

Smart-Web Switch

ZX903-SWTGW218AS

Web Manual

Ver. 1.0

Revision history

| Date | Version | Description |
|---------------|----------------|--------------------|
| Jan. 07, 2025 | V 1.0 | The first edition |

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1 Foreword

1.1 Target Audience

This manual is prepared for the installers and system administrators who are responsible for network installation, configuration and maintenance. It assumes that the user has 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.

1.2 Manual Convention

The following approaches should prevail.

| GUI Convention | Description |
|--|--|
| Interpretation | Describe operations and add necessary information. |
|  Notice | Remind the user of cautions as improper operations will result in data loss or equipment damage. |

2 Web Page Login

2.1 Log in the Network Management Client

Type in the default switch address: **http://192.168.2.1** and press “Enter”.

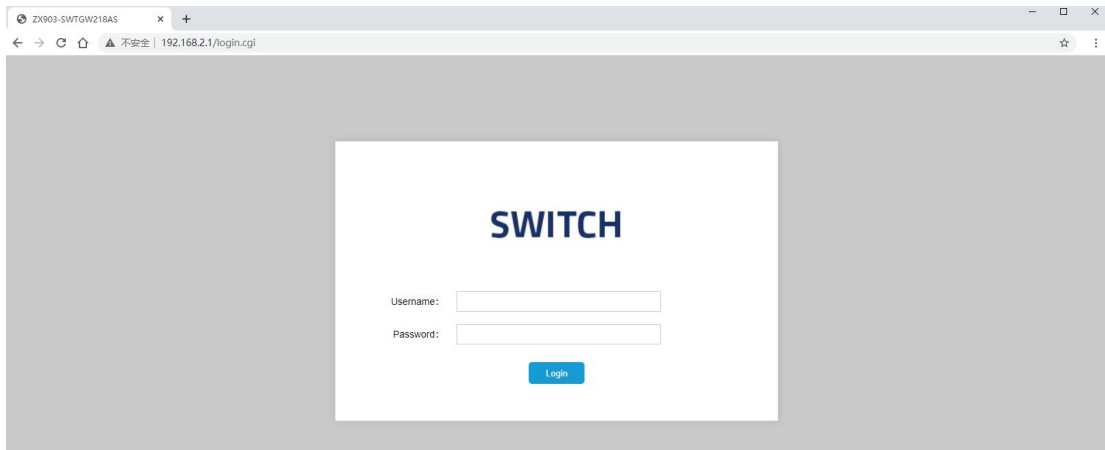


Description:

Browser standards: superior to IE 9.0, Chrome 23.0 and Firefox 20.0

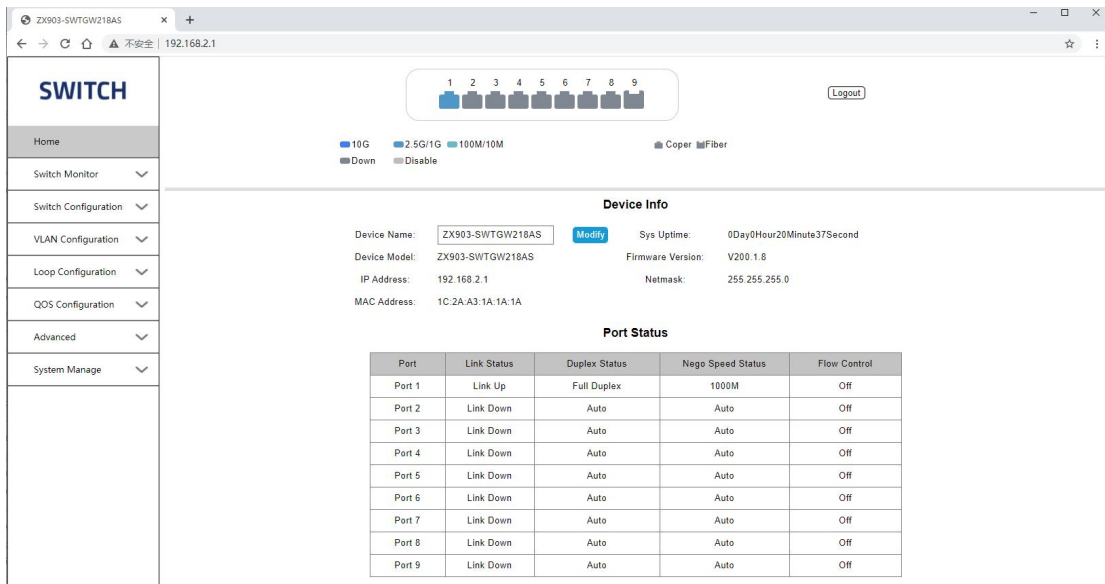
Keep the IP network segment of PC consistent with that of switch but differentiate the IP address as you log in. Set PC's IP address of 192.168.2.x and the subnet mask of 255.255.255.0 for the first login ($1 < x \leq 254$).

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.



2.2 Constitution of Client Interface

The typical operation interface of Web network management system is as follows.



2.3 Navigation Bar on Web Interface

Menu items such as System, Configuration, Security, Monitoring, and Tools are available on the web network management client. Each item contains submenus. Navigation bar is detailed as follows:

| menu items | Submenus | Secondary Submenus | Description |
|------------|-------------|--------------------|---|
| home | information | | Display the port state and product info |

