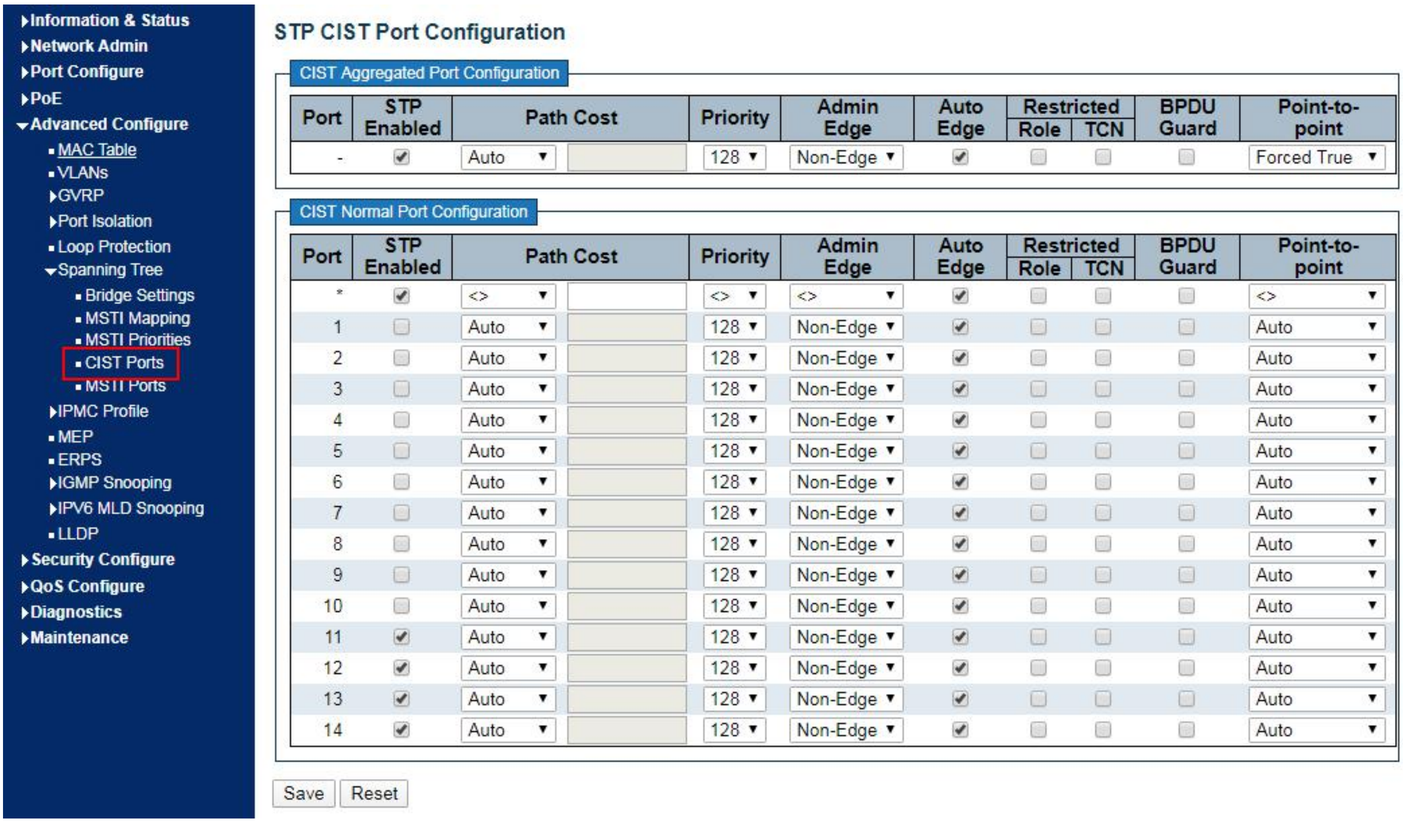
Configuration Items	Description
MSTI Priorities	The configured instance priorities range from 0 to 61,440.

🕮 Description:

Note: The configured instance priorities must be a multiple of 4,094 ranging from 0 to 61,440.

6.6.4 CIST Ports

Click the “Advanced Configure-Spanning Tree-CIST Ports” as follows:



STP CIST Port Configuration

CIST Aggregated Port Configuration

Port	STP Enabled	Path Cost		Priority	Admin Edge	Auto Edge	Restricted		BPDU Guard	Point-to-point
							Role	TCN		
-	☑	Auto ▾		128 ▾	Non-Edge ▾	☑	□	□	□	Forced True ▾

CIST Normal Port Configuration

Port	STP Enabled	Path Cost		Priority	Admin Edge	Auto Edge	Restricted		BPDU Guard	Point-to-point
							Role	TCN		
*	☑	<> ▾		<> ▾	<> ▾	☑	□	□	□	<> ▾
1	□	Auto ▾		128 ▾	Non-Edge ▾	☑	□	□	□	Auto ▾
2	□	Auto ▾		128 ▾	Non-Edge ▾	☑	□	□	□	Auto ▾
3	□	Auto ▾		128 ▾	Non-Edge ▾	☑	□	□	□	Auto ▾
4	□	Auto ▾		128 ▾	Non-Edge ▾	☑	□	□	□	Auto ▾
5	□	Auto ▾		128 ▾	Non-Edge ▾	☑	□	□	□	Auto ▾
6	□	Auto ▾		128 ▾	Non-Edge ▾	☑	□	□	□	Auto ▾
7	□	Auto ▾		128 ▾	Non-Edge ▾	☑	□	□	□	Auto ▾
8	□	Auto ▾		128 ▾	Non-Edge ▾	☑	□	□	□	Auto ▾
9	□	Auto ▾		128 ▾	Non-Edge ▾	☑	□	□	□	Auto ▾
10	□	Auto ▾		128 ▾	Non-Edge ▾	☑	□	□	□	Auto ▾
11	☑	Auto ▾		128 ▾	Non-Edge ▾	☑	□	□	□	Auto ▾
12	☑	Auto ▾		128 ▾	Non-Edge ▾	☑	□	□	□	Auto ▾
13	☑	Auto ▾		128 ▾	Non-Edge ▾	☑	□	□	□	Auto ▾
14	☑	Auto ▾		128 ▾	Non-Edge ▾	☑	□	□	□	Auto ▾

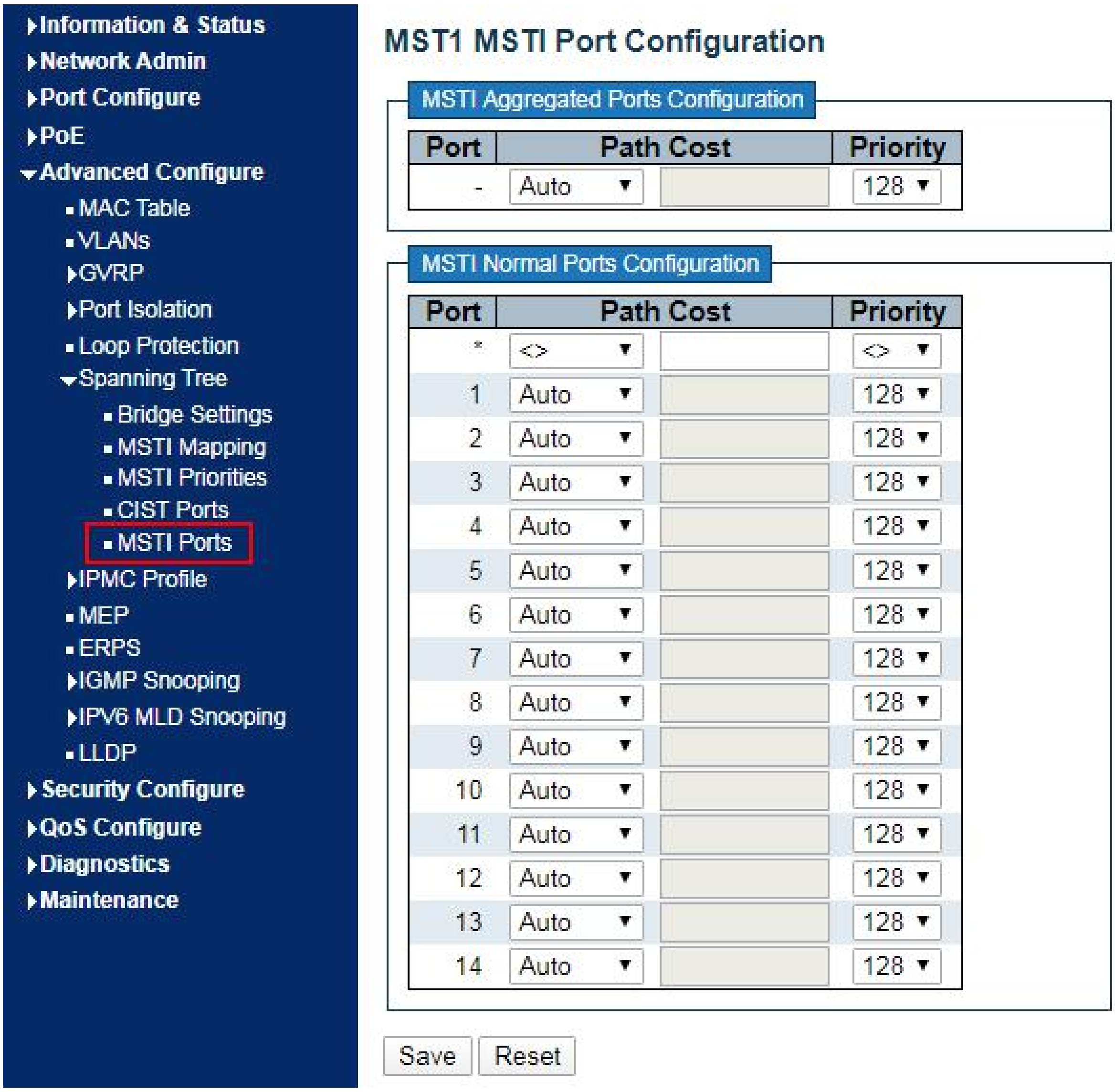
Interface data are as follows.

Configuration Items	Description
Ring Network Enabled	Check to enable the port's STP functions.
Path Cost (0=Auto)	Automatically define the cost measure associated with forwarding packets to a specified port list, with 0 (auto) by default. The smaller the number, the more likely it will be to use this port for packet forwarding Control the path cost incurred by the port. The Auto setting will set the path cost as appropriate by the physical link speed, using the 802.1D recommended values. Using the Specific setting, a user-defined value can be entered. The path cost is used when establishing the active topology of the network. Lower path cost ports are chosen as forwarding ports in favor of higher path cost ports. Valid values are in the range from 1 to 200,000,000.
Priority	Priority will determine the forwarding state of ports when path costs are the same.
Auto Boundary	Appoint the port as a boundary port by choosing True mode. The port will be out of the boundary state by choosing "False" mode. Besides, the boundary state will be judged by the BPDU message received by the port if the "Auto" mode is chosen.
Restricted Role	Drop down the list to switch the restricted role subject to the True and False modes (with "False" mode by default). It won't be a root port in the "True" mode.

Restricted TCN	A TCN is a simple BPDU that the bridge sends to its root port, which is switched between True and False modes, with “False” mode by default.
BPDU Protection	Port will be disabled (shut down) upon receiving a BPDU message if this function is enabled.
P2P	Links are shared peer to peer under the True mode. P2P port is similar to an edge port, with “Auto” mode by default.

6.6.5 MSTI Ports

Users can configure the priority and path cost of an instance port.
Click the “Advanced Configure-Spanning Tree-MSTI Ports” as follows:



MST1 MSTI Port Configuration

MSTI Aggregated Ports Configuration

Port	Path Cost		Priority
-	Auto		128

MSTI Normal Ports Configuration

Port	Path Cost		Priority
*	<>		<>
1	Auto		128
2	Auto		128
3	Auto		128
4	Auto		128
5	Auto		128
6	Auto		128
7	Auto		128
8	Auto		128
9	Auto		128
10	Auto		128
11	Auto		128
12	Auto		128
13	Auto		128
14	Auto		128

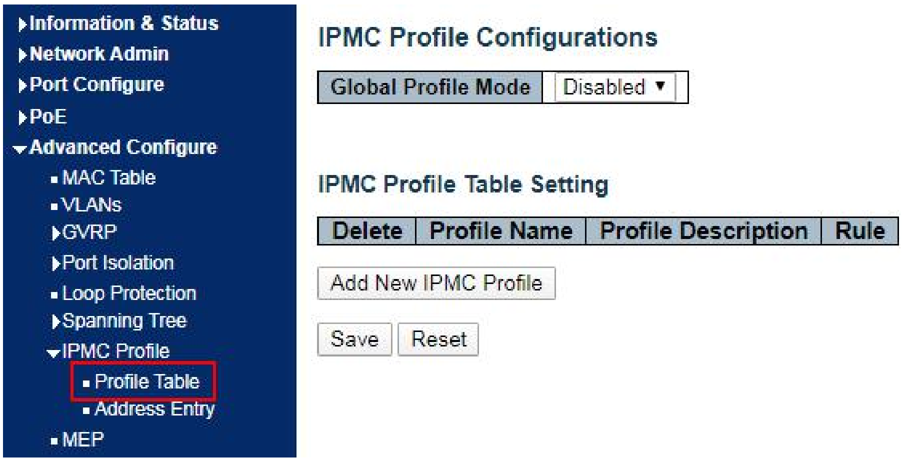
Interface data are as follows.

Configuration Items	Description
Path Cost	Automatically define the cost measure associated with forwarding packets to a specified port list, with 0 (auto) by default. The smaller the number, the more likely it will be to use this port for packet forwarding Control the path cost incurred by the port. The Auto setting will set the path cost as appropriate by the physical link speed, using the 802.1D recommended values. Using the Specific setting, a user-defined value can be entered. The path cost is used when establishing the active topology of the network. Lower path cost ports are chosen as forwarding ports in favor of higher path cost ports. Valid values are in the range from 1 to 200,000,000.
Priority	Priority will determine the forwarding state of ports when path costs are the same.

6.7 IPMC Profile

Users can configure a filter multicast list

Click the “Advanced Configure-IPMC Profile-Address Entry” as follows:



IPMC Profile Configurations

Global Profile Mode: Disabled

IPMC Profile Table Setting

Delete	Profile Name	Profile Description	Rule

Interface data are as follows.

Configuration Items	Description
Entry Name	Enter the multicast name to be filtered
Start Address	Enter the start multicast address
End Address	Enter the end multicast address

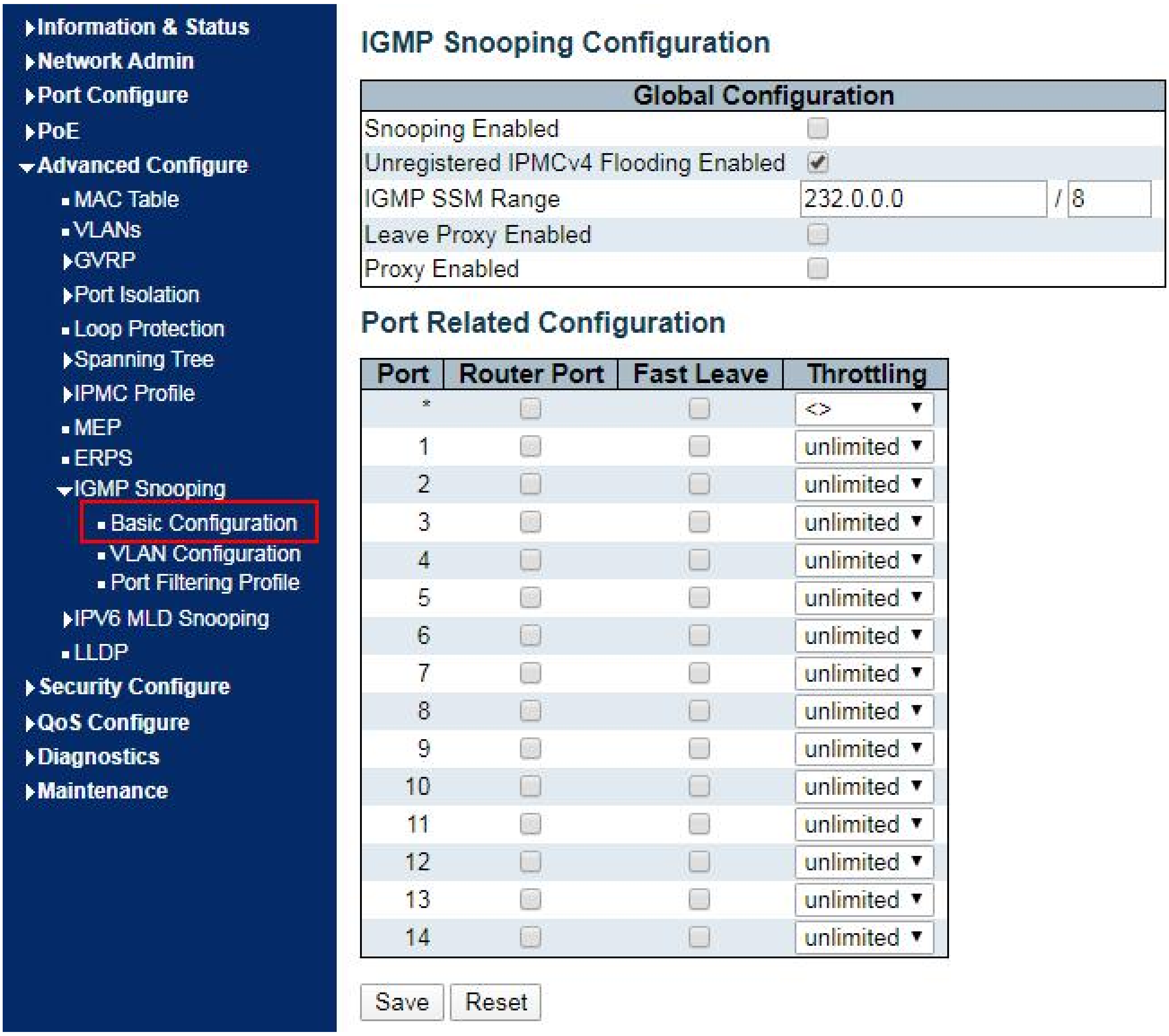
6.8 IGMP Snooping

IGMP Snooping (Internet Group Management Protocol Snooping) is a multicast management and control mechanism that works on a Layer 2 Ethernet switch.

The switch maps its interfaces with multicast group addresses and forwards the multicast data streams accordingly by snooping the IGMP message received by each interface when IGMP Snooping is enabled.

6.8.1 Basic Configuration

Click the “Advanced Configure-IGMP Snooping-Basic Configuration” to check the configuration info of IGMP Snooping as follows:



IGMP Snooping Configuration

Global Configuration	
Snooping Enabled	☐
Unregistered IPMCv4 Flooding Enabled	☑
IGMP SSM Range	232.0.0.0 / 8
Leave Proxy Enabled	☐
Proxy Enabled	☐

Port Related Configuration

Port	Router Port	Fast Leave	Throttling
*	☐	☐	<>
1	☐	☐	unlimited
2	☐	☐	unlimited
3	☐	☐	unlimited
4	☐	☐	unlimited
5	☐	☐	unlimited
6	☐	☐	unlimited
7	☐	☐	unlimited
8	☐	☐	unlimited
9	☐	☐	unlimited
10	☐	☐	unlimited
11	☐	☐	unlimited
12	☐	☐	unlimited
13	☐	☐	unlimited
14	☐	☐	unlimited

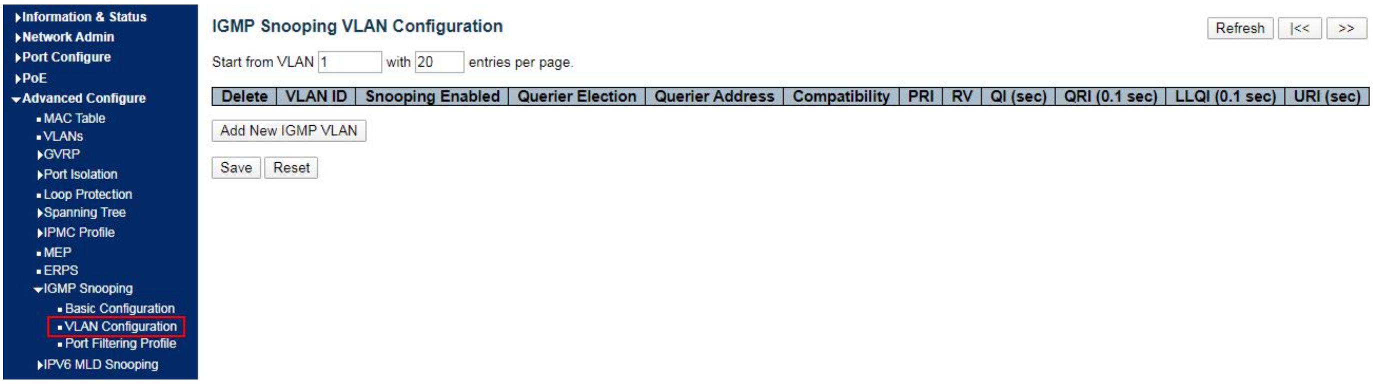
Interface data are as follows.

Configuration Items	Description
Snooping Enabled	Enable or disable IGMP Snooping.
Unregistered IPMCv4 Flooding Enabled	
Routing Port	It refers to the port connected to a Layer 3 multicast router or IGMP Querier. Specify which ports act as router ports. A router port is a port on the Ethernet switch that leads towards the Layer 3 multicast device or IGMP Querier. If an aggregation member port is selected as a router port, the whole aggregation will act as a router port.

Fast Leave	Fast leave performs deleting MAC forward entry immediately upon receiving message for group de-registration

6.8.2 VLAN Configuration

Click the “Advanced Configure-IGMP Snooping-VLAN Configuration” to check the configuration info of IGMP Snooping as follows:



IGMP Snooping VLAN Configuration

Start from VLAN 1 with 20 entries per page.

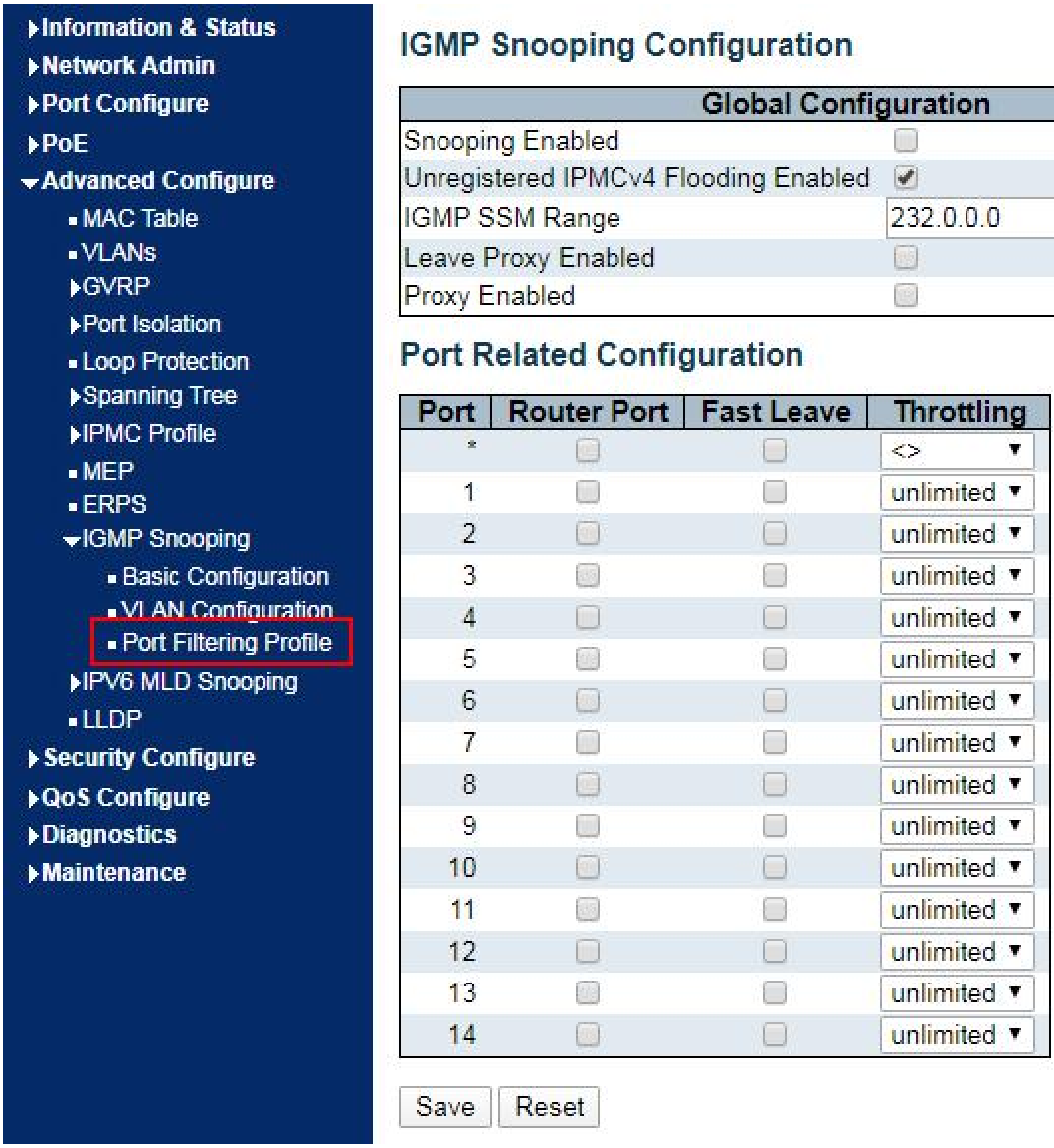
Delete	VLAN ID	Snooping Enabled	Querier Election	Querier Address	Compatibility	PRI	RV	QI (sec)	QRI (0.1 sec)	LLQI (0.1 sec)	URI (sec)

Interface data are as follows.