| | | | | |
|----------------------|-------------------|-------------------------------|---|--|
| Switch Monitor | MAC address Table | | Display the mac address table | |
| | Port Statistics | | Display Port Data Statistics | |
| Switch configuration | Port Setting | | Configure and view all ports | |
| | Port Mirror | | Configure and view the Port-based Mirroring | |
| | Port Isolation | | Configure and view the Port Isolation | |
| | Port Rate Limit | | Configure and view the Bandwidth Contro | |
| | Port Aggregate | static | | Configure and view Trunk Group Setting information |
| | | LACP | | Configure and view LACP Group Setting |
| Static MAC | | Configure and view Static MAC | | |
| VLAN Configuration | VLAN | VLAN Setting | Configure and view the VLAN | |
| | | Port VLAN | Configure and view the Prot of port | |
| Loop Configuration | Loop protocol | | Configure and view Loop Protocol | |
| | STP Global | | Configure and view STP global | |
| | STP Port | | Configure and view STP port | |
| QoS Configuration | Port to Queue | | Configure and view the Port to Queue | |
| | Queue Weight | | Configure and view Queue Weight | |
| Advanced | DHCP Snooping | | Configure viewing DHCP Snooping information | |
| | Storm Control | | Configure and view Storm Control | |

| | | | |
|---------------|----------------------|--|---|
| | IGMP Setting | | Configure viewing IGMP Snooping information |
| | Jumbo Frame | | Configure and view the Jumbo Frame |
| System Manage | IP Setting | | Configure and view the management IP address |
| | LOgin Setting | | Configure and view the management account |
| | Setting reboot | | Restart system |
| | Save Configuration | | Save Configuration |
| | Backup Configuration | | Save and Restore Configuration |
| | Firmware Upgrade | | Updating and upgrading device software versions |
| | Factory Default | | Factory reset |

3 Home

3.1 Information

Display system information, including model, version, MAC, etc.

Instructions:

1. Click the "Home" in the navigation bar as follows:

| Device Info | | | |
|---------------|-------------------|------------------------|---------------------------------------|
| Device Name: | ZX903-SWTGW218AS | Modify | Sys Uptime: 0Day0Hour20Minute37Second |
| Device Model: | ZX903-SWTGW218AS | Firmware Version: | V200.1.8 |
| IP Address: | 192.168.2.1 | Netmask: | 255.255.255.0 |
| MAC Address: | 1C:2A:A3:1A:1A:1A | | |

4 Switch Monitor

4.1 MAC Address Table

Operation steps:

1. Click on the 'Switch Monitor > MAC Address Table' menu in the navigation bar to enter the MAC Address Table page."

| MAC Address | Type | Port | VLAN ID |
|-------------------|---------|------|---------|
| 00:0E:C6:3C:2F:5B | dynamic | 1 | 1 |
| 1C:2A:A3:1A:1A:1A | dynamic | CPU | 1 |

Total 2 Items, Current 1-10 Items, PerPage 10 Items << < 1 > >> 1 /1 Pages

2. MAC address table needs constant updates to cater to network changes. It automatically generates entries that are limited by their lifetime (i.e. aging time). Those entries not refreshed after expiration will be deleted. The aging time of an entry will be recalculated if its record is refreshed before expiration.

Proper aging time helps to achieve the aging target of MAC address. Shortage of aging time may lead many switches broadcast to discover the packets of destination MAC addresses, thus influencing the switch performance.

Aging too long can cause the switch to save outdated MAC address entries, thus exhausting the forwarding resources and failing to update the forwarding table based on network changes.

The switch may remove valid MAC address table entries due to too short aging time, thus reducing forwarding efficiency. In general, the aging time recommended is 300 seconds by default.

Instructions for aging time setting:

1. Click the "Switch Monitor > MAC Address Table", in the navigation bar as follows:

| MAC Address | Type | Port | VLAN ID |
|-------------------|---------|------|---------|
| 1C:2A:A3:1A:1A:1A | dynamic | CPU | 1 |

Total 1 Items, Current 1-10 Items, PerPage 10 Items << < 1 > >> 1 /1 Pages

4.2 Port Statistics

Display port statistics information.

Instructions:

1. Click the “Switch Monitor > Port Statistics”, in the navigation bar as follows:

| Port | State | Link Status | TxGoodPkt | RxGoodPkt | TxGoodBytes | RxGoodBytes |
|--------|--------|-------------|-----------|-----------|-------------|-------------|
| Port 1 | Enable | Link Up | 2269 | 3461 | 1504273 | 381307 |
| Port 2 | Enable | Link Down | 0 | 0 | 0 | 0 |
| Port 3 | Enable | Link Down | 0 | 0 | 0 | 0 |
| Port 4 | Enable | Link Down | 0 | 0 | 0 | 0 |
| Port 5 | Enable | Link Down | 0 | 0 | 0 | 0 |
| Port 6 | Enable | Link Down | 0 | 0 | 0 | 0 |
| Port 7 | Enable | Link Down | 0 | 0 | 0 | 0 |
| Port 8 | Enable | Link Down | 0 | 0 | 0 | 0 |
| Port 9 | Enable | Link Down | 0 | 0 | 0 | 0 |

Clear

5 Switch Configuration

5.1 Port Setting

Querying and configuring Ethernet ports.

Instructions:

1. Click the “Switch Configuration > Port Setting” in the navigation bar as follows:

| Port | State | Duplex Mode | Negotiation Speed | Flow Control |
|----------|----------|-------------|-------------------|--------------|
| Select ▼ | Enable ▼ | Auto ▼ | Auto ▼ | Off ▼ |

Apply

| Port | State | Duplex Mode | Negotiation Speed | Flow Control |
|----------|----------|-------------|-------------------|--------------|
| Select ▼ | Enable ▼ | Auto ▼ | Auto ▼ | Off ▼ |

Apply

| Port | State | Duplex Mode | | Negotiation Speed | | Flow Control | |
|--------|--------|------------------|---------------|-------------------|---------------|------------------|---------------|
| | | Config Attribute | Actual Status | Config Attribute | Actual Status | Config Attribute | Actual Status |
| Port 1 | Enable | Auto | Full Duplex | Auto | 1000M | Off | Off |
| Port 2 | Enable | Auto | Half Duplex | Auto | 10M | Off | Off |
| Port 3 | Enable | Auto | Half Duplex | Auto | 10M | Off | Off |
| Port 4 | Enable | Auto | Half Duplex | Auto | 10M | Off | Off |
| Port 5 | Enable | Auto | Half Duplex | Auto | 10M | Off | Off |
| Port 6 | Enable | Auto | Half Duplex | Auto | 10M | Off | Off |
| Port 7 | Enable | Auto | Half Duplex | Auto | 10M | Off | Off |
| Port 8 | Enable | Auto | Half Duplex | Auto | 10M | Off | Off |
| Port 9 | Enable | Auto | Half Duplex | Auto | 10M | Off | Off |

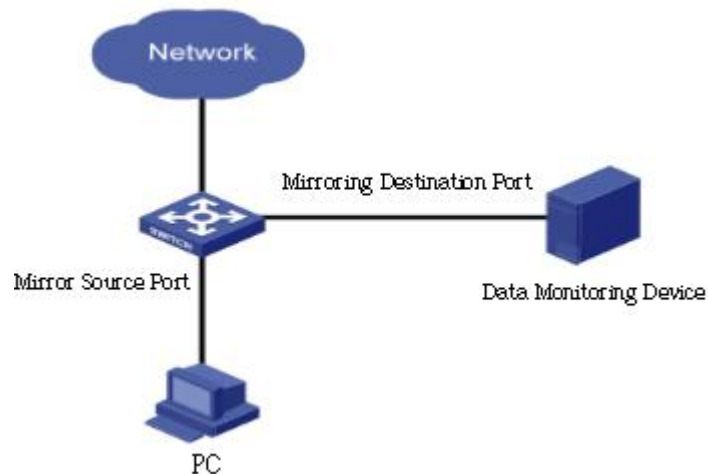
Interface data are as follows.

| Query Items | Description |
|--------------|---|
| State | Enable or disable port |
| Speed/Duplex | Configure the rate and negotiation status of the port. You can configure the forced 10M/Half, 10M/Full, 100M/Half,100M/Full 1000M/Full , 2500M/Full |
| Flow Control | After it is enabled on both local network and opposite network devices, the local one will notify the other to stop transmitting messages in the presence of network congestion. The opposite one will execute the command temporarily to ensure zero message loss. Off-Disabled reception and transmission of PAUSE frame; On-Enabled reception and transmission of PAUSE frame; |

5.2 Port Mirror

Port Mirroring copies the message of a specified switch port to the destination port. The copied port is the Source Port, and the copying port is the Destination Port. Destination Port accesses to data inspection devices so that users can analyze the

messages received to monitor network and troubleshoot as follows:



Instructions:

1. Click the “Switch Configuration > Port Mirror”, in the navigation bar as follows:

| Mirror Group | Source mirror port | Mirror Direction | Destination Port |
|-----------------|--------------------|------------------|------------------|
| Mirror Group1 ▾ | Select ▾ | Both ▾ | Port 1 ▾ |

| Mirror Group | Source mirror port | Mirror Direction | Destination Port |
|--------------|--------------------|------------------|------------------|
| | | | |

Interface data are as follows

| Configuration Items | Description |
|---------------------|---|
| Mirror Direction | Enable or disable port mirroring, support Rx, Tx, and Both |
| Destination Port | Only one ordinary physical port can be selected, excluding link aggregation port and source port. |
| Source mirror port | List of mirrored source ports |

5.3 Port Isolation

Messages of broadcast, multicast, etc. will flood at each port even though the flow needs no mutual communication sometimes. Under this circumstance, port isolation can separate the messages between two ports.

Instructions:

1. Click the “Switch Configuration > Port Isolation”, in the navigation bar as follows:

| Port | Port Isolation List |
|--------|---------------------|
| Port 1 | Port 1 |
| Port 2 | Port 2 |
| Port 3 | Port 3 |
| Port 4 | Port 4 |
| Port 5 | Port 5 |
| Port 6 | Port 6 |

Apply

| Port | Port Isolation List |
|--------|---------------------|
| Port 1 | 1-9 |
| Port 2 | 1-9 |
| Port 3 | 1-9 |
| Port 4 | 1-9 |
| Port 5 | 1-9 |
| Port 6 | 1-9 |
| Port 7 | 1-9 |
| Port 8 | 1-9 |
| Port 9 | 1-9 |

Interface data are as follows

| Configuration Items | Description |
|---------------------|---|
| Port | Port list |
| Port Isolation List | Establish the member list of interworking group |

5.4 Port Rate Limit

It refers to the rate restriction on transmitting and receiving data at physical interfaces.

Restrict the rate limiting at the egress before transmitting flow, thus controlling all outgoing message flow;

Restrict the rate limiting at the ingress before receiving flow, thus controlling all incoming message flow;

Instructions:

1. Click the “Switch Configuration > Port Rate Limit”, in the navigation bar as follows:

| Port | Ingress Rate Limit (Kbit/sec) | Egress Rate Limit (Kbit/sec) |
|----------|---------------------------------|---------------------------------|
| Select ▾ | <input type="text"/> 16-2500000 | <input type="text"/> 16-2500000 |

Apply

| Port | Ingress Rate Limit (Kbit/sec) | Egress Rate Limit (Kbit/sec) |
|----------|----------------------------------|----------------------------------|
| Select ▾ | <input type="text"/> 16-10000000 | <input type="text"/> 16-10000000 |

Apply

| Port | Ingress Rate Limit (Kbit/sec) | Egress Rate Limit (Kbit/sec) |
|--------|-------------------------------|------------------------------|
| Port 1 | Unlimited | Unlimited |
| Port 2 | Unlimited | Unlimited |
| Port 3 | Unlimited | Unlimited |
| Port 4 | Unlimited | Unlimited |
| Port 5 | Unlimited | Unlimited |
| Port 6 | Unlimited | Unlimited |
| Port 7 | Unlimited | Unlimited |
| Port 8 | Unlimited | Unlimited |
| Port 9 | Unlimited | Unlimited |

Interface data are as follows

| Configuration Items | Description |
|---------------------|---|
| Type | Ingress: inbound port direction Degree: direction of outgoing port |
| State | Enable or disenable port restrictions |
| Rate | Rate limit, Port1-8 range: 16 to 2500000kb,Port9 range:16 to 10000000kb |