Configuration Items	Description
VLAN ID	
Snooping Enabled	Enable or disable the per-VLAN IGMP Snooping. Up to 32 VLANs can be selected for IGMP Snooping.
Querier Election	Enable or disable the IGMP Querier election. Enable to join IGMP Querier election in the VLAN. Disable to act as an IGMP Non-Querier.
Querier Address	Define the IPv4 address as source address used in IP header for IGMP Querier election. When the Querier address is not set, system uses IPv4 management address of the IP interface associated with this VLAN. When the IPv4 management address is not set, system uses the first available IPv4 management address. Otherwise, system uses a pre-defined value. By default, this value will be 192.0.2.1.

6.8.3 Port Filtering Profile

Click the “Advanced Configure-IGMP Snooping-Port Filtering Profile” to call the multicast list configured by IPMC Profile.



IGMP Snooping Configuration

Global Configuration	
Snooping Enabled	□
Unregistered IPMCv4 Flooding Enabled	☑
IGMP SSM Range	232.0.0.0 / 8
Leave Proxy Enabled	□
Proxy Enabled	□

Port Related Configuration

Port	Router Port	Fast Leave	Throttling
*	□	□	<>
1	□	□	unlimited
2	□	□	unlimited
3	□	□	unlimited
4	□	□	unlimited
5	□	□	unlimited
6	□	□	unlimited
7	□	□	unlimited
8	□	□	unlimited
9	□	□	unlimited
10	□	□	unlimited
11	□	□	unlimited
12	□	□	unlimited
13	□	□	unlimited
14	□	□	unlimited

Interface data are as follows.

Configuration Items	Description
VLAN ID	
Snooping Enabled	Enable or disable the per-VLAN IGMP Snooping. Up to 32 VLANs can be selected for IGMP Snooping.
Querier Election	Enable or disable the IGMP Querier election. Enable to join IGMP Querier election in the VLAN. Disable to act as an IGMP Non-Querier.

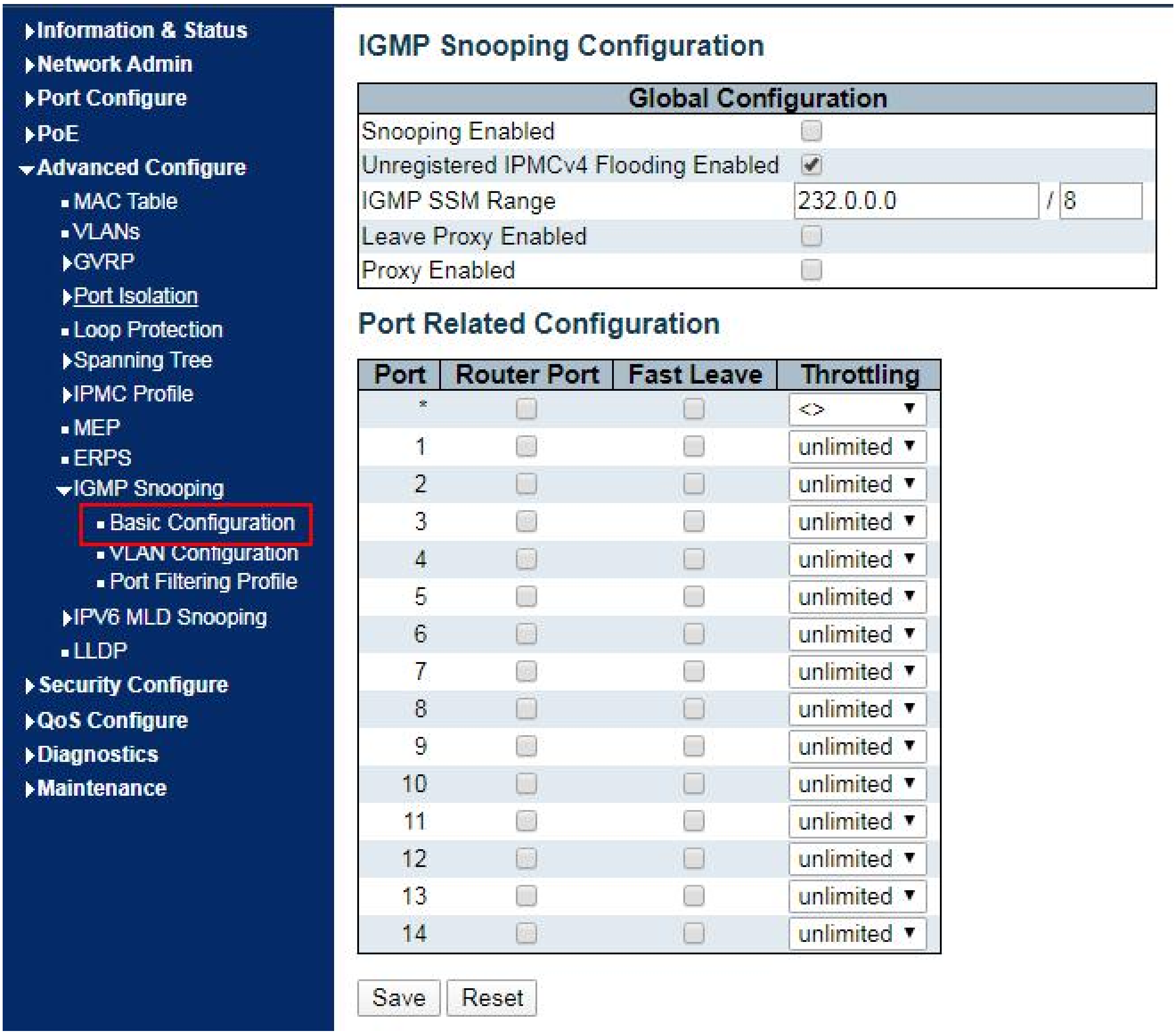
Querier Address	Define the IPv4 address as source address used in IP header for IGMP Querier election. When the Querier address is not set, system uses IPv4 management address of the IP interface associated with this VLAN. When the IPv4 management address is not set, system uses the first available IPv4 management address. Otherwise, system uses a pre-defined value. By default, this value will be 192.0.2.1.

6.9 IPv6 MLD Snooping

IPv6 MLD Snooping is a multicast management and control mechanism that works on a Layer 2 Ethernet switch. The switch maps its interfaces with multicast group addresses and forwards the multicast data streams accordingly by snooping the IPv6 MLD message received by each interface when IPv6 MLD Snooping is enabled.

6.9.1 Basic Configuration

Click the “Advanced Configure-IPv6 MLD Snooping-Basic Configuration” to check the configuration info as follows:



IGMP Snooping Configuration

Global Configuration	
Snooping Enabled	□
Unregistered IPMCv4 Flooding Enabled	☑
IGMP SSM Range	232.0.0.0 / 8
Leave Proxy Enabled	□
Proxy Enabled	□

Port Related Configuration

Port	Router Port	Fast Leave	Throttling
*	□	□	<> ▼
1	□	□	unlimited ▼
2	□	□	unlimited ▼
3	□	□	unlimited ▼
4	□	□	unlimited ▼
5	□	□	unlimited ▼
6	□	□	unlimited ▼
7	□	□	unlimited ▼
8	□	□	unlimited ▼
9	□	□	unlimited ▼
10	□	□	unlimited ▼
11	□	□	unlimited ▼
12	□	□	unlimited ▼
13	□	□	unlimited ▼
14	□	□	unlimited ▼

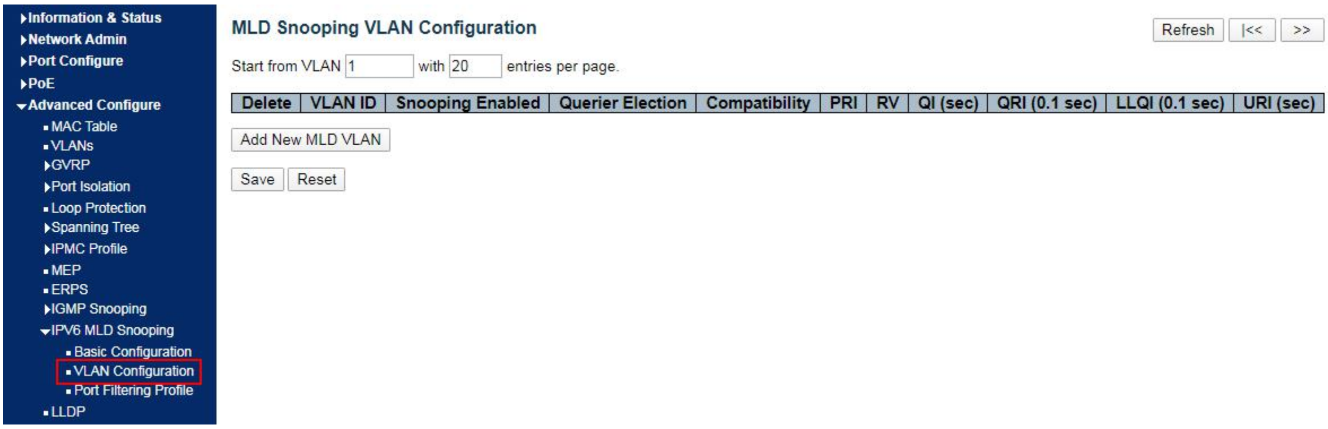
Interface data are as follows.

Configuration Items	Description
Enable Snooping	Enable or disable IPv6 MLD Snooping
Unregistered IPMCv6 Flooding Enabled	
Routing port	It refers to the port connected to a Layer 3 multicast router or IGMP Querier. Specify which ports act as router ports. A router port is a port on the Ethernet switch that leads towards the Layer 3 multicast device or MLD querier. If an aggregation member port is selected as a router port, the whole aggregation will act

	as a router port.
Fast leave	Fast leave performs deleting MAC forward entry immediately upon receiving message for group de-registration

6.9.2 VLAN Configuration

Click the “Advanced Configure-IPV6 MLD Snooping-VLAN Configuration” to check the configuration info of MLD Snooping as follows:



MLD Snooping VLAN Configuration

Start from VLAN 1 with 20 entries per page.

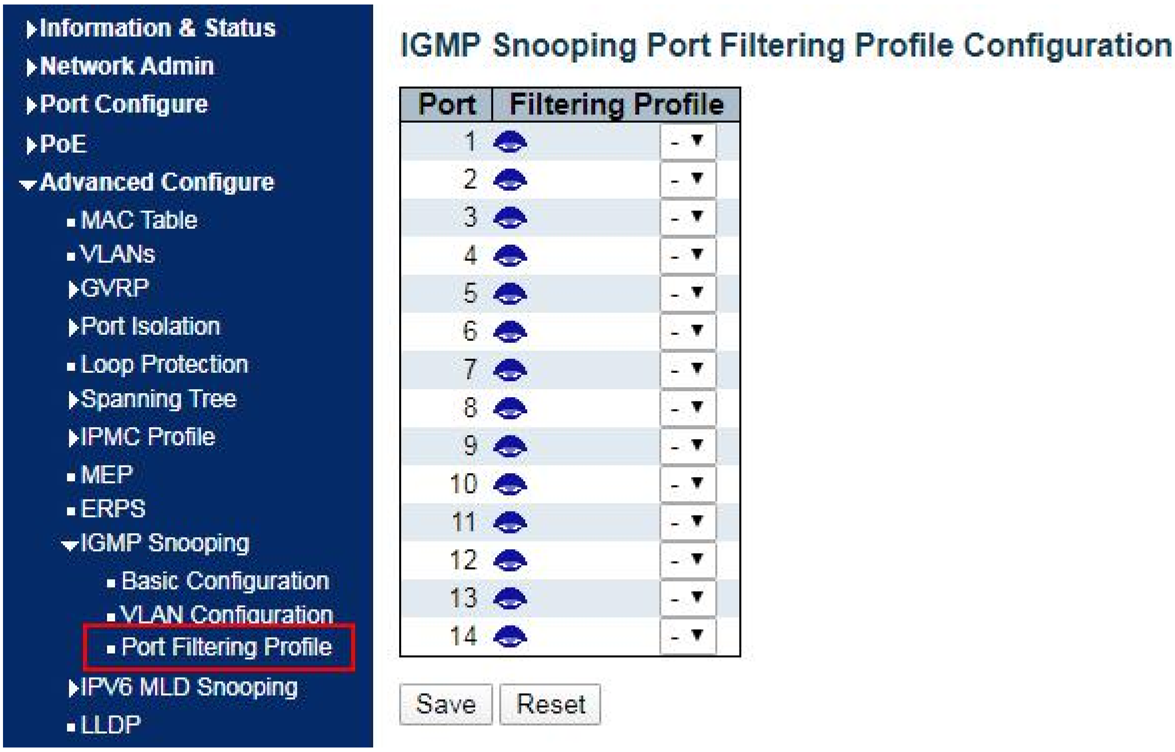
Delete	VLAN ID	Snooping Enabled	Querier Election	Compatibility	PRI	RV	QI (sec)	QRI (0.1 sec)	LLQI (0.1 sec)	URI (sec)

Interface data are as follows.

Configuration Items	Description
VLAN ID	
Snooping Enabled	Enable or disable the per-VLAN MLD Snooping. Up to 32 VLANs can be selected for MLD Snooping.
Querier Election	Enable or disable the MLD Querier election. Enable to join MLD Querier election in the VLAN. Disable to act as an MLD Non-Querier.
Querier Address	Define the Ipv6 address as source address used in IP header for MLD Querier election. When the Querier address is not set, system uses Ipv6 management address of the IP interface associated with this VLAN. When the Ipv6 management address is not set, system uses the first available IPv6 management address. Otherwise, system uses a pre-defined value.

6.9.3 Port Filtering Profile

Click the “Advanced Configure-IPv6 MLD Snooping-VLAN Configuration” to check the configuration info as follows:



IGMP Snooping Port Filtering Profile Configuration

Port	Filtering Profile
1	-
2	-
3	-
4	-
5	-
6	-
7	-
8	-
9	-
10	-
11	-
12	-
13	-
14	-

Interface data are as follows.

Configuration Items	Description
VLAN ID	
Snooping Enabled	Enable or disable the per-VLAN MLD Snooping. Up to 32 VLANs can be selected for IGMP Snooping. Enable the per-VLAN IGMP Snooping. Up to 32 VLANs can be selected for IGMP Snooping.
Querier Election	Enable or disable the MLD Querier election. Enable to join MLD Querier election in the VLAN. Disable to act as an MLD Non-Querier.

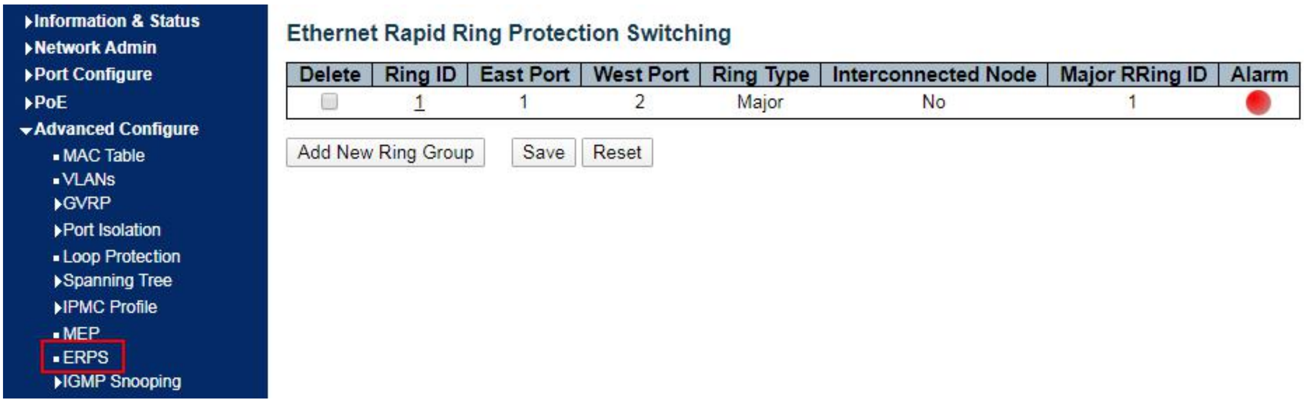
6.10 ERPS

ERPS (Ethernet Ring Protection Switching):

As the latest mature standard of ERPS, ITU-TG.8032 ERPS supports multi-ring and multi-domain structures, absorbs the advantages of EAPS, RPR, SDH, STP, etc., and optimizes the inspection mechanism in terms of two-way faults. In addition, it supports main device backups, load sharing and other work methods in 50ms switching.

Note: Disable STP before enabling ERPS.

Click the "Advanced Configure-ERPS" as follows:



Ethernet Rapid Ring Protection Switching

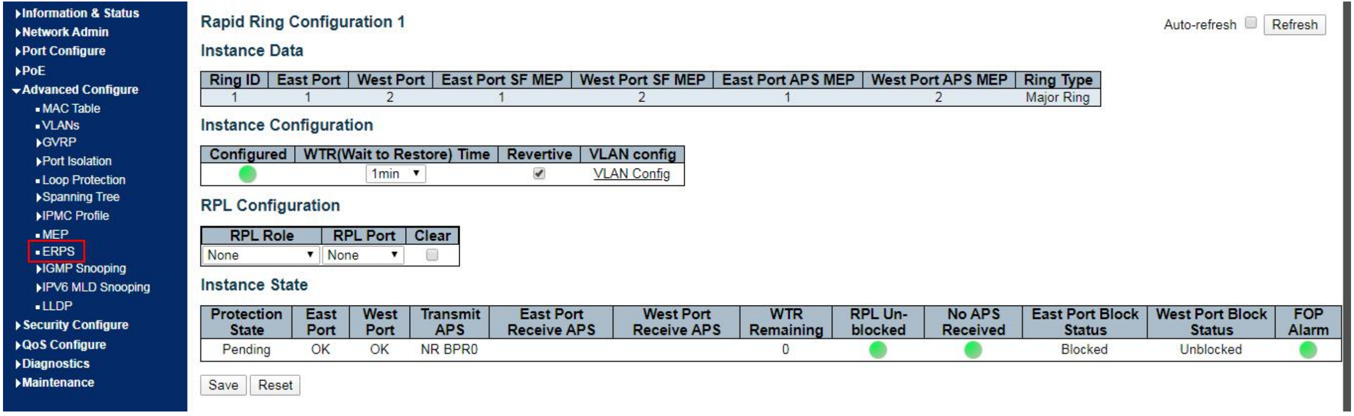
Delete	Ring ID	East Port	West Port	Ring Type	Interconnected Node	Major RRing ID	Alarm
□	1	1	2	Major	No	1	●

Interface data are as follows.

Configuration Items	Description
Ring ID	ID of ERPS Ring Instances
East Port	Choose a port No. involved in Ring protection
West Port	Choose another port No. involved in Ring protection
Ring Type	Select from "Main Ring" or "Sub-Ring" (only deployed in multi-ring applications), with "Main Ring" by default.
Interconnection Node	It refers to the node connecting 2 or more rings in a multi-ring application at the same time
Main Ring ID	Main Ring shares the same ID with Ring in a single ring application. Sub-Ring has to fill in the Main Ring ID in a multi-ring application.
R-APS VLAN(1-4,094)	The VLAN used as R-APS VLAN.

Click the "Add New Ring Group";

Click the link in the "Ring ID" list to configure the ERPS Ring as follows:



Rapid Ring Configuration 1

Instance Data

Ring ID	East Port	West Port	East Port SF MEP	West Port SF MEP	East Port APS MEP	West Port APS MEP	Ring Type
1	1	2	1	2	1	2	Major Ring

Instance Configuration

Configured	WTR(Wait to Restore) Time	Revertive	VLAN config
●	1min ▾	☑	VLAN Config

RPL Configuration

RPL Role	RPL Port	Clear
None ▾	None ▾	□

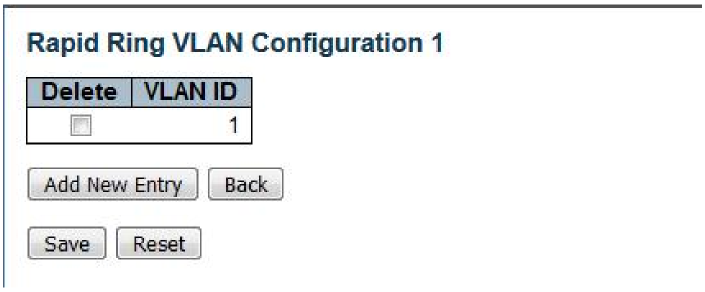
Instance State

Protection State	East Port	West Port	Transmit APS	East Port Receive APS	West Port Receive APS	WTR Remaining	RPL Un-blocked	No APS Received	East Port Block Status	West Port Block Status	FOP Alarm
Pending	OK	OK	NR BPR0			0	●	●	Blocked	Unblocked	●

Configuration Items	Description
WTR Time (5-12s)	Check the box and enter the WTR Time of R-APS function, which by default is 1 minute.
Restore the Revertive Mode	Check the box to enable or disable the R-APS restore option by dropping down the list.
VLAN Protection	Click the “VLAN Protection” to edit the protected VLAN group.
RPL Role	Select from “None”, “RPL Owner” and “RPL Neighbor” by dropping down the list.
RPL Port	Select from “None”, “East Port” and “West Port” by dropping down the list.

“Save” and finish.

Click the “VLAN Protection” to edit the protected VLAN configuration.



Rapid Ring VLAN Configuration 1

Delete	VLAN ID
□	1

Note: Users can modify or add other VLANs (ID 1 by default) for protection in this page.

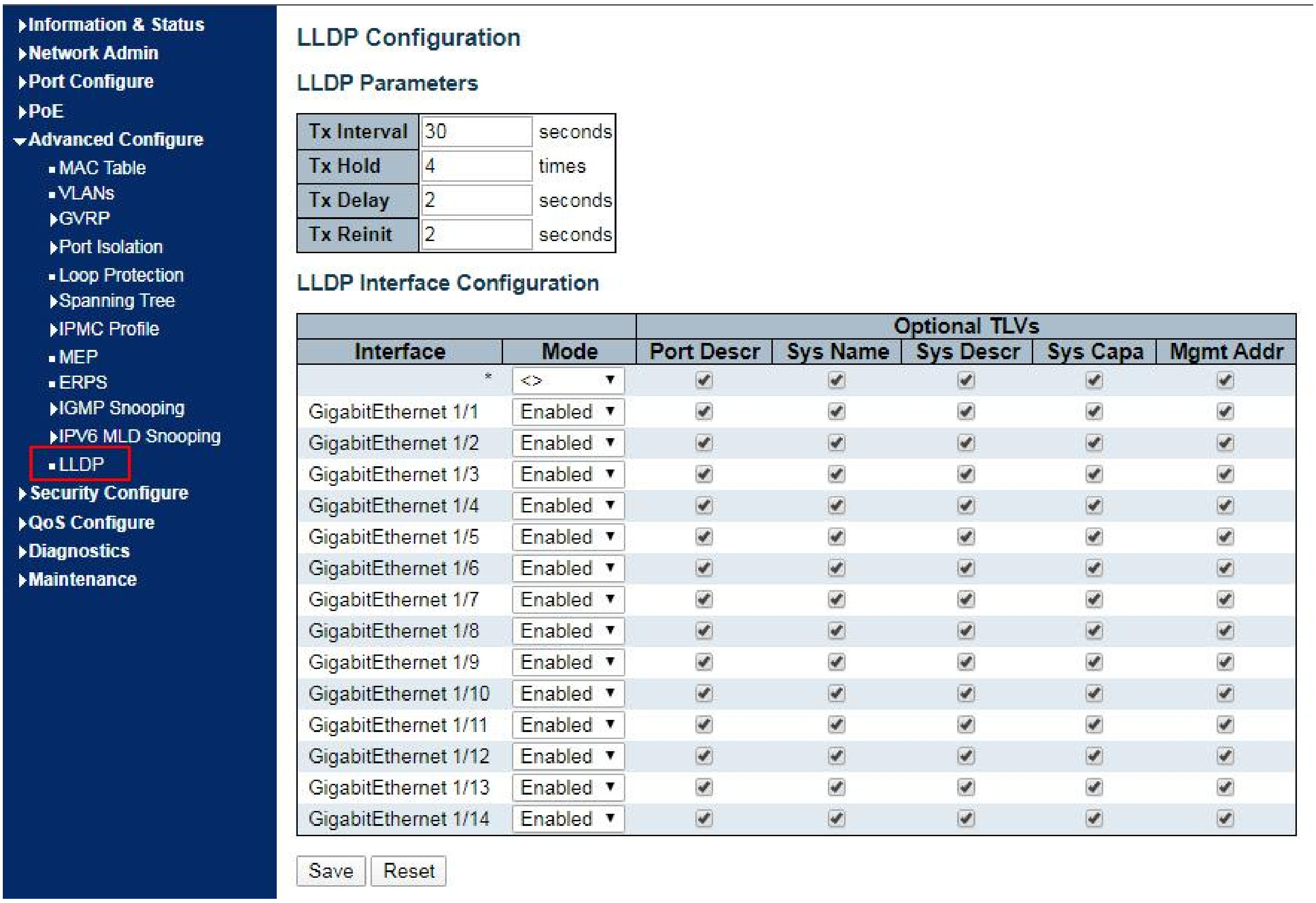
6.11 LLDP

Link Layer Discovery Protocol (LLDP) is a vendor-independent Layer 2 protocol that allows network devices to notify local subnets of the identifications and performance.