5.5 Port Aggregate

5.5.1 static

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

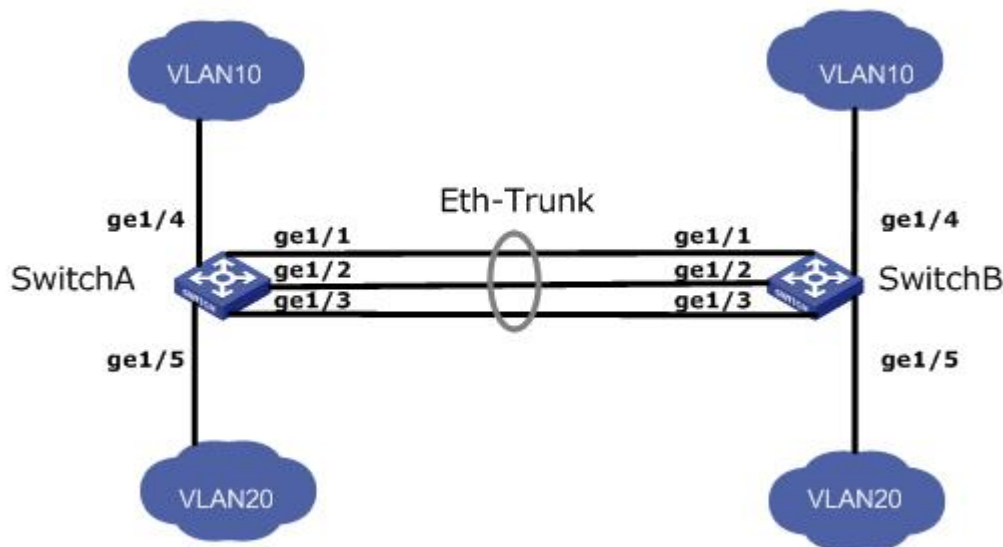
LAG (Link Aggregation Group) is a logical link bundled by multiple Ethernet links (Eth-Trunk).

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.



When there are the following requirements, link aggregation can be configured to achieve:

- When the bandwidth between two switch devices connected through a link is insufficient.
- When the reliability of connecting two switch devices through a link does not meet the requirements.

Link aggregation is divided into static mode and LACP mode based on whether the Link Aggregation Control Protocol (LACP) is enabled or not. In static mode, the establishment of Eth Trunk and the addition of member interfaces are manually configured without the involvement of link aggregation control protocols. In this mode, all active links participate in data forwarding and evenly share traffic, hence it is called load sharing mode. If an active link fails, the link aggregation group automatically shares the traffic equally among the remaining active links. When it is necessary to provide a larger link bandwidth between two directly connected devices and the devices do not support the LACP protocol, static mode can be used.

Instructions:

1. Click the “Switch Configuration > Port Aggregate”, in the navigation bar as follows:

| Aggregate Group ID | Type | Port |
|--------------------|--------|--------|
| Trunk1 | static | Select |

Apply

| Select | Aggregate Group ID | Type | Member port | Aggregated Port |
|--------|--------------------|------|-------------|-----------------|
| | | | | |

Delete

Interface data are as follows

| Configuration Items | Description |
|---------------------|--|
| Group ID | There are 2 LAGs numbering from 1 to 2. |
| Ports | Up to 4 member ports are available in LAG. |

5.5.2 LACP

LACP (Link Aggregation Control Protocol), based on IEEE 802.3ad Standard, dynamically aggregates and disaggregates links. It exchanges info with the opposite network devices 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 transmitting 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 “Switch Configuration > Port Aggregate” in the navigation bar, select the LAG ID and LACP mode, “Edit” them as follows:

| Aggregate Group ID | Type | Port |
|--------------------|--------|--------|
| Trunk1 | static | Select |

Apply

| Select | Aggregate Group ID | Type | Member port | Aggregated Port |
|--------------------------|--------------------|------|-------------|-----------------|
| <input type="checkbox"/> | Trunk1 | LACP | 3-4 | |

Delete

2. Click the “Switch Configuration > Port Aggregate” Select LACP, select two ports to add as one LACP group

| Aggregate Group ID | Type | Port |
|--------------------|------|--------|
| Trunk1 | LACP | Select |

Apply

| Select | Aggregate Group ID | Type | Member port | Aggregated Port |
|--------------------------|--------------------|------|-------------|-----------------|
| <input type="checkbox"/> | Trunk1 | LACP | 3-4 | |

Delete

Interface data are as follows

| Configuration Items | Description |
|---------------------|--|
| Type | <p>Static mode: When it is necessary to increase the bandwidth or reliability between two devices, and one of the devices does not support the LACP protocol, a static link aggregation can be created on the device and multiple member interfaces can be added to increase the bandwidth and reliability between the devices.</p> <p>LACP mode: In dynamic LACP mode, the link between two devices has the ability of redundant backup. When some links fail, the backup link is used to replace the faulty link, maintaining uninterrupted data transmission.</p> |
| System Priority | LACP determines the active and passive modes between two devices subject to priority standard. |
| Port | Port list |
| Port Priority | LACP determines the dynamic LAG member mode subject to the port priority with a superior system. |
| Timeout | It decides the transmission frequency of LACP messages. |

 Description:

Please make sure there is no member interface accessing the Eth-Trunk before changing its work pattern, otherwise it fails.

5.5 Static MAC

Static table is manually configured by users and distributed to each interface board, which won't age.