Currently, diversified network devices with complex configuration need a standard info exchange platform for manufacturers to discover others and exchange their unique systems and configuration info.

That’s how LLDP comes out. It is a standard link layer discovery method which integrates the info such as main capabilities, management addresses, device and interface identifications of terminal devices into the TLV (Type/Length/Value), encapsulates it in LLDPDU (Link Layer Discovery Protocol Data Unit) and sends it to the directly connected neighbors. After receiving the info, they will save it in the form of standard MIB (Management Information Base) for NMS inquiry and link communication judgment.

Click the “Advanced Configure-LLDP” as follows:



LLDP Configuration

LLDP Parameters

Tx Interval	30	seconds
Tx Hold	4	times
Tx Delay	2	seconds
Tx Reinit	2	seconds

LLDP Interface Configuration

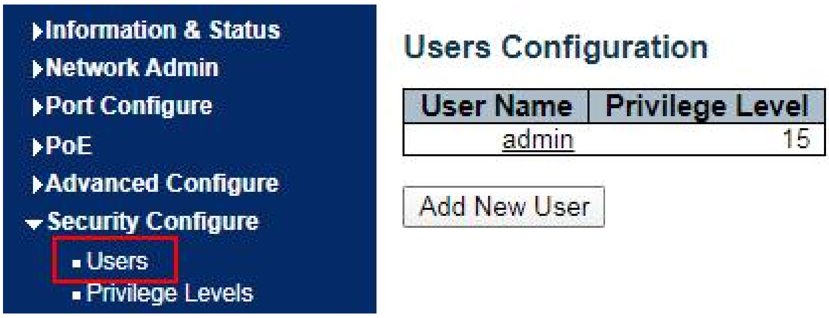
		Optional TLVs				
Interface	Mode	Port Descr	Sys Name	Sys Descr	Sys Capa	Mgmt Addr
*	<>	☑	☑	☑	☑	☑
GigabitEthernet 1/1	Enabled	☑	☑	☑	☑	☑
GigabitEthernet 1/2	Enabled	☑	☑	☑	☑	☑
GigabitEthernet 1/3	Enabled	☑	☑	☑	☑	☑
GigabitEthernet 1/4	Enabled	☑	☑	☑	☑	☑
GigabitEthernet 1/5	Enabled	☑	☑	☑	☑	☑
GigabitEthernet 1/6	Enabled	☑	☑	☑	☑	☑
GigabitEthernet 1/7	Enabled	☑	☑	☑	☑	☑
GigabitEthernet 1/8	Enabled	☑	☑	☑	☑	☑
GigabitEthernet 1/9	Enabled	☑	☑	☑	☑	☑
GigabitEthernet 1/10	Enabled	☑	☑	☑	☑	☑
GigabitEthernet 1/11	Enabled	☑	☑	☑	☑	☑
GigabitEthernet 1/12	Enabled	☑	☑	☑	☑	☑
GigabitEthernet 1/13	Enabled	☑	☑	☑	☑	☑
GigabitEthernet 1/14	Enabled	☑	☑	☑	☑	☑

7 Security Configure

7.1 Users

Users can reset the passwords on the switch.

Click the “Security Configure-Users” as follows:



Users Configuration

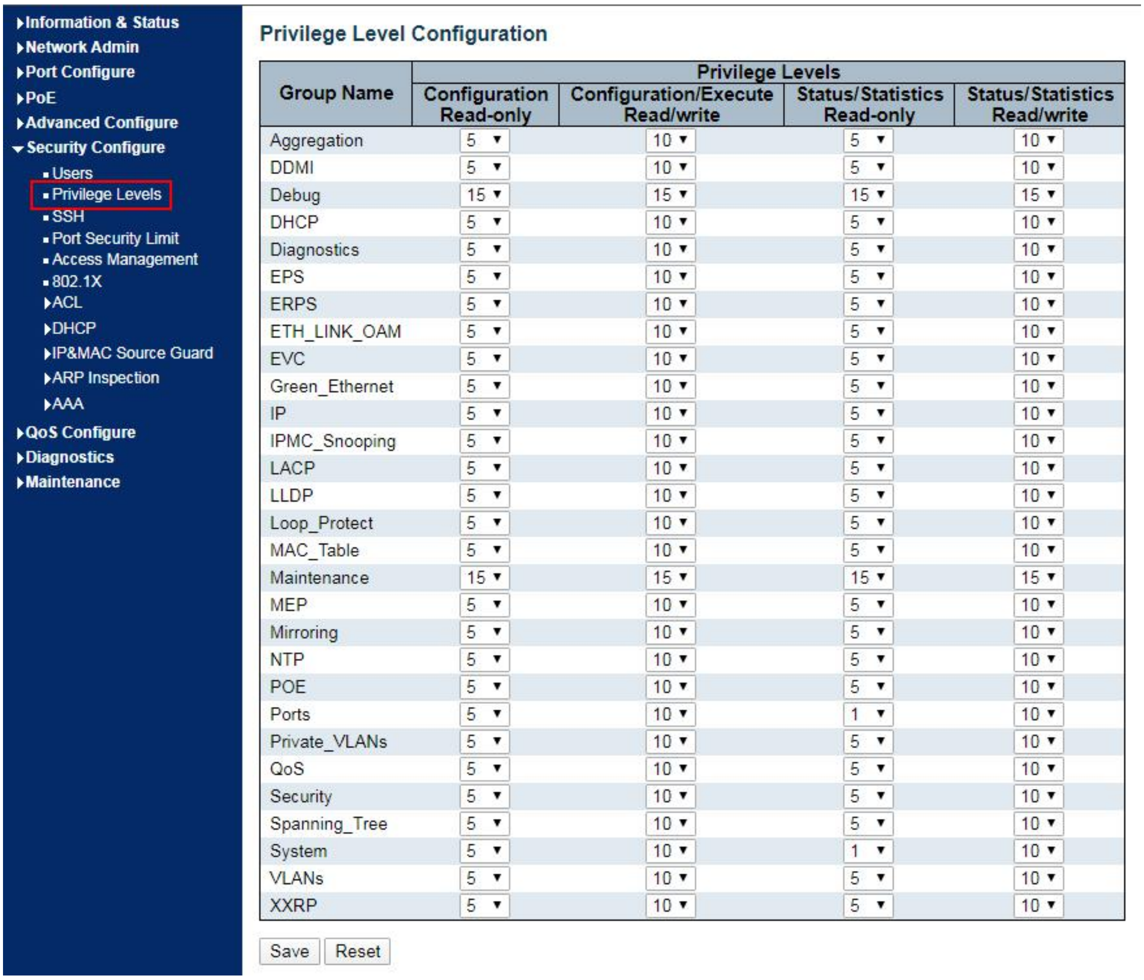
User Name	Privilege Level
admin	15

“Save” and finish.

7.2 Privilege Levels

Users can change the login level on the switch.

Click the “Security Configure-Privilege Levels” as follows:



Privilege Level Configuration

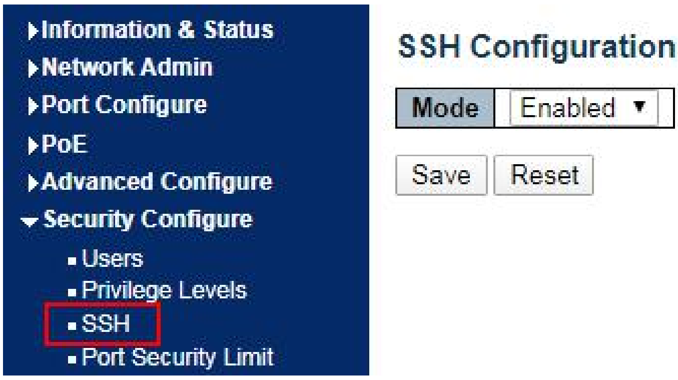
Group Name	Privilege Levels			
	Configuration Read-only	Configuration/Execute Read/write	Status/Statistics Read-only	Status/Statistics Read/write
Aggregation	5	10	5	10
DDMI	5	10	5	10
Debug	15	15	15	15
DHCP	5	10	5	10
Diagnostics	5	10	5	10
EPS	5	10	5	10
ERPS	5	10	5	10
ETH_LINK_OAM	5	10	5	10
EVC	5	10	5	10
Green_Ethernet	5	10	5	10
IP	5	10	5	10
IPMC_Snooping	5	10	5	10
LACP	5	10	5	10
LLDP	5	10	5	10
Loop_Protect	5	10	5	10
MAC_Table	5	10	5	10
Maintenance	15	15	15	15
MEP	5	10	5	10
Mirroring	5	10	5	10
NTP	5	10	5	10
POE	5	10	5	10
Ports	5	10	1	10
Private_VLANs	5	10	5	10
QoS	5	10	5	10
Security	5	10	5	10
Spanning_Tree	5	10	5	10
System	5	10	1	10
VLANs	5	10	5	10
XXRP	5	10	5	10

7.3 SSH

SSH (Secure Shell) is a security protocol based on the application layer and formulated by the Network Working Group of IETF. SSH provides safe network services in a reliable manner, especially the Rlogin Session service. It can prevent info disclosure during remote management.

The switch manages SSH.

Click the “Security Configure-SSH” as follows:



SSH Configuration

Mode	Enabled

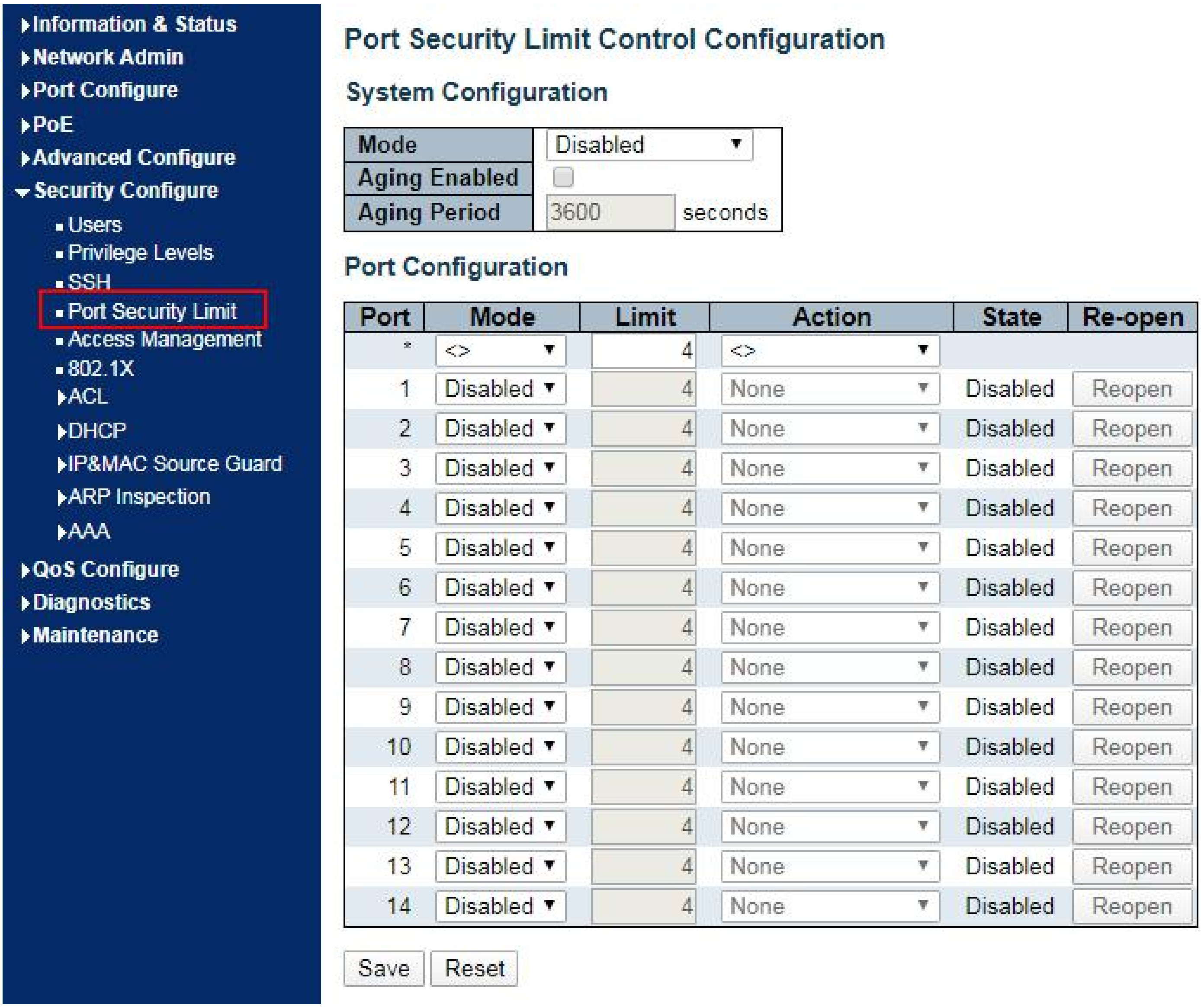
7.4 Port Security Limit

Port Security:

The number of restricted MAC addresses on a port.

The switch supports Port Security.

Click the “Security Configure-Port Security Limit” as follows:



Port Security Limit Control Configuration

System Configuration

Mode	Disabled
Aging Enabled	□
Aging Period	3600 seconds

Port Configuration

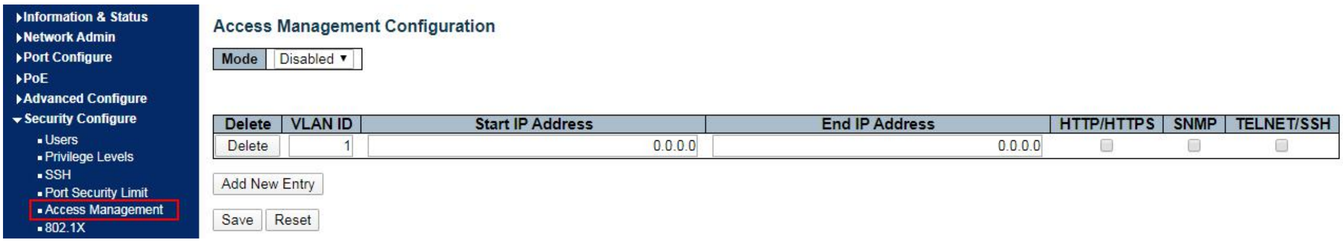
Port	Mode	Limit	Action	State	Re-open
*	<>	4	<>		
1	Disabled	4	None	Disabled	Reopen
2	Disabled	4	None	Disabled	Reopen
3	Disabled	4	None	Disabled	Reopen
4	Disabled	4	None	Disabled	Reopen
5	Disabled	4	None	Disabled	Reopen
6	Disabled	4	None	Disabled	Reopen
7	Disabled	4	None	Disabled	Reopen
8	Disabled	4	None	Disabled	Reopen
9	Disabled	4	None	Disabled	Reopen
10	Disabled	4	None	Disabled	Reopen
11	Disabled	4	None	Disabled	Reopen
12	Disabled	4	None	Disabled	Reopen
13	Disabled	4	None	Disabled	Reopen
14	Disabled	4	None	Disabled	Reopen

7.5 Access Management

Access Management Web service can help you safely access the switch resources.

The switch supports Access Management.

Click the “Security Configure-Access Management” as follows:



Access Management Configuration

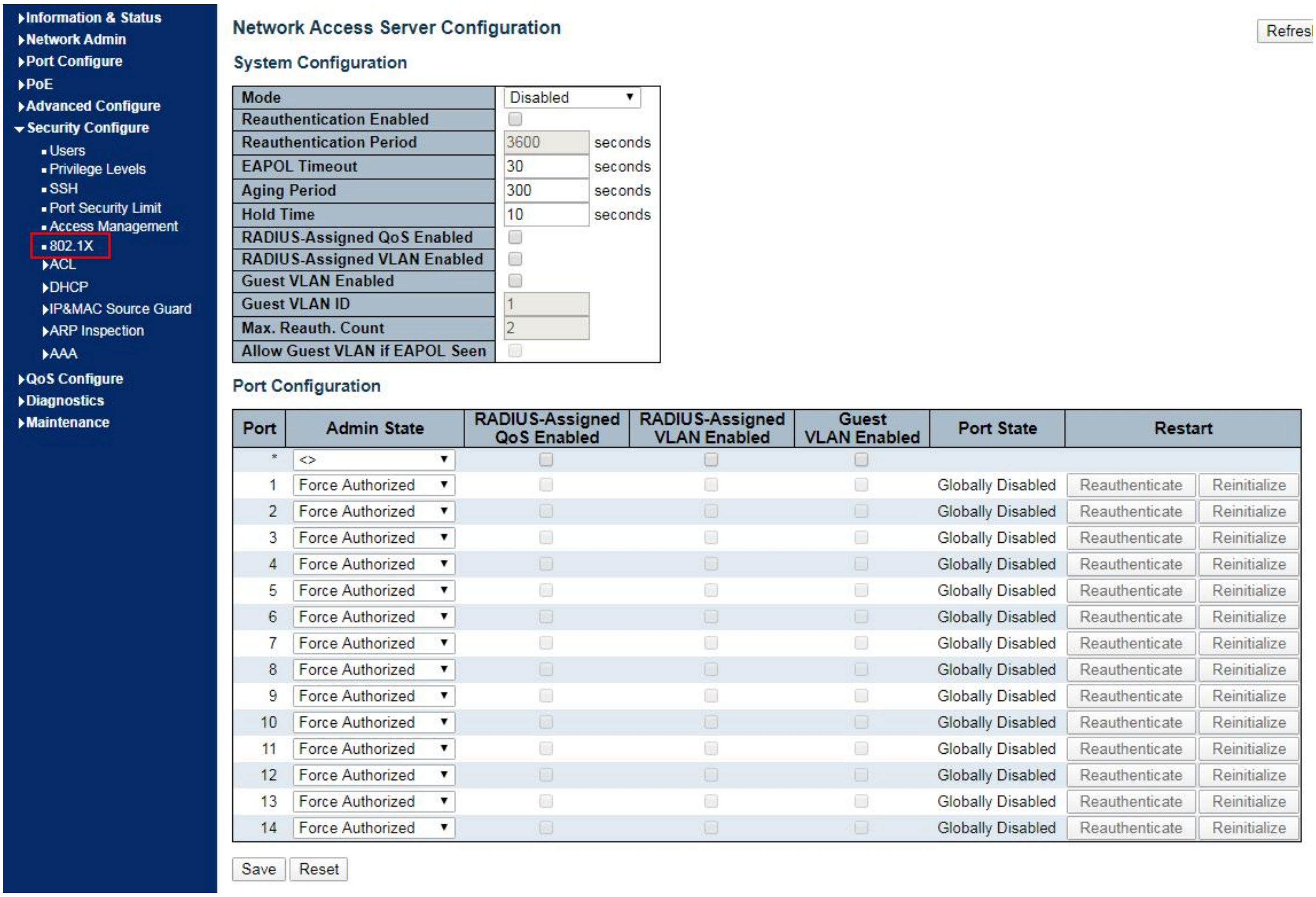
Mode: Disabled

Delete	VLAN ID	Start IP Address	End IP Address	HTTP/HTTPS	SNMP	TELNET/SSH
Delete	1	0.0.0.0	0.0.0.0	□	□	□

7.6 802.1X

802.1X is a Client/Server-based protocol for access control and authentication, which prevents the unauthorized users/devices from accessing a LAN/WLAN through an access port. 802.1X authenticates the users/devices connected to the port before acquiring the services provided by the switch or LAN. Prior to authentication, only EAPoL (Extensible Authentication Protocol over Lan) data can flow through the switch port. Normal data are also allowed to flow through the Ethernet port smoothly after authentication.

Click the “Security Configure-802.1X” as follows:



Network Access Server Configuration

System Configuration

Mode	Disabled
Reauthentication Enabled	□
Reauthentication Period	3600 seconds
EAPOL Timeout	30 seconds
Aging Period	300 seconds
Hold Time	10 seconds
RADIUS-Assigned QoS Enabled	□
RADIUS-Assigned VLAN Enabled	□
Guest VLAN Enabled	□
Guest VLAN ID	1
Max. Reauth. Count	2
Allow Guest VLAN if EAPOL Seen	□

Port Configuration

Port	Admin State	RADIUS-Assigned QoS Enabled	RADIUS-Assigned VLAN Enabled	Guest VLAN Enabled	Port State	Restart	
*	<>	□	□	□			
1	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
2	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
3	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
4	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
5	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
6	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
7	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
8	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
9	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
10	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
11	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
12	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
13	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
14	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize

Interface data are as follows

Configuration Items	Description
System Configuration	Select from “Mode, Reauthentication Enabled, Reauthentication Period, 3,600 seconds, EAPOL Timeout, 30 seconds, Aging Period, 300 seconds, Hold Time, 10

	seconds, RADIUS-Assigned QoS Enabled, RADIUS-Assigned VLAN Enabled, Guest VLAN Enabled, Guest VLAN ID 1, Max. Reauth Count 2, Allow Guest VLAN if EAPoL Seen”
Port Configuration	Select from “Port, Admin State, RADIUS-Assigned QoS Enabled, RADIUS-Assigned VLAN Enabled, Guest VLAN Enabled, Port State, Restart”

“Save” and finish.

7.7 ACL

Access Control List (ACL) is the instruction list of switch interfaces, which is used to control packet ingress and egress. It applies to all routed protocols, such as IP, IPX and AppleTalk.

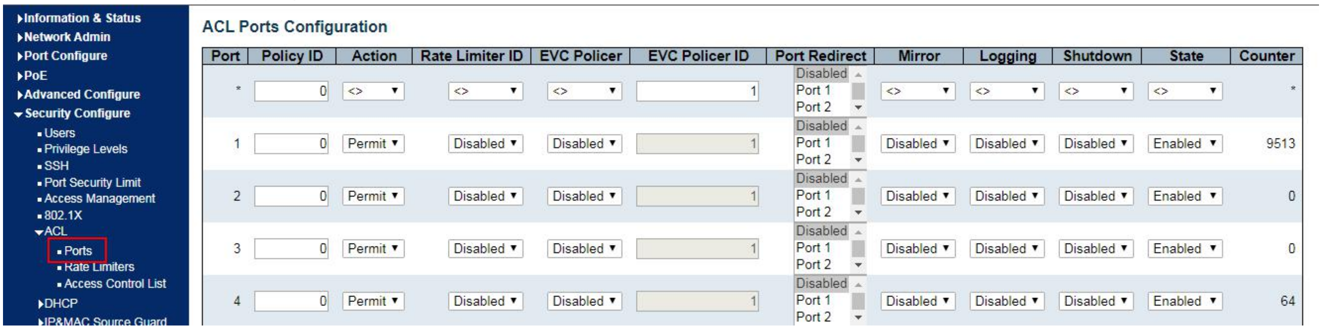
Communication between information points and internal & external networks are essential business requirements of enterprise networks. For secure Intranet, access rights can be controlled by formulating security policies ensuring that unauthorized users can only use certain network resources. In short, ACL filtering flow is a network technology for access control.

ACL is configured to restrict network flow and authorized devices, forward specified port packets, etc. For example, external public network is beyond the reach of the devices in the LAN, or only FTP service is available. ACL can be configured either on routers or on the business software with ACL functions.

ACL, based on device hardware layer security, is an important technology to ensure system security in IoT. By controlling the access to communication between software devices and specifying the access rules programmatically, ACL separates illegal devices from damaging system security and obtaining data.

7.7.1 ACL Ports

Click the “Security Configure-ACL-Ports” as follows.