Instructions:

1. Click the "Switch Configuration > Static MAC", in the navigation bar as follows:

| MAC | VLAN ID | Port |
|--|---------|--------|
| <input type="text" value="(MAC Format: XX:XX:XX:XX:XX:XX)"/> | VLAN 1 | Port 1 |

AddMAC

| Select | MAC Address | VLAN ID | Port |
|--------|-------------|---------|------|
| | | | |

Delete

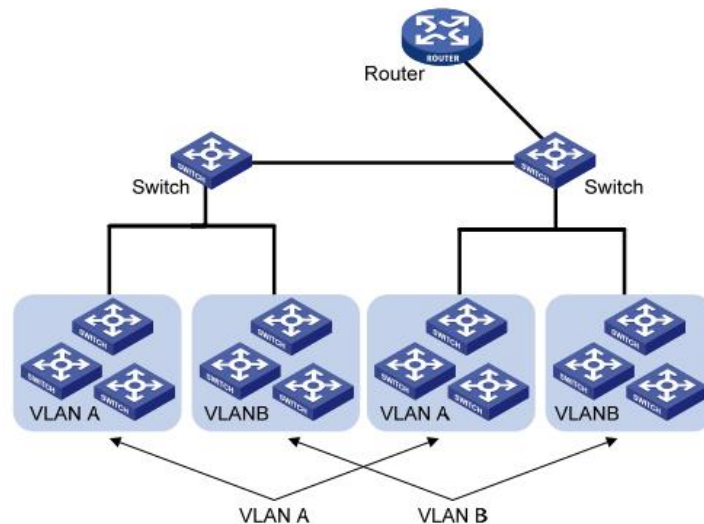
Interface data are as follows.

| Configuration Items | Description |
|---------------------|---|
| MAC Address | Enter the new MAC address e.g.: HH:HH:HH:HH:HH:HH |
| VLAN ID | Specify the VLAN ID |
| Port | Select the interface type and enter the port list |

6 VLAN Configuration

6.1 VLAN

VLAN is formulated not restricted to physical locations, which means the hosts in a same VLAN can be placed at will. As shown below, each VLAN, as a broadcast domain, divides a physical LAN into logical LANs. Hosts can exchange messages by means of traditional communication. For the hosts in different VLANs, the device such as router or L3 switch is a must.



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 security: 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 is compatible with VLAN types based on 802.1Q, protocols, MAC, and ports. For default configuration, 802.1Q VLAN mode should be adopted. Port VLAN is divided subject to a switch's interface No. Network administrator gives 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.

6.1.1 VLAN Setting

1. Click the "VLAN Configuration > VLAN Setting", in the navigation bar as follows:

VLAN List

VLAN Manage ?

VLAN ID:

(VLAN range: 1-4094)

VLAN Name:

(VLAN Name length: 0-14)

AddVLAN

| Select | No. | VLAN ID | VLAN Name |
|--------|-----|---------|-----------|
| | 1 | 1 | |

Select All

Delete

6.1.2 Port VLAN

The setting page function allows selecting the Access and Trunk port types.

1. Click the "VLAN Configuration > Port VLAN", in the navigation bar as follows:

| Port | Port vlan type | Access VLAN | Native VLAN | Trunk vlan |
|----------|----------------|-------------|-------------|---------------|
| Select ▾ | Access ▾ | VLAN 1 ▾ | VLAN 1 ▾ | Select VLAN ▾ |

Apply

| Port | Port vlan type | Access VLAN | Native VLAN | Trunk vlan |
|--------|----------------|-------------|-------------|------------|
| Port 1 | Access | 1 | - | - |
| Port 2 | Access | 1 | - | - |
| Port 3 | Access | 1 | - | - |
| Port 4 | Access | 1 | - | - |
| Port 5 | Access | 1 | - | - |
| Port 6 | Access | 1 | - | - |
| Port 7 | Access | 1 | - | - |
| Port 8 | Access | 1 | - | - |
| Port 9 | Access | 1 | - | - |

Interface data are as follows

| Configuration Items | Description |
|---------------------|--|
| VLAN ID | It is required to select an ID ranging from 1 to 4,094 |
| Native VLAN | Setting the PVID of a port |

7 Loop Configuration

7.1 Loop protocol

The device sends loop detection packets and checks whether the packets are returned to the device (the receiving and sending interfaces are not required to be the same) to check whether loops exist. If a port receives a loop detection packet from the local device, it is determined that the link to which the port resides has a loop. When a loop occurs on the network, the LED of the corresponding port blinks (blocking the loop when loop avoidance is enabled) to alert the network administrator that a loop exists on the port

Instructions:

1. Click the “Loop Configuration > Loop Protocol”, in the navigation bar as follows:



Interface data are as follows.

| Configuration Items | Description |
|---------------------|---|
| Loop Protocol | off, loop detection, loop Prevention, Spanning tree |

7.2 STP global

Fast spanning tree protocol (RSTP) is used to eliminate the physical loop of data link layer in LAN. Its core is fast spanning tree algorithm. RSTP is fully downward compatible with STP protocol. In addition to the functions of avoiding loops and dynamically managing redundant links like the traditional STP protocol, RSTP greatly shortens the topology convergence time. Under the ideal network topology scale, all switching devices support RSTP protocol, and when configured properly, the time to restore stability after topology

changes (link up / down) can be controlled at the second level. The main functions of RSTP can be summarized as follows:

- 1、 Discover and generate an optimal tree topology of LAN;
- 2、 Discover and recover the topology failure, automatically update the network topology, enable the backup link, and maintain the best tree structure;

Instructions:

1. Click the “Loop Configuration > STP global”, in the navigation bar as follows:

| | | |
|----------------------|-------------------|------------|
| Spanning Tree Status | Disable | |
| Version | RSTP ▼ | |
| Priority | 32768 ▼ | |
| Max Aging Time | 20 | (6~40 Sec) |
| Hello Time | 2 | (1~10 Sec) |
| Forward Delay | 15 | (4~30 Sec) |
| Root Priority | 32768 | |
| Root MAC Address | 1C:2A:A3:1A:1A:1A | |
| Root Path Cost | 0 | |
| Root Port | - | |
| Root Maximum Age | 20 Sec | |
| Root Hello Time | 2 Sec | |
| Root Forward Delay | 15 Sec | |

Apply

Interface data are as follows.