ACL Ports Configuration

Port	Policy ID	Action	Rate Limiter ID	EVC Policer	EVC Policer ID	Port Redirect	Mirror	Logging	Shutdown	State	Counter
*	0	<>	<>	<>	1	Disabled Port 1 Port 2	<>	<>	<>	<>	*
1	0	Permit	Disabled	Disabled	1	Disabled Port 1 Port 2	Disabled	Disabled	Disabled	Enabled	9513
2	0	Permit	Disabled	Disabled	1	Disabled Port 1 Port 2	Disabled	Disabled	Disabled	Enabled	0
3	0	Permit	Disabled	Disabled	1	Disabled Port 1 Port 2	Disabled	Disabled	Disabled	Enabled	0
4	0	Permit	Disabled	Disabled	1	Disabled Port 1 Port 2	Disabled	Disabled	Disabled	Enabled	64

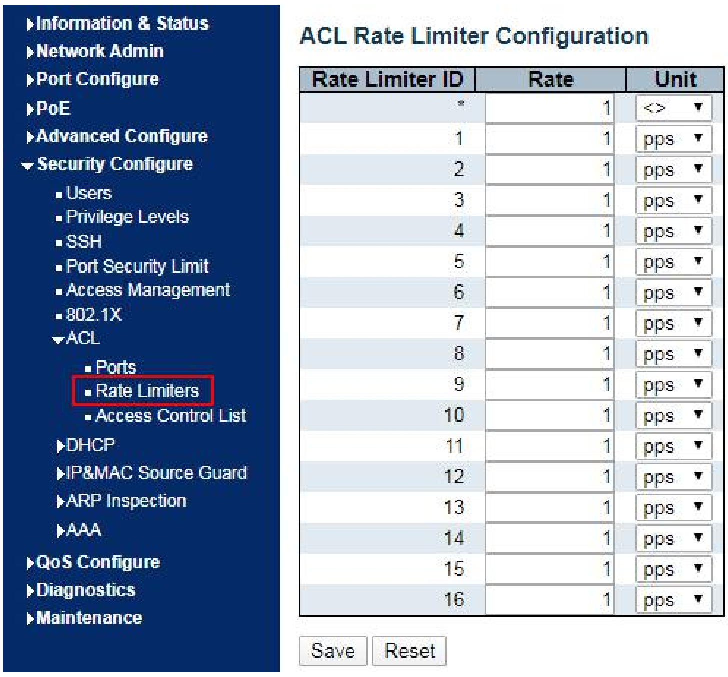
Interface data are as follows

Configuration Items	Description
Action	“Permit”: data can flow through this port. “Deny”: data cannot flow through this port.
Rate Limiter ID	The Rate Limiter ID bundled with the port. See details in Rate Limiter Configuration.
Port Redirect	Select which port frames are redirected on. The allowed values are **Disabled** or a specific port number and it can't be set when action is permitted. The default value is “Disabled”.
Mirror	Specify the mirror operation of this port. The allowed values are: **Enabled**: Frames received on the port are mirrored. **Disabled**: Frames received on the port are not mirrored. The default value is “Disabled”.
Logging	
Shutdown	Specify the port shut down operation of this port. The allowed values are: **Enabled**: If a frame is received on the port, the port will be disabled. **Disabled**: Port shut down is disabled. The default value is “Disabled”. Note: The shutdown feature only works when the packet length is less than 1,518 (without VLAN tags).
State	Specify the port state of this port. The allowed values are: **Enabled**: To reopen ports by changing the volatile port configuration of the ACL user module. **Disabled**: To close ports by changing the volatile port configuration of the ACL user module. The default value is “Enabled”.
Counter	Counts the number of frames that match this rule.

“Save” and finish.

7.7.2 Rate Limiter

Click the “Security Configure-ACL-Rate Limiters” as follows.



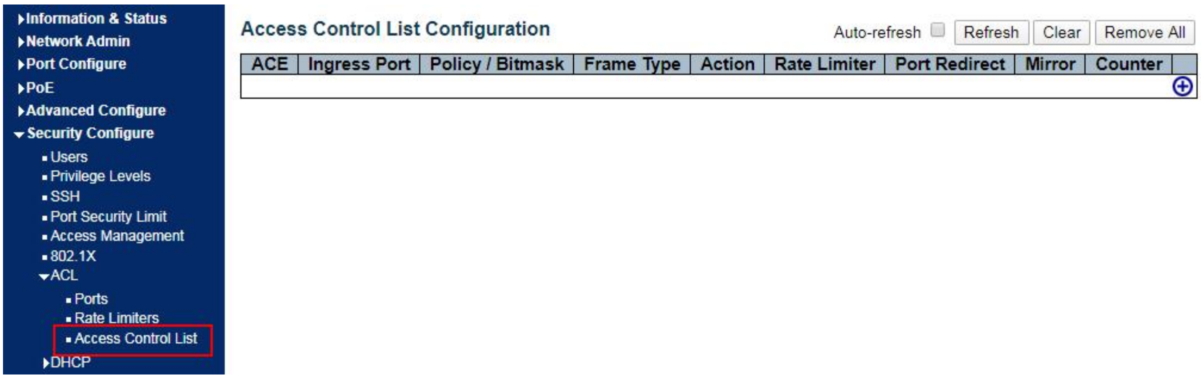
ACL Rate Limiter Configuration

Rate Limiter ID	Rate	Unit
*	1	<>
1	1	pps
2	1	pps
3	1	pps
4	1	pps
5	1	pps
6	1	pps
7	1	pps
8	1	pps
9	1	pps
10	1	pps
11	1	pps
12	1	pps
13	1	pps
14	1	pps
15	1	pps
16	1	pps

“Save” and finish.

7.7.3 Access Control List

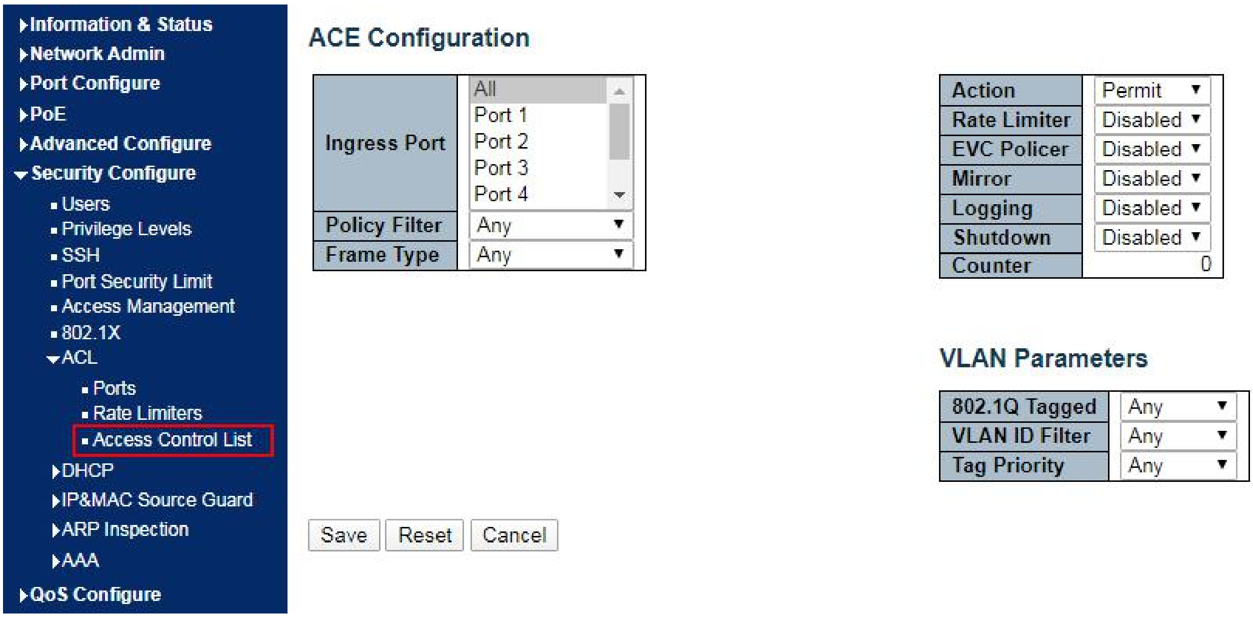
Click the “Security Configure-ACL-Access Control List” as follows:



Access Control List Configuration

ACE	Ingress Port	Policy / Bitmask	Frame Type	Action	Rate Limiter	Port Redirect	Mirror	Counter	
									⊕

Click the “+” to edit the Access Control List.



ACE Configuration

Ingress Port	All Port 1 Port 2 Port 3 Port 4
Policy Filter	Any
Frame Type	Any

Action	Permit
Rate Limiter	Disabled
EVC Policer	Disabled
Mirror	Disabled
Logging	Disabled
Shutdown	Disabled
Counter	0

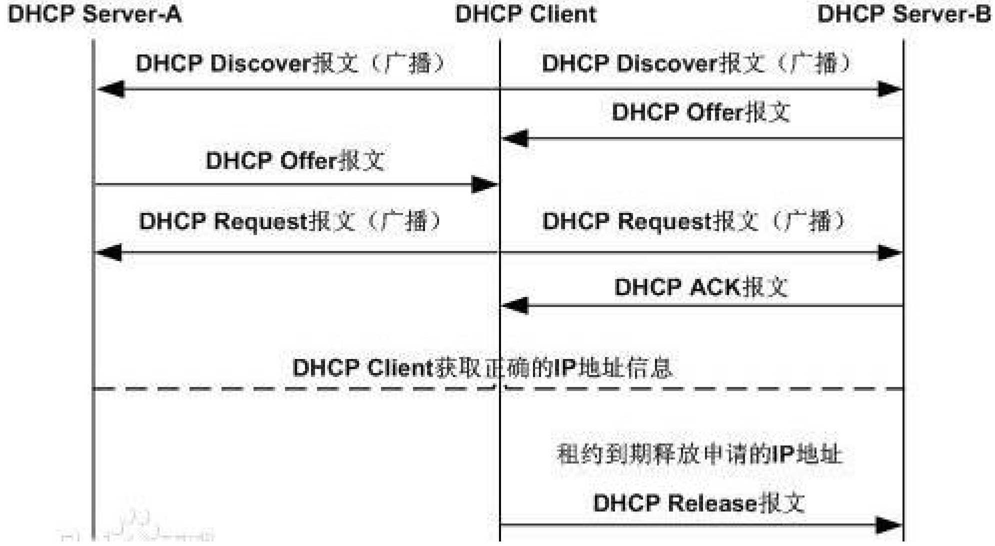
VLAN Parameters

802.1Q Tagged	Any
VLAN ID Filter	Any
Tag Priority	Any

7.8 DHCP Snooping

DHCP principle

DHCP takes UDP as the transmission protocol. The host sends a request to Port 68 of DHCP Server which replies to the Port 67 of the host. The interactive process is detailed as follows.



1. DHCP Client broadcasts a DHCP Discover message.
2. After receiving the message, all DHCP Severs will reply to DHCP Client a DHCP Offer message.

DHCP Server will send “Your (Client) IP Address” field as the IP Address in the message to DHCP Client, and put its own IP Address in the “Option” field for distinguishing. DHCP Server will record the assigned IP address after sending the message.

3. Generally speaking, DHCP Client can only process the first DHCP Offer message it receives.

It will broadcast a DHCP Request message and add the selected DHCP Server’s and the required IP address in the option field.

4. After receiving DHCP Request message, DHCP Server will compare the IP addresses with its own address. DHCP Server will only clear the corresponding records of IP address allocation if different; or it will respond to DHCP Client with a DHCP ACK message and add the lease term for the IP address in the option field.

5. DHCP Client will check the availability of the IP address assigned by DHCP Server in the DHCP ACK message. DHCP Client will own the IP address and renew the lease automatically if the address is valid, or it will send a DHCP Decline message to inform DHCP Server of disabling this IP address and applying for a new one.

6. DHCP Client can release the obtained IP address by sending a DHCP Release message at any time, and DHCP Server will recover and redistribute the corresponding IP address.

After half of the lease term, DHCP Client will send a DHCP Request message in unicast form to renew the IP address. Upon receiving the DHCP ACK message, DHCP Client should extend the term as required, otherwise, DHCP Client should continue to use this IP address.

After 87.5% of the lease term, DHCP Client will broadcast a DHCP Request message to renew the IP address. If DHCP Client receives a DHCP ACK message, the term will be extended as required; or DHCP Client has to continue to use the address until it expires. Then it should send a DHCP Release message to DHCP Server to release this IP address and apply for a new one.

What needs illustration is that DHCP Client may generally receive the first DHCP Offer packet from multiple DHCP Servers. In addition, the address [1] specified in the DHCP Offer sent by DHCP Server may not be the final address to be distributed, and it will be kept by DHCP Server till the Client makes a request.

DHCP Client sends a DHCP Request via broadcast packet to formally request DHCP Server for address distribution, so that other DHCP Servers sending Offer packets can also receive the Request packet, thereby releasing the IP addresses that have been offered (pre-allocated) to DHCP Client.

DHCP client will send a DHCP Decline info packet to DHCP Server to refuse the address that has been used by others.

DHCP Server will send a DHCP NAK message to DHCP Client for an address re-application during the negotiation due to incorrect address info (e.g. moving into a new subnet, or date expiration).

Steps are as follows.

DHCP Client broadcasts a DHCP Discover message to DHCP Server. It will re-send the message if DHCP Server fails to respond to it.

Upon receiving the message, DHCP Server will distribute resources (e.g. IP address) according to strategies and send a DHCP Offer message to DHCP Client.

DHCP Client will send a DHCP Request to apply for the server lease, and inform other servers of accepting this distributed address.

DHCP Server will send a DHCP ACK message for distributable resources, or a DHCP NAK message for non-distributable resources. DHCP Client can use the resources once it receives the DHCP ACK message, or it will re-send a DHCP Discover message if a DHCP NAK message is received.

DHCP Snooping principle

By snooping on the DHCP interactive messages between Client and Server, DHCP Snooping function will monitor users behaviors and filter DHCP messages and illegal servers by reasonable configuration. The followings interpret the terms and functions of DHCP Snooping:

1) DHCP Snooping Trust Port: Given that DHCP obtains IP interactive messages by broadcast, there are illegal servers that influence users to obtain normal IP, and some of them even cheat users and steal information. As a result, DHCP Snooping classifies the ports as the Trust port and the Untrust port. Devices only forward the DHCP Reply messages received from the Trust ports and abandon those from Untrust ports, in order to set the legal ports linked with DHCP Servers as Trust ports and others as Untrust ports, thus blocking the illegal servers.

2. DHCP Snooping binding database: Setting IP address privately is commonly seen in DHCP network, which not only increases the network maintenance difficulty, but also results in legal users failing to access the network due to conflicts. By snooping on the interactive messages between Client and Server, the IP, MAC, VID, PORT, lease and other information obtained by users are compiled into a user record entry to form the DHCP Snooping database. With the use of ARP inspection or check function, users' accesses to Internet will be controlled.

DHCP Snooping inspects the validity of messages flowing through the devices, abandons illegal ones, records user information, and creates a binding database for other functional queries. Here are some types of illegal messages:

1) The DHCP Reply messages received by Untrust port, including DHCP ACK, DHCP NACK, DHCP OFFER, etc.

2) The DHCP Reply messages received by Untrust port with network management info [giaddr].

3) During MAC verification, the DHCP Client field values of the Source MAC and DHCP messages respectively represent different packets.

4) With user information saved in the DHCP Snooping binding database, DHCP Release message has inconsistent port info with that saved in the database by devices.

7.8 Security-Related Functions of DHCP Snooping

In DHCP network environment, administrators often find that users modify and use static IP addresses rather than dynamic IP addresses without permission. Therefore, some users using dynamic IP addresses fail to access network normally, which complicates network application environment and increases the management difficulty of administrators. DHCP dynamic binding is a secure process in which a device obtains information by recording the IP of a legal user during DHCP Snooping. There are three control types. The first is to bind the address of a legal user with IP Source Guard. The second is to use the software's DAI (Dynamic ARP Inspection) to check the validity of a user by controlling the ARP. The last is to bind the legal user's ARP message by ARP Check. Note: when using the IP Source Guard to bind the address, the number of DHCP users that a switch can support is limited by hardware entries. Legal users may fail to add hardware entries and use network properly due to too many users. All ARPs are forwarded and processed by CPU when using the DAI function, which will seriously affect the switch performance.

The address binding relation between DHCP Snooping and IP Source Guard

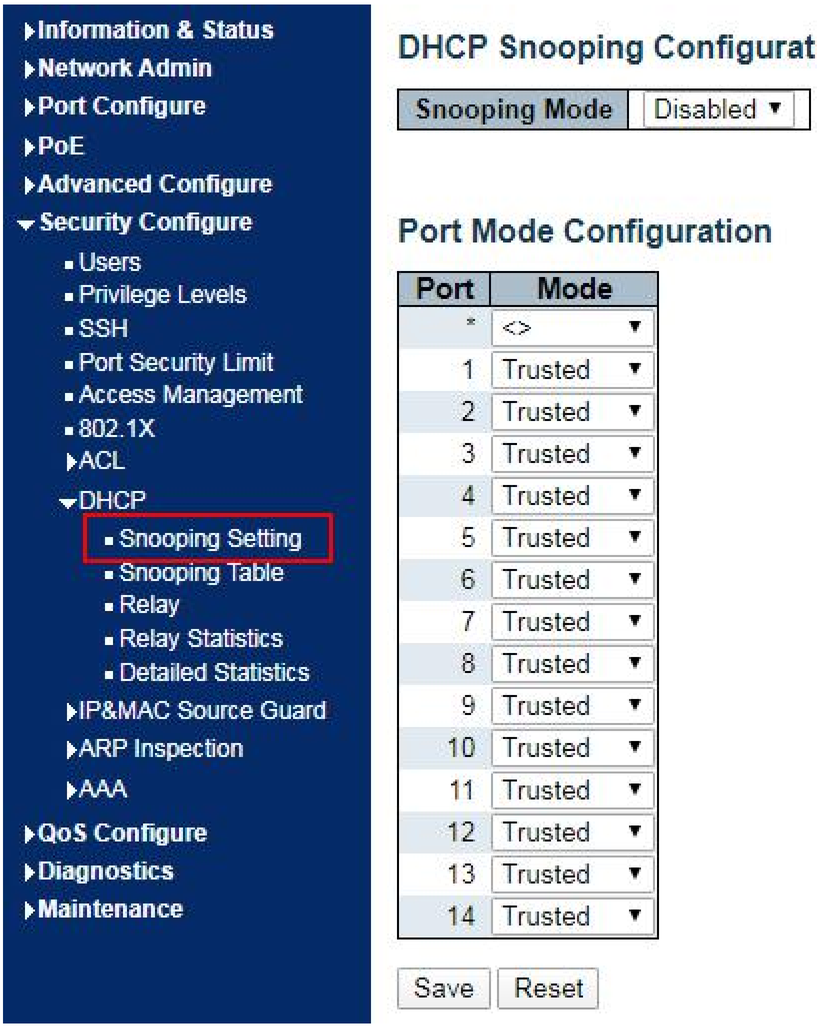
IP Source Guard maintains the IP Source address database by setting the user information [IP, MAC] in the database to the hardware filtering entries and restricting the users' network accesses. Please refer to the *IP&MAC Source Guard Configuration Section* for more info.

DHCP Snooping prevents users from setting up private IP addresses by snooping on DHCP process, maintaining the user IP database, and submitting the data to IP Source Guard for filtration to ensure that only users who obtain IP through DHCP have access to the network.

In addition, DHCP binding users' validity will be checked for higher security and problem prevention like ARP spoofing since DHCP binding filters IP messages only. Please refer to the *ARP Inspection Configuration Section* for more information.

7.8.1 DHCP Snooping

Click the "Security Configure-DHCP-Snooping Setting" as follows to check the switch configuration:



DHCP Snooping Configuration

Snooping Mode	Disabled

Port Mode Configuration

Port	Mode
*	<>
1	Trusted
2	Trusted
3	Trusted
4	Trusted
5	Trusted
6	Trusted
7	Trusted
8	Trusted
9	Trusted
10	Trusted
11	Trusted
12	Trusted
13	Trusted
14	Trusted

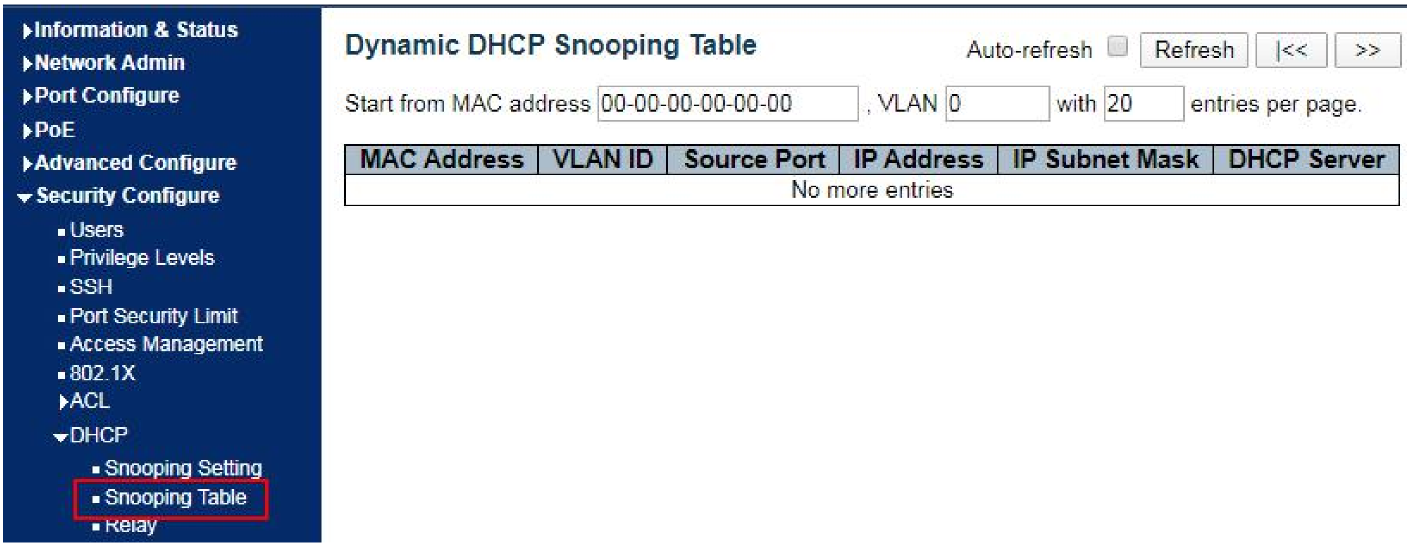
Interface data are as follows

Configuration Items	Description
DHCP Snooping Mode	Enable or disable DHCP Snooping.
Port Mode	Indicates the DHCP snooping port mode. Possible port modes are: **Trusted**: Configures the port as trusted source of the DHCP messages. **Untrusted**: Configures the port as untrusted source of the DHCP messages.

Click the "Save" to save all changes.

7.8.2 DHCP Snooping Table

Click the "Advanced Configure-DHCP-Snooping Table" to check the DHCP Snooping configuration as follows:



Dynamic DHCP Snooping Table

Start from MAC address 00-00-00-00-00-00 , VLAN 0 with 20 entries per page.

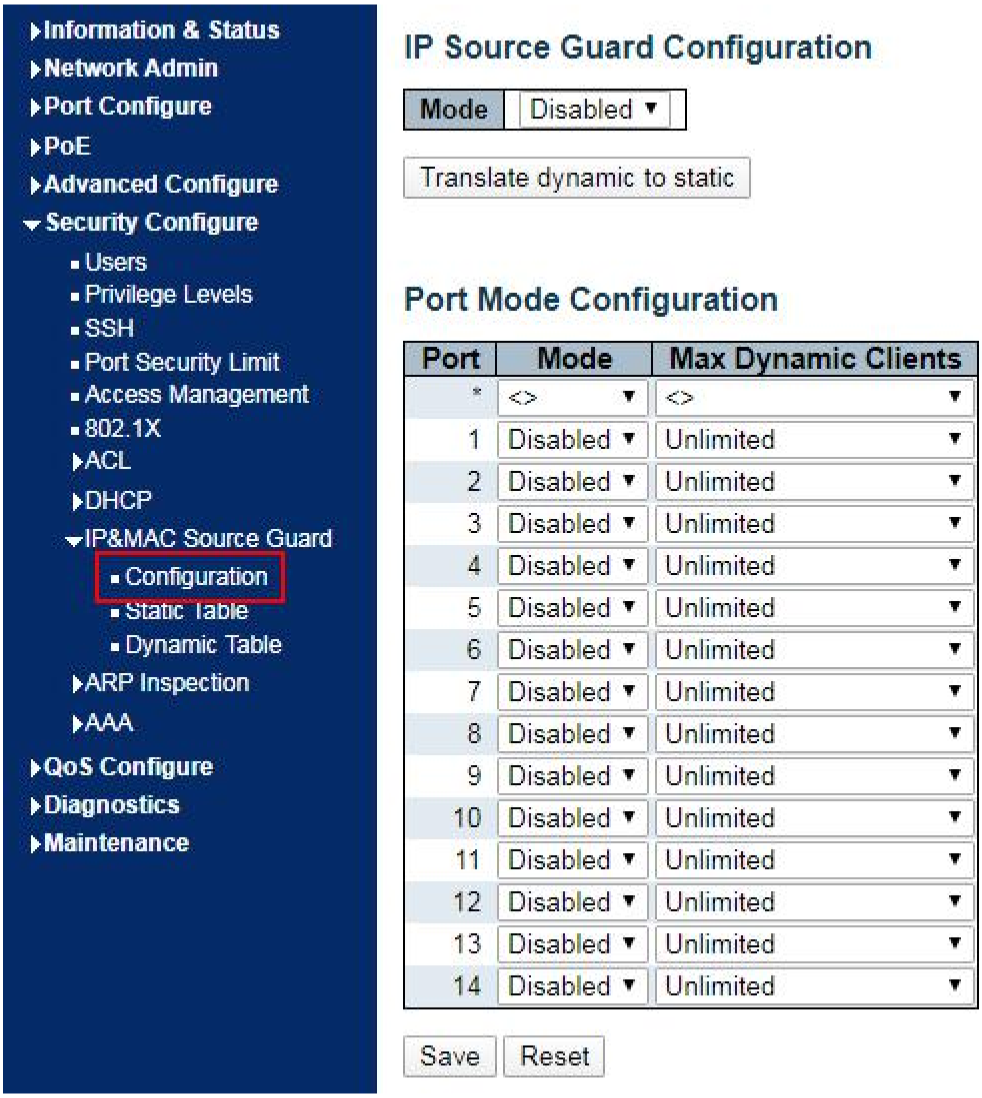
MAC Address	VLAN ID	Source Port	IP Address	IP Subnet Mask	DHCP Server
No more entries					

7.9 IP & MAC Source Guard

IP & MAC Source Guard maintains the Source IP & MAC binding database to filter the host messages based on Source IP & MAC on corresponding ports, thus ensuring the sole network access of the hosts of Source IP & MAC binding database.

7.9.1 Configuration

Click the “Security Configure-IP & MAC Source Guard-Configuration” as follows.



IP Source Guard Configuration

Mode: Disabled

Translate dynamic to static

Port Mode Configuration

Port	Mode	Max Dynamic Clients
*	<>	<>
1	Disabled	Unlimited
2	Disabled	Unlimited
3	Disabled	Unlimited
4	Disabled	Unlimited
5	Disabled	Unlimited
6	Disabled	Unlimited
7	Disabled	Unlimited
8	Disabled	Unlimited
9	Disabled	Unlimited
10	Disabled	Unlimited
11	Disabled	Unlimited
12	Disabled	Unlimited
13	Disabled	Unlimited
14	Disabled	Unlimited

Interface data are as follows.

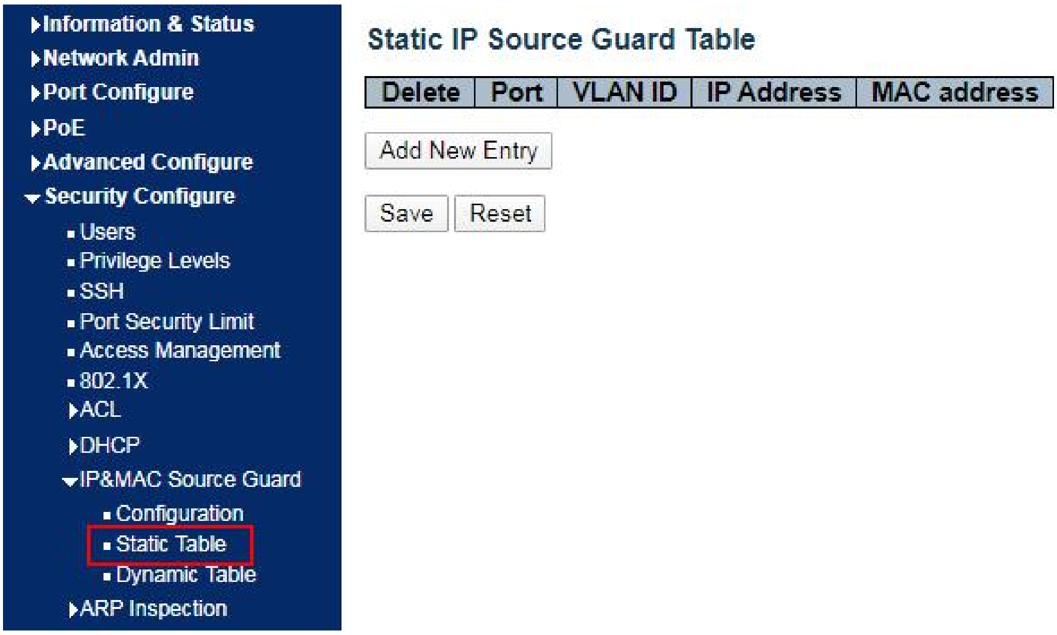
Configuration Items	Description
Global Pattern	Enable or disable IP & MAC Source Guard based on global pattern
Port Mode	Enable or disable IP & MAC Source Guard based on ports
Max Dynamic Clients	Select the max number of customers supported from: Unlimited, 0, 1, and 2.

“Save” and finish .

7.9.2 Static Table

Users can manually configure the binding entry of IP & MAC Guard to control the ports in this page.

Click the “Security Configure-IP & MAC Source Guard-Static Table” as follows.



Static IP Source Guard Table

Delete	Port	VLAN ID	IP Address	MAC address

Interface data are as follows

Configuration Items	Description
Port	Enter the port ID to be bound.
VLAN	Enter the VLAN ID to be bound.
IP Address	Enter the IP Address to be bound.
MAC Address	Enter the MAC Address to be bound.

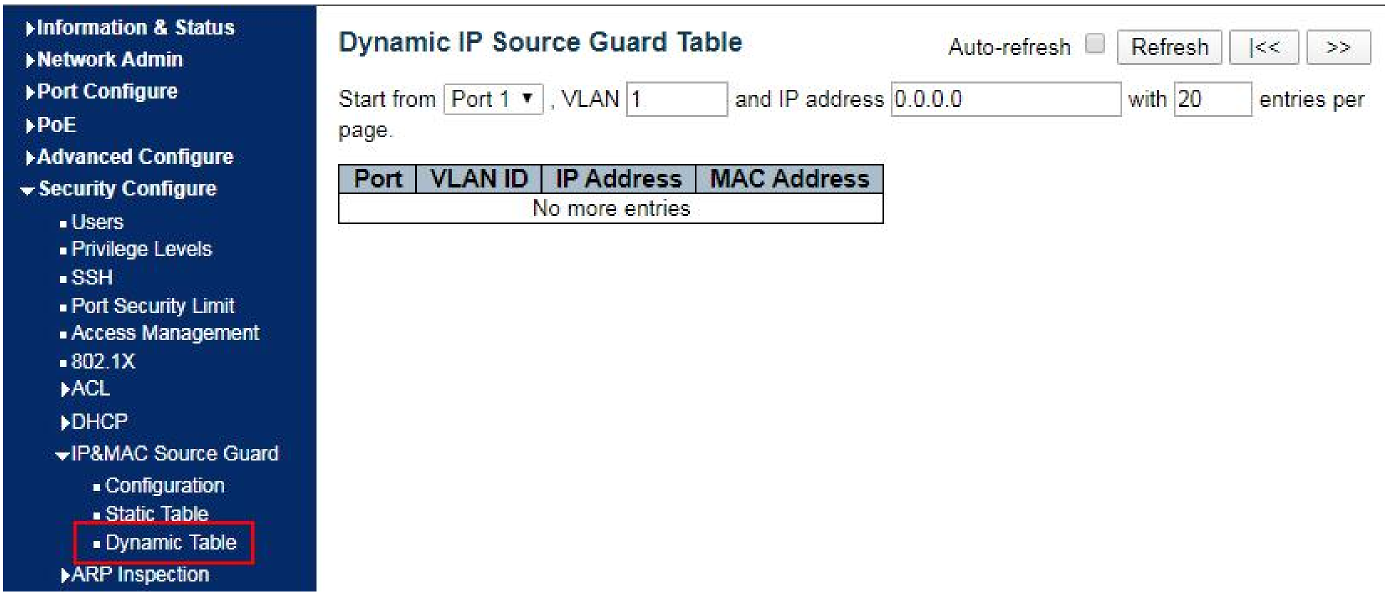
Click the “Add a New Entry” subject to the input info.

“Save” and finish.

7.9.3 Dynamic Table

Users can manually configure the binding entry of IP & MAC Guard to control the ports in this page.

Click the “Security Configure-IP & MAC Source Guard-Static Table” as follows.



Dynamic IP Source Guard Table

Start from Port 1 ▾ , VLAN 1 and IP address 0.0.0.0 with 20 entries per page.

Port	VLAN ID	IP Address	MAC Address
No more entries			

Interface data are as follows

Configuration Items	Description
Port	Display the port ID
VLAN	Display the VLAN ID
IP Address	Display the IP Address
MAC Address	Display the MAC Address

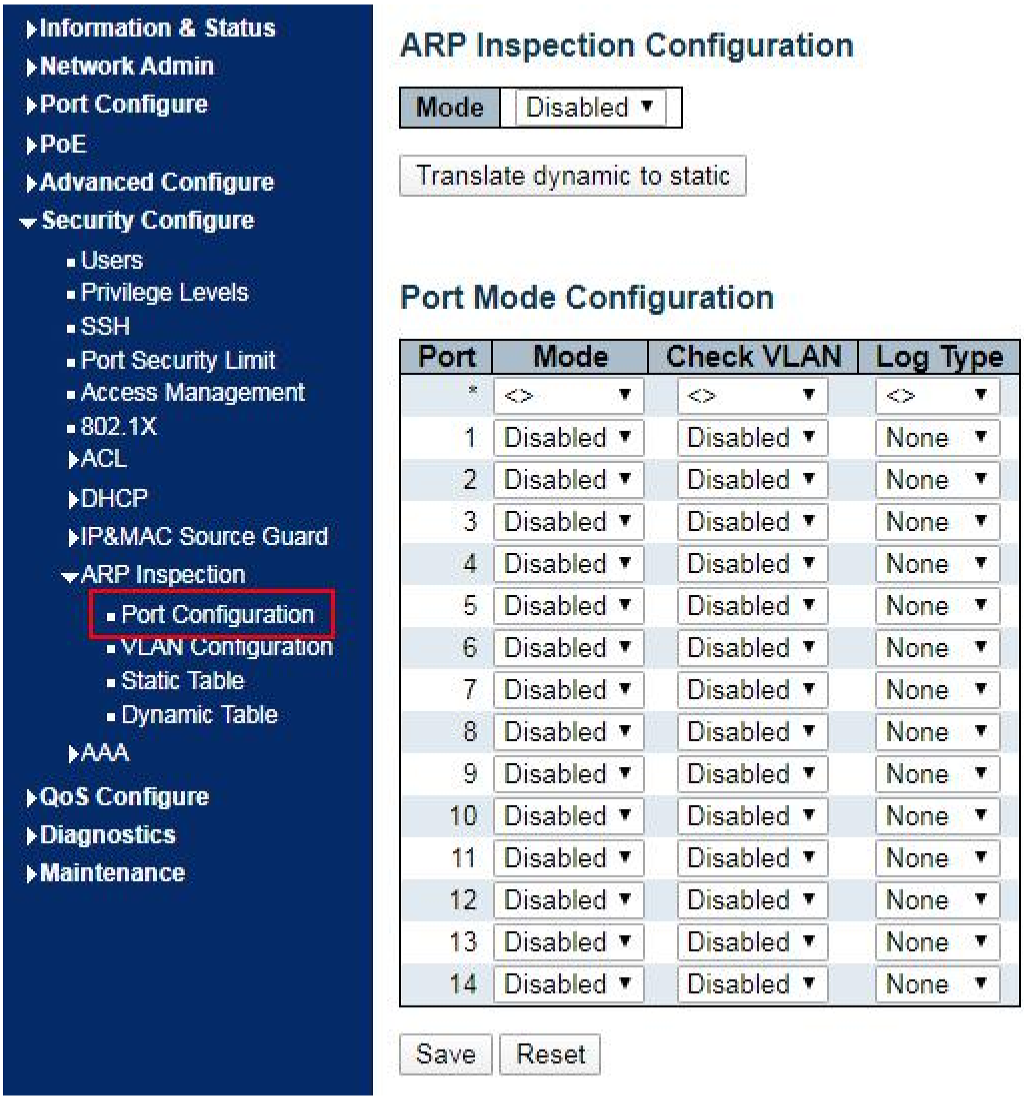
7.10 ARP Inspection

IP & MAC Source Guard maintains the Source IP & MAC binding database to filter the host messages based on Source IP & MAC on corresponding ports, thus ensuring the sole network access of the hosts of Source IP & MAC binding database.

7.10.1 Port Configuration

Users can edit the Port Configure in this page.

Click the “Security Configure-ARP Inspection-Port Configuration” as follows.



ARP Inspection Configuration

Mode: Disabled

Port Mode Configuration

Port	Mode	Check VLAN	Log Type
*	<>	<>	<>
1	Disabled	Disabled	None
2	Disabled	Disabled	None
3	Disabled	Disabled	None
4	Disabled	Disabled	None
5	Disabled	Disabled	None
6	Disabled	Disabled	None
7	Disabled	Disabled	None
8	Disabled	Disabled	None
9	Disabled	Disabled	None
10	Disabled	Disabled	None
11	Disabled	Disabled	None
12	Disabled	Disabled	None
13	Disabled	Disabled	None
14	Disabled	Disabled	None

Interface data are as follows

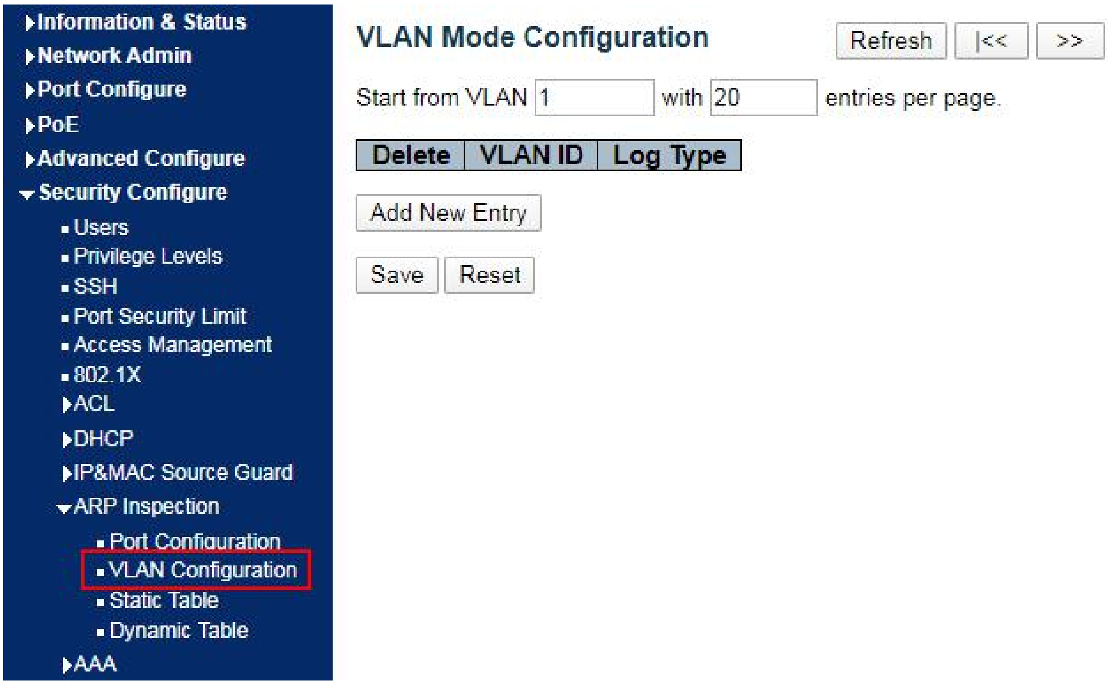
Configuration Items	Description
Global Pattern	Enable or disable ARP Inspection based on global pattern
Port Mode	Enable or disable ARP Inspection based on ports
Check VLAN	If you want to inspect the VLAN configuration, you have to enable the setting of "Check VLAN". The default setting of "Check VLAN" is disabled. When the setting of "Check VLAN" is disabled, the log type of ARP Inspection will refer to the port setting. And the setting of "Check VLAN" is enabled, the log type of ARP Inspection will refer to the VLAN setting. Possible setting of "Check VLAN" are: **Enabled**: Enable check VLAN operation. **Disabled**: Disable check VLAN operation.

Log Type	Only the Global Mode and Port Mode on a given port are enabled, and the setting of "Check VLAN" is disabled, the log type of ARP Inspection will refer to the port setting. There are four log types and possible types are: **None**: Log nothing. **Deny**: Log denied entries. **Permit**: Log permitted entries. **All:** Log all entries.

"Save" and finish.

7.10.2 VLAN Configuration

Click the "Security Configure-ARP Inspection-VLAN Configuration" as follows.



VLAN Mode Configuration

Refresh |<< >>

Start from VLAN 1 with 20 entries per page.

Delete	VLAN ID	Log Type

Add New Entry

Save Reset

Interface data are as follows

Configuration Items	Description
VLAN ID	Per-VLAN configuration of ARP Inspection
Log Type	Enable or disable ARP Inspection based on ports.
Check VLAN	Specify ARP Inspection is enabled on which VLANs. First, you have to enable the port setting on Port mode configuration web page. Only when both Global Mode and Port Mode on a given port are enabled, ARP Inspection is enabled on this given port. Second,

	you can specify which VLAN will be inspected on VLAN mode configuration web page. The log type also can be configured on per VLAN setting. Possible types are: **None**: Log nothing. **Deny**: Log denied entries. **Permit**: Log permitted entries. **All:** Log all entries.

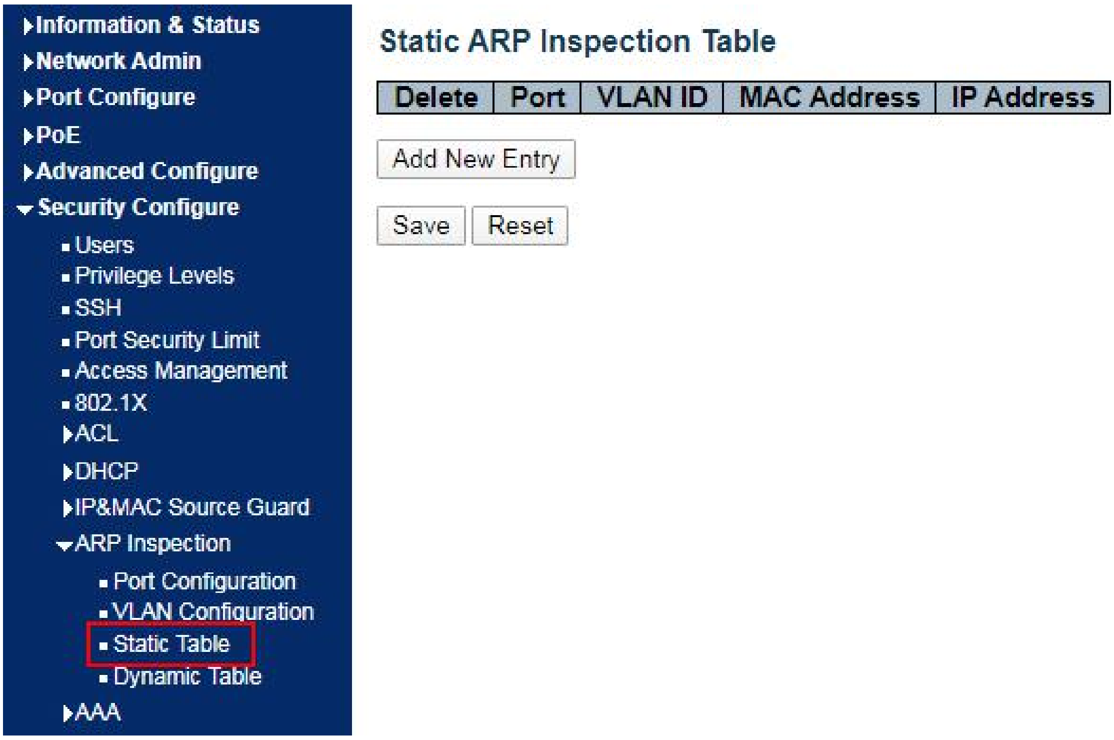
“Save” and finish.

Click the “Add New Entry” to create a new VLAN configuration.

7.10.3 Static Table

Users can manually configure the binding table of ARP Inspection to control the ports in this page.

Click the “Security Configure-ARP Inspection-Static Table” as follows.



Interface data are as follows

Configuration Items	Description
Port	Enter the port ID to be bound.

VLAN	Enter the VLAN ID to be bound.
IP Address	Enter the IP Address to be bound.
MAC Address	Enter the MAC Address to be bound.

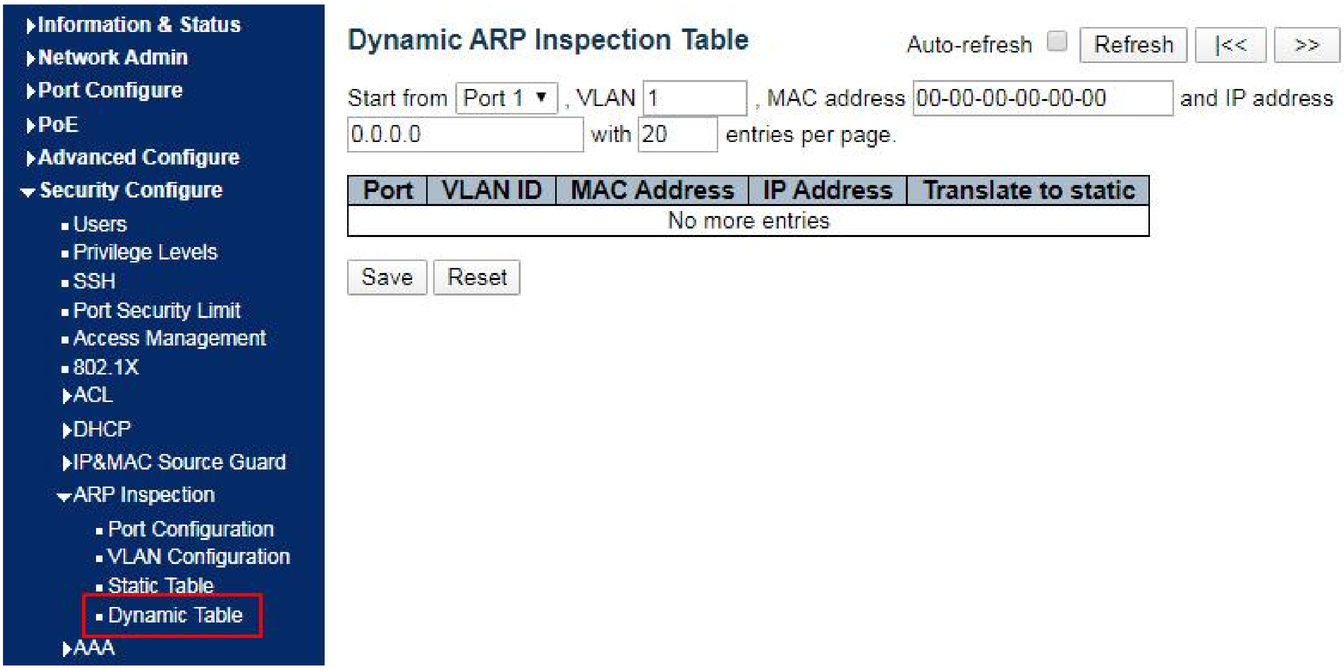
Click the “Add New Entry” subject to the input info.

“Save” and finish.

7.10.4 Dynamic Table

Users can manually configure the binding table of IP & MAC Guard to control the ports in this page.

Click the “Security Configure-ARP Inspection-Dynamic Table” as follows.



Dynamic ARP Inspection Table

Start from Port 1 ▾ , VLAN 1 , MAC address 00-00-00-00-00-00 and IP address 0.0.0.0 with 20 entries per page.