| Configuration Items | Description |
|---------------------|--|
| Force Version | Configure view STP mode |
| Maximum Age | Configure view maximum age time |
| Hello Time | Configure view Hello time |
| Forward Delay | Configure and view forwarding delay time |

7.3 STP port

Instructions:

1. Click the “Loop Configuration > STP port”, in the navigation bar as follows:

| Port | Path Cost | Priority | P2P | Edge |
|----------|------------------------|----------|--------|------|
| Select ▼ | 0 (1~200000000),0=Auto | 128 ▼ | Auto ▼ | No ▼ |

Apply

| Port | State | Role | Path Cost | | Priority | P2P | | Edge | |
|--------|------------|----------|-----------|---------|----------|--------|--------|--------|--------|
| | | | Config | Actual | | Config | Actual | Config | Actual |
| Port 1 | Forwarding | Disabled | Auto | 20000 | 128 | Auto | True | False | False |
| Port 2 | Forwarding | Disabled | Auto | 2000000 | 128 | Auto | False | False | False |
| Port 3 | Forwarding | Disabled | Auto | 2000000 | 128 | Auto | False | False | False |
| Port 4 | Forwarding | Disabled | Auto | 2000000 | 128 | Auto | False | False | False |
| Port 5 | Forwarding | Disabled | Auto | 2000000 | 128 | Auto | False | False | False |
| Port 6 | Forwarding | Disabled | Auto | 2000000 | 128 | Auto | False | False | False |
| Port 7 | Forwarding | Disabled | Auto | 2000000 | 128 | Auto | False | False | False |
| Port 8 | Forwarding | Disabled | Auto | 2000000 | 128 | Auto | False | False | False |
| Port 9 | Forwarding | Disabled | Auto | 2000000 | 128 | Auto | False | False | False |

Interface data are as follows.

| Configuration Items | Description |
|---------------------|-------------------------------|
| Path Cost | Configure view port path Cost |
| Priority | Configure view port priority |
| P2P | Configure and view P2P |
| Edge | Configure view edge ports |

8 QoS Configuration

QoS (Quality of Service) assesses the ability of service providers to meet customer needs and the ability of transmitting 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 business flow within a certain 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 the messages on a FIFO basis, and makes every effort to transmit 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.

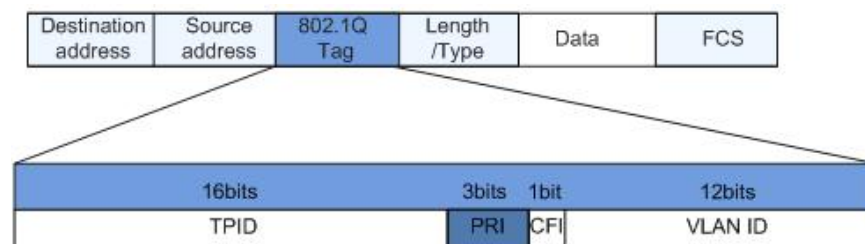
The ability to distinguish business types is the prerequisite to provide corresponding services, so the traditional best-effort service no longer meets the application needs. Therefore, QoS comes into being. It regulates the network flow to avoid and handle network congestion and reduce packet loss rate. 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

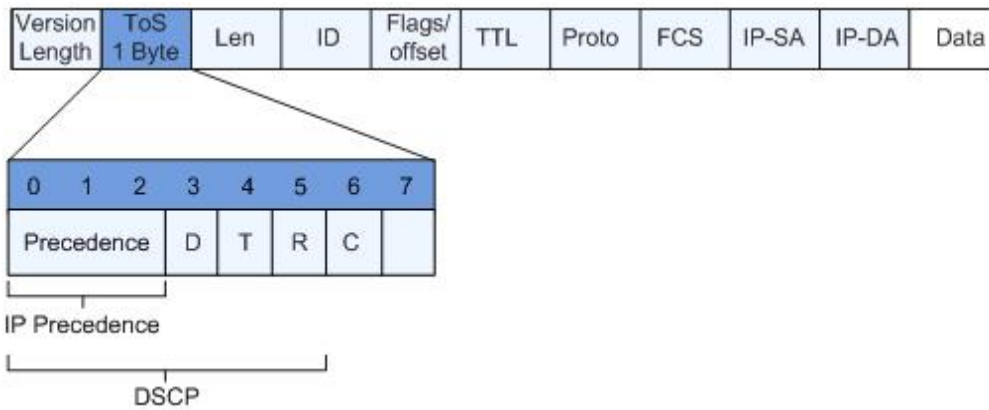


The 802.1Q header contains 3-bit PRI fields. PRI field defines 8 CoS of business priority ranging from 7 to 0 from high to low.

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 to Queue

Sets processing priorities for different tags of the data frame

1. Click the "QoS Configuration > Port to Queue", in the navigation bar as follows:

| Port | Queue |
|----------|-------|
| Select ▼ | 1 ▼ |

Apply

| Port | Queue |
|--------|-------|
| Port 1 | 1 |
| Port 2 | 1 |
| Port 3 | 1 |
| Port 4 | 1 |
| Port 5 | 1 |
| Port 6 | 1 |
| Port 7 | 1 |
| Port 8 | 1 |
| Port 9 | 1 |

Interface data are as follows

| Configuration Items | Description |
|---------------------|-------------|
| Queue | 1-8 |

8.2 Queue Weight

When the weight is strict priority, it is equivalent to SP, and when the weight is 1-15, it is equivalent to WRR (weighted cyclic Scheduling algorithm).