Port	VLAN ID	MAC Address	IP Address	Translate to static
No more entries				

Interface data are as follows

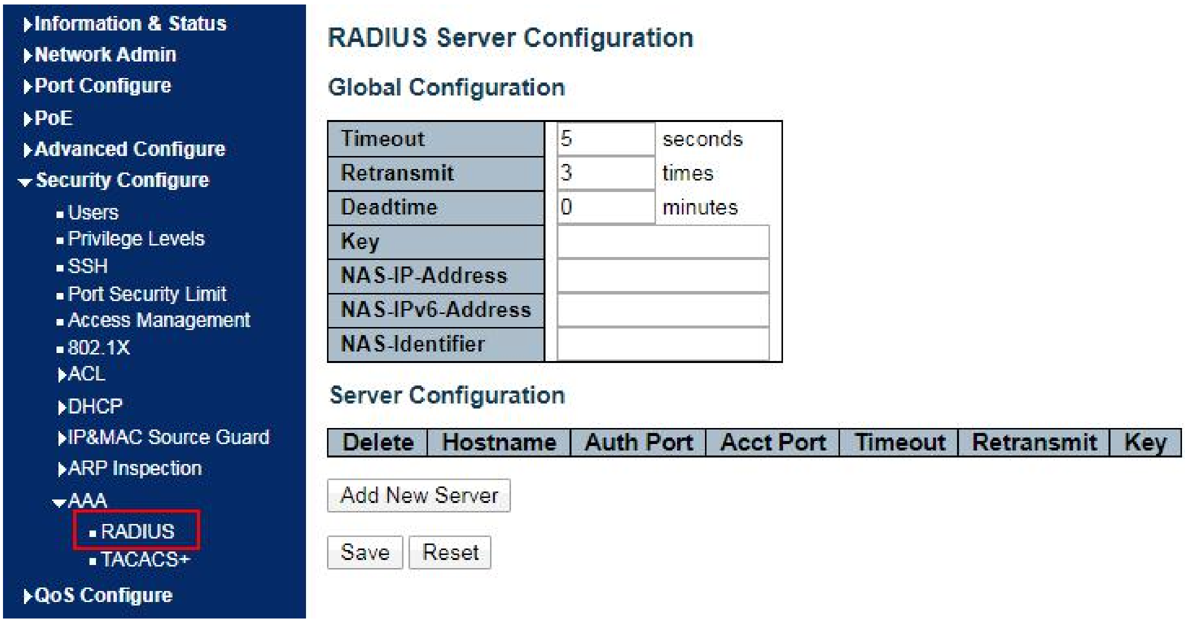
Configuration Items	Description
Port	Display the port ID
VLAN	Display the VLAN ID
IP Address	Display the IP Address
MAC Address	Display the MAC Address

7.11 AAA

AAA is the abbreviation of Authentication, Authorization and Accounting. It is a security management mechanism for network access control to provide three kinds of security services.

7.11.1 RADIUS

Click the “Security Configure-AAA-RADIUS” as follows:



RADIUS Server Configuration

Global Configuration

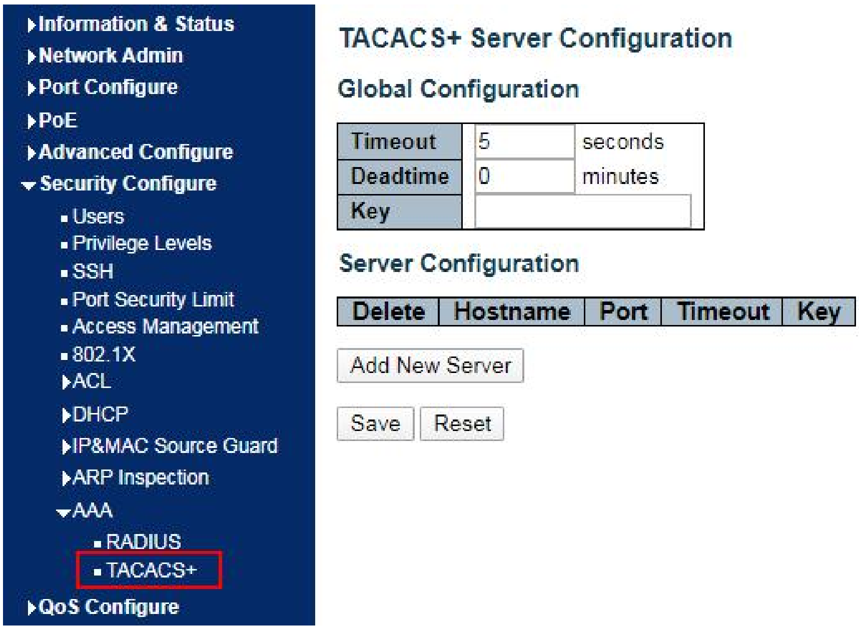
Timeout	5	seconds
Retransmit	3	times
Deadtime	0	minutes
Key		
NAS-IP-Address		
NAS-IPv6-Address		
NAS-Identifier		

Server Configuration

Delete	Hostname	Auth Port	Acct Port	Timeout	Retransmit	Key

7.11.1TACACS+

Click the “Security Configure-AAA- TACACS+” as follows:



TACACS+ Server Configuration

Global Configuration

Timeout	5	seconds
Deadtime	0	minutes
Key		

Server Configuration

Delete	Hostname	Port	Timeout	Key

8 QoS

QoS (Quality of Service) assesses the ability of service providers to meet customer needs and the ability of sending packets over the Internet. Diversified services can be assessed based on different aspects. QoS usually refers to the evaluation of service capabilities that support core requirements such as bandwidth, delay, delay variation, and packet loss rate during delivery. Bandwidth, also known as throughput, refers to the average rate of business flow in a given period of time, with the unit of kbit/s. Delay refers to the average time required for business flowing through the network. For a network device, the followings are general levels of delay requirements. There are two delay levels, that is, the high-priority business can be served as soon as possible by scheduling method of priority queue, while the low-priority business gets services after that. Delay variation refers to the time change of business flowing through the network. Packet loss rate refers to the percentage of lost business flow during transmission. As modern transmission systems are very reliable, information is often lost in network congestion. Packet loss due to queue overflow is the most common situation.

All messages in a traditional IP network are treated equally. Every network device processes messages on a FIFO basis, and makes every effort to send them to destinations without guaranteeing reliability, transfer delay, or other performance.

Network service quality is constantly improved as new applications keep springing up in the rapidly changing IP network. For example, VoIP, video and other delay-sensitive services have set higher standards on message transmission delay. Message transmission in a short period has been the common trend. In order to support voice, video and data services with different requirements, the network needs to identify business types and provide corresponding services.

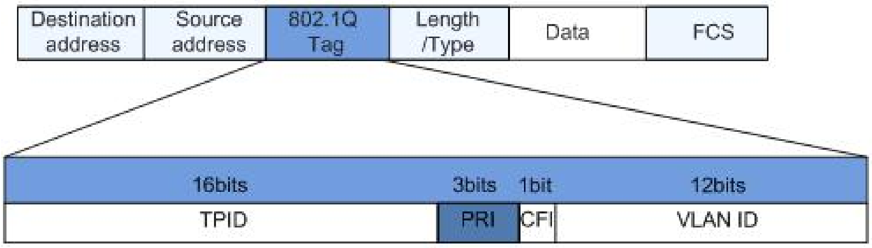
The ability to distinguish business types is the prerequisite to provide corresponding services, so the traditional best-effort service no longer meets the application needs. So QoS comes into being. It regulates the network flow to avoid and handle network congestion and reduce packet loss rate. Meanwhile, users can enjoy dedicated bandwidths while business can improve service quality, thus perfecting the network service capacity.

QoS priorities vary with message types. For instance, the VLAN message uses 802.1p, also known as the CoS (Class of Service) field, while the IP message uses DSCP. To maintain the priority, these fields need to be mapped at the gateway connected with various networks when messages flow through the network.

802.1p priority in the VLAN frame header

Typically, VLAN frames are interacted between Layer 2 devices. The PRI field (i.e. 802.1p priority), or CoS field, in the VLAN frame header identifies the quality of service requirements according to the definitions in IEEE 802.1Q.

802.1p priority in the VLAN frame

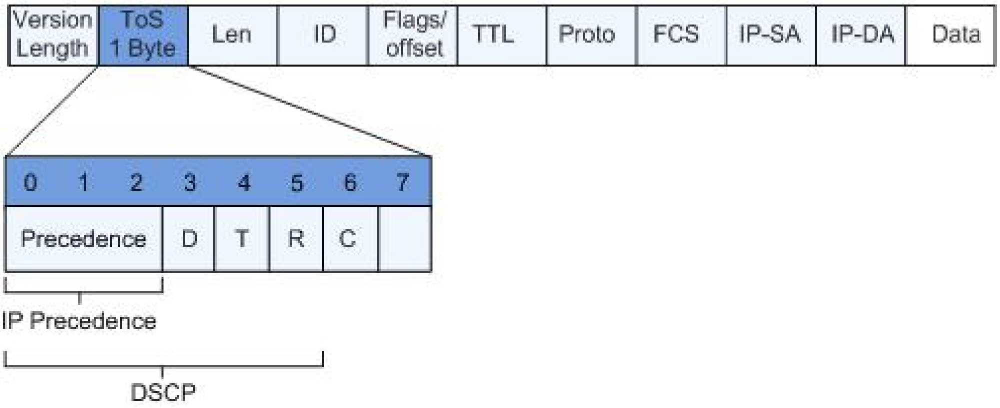


The 802.1Q header contains 3-bit PRI fields. PRI field defines 8 CoS of business priority ranging from 7 to 0 from high to low.

IP Precedence/DSCP Field

According to RFC791 definition, ToS (Type of Service) domain in the IP message header is composed of 8 bits. Among them, the 3-bit long Precedence field, as located in the following, identifies the IP message priority.

IP Precedence/DSCP Field



0 to 2 bits are Precedence fields representing the 8 priorities of message transmission ranging from 7 to 0 from high to low, with either Level 7 or 6 as the highest priority that is generally reserved for routing or updating network control communication. User-level applications only have access to Level 0 to 5.

ToS domain, in addition to Precedence fields, also includes D, T and R bits: D-bit represents the Delay requirement (0 for normal delay and 1 for low delay). T-bit represents the throughput (0 for normal throughput and 1 for high throughput). R-bit represents the reliability (0 for normal reliability and 1 for high reliability). ToS domain reserves the 6 and 7 bits.

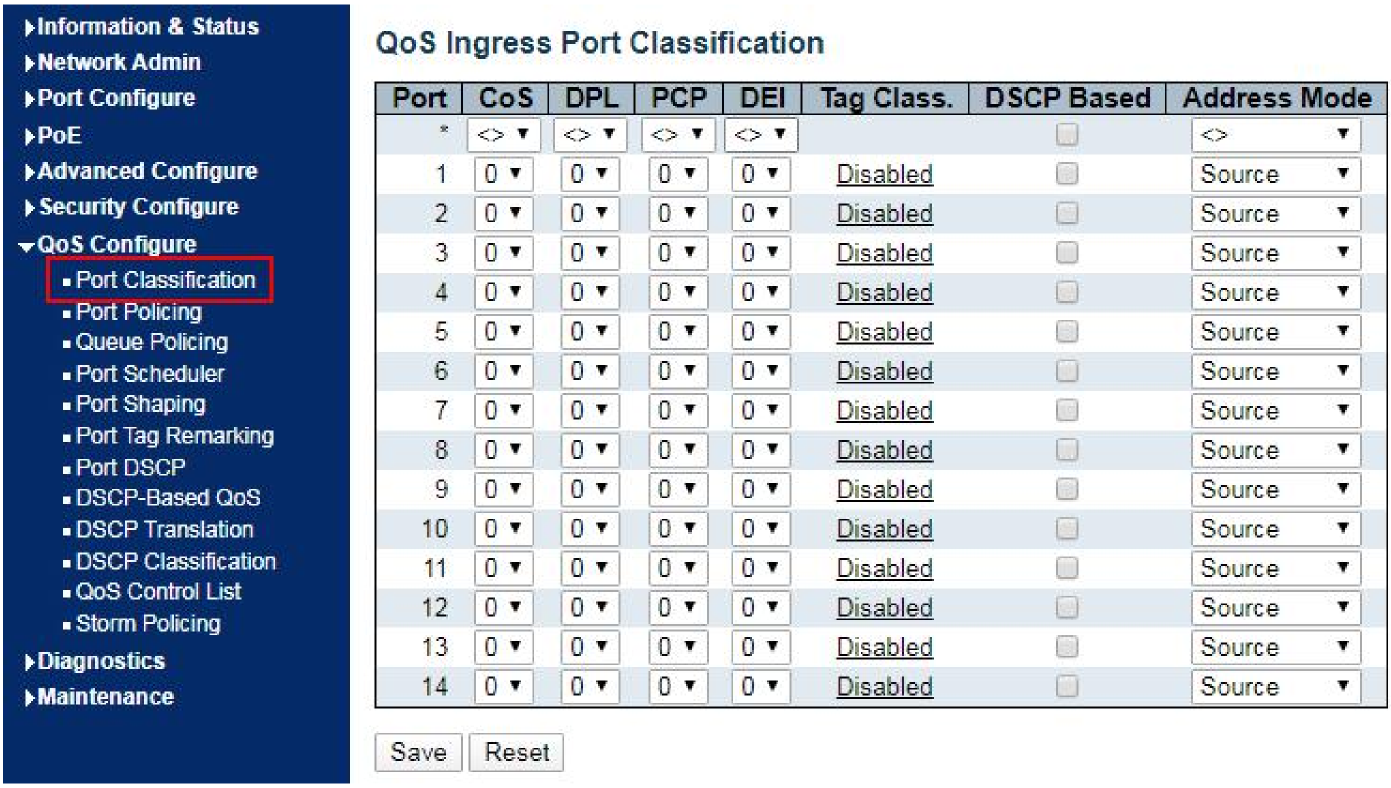
RFC1349 redefines the ToS domain by adding a C-bit to represent the Monetary Cost. The IETF DiffServ group then redefines the 0 to 5 bits of ToS domain in the IPv4 message header of RFC2474 as DSCP and renames it as DS (Differentiated Service) byte as shown in the figure above.

The first 6 bits (0-5 bits) of DS field distinguish the DSCP (DS Code Point), and the higher 2 bits (6-7 bits) are reserved. The lower 3 bits (0-2 bits) are CSCP (Class Selector Code Point), with the same CSCP value representing the DSCP of the same class. DS nodes select corresponding PHB (Per-Hop Behavior) according to DSCP values.

8.1 Port Classification

The switch configures 802.1p priority by default and distributes the info such as DPL, PCP and DEI to each port. The priority and valid priority are marked as 0 (the lowest) and 7 (the highest).

Click the "QoS Configure-Port Classification" as follows:



QoS Ingress Port Classification

Port	CoS	DPL	PCP	DEI	Tag Class.	DSCP Based	Address Mode
*	<>	<>	<>	<>		□	<>
1	0	0	0	0	Disabled	□	Source
2	0	0	0	0	Disabled	□	Source
3	0	0	0	0	Disabled	□	Source
4	0	0	0	0	Disabled	□	Source
5	0	0	0	0	Disabled	□	Source
6	0	0	0	0	Disabled	□	Source
7	0	0	0	0	Disabled	□	Source
8	0	0	0	0	Disabled	□	Source
9	0	0	0	0	Disabled	□	Source
10	0	0	0	0	Disabled	□	Source
11	0	0	0	0	Disabled	□	Source
12	0	0	0	0	Disabled	□	Source
13	0	0	0	0	Disabled	□	Source
14	0	0	0	0	Disabled	□	Source

Interface data are as follows.

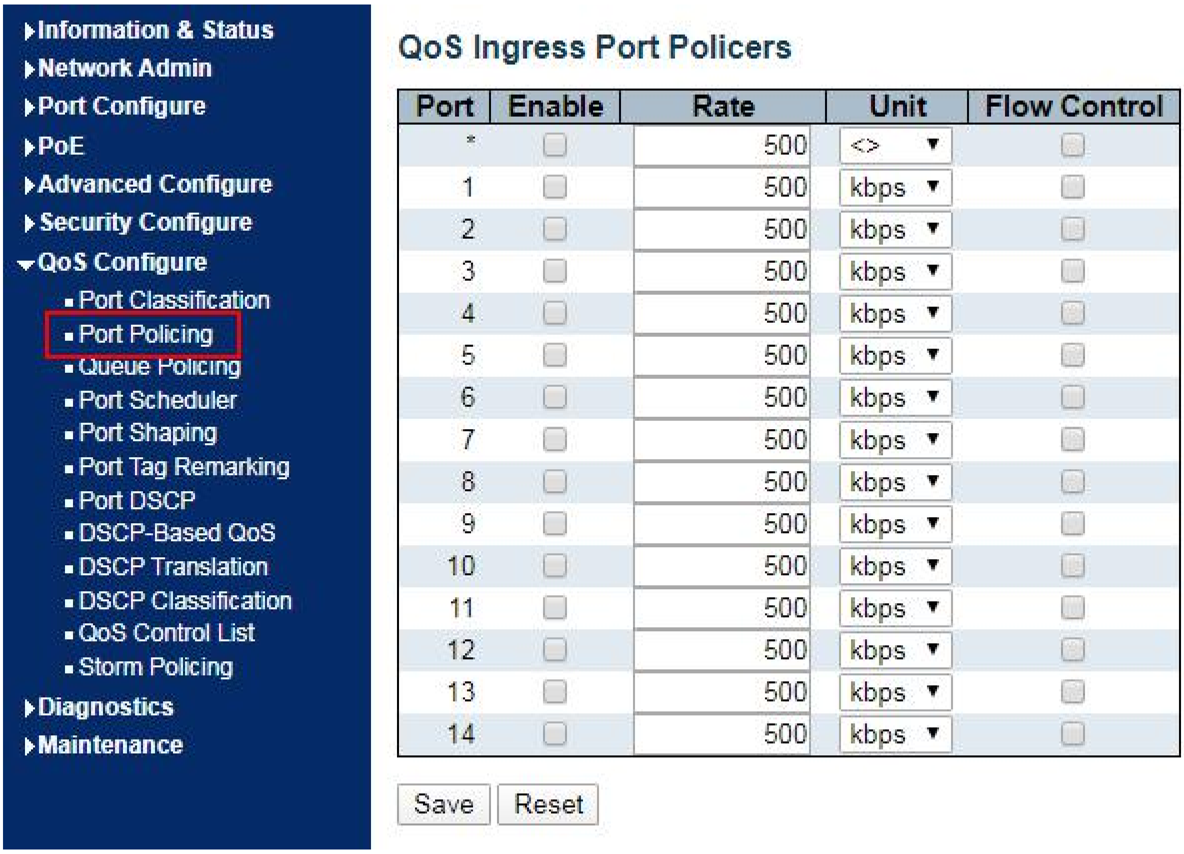
Configuration Items	Description
CoS	Controls the default class of service. All frames are classified to a CoS. There is a one to one mapping between CoS, queue and priority. A CoS of 0 (zero) has the lowest priority The classified CoS can be overruled by a QCL entry. Note: If the default CoS has been dynamically changed, then the actual default CoS is shown

	in parentheses after the configured default CoS.
DPL	Controls the default drop precedence level. All frames are classified to a drop precedence level. The classified DPL can be overruled by a QCL entry.
PCP	Controls the default PCP value. All frames are classified to a PCP value. If the port is VLAN aware and the frame is tagged, then the frame is classified to the PCP value in the tag. Otherwise the frame is classified to the default PCP value.
DEI	Controls the default DEI value. All frames are classified to a DEI value. If the port is VLAN aware and the frame is tagged, then the frame is classified to the DEI value in the tag. Otherwise the frame is classified to the default DEI value.
Address Mode	The IP/MAC address mode specifying whether the QCL classification must be based on source (SMAC/SIP) or destination (DMAC/DIP) addresses on this port. The allowed values are: Source: Enable SMAC/SIP matching. Destination: Enable DMAC/DIP matching.

“Save” and finish.

8.2 Port Policing

Click the “QoS Configure-Port Policing” as follows:



QoS Ingress Port Policers

Port	Enable	Rate	Unit	Flow Control
*	□	500	<>	□
1	□	500	kbps	□
2	□	500	kbps	□
3	□	500	kbps	□
4	□	500	kbps	□
5	□	500	kbps	□
6	□	500	kbps	□
7	□	500	kbps	□
8	□	500	kbps	□
9	□	500	kbps	□
10	□	500	kbps	□
11	□	500	kbps	□
12	□	500	kbps	□
13	□	500	kbps	□
14	□	500	kbps	□

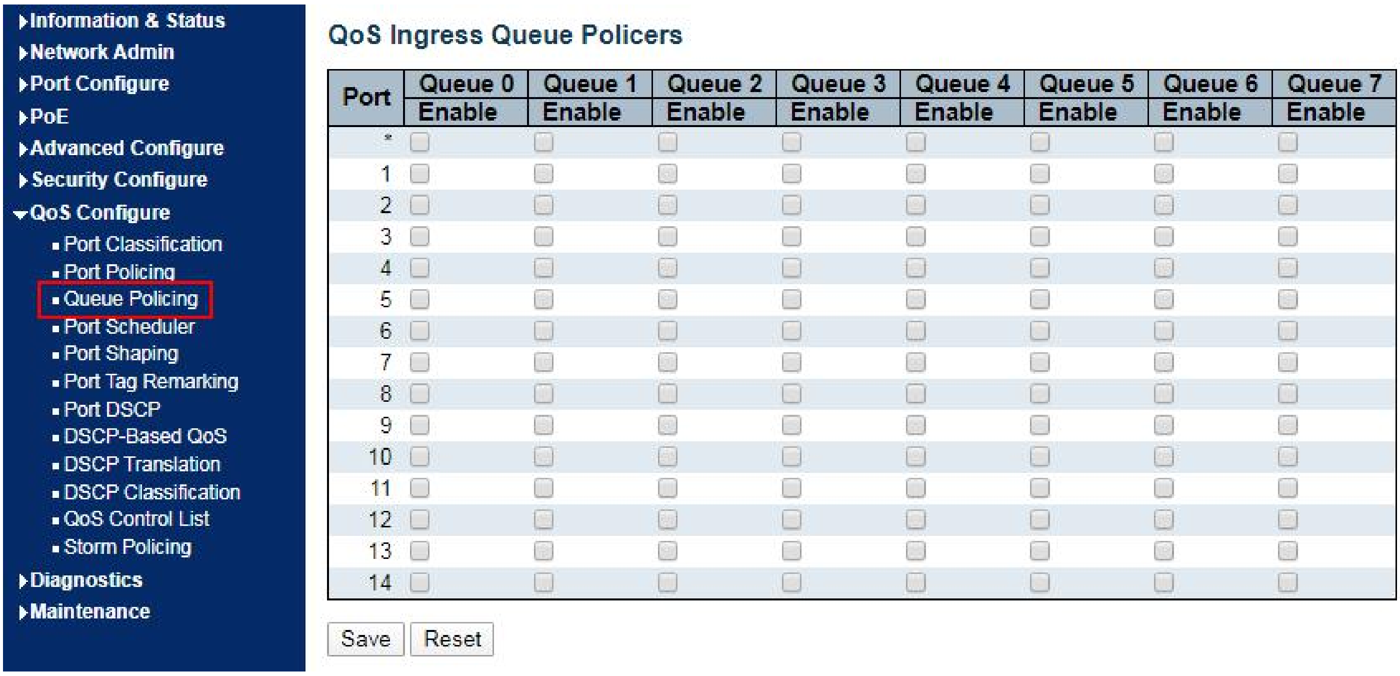
Interface data are as follows.

Configuration Items	Description
Enabled	Enable or disable the port ingress Policing.
Rate	Controls the rate for the policer. The default value is 500. This value is restricted to 100-1,000,000 when the “Unit” is “kbps” or “fps”, and it is restricted to 1-3,300 when the “Unit” is “Mbps” or “kfps”.
Unit	Controls the unit of measure for the policer rate as kbps, Mbps, fps or kfps. The default value is “kbps”.
Flow Control	If flow control is enabled and the port is in flow control mode, then pause frames are sent instead of discarding frames.

“Save” and finish.

8.3 Queue Policing

Click the “QoS Configure-Queue Policing” as follows:



QoS Ingress Queue Policers

Port	Queue 0 Enable	Queue 1 Enable	Queue 2 Enable	Queue 3 Enable	Queue 4 Enable	Queue 5 Enable	Queue 6 Enable	Queue 7 Enable
*	□	□	□	□	□	□	□	□
1	□	□	□	□	□	□	□	□
2	□	□	□	□	□	□	□	□
3	□	□	□	□	□	□	□	□
4	□	□	□	□	□	□	□	□
5	□	□	□	□	□	□	□	□
6	□	□	□	□	□	□	□	□
7	□	□	□	□	□	□	□	□
8	□	□	□	□	□	□	□	□
9	□	□	□	□	□	□	□	□
10	□	□	□	□	□	□	□	□
11	□	□	□	□	□	□	□	□
12	□	□	□	□	□	□	□	□
13	□	□	□	□	□	□	□	□
14	□	□	□	□	□	□	□	□

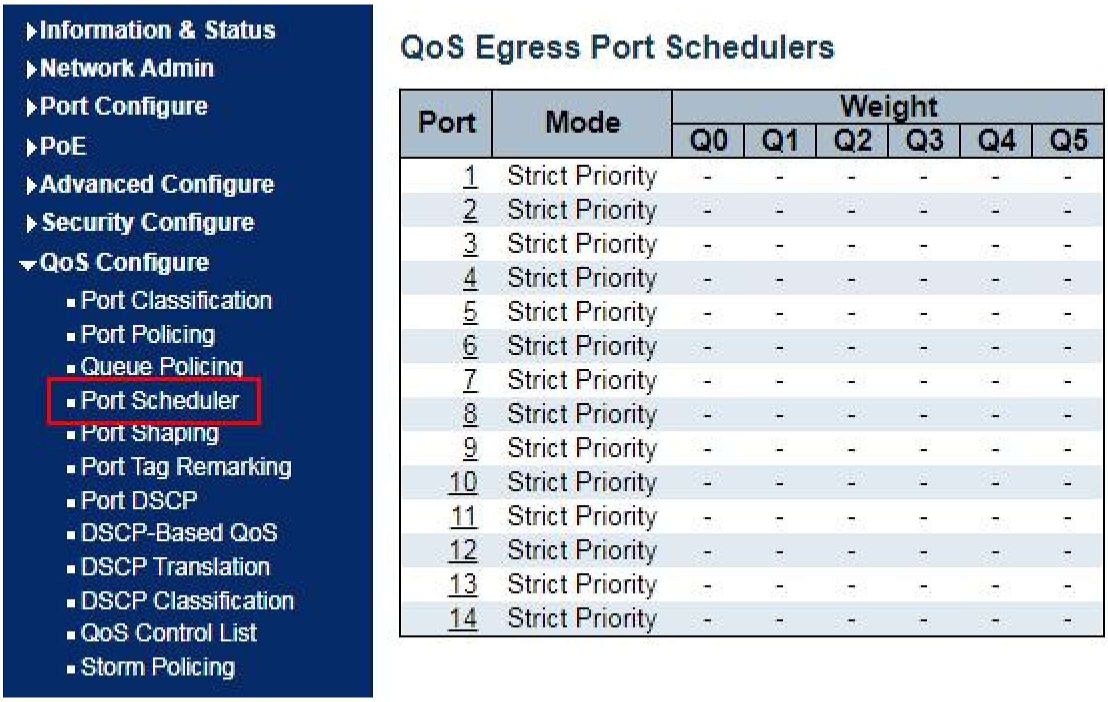
Interface data are as follows.

Configuration Items	Description
Queue0-7	Ingress queue policers

“Save” and finish.

8.4 Port Scheduler

Click the “QoS Configure-Port Scheduler” as follows:



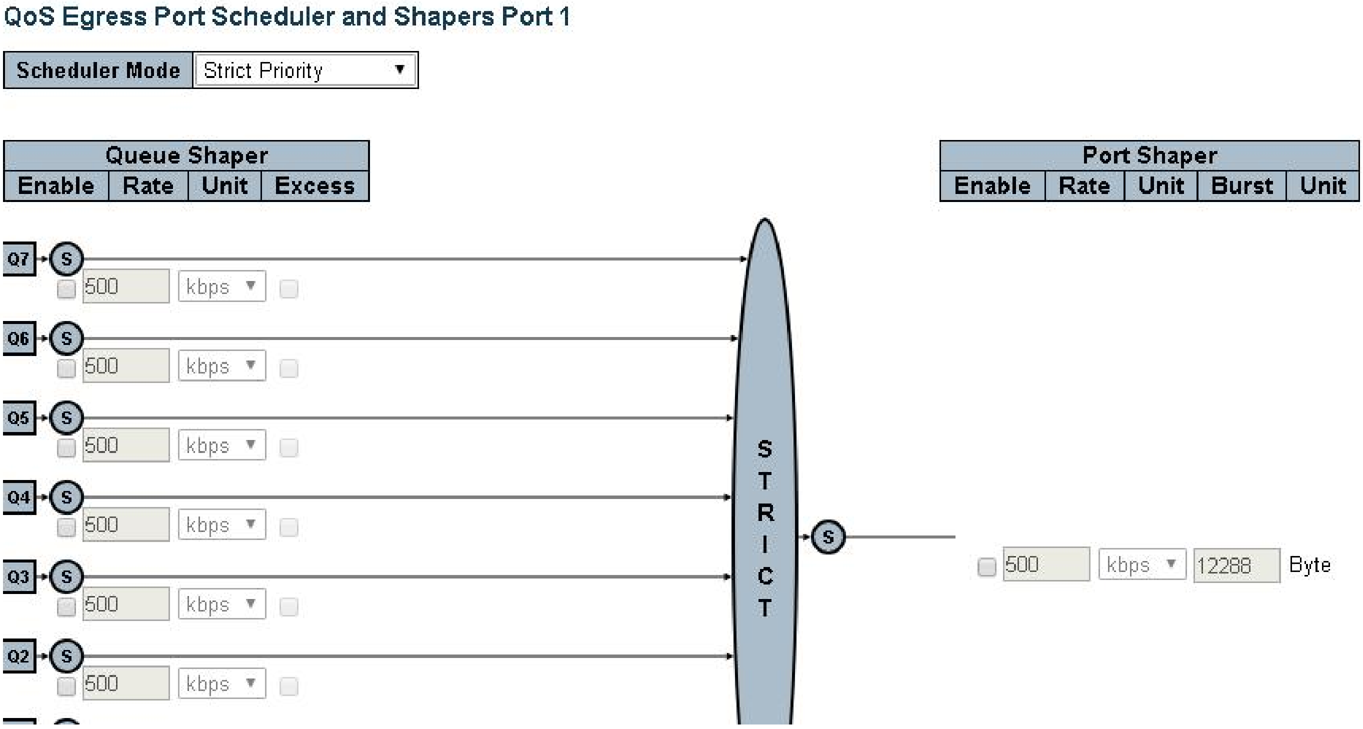
QoS Egress Port Schedulers

Port	Mode	Weight					
		Q0	Q1	Q2	Q3	Q4	Q5
1	Strict Priority	-	-	-	-	-	-
2	Strict Priority	-	-	-	-	-	-
3	Strict Priority	-	-	-	-	-	-
4	Strict Priority	-	-	-	-	-	-
5	Strict Priority	-	-	-	-	-	-
6	Strict Priority	-	-	-	-	-	-
7	Strict Priority	-	-	-	-	-	-
8	Strict Priority	-	-	-	-	-	-
9	Strict Priority	-	-	-	-	-	-
10	Strict Priority	-	-	-	-	-	-
11	Strict Priority	-	-	-	-	-	-
12	Strict Priority	-	-	-	-	-	-
13	Strict Priority	-	-	-	-	-	-
14	Strict Priority	-	-	-	-	-	-

Interface data are as follows.

Configuration items	Description
QoS Egress Port Schedulers	Egress port schedulers

Click the “1”



QoS Egress Port Scheduler and Shapers Port 1

Scheduler Mode: Strict Priority

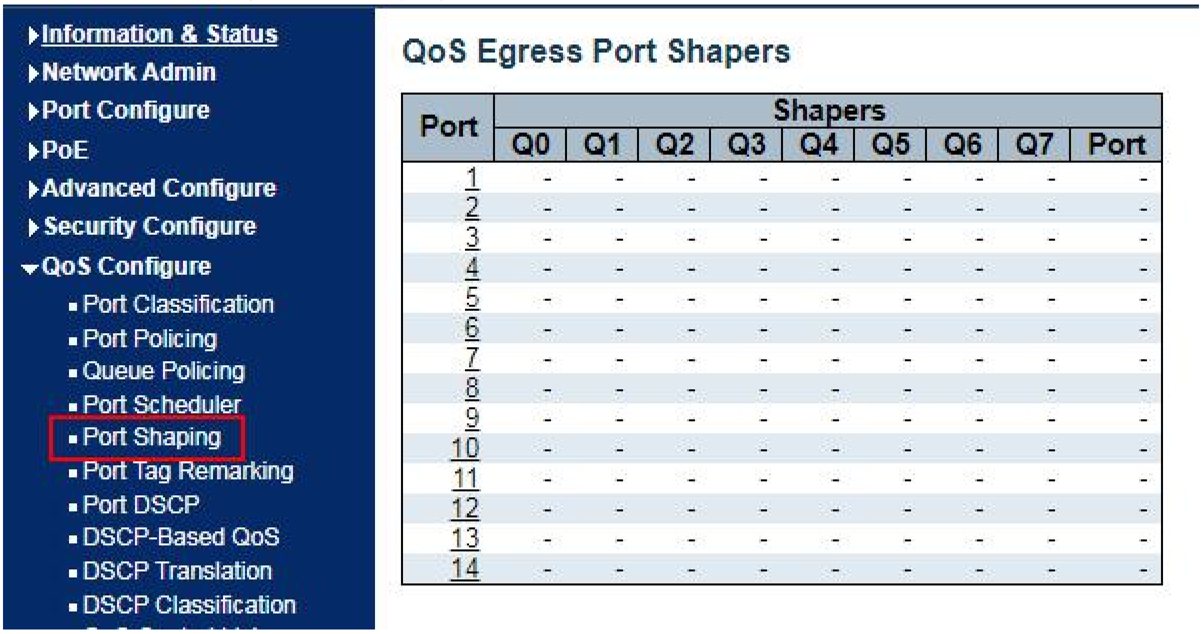
Queue Shaper				
	Enable	Rate	Unit	Excess
Q7	□	500	kbps	□
Q6	□	500	kbps	□
Q5	□	500	kbps	□
Q4	□	500	kbps	□
Q3	□	500	kbps	□
Q2	□	500	kbps	□

Port Shaper				
Enable	Rate	Unit	Burst	Unit
□	500	kbps	12288	Byte

“Save” and finish.

8.5 Port Shaping

Click the “QoS Configure-Port Shaping” as follows:



QoS Egress Port Shapers

Port	Shapers								
	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Port
1	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-

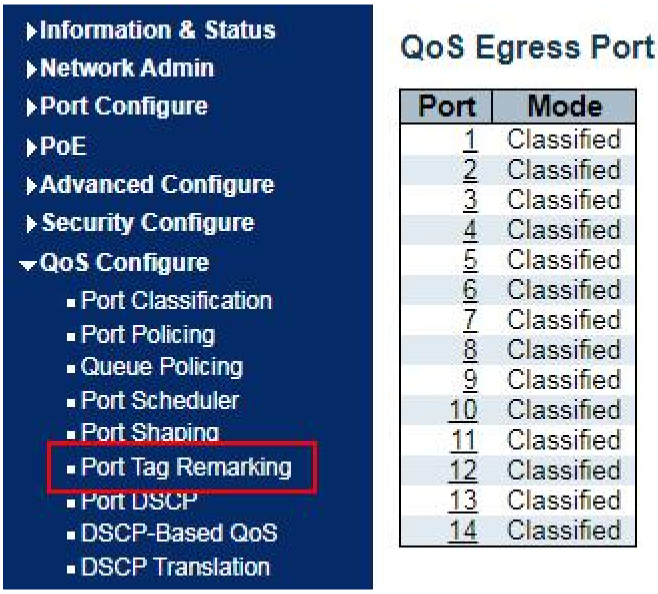
Interface data are as follows.

Configuration Items	Description
Scheduler Mode	Select the egress port scheduler from static and WRR

“Save” and finish.

8.6 Port Tag Remarking

Click the “QoS Configure-Port Tag Remarking” as follows:



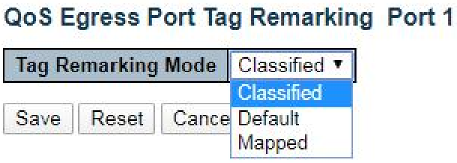
QoS Egress Port Tag Remarking

Port	Mode
1	Classified
2	Classified
3	Classified
4	Classified
5	Classified
6	Classified
7	Classified
8	Classified
9	Classified
10	Classified
11	Classified
12	Classified
13	Classified
14	Classified

Interface data are as follows.

Configuration Items	Description
QoS Egress Port Tag Remarking	Egress port tag remarking

Click the “1”

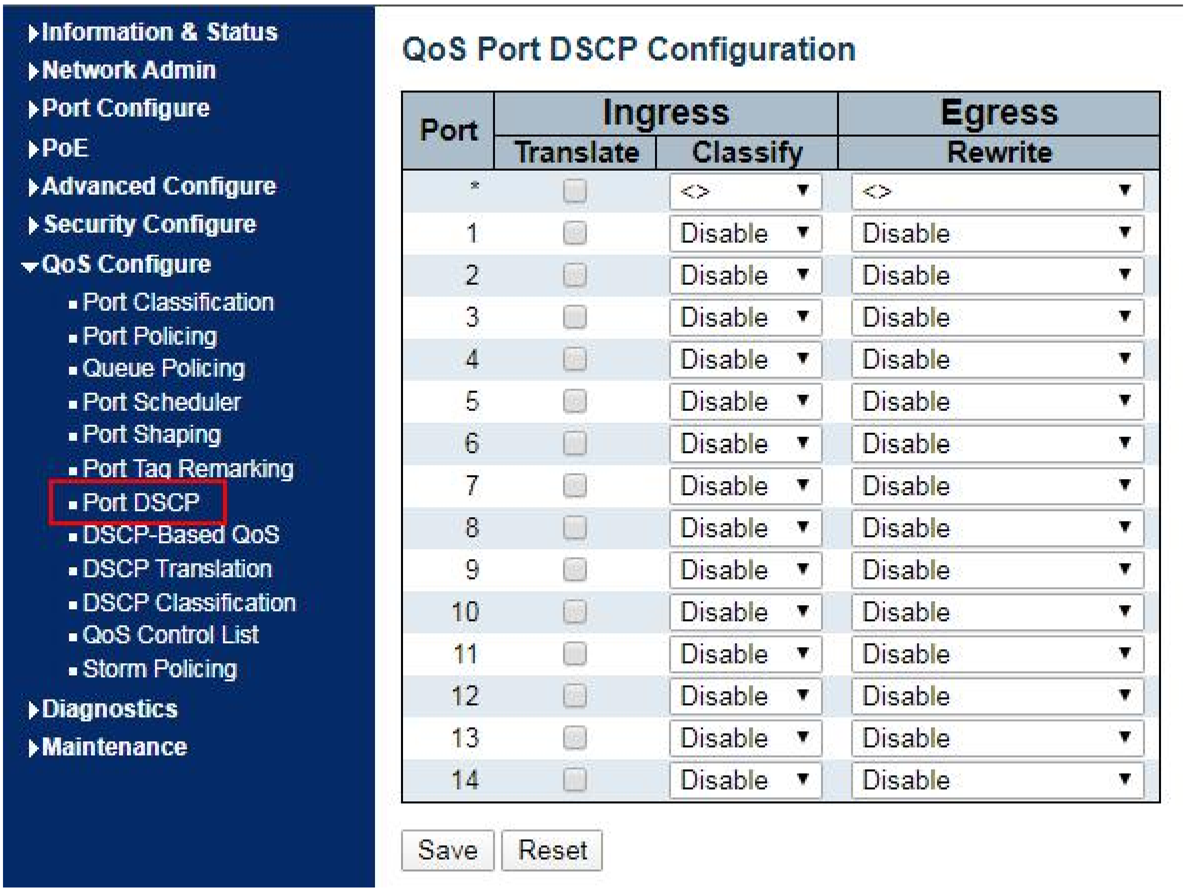

QoS Egress Port Tag Remarking Port 1

Tag Remarking Mode	Classified ▾

“Save” and finish.

8.7 Port DSCP

Click the “QoS Configure-Port DSCP” as follows:



QoS Port DSCP Configuration

Port	Ingress		Egress
	Translate	Classify	Rewrite
*	☐	<>	<>
1	☐	Disable	Disable
2	☐	Disable	Disable
3	☐	Disable	Disable
4	☐	Disable	Disable
5	☐	Disable	Disable
6	☐	Disable	Disable
7	☐	Disable	Disable
8	☐	Disable	Disable
9	☐	Disable	Disable
10	☐	Disable	Disable
11	☐	Disable	Disable
12	☐	Disable	Disable
13	☐	Disable	Disable
14	☐	Disable	Disable

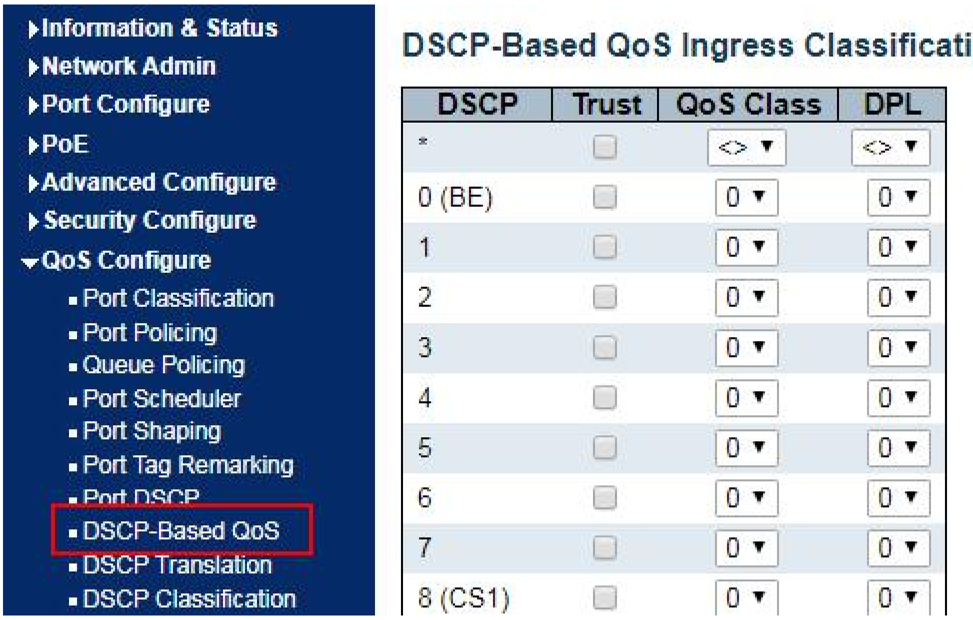
Interface data are as follows.

Configuration Items	Description
QoS Port DSCP Configuration	DSCP rewrite

“Save” and finish.

8.8 DSCP-Based QoS

Click the “QoS Configure- DSCP-Based QoS” as follows:



DSCP-Based QoS Ingress Classification

DSCP	Trust	QoS Class	DPL
*	□	<>	<>
0 (BE)	□	0	0
1	□	0	0
2	□	0	0
3	□	0	0
4	□	0	0
5	□	0	0
6	□	0	0
7	□	0	0
8 (CS1)	□	0	0

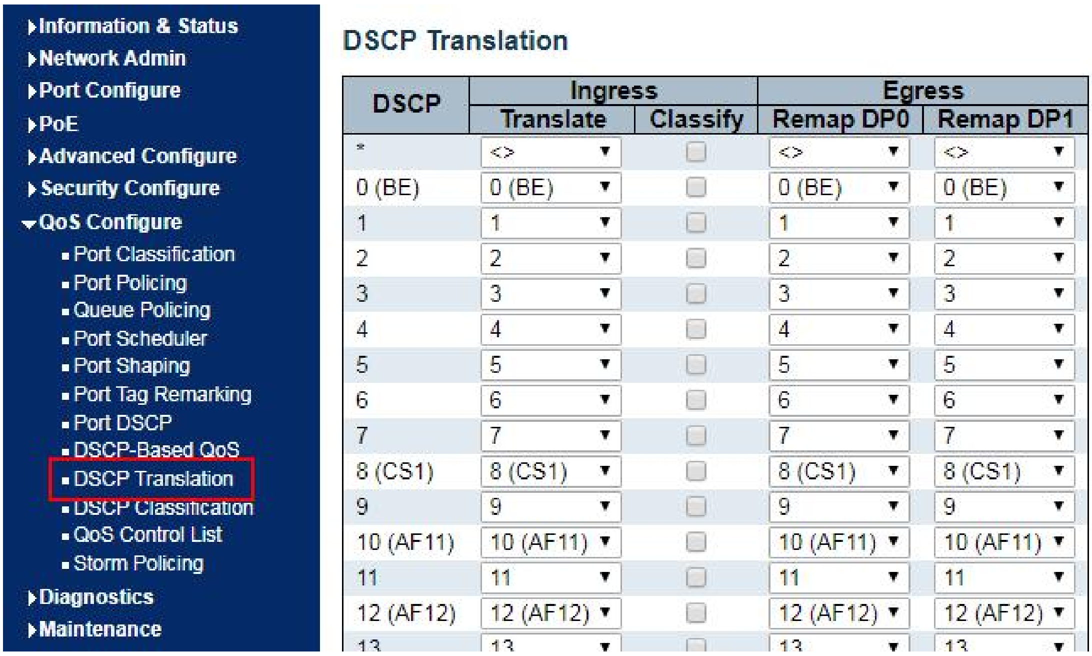
Interface data are as follows.

Configuration Items	Description
DSCP-Based QoS Ingress Classification	Select a trusted DSCP

“Save” and finish.

8.9 DSCP Translation

Click the “QoS Configure-DSCP Translation” as follows:



DSCP Translation

DSCP	Ingress		Egress	
	Translate	Classify	Remap DP0	Remap DP1
*	<>	□	<>	<>
0 (BE)	0 (BE)	□	0 (BE)	0 (BE)
1	1	□	1	1
2	2	□	2	2
3	3	□	3	3
4	4	□	4	4
5	5	□	5	5
6	6	□	6	6
7	7	□	7	7
8 (CS1)	8 (CS1)	□	8 (CS1)	8 (CS1)
9	9	□	9	9
10 (AF11)	10 (AF11)	□	10 (AF11)	10 (AF11)
11	11	□	11	11
12 (AF12)	12 (AF12)	□	12 (AF12)	12 (AF12)
13	13	□	13	13

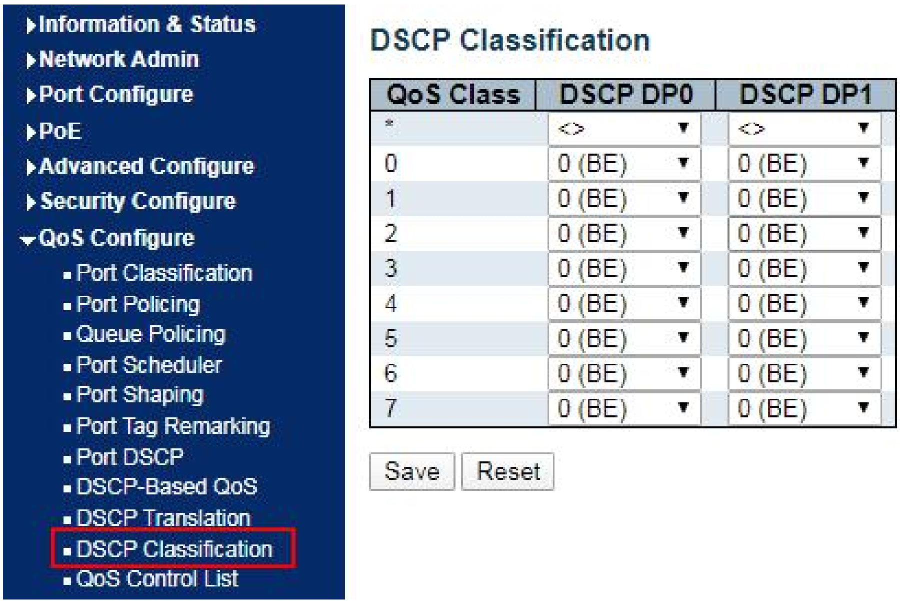
Interface data are as follows.

Configuration Items	Description
DSCP Translation	DSCP Translation

“Save” and finish.

8.10 DSCP Classification

Click the “QoS Configuration-DSCP Classification” as follows:



DSCP Classification

QoS Class	DSCP DP0	DSCP DP1
*	<>	<>
0	0 (BE)	0 (BE)
1	0 (BE)	0 (BE)
2	0 (BE)	0 (BE)
3	0 (BE)	0 (BE)
4	0 (BE)	0 (BE)
5	0 (BE)	0 (BE)
6	0 (BE)	0 (BE)
7	0 (BE)	0 (BE)

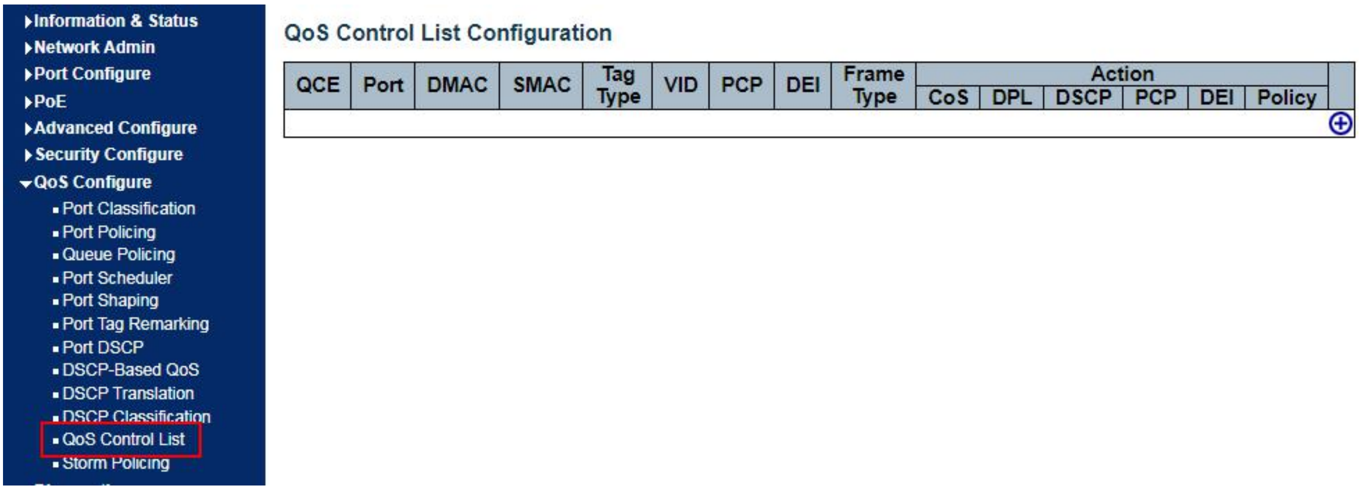
Interface data are as follows.