1. Click the "QoS Configuration >Queue Weight", in the navigation bar as follows:

| Queue | Weight |
|-------|-----------------|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | Strict priority |
| 6 | |
| 7 | |
| 8 | |

Apply

| Queue | Weight |
|-------|-----------------|
| 1 | Strict priority |
| 2 | Strict priority |
| 3 | Strict priority |
| 4 | Strict priority |
| 5 | Strict priority |
| 6 | Strict priority |
| 7 | Strict priority |
| 8 | Strict priority |

Interface data are as follows.

| Configuration Items | Description |
|---------------------|--|
| Weight | The default value is strict priority. The weight ranges from 1 to 15 |

9 Advanced

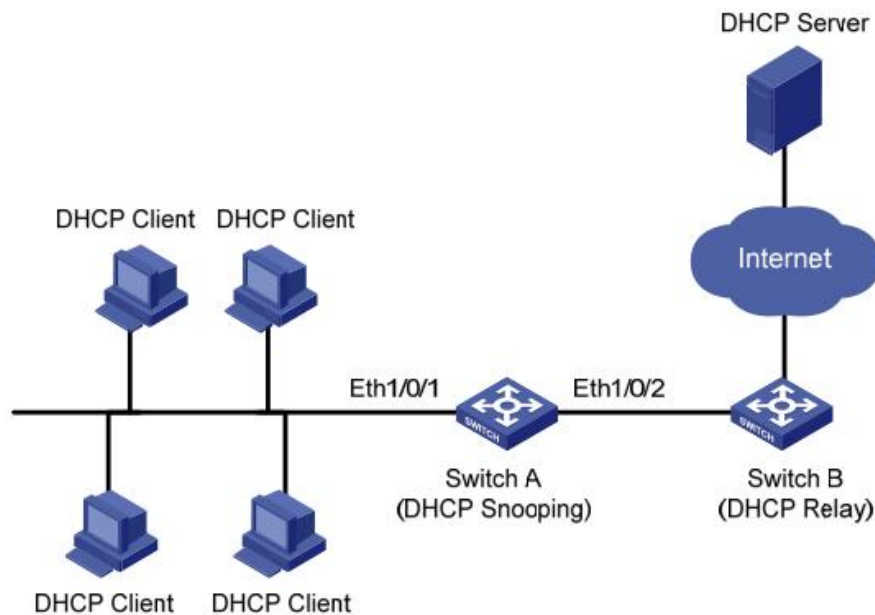
9.1 DHCP Snooping

For sake of security, the network administrator may need to record the IP address of a user surfing the Internet and to confirm the correspondence between the IP address obtained from DHCP Server and the host's MAC address.

Switch can record the user's IP address through the secure DHCP relay at the network layer.

Switch can monitor DHCP messages and record the user's IP address through DHCP Snooping at the data link layer. In addition, private DHCP Server in the network may lead to wrong IP address for the user. To ensure that users obtain IP addresses through legal DHCP Server, the DHCP Snooping security mechanism divides the ports into Trust Port and Untrust Port.

Trust Port directly or indirectly connects legal DHCP Server. It forwards the DHCP messages received to ensure the correct IP address for DHCP Client. Untrust Port connects illegal DHCP Server. DHCPACK and DHCP OFFER messages received from the DHCP Server on the Untrust Port will be discarded to prevent incorrect IP addresses.



Typical Networking of DHCP Snooping

The following methods are used to obtain the IP address and user MAC address from DHCP Server:

- Snooping the DHCPREQUEST message
- Snooping the DHCPACK message

Enable DHCP Snooping

Instructions:

1. Click the "Advanced > DHCP Snooping". DHCP Snooping interface is divided into global configuration and port configuration. Select the port to be modified in the port configuration and "Edit" the details as follows:

DHCP Snooping

Trust Port Select All Port 1 Port 2 Port 3 Port 4 Port 5 Port 6 Port 7 Port 8 Port 9

Interface data are as follows.

| Configuration Items | Description |
|---------------------|---|
| State | Enable and disable the DHCP Snooping |
| VLAN | Valid VLAN No. of DHCP Snooping |
| Port | Configure the port No. of DHCP Snooping |
| Trust | Whether the port is a Trust Port |

9.2 Storm Control

Storms generated via broadcast, unknown multicast and unicast messages are prevented as follows. These messages will be suppressed subject to packet rates respectively. The average rate of the messages received by monitoring interfaces will be compared with the max threshold configured during an inspection interval. Configured storm policing will be performed at this interface if the average rate exceeds the max threshold.

When a L2 Ethernet interface receives the broadcast, unknown multicast or unicast messages, the device will forward them to other L2 interfaces in a same VLAN (Virtual Local Area Network) if the egress interface cannot be recognized according to destination MAC addresses. As a result, broadcast storm may occur to degrade device operation performance.

Three kinds of message flow can be controlled by storm policing characteristics to stay away from broadcast storms.

Instructions:

1. Click the "Advanced > Storm Control", in the navigation bar as follows:

| Port | Broadcast Rate (Kbit/sec) | Known Multicast Rate (Kbit/sec) | Unknown Multicast Rate (Kbit/sec) | Unknown Unicast Rate (Kbit/sec) |
|--------|---------------------------------|---------------------------------|-----------------------------------|---------------------------------|
| Select | <input type="text"/> 16-2500000 | <input type="text"/> 16-2500000 | <input type="text"/> 16-2500000 | <input type="text"/> 16-2500000 |

Apply

| Port | Broadcast Rate (Kbit/sec) | Known Multicast Rate (Kbit/sec) | Unknown Multicast Rate (Kbit/sec) | Unknown Unicast Rate (Kbit/sec) |
|--------|----------------------------------|----------------------------------|-----------------------------------|----------------------------------|
| Select | <input type="text"/> 16-10000000 | <input type="text"/> 16-10000000 | <input type="text"/> 16-10000000 | <input type="text"/> 16-10000000 |

Apply

| Port | Broadcast Rate (Kbit/sec) | Known Multicast Rate (Kbit/sec) | Unknown Multicast Rate (Kbit/sec) | Unknown Unicast Rate (Kbit/sec) |
|--------|---------------------------|---------------------------------|-----------------------------------|---------------------------------|
| Port 1 | Off | Off | Off | Off |
| Port 2 | Off | Off | Off | Off |
| Port 3 | Off | Off | Off | Off |
| Port 4 | Off | Off | Off | Off |
| Port 5 | Off | Off | Off | Off |
| Port 6 | Off | Off | Off | Off |
| Port 7 | Off | Off | Off | Off |
| Port 8 | Off | Off | Off | Off |
| Port 9 | Off | Off | Off | Off |

Default

Interface data are as follows.