Configuration Items	Description
DSCP Classification	DSCP Classification

“Save” and finish.

8.11 QoS Control List

Click the “QoS Configure-QoS Control List” as follows:



QoS Control List Configuration

QCE	Port	DMAC	SMAC	Tag Type	VID	PCP	DEI	Frame Type	Action					
									CoS	DPL	DSCP	PCP	DEI	Policy

Interface data are as follows.

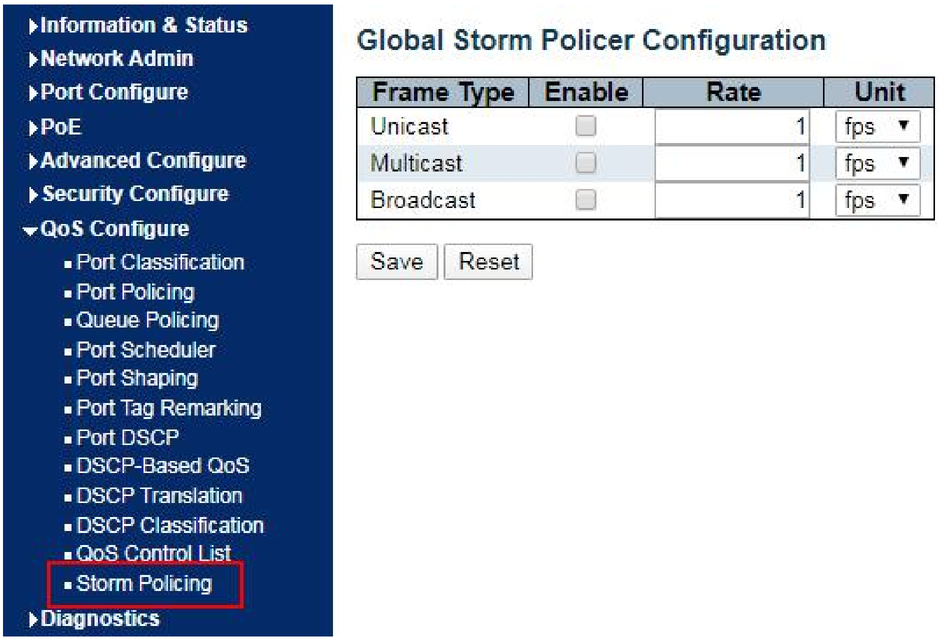
Configuration Items	Description
QCL	QoS ACL

Click the "+"

"Save" and finish.

8.12 Storm Policing

Click the "QoS Configure-Storm Policing" as follows:



Global Storm Policer Configuration

Frame Type	Enable	Rate	Unit
Unicast	□	1	fps
Multicast	□	1	fps
Broadcast	□	1	fps

Interface data are as follows.

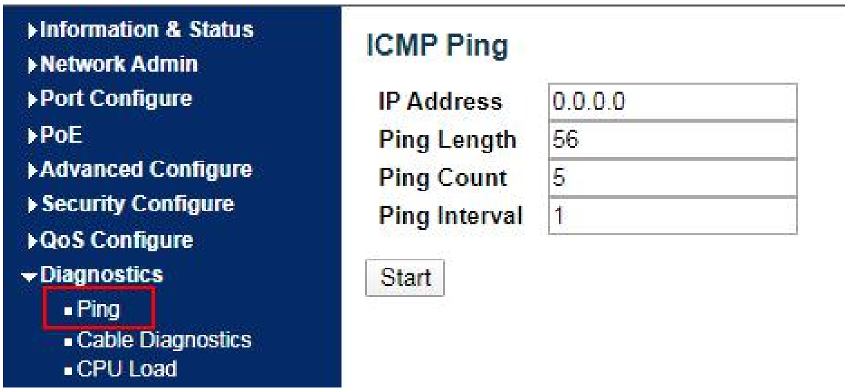
Configuration Items	Description
Frame Type	The switch supports: Unknown Unicast, Unknown Multicast, and Broadcast
Enabled	Enable or disable the Storm Policing
Rate	The rate unit is packets per second (pps). Valid values are: **1**, **2**, **4**, **8**, **16**, **32**, **64**, **128**, **256**, **512**, **1K**, **2K**, **4K**, **8K**, **16K**, **32K**, **64K**, **128K**, **256K**, **512K** or **1,024K**.

"Save" and finish.

9 Diagnostics

9.1 Ping

Destination node responds to the ICMP Echo packet sent from Ping to the specified IP address.
Click the “Diagnostics-Ping” as follows:



ICMP Ping

IP Address	0.0.0.0
Ping Length	56
Ping Count	5
Ping Interval	1

Followings are the fields that can be configured or displayed:

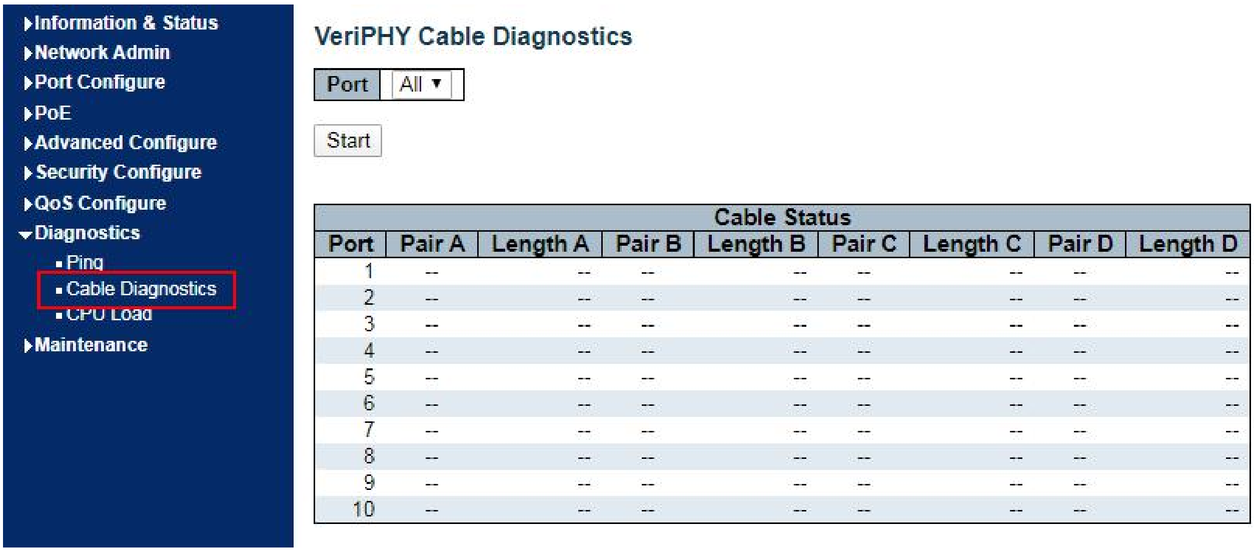
Configuration Items	Description
IP Address	Enter the IP Address to be pinged.
Ping Count	Enter the number of times (from 1 to 60) to ping the IPv4 or IPv6 address.
Ping Length	Enter a number ranging from 1-1,452, with 56 by default.
Ping Interval	Enter the ping interval

Click the “Start” for a ping test.

9.2 Cable Diagnostics

Use the cable states which can inspect the 10/100/1,000 BASE-T electrical interfaces, such as the state of open circuit, short circuit and length of line pairs.

Click the “Diagnostics-Cable Diagnostics” as follows:



VeriPHY Cable Diagnostics

Port: All ▾

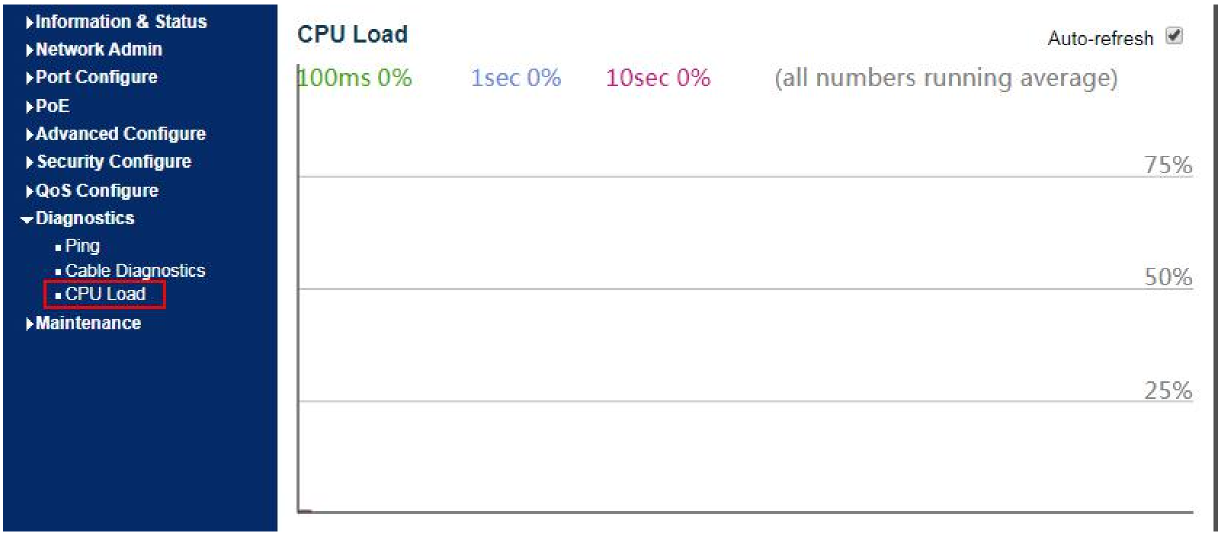
Start

Cable Status								
Port	Pair A	Length A	Pair B	Length B	Pair C	Length C	Pair D	Length D
1	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--
7	--	--	--	--	--	--	--	--
8	--	--	--	--	--	--	--	--
9	--	--	--	--	--	--	--	--
10	--	--	--	--	--	--	--	--

Click the “Start” for a “Cable Diagnostics” test.

9.3 CPU Load

Display the CPU load for users with an integer percentage and calculate the simple average at time intervals. Click the “Diagnostics-CPU Load” as follows:



CPU Load

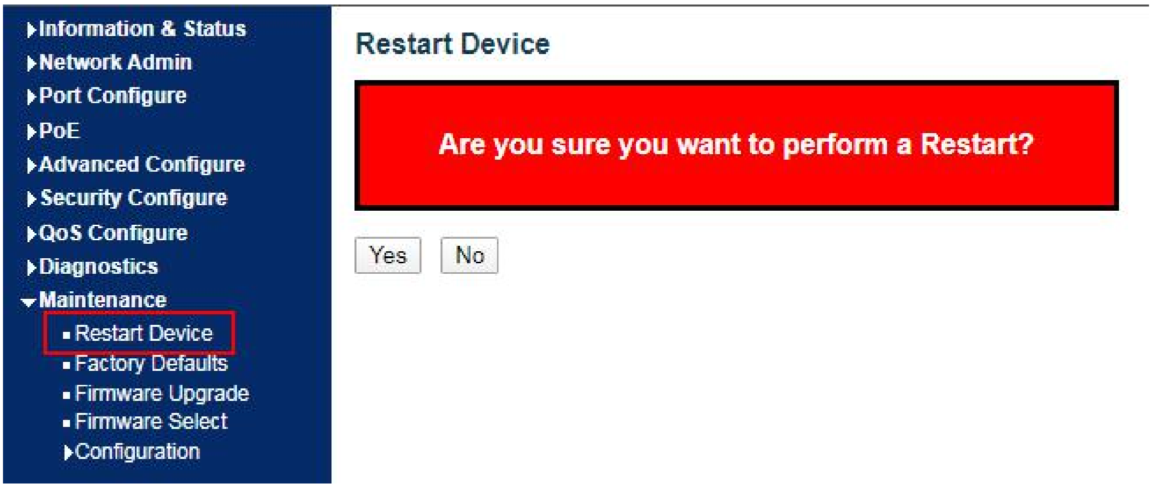
Auto-refresh ☑

100ms 0% 1sec 0% 10sec 0% (all numbers running average)

10 Maintenance

10.1 Restart Device

Click the “Maintenance-Restart Device” to perform a restart.



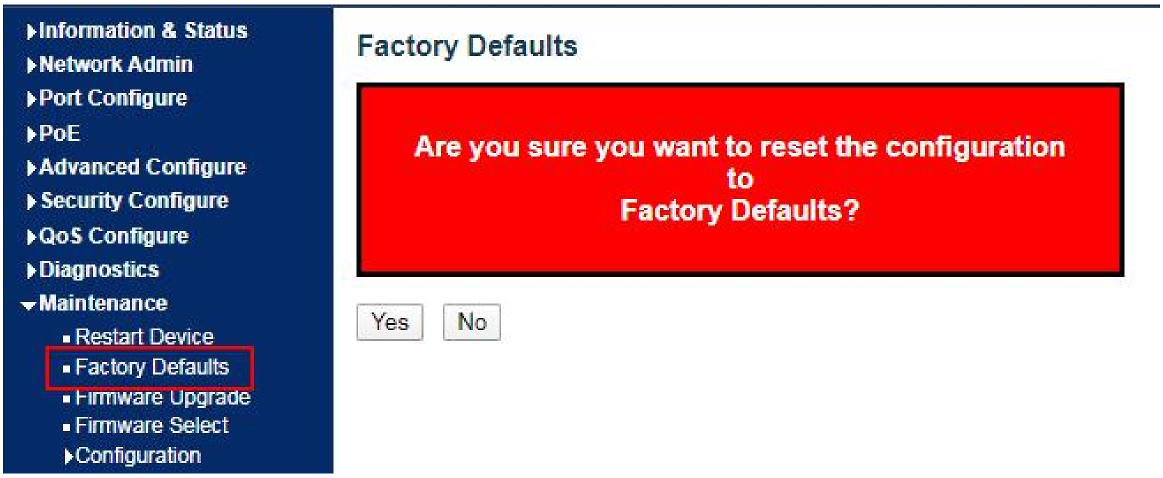
Restart Device

Are you sure you want to perform a Restart?

Click the “Yes”.

10.2 Factory Defaults

Click the “Maintenance-Factory Defaults” to reset the configuration to factory defaults.



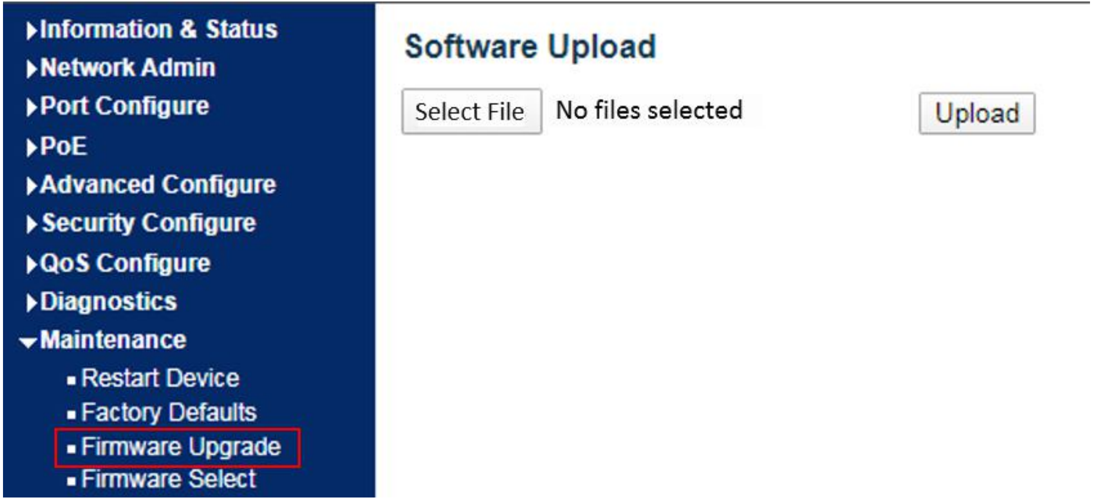
Factory Defaults

Are you sure you want to reset the configuration to Factory Defaults?

Click the “Yes”.

10.3 Firmware Upgrade

Click the “Maintenance-Firmware Upgrade” to upgrade.

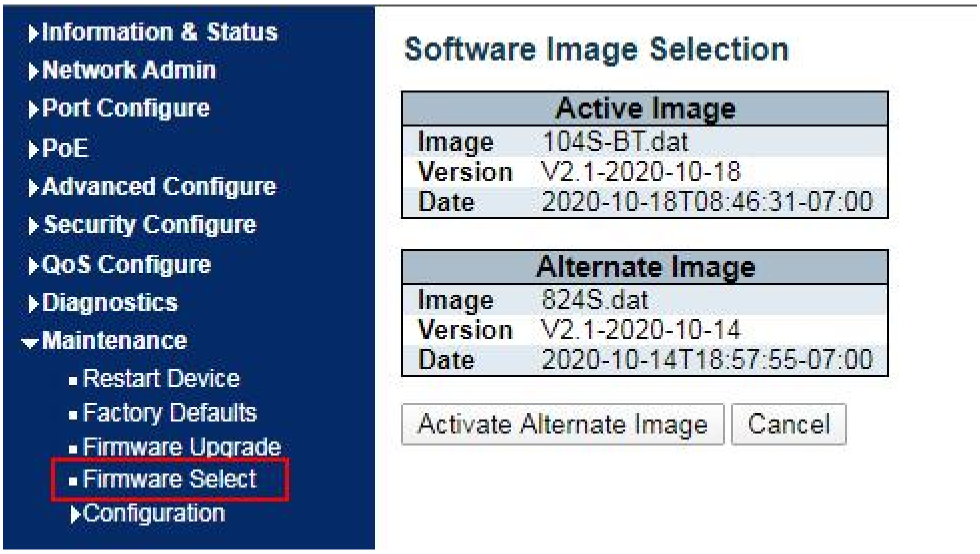


Click the “Browse” to select the firmware documents for upgrade.

Click the “Upload” for firmware upgrade.

10.4 Firmware Select

Click the “Maintenance-Firmware Select” to switch the spare firmware.



Software Image Selection

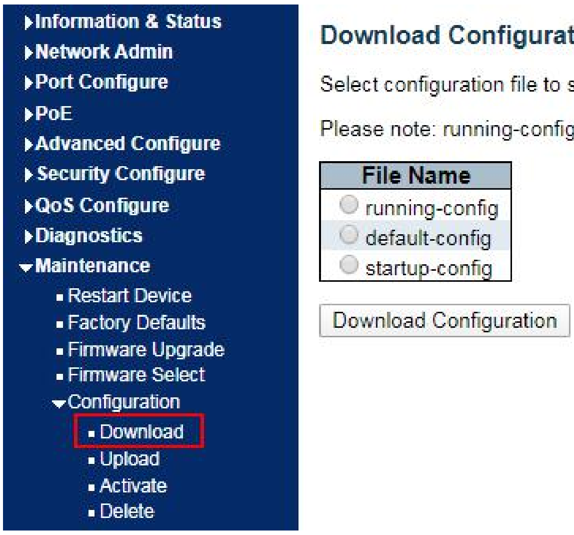
Active Image	
Image	104S-BT.dat
Version	V2.1-2020-10-18
Date	2020-10-18T08:46:31-07:00

Alternate Image	
Image	824S.dat
Version	V2.1-2020-10-14
Date	2020-10-14T18:57:55-07:00

Click the “Activate Alternate Image” to switch firmware.

10.5 Configuration

1. Click the “Maintenance-Configuration-Download” to download the configuration-related documents.



Download Configuration

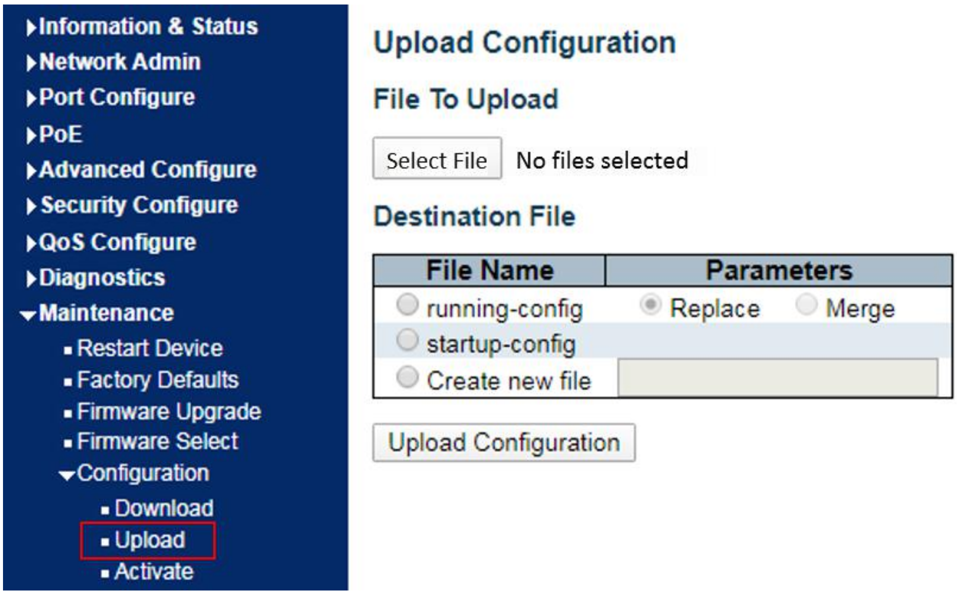
Select configuration file to save.

Please note: running-config may take a while to prepare for download.

File Name
○ running-config
○ default-config
○ startup-config

Click the “Download Configuration”.

2. Click the “Maintenance-Configuration-Upload” to upload the configuration-related documents.



Upload Configuration

File To Upload

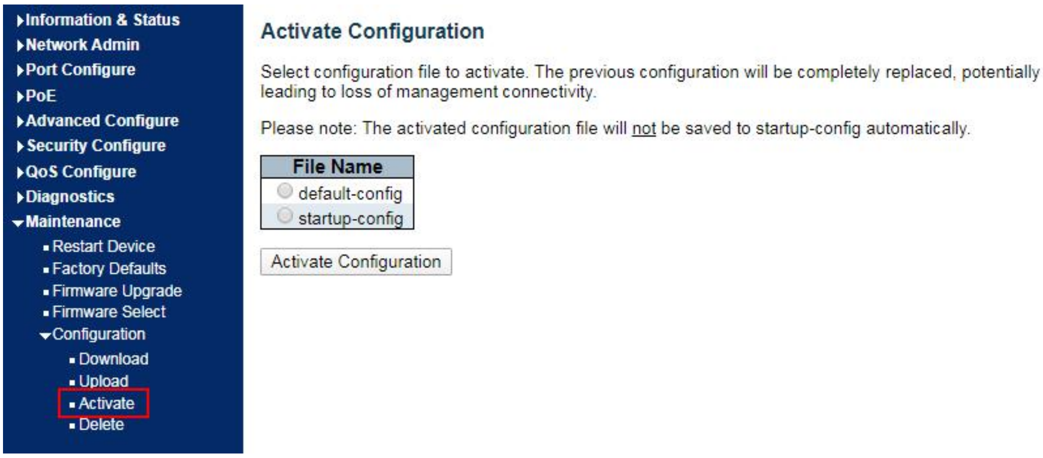
Select File No files selected

Destination File

File Name	Parameters
○ running-config	● Replace ○ Merge
○ startup-config	
○ Create new file	

Click the “Upload”.

3. Click the “Maintenance-Configuration-Activate” to activate the configuration-related documents.



Activate Configuration

Select configuration file to activate. The previous configuration will be completely replaced, potentially leading to loss of management connectivity.

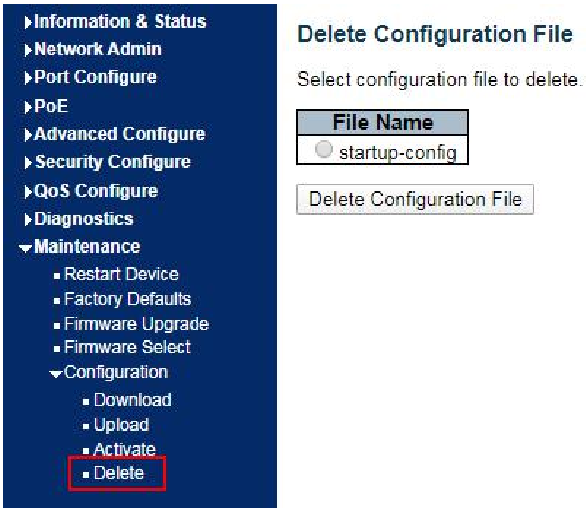
Please note: The activated configuration file will not be saved to startup-config automatically.

File Name
○ default-config
○ startup-config

Activate Configuration

Click the “Activate Configuration”.

4. Click the “Maintenance – Configuration-Delete” to delete the configuration-related documents.



Delete Configuration File

Select configuration file to delete.

File Name
○ startup-config

Delete Configuration File

Click the “Delete Configuration File”.