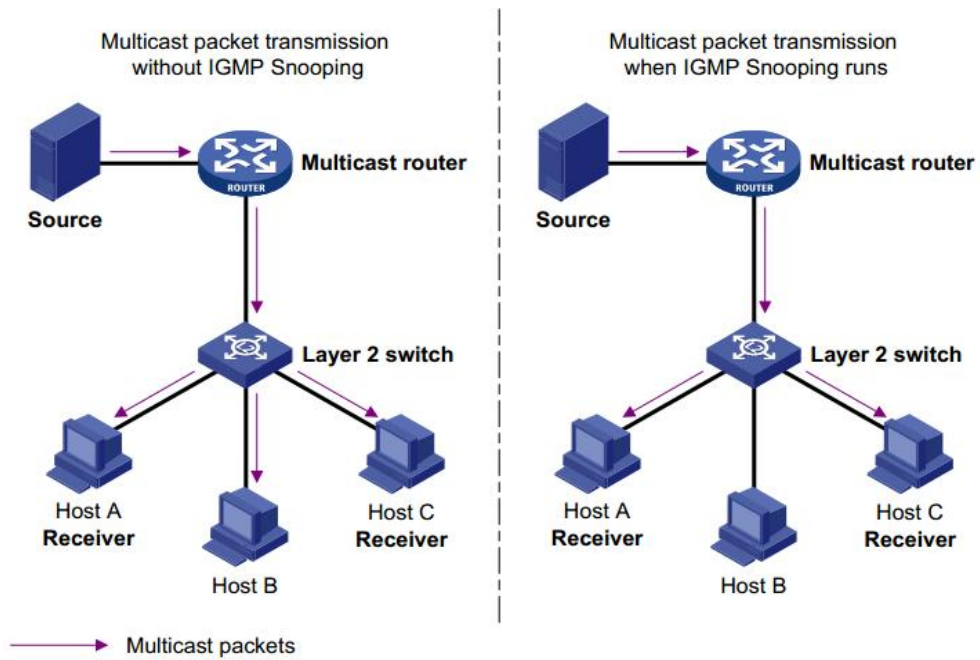
| Configuration Items | Description |
|---------------------|--|
| Storm Type | The storm type, like Broadcast, Multicast, Unicast |
| Port | Port list |
| State | Enable or disable storm control |
| Rate | Rate ranges from 16 to 10r,000,000 Kbps |

9.3 IGMP Snooping

IGMP Snooping (Internet Group Management Protocol Snooping) is a constraint mechanism on L2 devices to manage and control multicast groups.

By analyzing the IGMP messages received, L2 devices establish a mapping between ports and MAC multicast addresses and forward the multicast data accordingly.

As shown below, multicast data are transmitted on L2 without IGMP snooping. When IGMP snooping runs, known multicast group data are transmitted to specified receivers while unknown multicast data are still on Layer 2.



Instructions:

1. Click the “Advanced > IGMP Setting”, in the navigation bar as follows:

IGMP

| Router Port | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| static | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| dynamic | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Apply

Dump IGMP entry

| IP Address | Port | VLAN ID |
|------------|------|---------|
|------------|------|---------|

Interface data are as follows.


| Configuration Items | Description |
|---------------------|-------------------------------------|
| Enable | Enable or disable the IGMP Snooping |
| Dump IGMP entry | Display multicast group entries |

9.4 Jumbo Frame

Set the MTU (Maximum Transmission Unit) of the port

Instructions:

1. Click the “Advanced > Jumbo Frame”, in the navigation bar as follows:

Jumbo Frame Setting 

Jumbo Frame Size

Interface data are as follows

| Configuration Items | Description |
|---------------------|-------------------------|
| Jumbo Frame | Set the MTU of the port |

10 System Manage

10.1 IP Setting

Change the management IP address on web interface

1. Click the “System Manage > IP Setting” in the navigation bar as follows:

IP Address Mode:

IP Address: *

Netmask: *

Gateway: *

Interface data are as follows.

| Query Items | Description |
|--------------|--|
| DHCP Setting | Enable: Enable DHCP client in system Disable: Disable DHCP client |
| IP Address | Manager IP address |

| | |
|---------|----------------------------|
| Netmask | Manager IP mask |
| Gateway | Manager IP default gateway |

10.2 User Management

Users can check and modify the current username and password of the switch.
Instructions:

1. Click the “System Manage > User Management” in the navigation bar as follows:

New Username: *

New Password: *

Confirm Password: *

Interface data are as follows.

| Query Items | Description |
|------------------|-------------------------------|
| New Username | New Username |
| New Password | New Password |
| Confirm Password | Enter the new user name again |

10.3 Device Reboot

Restart the system.

Instructions

1. Click the “System Manage > Device Reboot”, in the navigation bar as follows:

Reboot

10.4 Save Configuration

Instructions

1. Click the “System Manage > Save Configuration”, in the navigation bar as follows:



10.5 Backup Configuration

System configuration upgrade or backup

Instructions

1. Click the “System Manage > Backup Configuration”, in the navigation bar as follows:



Interface data are as follows.

| Configuration Items | Description |
|---------------------|----------------------|
| Backup | Backup configuration |
| Restore | Upload configuration |


10.6 Firmware Upgrade

System version firmware upgrade

Instructions:

1. Click the “System Manage > Firmware Upgrade”, in the navigation bar as follows:



 **Note:** After clicking OK, do not power off during the upgrade process, stay on the upgrade page for about 1 minute until the upgrade is complete

10.7 Restore Factory

Restore factory settings

Instructions

1. Click the “System Manage > Restore factory”, in the navigation bar as follows:

