



# **Vi30110**

## **GUI User Guide**

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10-Port L2+ Managed PoE Switch

Release A2

# About This Manual

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## Purpose

This manual gives specific information on how to operate and use the management functions of the Vi30110.

## Audience

The manual is intended for use by network administrators who are responsible for operating and maintaining network equipment. Consequently, it assumes a basic working knowledge of general switch functions, the Internet Protocol (IP), and Simple Network Management Protocol (SNMP).

## Conventions

The following conventions are used throughout this manual to show information.



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**NOTE:** Emphasizes important information or calls your attention to related features or instructions.

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**WARNING:** Alerts you to a potential hazard that could cause personal injury.

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**CAUTION:** Alerts you to a potential hazard that could cause loss of data, or damage the system or equipment.

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**CE Mark Warning**

This is a Class B device. In a domestic environment, this product may cause radio interference. In which case, the user may be required to take adequate measures.

**UL Mark**

UL 60950-1 Information Technology Equipment - Safety - Part 1:  
General Requirements - Edition 2 - Revision Date 2019/10/18

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## Revision History

<b>Release</b>	<b>Date</b>	<b>Revision</b>
<b>Initial Release</b>	<b>9/26/2019</b>	<b>A1</b>
	<b>10/21/2019</b>	<b>A2</b>

## Overview

In this User Guide, it will not only tell you how to install and connect your network system but configure and monitor the Vi30110 through the web by (RJ-45) serial interface and Ethernet ports step-by-step. Many explanations in detail of hardware and software functions are shown as well as the examples of the operation for web-based interface.

The Vi30110, the next generation Managed switch from Manufacture, is a portfolio of affordable managed switches that provides a reliable infrastructure for your business network. These switches deliver more intelligent features you need to improve the availability of your critical business applications, protect your sensitive information, and optimize your network bandwidth to deliver information and applications more effectively. It provides the ideal combination of affordability and capabilities for entry level networking includes small business or enterprise application and helps you create a more efficient, better-connected workforce.

Vi30110 Managed Switches provide 10 ports in a single device; the specification is highlighted as follows.

- L2+ features provide better manageability, security, QoS, and performance.
- Support IPv4/IPv6 dual stack management
- Support SSH/SSL secured management
- Support SNMP v1/v2c/v3
- Support RMON groups 1,2,3,9
- Support sFlow
- Support IGMP v1/v2/v3 Snooping
- Support MLD v1/v2 Snooping
- Support RADIUS and TACACS+ authentication
- Support IP Source Guard
- Support DHCP Relay (Option 82)
- Support DHCP Snooping
- Support ACL and QCL for traffic filtering
- Support 802.1d(STP), 802.1w(RSTP) and 802.1s(MSTP)
- Support LACP and static link aggregation
- Support Q-in-Q double tag VLAN
- Support GVRP dynamic VLAN

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## Overview of this User Guide

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- Chapter 1 "Operation of Web-based Management"
- Chapter 2 "Configuration"
- Chapter 3 "Monitor"
- Chapter 4 "Diagnostics"
- Chapter 5 "Maintenance"

## Quick Installation and Initial Configuration

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#### Chapter 1 "Introduction"

- Overview
- Front View of the Switch
- Rear View of the Switch
- LED Descriptions
- Mode/Reset Button

#### Chapter 2 "Installing the Switch"

- Package Contents
- Mounting the Switch on Wall
- Mounting the Switch on Desk or Shelf
- Connecting the AC Power Cord
- Installing SFP Modules

#### Chapter 3 "Initial Configuration of Switch"

- Initial Configuration of Switch
- Initial Switch Configuration Procedure

#### Chapter 4 "Troubleshooting"

## Overview

This user guide describes how to install, configure, and troubleshoot the Vi30110, 10 Ports L2+ Managed GbE PoE+ Switch. PoE+ total up to 250W.

By reading this user guide, users can perform the following tasks:

- To check the switch status by reading the LED behavior
- To reset the switch or to restore the switch to factory defaults
- To install the switch
- To use a Web browser to initially configure the switch
- To troubleshoot the switch

## Front View of the Switch

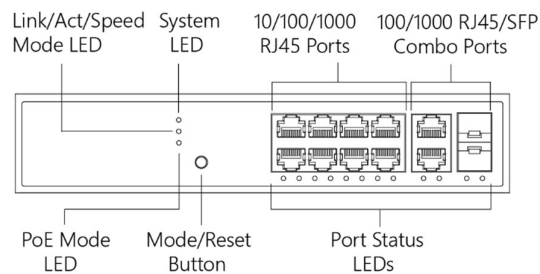


Figure 1: Front Panel of the Switch

## Rear View of the Switch

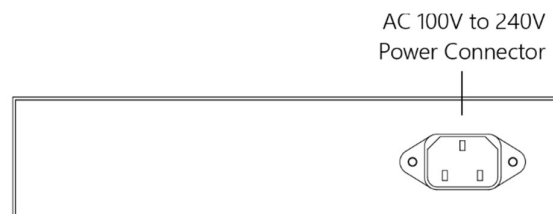


Figure 2: Rear Panel of the Switch

## LED Descriptions

The LEDs on the front panel provide users with switch status checking and monitoring. There are three types of LEDs as follows:

- **System LED**  
indicates if the switch is powered up correctly or not.
- **Mode LEDs**  
indicates the mode of all ports on the switch. Users can press the Mode button sequentially to switch among the two different modes (Link/Activity/Speed mode and PoE mode).
- **Port Status LEDs**  
indicates the current status of each port. Users can check these LEDs to understand the port status in different modes, after changing the mode by pressing Mode button.



The following table details the functions and descriptions of various LED indicators:

Table 1: System LED

LED	Color	State	Description
System	Green	On	The switch is powered ON correctly.
		Off	The switch is not receiving power.

Table 2: Mode LEDs

LED	Color	State	Description
Link/Act/Speed	Green	On	The Port Status LEDs are displaying link status, network activity and speed of each port.
PoE	Green	On	The RJ45 Port Status LEDs are displaying PoE powering status of each port.

By pressing the Mode button in less than 2 seconds to change LED modes (Link/Act/Speed Mode or PoE Mode), users can check the port status by reading the LED behaviors per the table below:

Table 3: Port Status LEDs

When Link/Act/Speed Mode LED Lit			
LED	Color	State	Description
RJ45 Ports	Green	On	The port is enabled and established a link to connected device, and the connection speed is 1000Mbps.
	Green	Blinking	The port is transmitting/receiving packets, and the connection speed is 1000Mbps.
	Amber	On	The port is enabled and established a link to connected device, and the connection speed is 10/100Mbps.
	Amber	Blinking	The port is transmitting/receiving packets, and the connection speed is 10/100Mbps.
	--	Off	The port has no active network cable connected, or it is not established a link to connected device. Otherwise, the port may have been disabled through the switch user interface.
SFP Ports	Green	On	The port is enabled and established a link to connected device, and the connection speed is 1000Mbps.
	Green	Blinking	The port is transmitting/receiving packets, and the connection speed is 1000Mbps.
	Amber	On	The port is enabled and established a link to connected device, and the connection speed is 100Mbps.
	Amber	Blinking	The port is transmitting/receiving packets, and the connection speed is 100Mbps.
	--	Off	The port has no active network cable connected, or it is not established a link to connected device. Otherwise, the port may have been disabled through the switch user interface.
When PoE Mode LED Lit			
LED	Color	State	Description
RJ45 Ports	Green	On	The port is enabled and supplying power to connected device.
	Amber	On	An abnormal state, such as overload status, has been detected in the switch.

	--	Off	The port has no active network cable connected, or it is not connected a PoE PD device. Otherwise, the port may have been disabled through the switch user interface.
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## Mode/Reset Button

By pressing the Mode/Reset Button for certain period of time, users can perform the following tasks:

- **Change Port Status LED Mode**  
to read the port status correctly in the two different modes (Link/Act/Speed mode or PoE mode).
- **Reset the Switch**  
to reboot and get the switch back to the previous configuration settings saved.
- **Restore the Switch to Factory Defaults**  
to restore the original factory default settings back to the switch.




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### NOTE:

According to the table below, users can easily judge which task is being performed by reading the LED behaviors while pressing the Mode/Reset button. **Once the LED behaviors are correctly displayed, users may just release the button.**

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Table 4: Mode/Reset Button Descriptions

Task to be Performed	Time Period of Pressing Button	SYS LED Behavior	Port Status LED Behavior
Change LED Mode	0 ~ 2 seconds	ON Green	LED status will be changed according the mode selected.
Reset the Switch	2 ~ 7 seconds	Blinking Green	ALL LEDs Light OFF
Restore to Defaults	7 ~ 12 seconds	Blinking Green	ALL LEDs Stay ON

**Package Contents**

- The Switch
- **AC Power Cord**  
(Must select power supply cord as Type SVT or SPT-2, Min. 18 AWG. Min. 1.5 m, max. 4.5m (14.76 ft) long. One end terminates with NEMA 5-15P, min. 125 Vac, the other end with and appliance coupler.)
- Four Adhesive Rubber Feet
- Installation Guide

**NOTE:**

The switch is an indoor device. If it is to be used with outdoor devices such as outdoor IP cameras or outdoor WiFi APs, then users are strongly suggested to install a surge protector or surge suppressor in order to protect the switch.

**Mounting the Switch on Wall**

**Step 1:** Install user-supplied screws on the appropriate location on the wall, and be aware of the dimensional limitation of the screws.

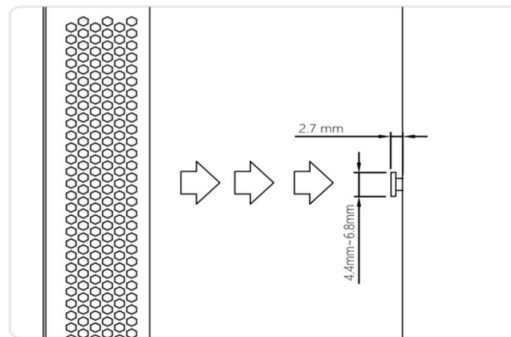


Figure 3: Install screws to the wall

**Step 2:** Make sure that the switch is attached securely to wall.

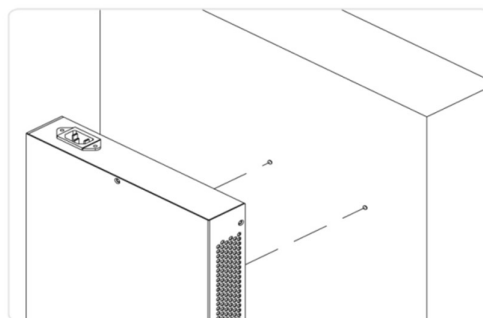


Figure 4: Attaching switch to the wall

## Mounting the Switch on Desk or Shelf

**Step 1:** Verify that the workbench is sturdy and reliably grounded.

**Step 2:** Attach the four adhesive rubber feet to the bottom of the switch.

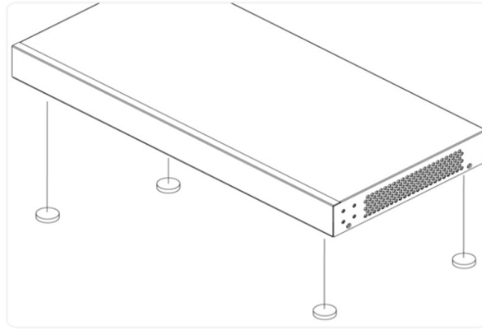


Figure 4: Attaching the rubber feet

## Connecting the AC Power Cord

**Step 1:** Connect the AC power cord to the AC power receptacle of switch.

**Step 2:** Connect the other end of the AC power cord to the AC power outlet.

**Step 3:** Check the SYS LED. If it's ON, the power connection is correct.

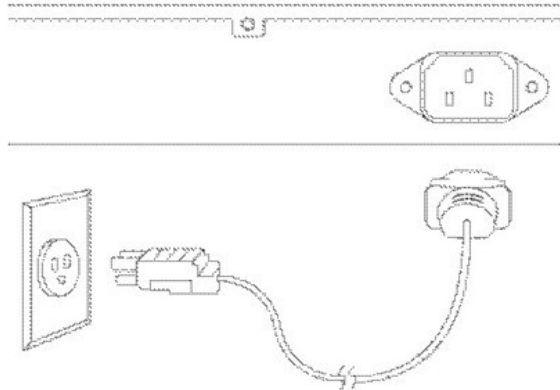


Figure 6: Connecting the AC power cord

## Installing SFP Modules

You can install or remove a mini-GBIC SFP module from a SFP port without having to power off the switch.

**Step 1:** Insert the module into the SFP port.

**Step 2:** Press firmly to ensure that the module seats into the connector.

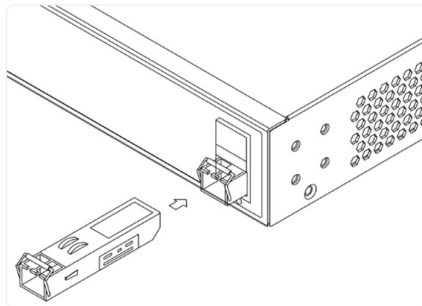


Figure 7: Installing a SFP Module into a SFP port



**NOTE:**

The SFP ports should use UL Listed Optional Transceiver product, Rated 3.3Vdc, Laser Class 1.

- The ITE is to be connected only to PoE networks without routing to the outside plant.
- If you need using outdoor device connect to this device with cable then you need to addition an arrester on the cable between outdoor device and this device.



Figure 8: Addition of an arrester between outdoor device and this switch

### Initial Switch Configuration Using Web Browsers

After powering up the switch for the first time, you can perform the initial switch configuration using a web browser. For managing other switch features, please refer to the Web interface user guide for details.

To begin with the initial configuration stage, you need to reconfigure your PC's IP address and subnet mask so as to make sure the PC can communicate with the switch. After changing PC's IP address (for example, 192.168.1.250), then you can access the Web interface of the switch using the switch's default IP address as shown below.



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**NOTE:**

The factory default IP address of the switch is 192.168.1.1  
The factory default Subnet Mask of switch is 255.255.255.0

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### Initial Switch Configuration Procedure

The initial switch configuration procedure is as follows:

1. Power up the PC that you will use for the initial configuration. Please make sure the PC has the Ethernet RJ45 connector to be connected to the switch via standard Ethernet LAN cable.
2. Reconfigure the PC's IP address and Subnet Mask as below, so that it can communicate with the switch. The method to change the PC's IP address, for example, for a PC running Windows® 7/8.x/10, is as follows:

**Step 1:** Type "*network and sharing*" into the **Search Box** in the **Start Menu**

**Step 2:** Select **Network and Sharing Center**

**Step 3:** Click on **Change adapter settings** on the left of PC screen



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**NOTE:**

Users can also skip step 1 to 3, by pressing **WinKey+R** and type "*ncpa.cpl*" command to get to step 4 directly.

---

**Step 4:** Right-click on your local adapter and select **Properties**

**Step 5:** In the **Local Area Connection Properties** window highlight **Internet Protocol Version 4 (TCP/IPv4)**, then click the **Properties** button.



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**NOTE:**

Be sure to record all your PC's current IP settings to be able to restore them later.

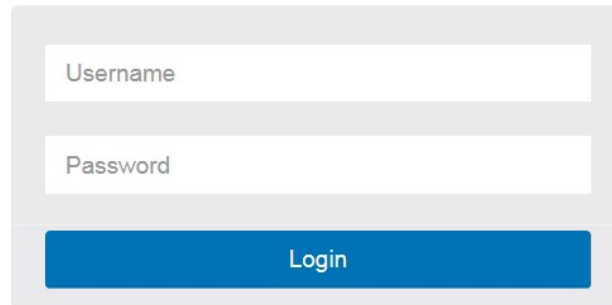
---

**Step 6:** Select the radio button **Use the following IP address** and enter in the IP for the PC (e.g. any IP address not in use, and in between 192.168.1.2 and 192.168.1.254), Subnet mask (e.g. 255.255.255.0), and Default gateway that corresponds with your network setup. Then enter your Preferred and Alternate DNS server addresses.

**Step 7:** Click **OK** to change the PC's IP address.

3. Power up the switch to be initially configured, and wait until it has finished its start-up processes.
4. Connect the PC to any port on the switch using a standard Ethernet cable, and check the port LED on the switch to make sure the link status of the PC's is OK.
5. Run your Web browser on the PC, enter the factory default IP address, so as to access the switch's Web interface.

If your PC is configured correctly, you will see the login page of the switch as shown by Figure 9 below.

The image shows a web interface login page. It consists of a light gray rectangular container. Inside the container, there are two white input fields stacked vertically. The top field is labeled "Username" and the bottom field is labeled "Password". Below these fields is a solid blue button with the word "Login" written in white text in the center.

*Figure 9: Web Interface Login Page*

If you do not see the above login page, please perform the following steps:

- Refresh the web page.
- Check to see if there is an IP conflict issue.
- Clean browser cookies and temporary internet files.
- Check your PC settings again and repeat step 2.

6. Enter the factory default username and password in login page. Click "Login" to log into the switch.



---

**NOTE:**

The factory default Username of the switch is **admin**.  
There is no factory default Password of the switch.

---

The following table provides information for users to easily troubleshoot problems by taking actions based on the suggested solutions within.

*Table 5: Troubleshooting Table*

Symptoms	Possible Causes	Suggested Solutions
SYSTEM LED is Off	The switch is not receiving power.	<ol style="list-style-type: none"> <li>1. Check if correct power cord is connected firmly to the switch and to the AC outlet socket.</li> <li>2. Perform power cycling the switch by unplugging and plugging the power cord back into the switch.</li> <li>3. If the LED is still off, try to plug power cord into different AC outlet socket to make sure correct AC source is supplied.</li> </ol>
Port Status LED is Off in the Link/Act/Speed Mode	The port is not connected or the connection is not working.	<ol style="list-style-type: none"> <li>1. Check if the cable connector plug is firmly inserted and locked into the port at both the switch and the connected device.</li> <li>2. Make sure the connected device is up and running correctly.</li> <li>3. If the symptom still exists, try different cable or different port, in order to identify if it is related to the cable or specific port.</li> <li>4. Check if the port is disabled in the configuration settings via WEB user interface.</li> </ol>
Port Status LED is Off in the PoE Mode	The port is not supplying power	<ol style="list-style-type: none"> <li>1. Check if the cable connector plug is firmly inserted and locked into the port at both the switch and the connected device.</li> <li>2. Make sure the correct Ethernet cables are used.</li> <li>3. If the symptom still exists, try different cable or different port, in order to identify if it is related to the cable or specific port.</li> <li>4. Check if the port is disabled in the configuration settings via WEB user interface.</li> </ol>



## **WARNING**

- Self-demolition on Product is strictly prohibited. Damage caused by self-demolition will be charged for repair fees.
- The switch is an indoor device; if it will be used in an outdoor environment or connects with some outdoor device, then it must use a lightning arrester to protect the switch.
- Before installation, please make sure input power supply and product specifications are compatible with each other.
- To reduce the risk of electric shock, please disconnect all AC or DC power cord and RPS cables to remove power from the unit completely.
- Before importing/exporting configuration, please make sure the firmware version is always the same.
- After the firmware upgrade, the switch will remove the configuration automatically to the latest firmware version.

## **MISE EN GARDE**

- Il est strictement interdit de démonter le produit par vous-même. Si le dommage causé par le démontage est volontaire, des frais de réparation vous seront facturés.
- L'interrupteur est une unité intérieure; s'il doit être utilisé à l'extérieur ou relié à certaines unités extérieures, vous devez utiliser un parafoudre pour le protéger.
- Avant l'installation, veuillez vous assurer de la compatibilité de la puissance d'entrée et des spécifications du produit.
- Afin de réduire le risque de choc électrique, veuillez couper l'alimentation électrique de l'équipement et de toutes les lignes électriques de courant alternatif ou de courant continu et des câbles redondants du système d'alimentation.
- Avant d'importer/exporter la configuration, assurez-vous que la version du micrologiciel est toujours la même.
- Après la mise à niveau du micrologiciel, le commutateur supprime automatiquement la configuration de la dernière version du micrologiciel.

## Initial Configuration

This chapter instructs you how to configure and manage the Vi30110 through the web user interface. With this facility, you can easily access and monitor through any one port of the switch all the status of the switch, including MIBs status, each port activity, Spanning tree status, port aggregation status, multicast traffic, VLAN and priority status, even illegal access record and so on.

The default values of the Vi30110 are listed in the table below:

<b>IP Address</b>	192.168.1.1
<b>Subnet Mask</b>	255.255.255.0
<b>Default Gateway</b>	192.168.1.254
<b>Username</b>	admin
<b>Password</b>	

After the Vi30110 has been finished configuration its interface, you can browse it. For instance, type <http://192.168.1.1> in the address row in a browser, it will show the following screen and ask you inputting username and password in order to login and access authentication.

The default username is “**admin**” and password is **empty**. For the first time to use, please enter the default username and password, and then click the **<Login>** button. The login process now is completed. In this login menu, you have to input the complete username and password respectively, the Vi30110 will not give you a shortcut to username automatically. This looks inconvenient, but safer.

In the Vi30110, allowed two or more users using administrator’s identity to manage this switch, which administrator to do the last setting, it will be an available configuration to affect the system.




---

### NOTE:

When you login the Switch WEB page to manage. You must first type the Username of the admin. Password was blank, so when you type after the end Username, please press enter. Management page to enter WEB.

When you login Vi30110 switch Web UI management, you can use both ipv4 ipv6 login to manage.

To optimize the display effect, we recommend you use Microsoft IE 6.0 above, Netscape V7.1 above or Firefox V1.00 above and have the resolution 1024x768. The switch supported neutral web browser interface.

---



---

**NOTE:**

AS Vi30110 the function enables dhcp, so If you do not have DHCP server to provide ip addresses to the switch, the Switch **default ip 192.168.1.1**

---

A login form with a light gray border. It contains three main sections: a top white input field, a middle white input field with the text "Password" in gray, and a bottom blue button with the text "Login" in white.

**Figure 1: The Login Page**

This chapter describes the entire basic configuration tasks which includes the System Information and any manage of the Switch (e.g. Time, Account, IP, Syslog and NTP.)

## 2-1 System

You can identify the system by configuring the contact information, name, and location of the switch.

### 2-1.1 Information

The switch system's contact information is provided here.

#### Web Interface

To configure System Information in the web interface:

1. Click Configuration, System and Information.
2. Write System Contact, System Name, System Location information in this page.
3. Click Apply

System Information Configuration	
System Contact	<input type="text"/>
System Name	<input type="text"/>
System Location	<input type="text"/>

Apply Reset

Figure 2-1.1: System Information

#### Parameter Description:

- **System Contact:**  
The textual identification of the contact person for this managed node, together with information on how to contact this person. The allowed string length is 0 to 128.
- **System Name:**  
An administratively assigned name for this managed node. By convention, this is the node's fully-qualified domain name. A domain name is a text string drawn from the alphabet (A-Za-z), digits (0-9), minus sign (-).  
No space characters are permitted as part of a name. The first character must be an alpha character. And the first or last character must not be a minus sign. The allowed string length is 0 to 128.
- **System Location:**  
The physical location of this node (e.g., telephone closet, 3rd floor). The allowed string length is 0 to 128.

### **Buttons**

- **Apply:**  
Click to save changes.
- **Reset:**  
Click to undo any changes made locally and revert to previously saved values.

## 2-1.2 IP

The IPv4 address for the switch could be obtained via DHCP Server for VLAN 1. To manually configure an address, you need to change the switch's default settings to values that are compatible with your network. You may also need to establish a default gateway between the switch and management stations that exist on another network segment.

Configure the switch-managed IP information on this page

Configure IP basic settings, control IP interfaces and IP routes.

The maximum number of interfaces supported is 8 and the maximum number of routes is 32.

### Web Interface

To configure an IP address in the web interface:

1. Click Configuration, System and IP.
2. Click Add Interface then you can create new Interface on the switch.
3. Click Add Route then you can create new Route on the switch.
4. Click Apply.

The screenshot shows the 'IP Configuration' web interface. At the top, there is a breadcrumb trail: Home > Configuration > System > IP. The interface is divided into several sections:

- IP Configuration:** A form with three rows: 'Mode' set to 'Host', 'DNS Server' set to 'Configured' with a value of '8.8.8.8', and 'DNS Proxy' which is unchecked.
- IP Interfaces:** A table with columns for 'Delete', 'VLAN', 'IPv4 DHCP' (subdivided into 'Enable', 'Fallback', 'Current Lease'), 'IPv4' (subdivided into 'Address', 'Mask Length'), and 'IPv6' (subdivided into 'Address', 'Mask Length'). One interface is listed with VLAN 1, IPv4 address 192.168.1.1, and mask length 24.
- IP Routes:** A table with columns for 'Delete', 'Network', 'Mask Length', 'Gateway', and 'Next Hop VLAN'. Three routes are listed: 0.0.0.0 with mask 0 and gateway 192.168.1.254; 169.254.0.0 with mask 16 and gateway 192.168.1.1; and 192.168.1.0 with mask 24 and gateway 192.168.1.1.

Buttons for 'Add Interface', 'Add Route', 'Apply', and 'Reset' are visible at the bottom of the interface.

Figure2-1.2: The IP configuration

### Parameter Description:

#### IP Configuration

- **Mode:**

Configure whether the IP stack should act as a Host or a Router. In Host mode, IP traffic between interfaces will not be routed. In Router mode traffic is routed between all interfaces.

- **DNS Server :**

This setting controls the DNS name resolution done by the switch. The following modes are supported:

- From any DHCP interfaces:
  - The first DNS server offered from a DHCP lease to a DHCP-enabled interface will be used.

- No DNS server:
  - No DNS server will be used.
- Configured:
  - Explicitly provide the IP address of the DNS Server in dotted decimal notation.
- From this DHCP interface:
  - Specify from which DHCP-enabled interface a provided DNS server should be preferred.
- **DNS Proxy :**

When DNS proxy is enabled, system will relay DNS requests to the currently configured DNS server, and reply as a DNS resolver to the client devices on the network.

### IP Interfaces

- **Delete :**

Select this option to delete an existing IP interface.
- **VLAN :**

The VLAN associated with the IP interface. Only ports in this VLAN will be able to access the IP interface. This field is only available for input when creating a new interface.
- **IPv4 DHCP Enabled :**

Enable the DHCP client by checking this box. If this option is enabled, the system will configure the IPv4 address and mask of the interface using the DHCP protocol. The DHCP client will announce the configured System Name as hostname to provide DNS lookup.
- **IPv4 DHCP Fallback Timeout :**

The number of seconds for trying to obtain a DHCP lease. After this period expires, a configured IPv4 address will be used as IPv4 interface address. A value of zero disables the fallback mechanism, such that DHCP will keep retrying until a valid lease is obtained. Legal values are 0 to 4294967295 seconds.
- **IPv4 DHCP Current Lease :**

For DHCP interfaces with an active lease, this column show the current interface address, as provided by the DHCP server.
- **IPv4 Address :**

The IPv4 address of the interface in dotted decimal notation.  
If DHCP is enabled, this field is not used. The field may also be left blank if IPv4 operation on the interface is not desired.
- **IPv4 Mask Length :**

The IPv4 network mask, in number of bits (prefix length). Valid values are between 0 and 30 bits for an IPv4 address.  
If DHCP is enabled, this field is not used. The field may also be left blank if IPv4 operation on the interface is not desired.
- **IPv6 Address :**

The IPv6 address of the interface. An IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon separating each field (:). For example, fe80::215:c5ff:fe03:4dc7. The symbol :: is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; but it can appear only once. It can also represent a legally valid IPv4 address. For example, ::192.1.2.34.  
The field may be left blank if IPv6 operation on the interface is not desired.
- **IPv6 Mask Length :**

The IPv6 network mask, in number of bits (prefix length). Valid values are between 1 and 128 bits for an IPv6 address.  
The field may be left blank if IPv6 operation on the interface is not desired.

### **IP Routes**

- **Delete :**  
Select this option to delete an existing IP route.
- **Network :**  
The destination IP network or host address of this route. Valid format is dotted decimal notation or a valid IPv6 notation. A default route can use the value 0.0.0.0 or IPv6 :: notation.
- **Mask Length :**  
The destination IP network or host mask, in number of bits (prefix length). It defines how much of a network address that must match, in order to qualify for this route. Valid values are between 0 and 32 bits respectively 128 for IPv6 routes. Only a default route will have a mask length of 0 (as it will match anything).
- **Gateway :**  
The IP address of the IP gateway. Valid format is dotted decimal notation or a valid IPv6 notation. Gateway and Network must be of the same type.
- **Next Hop VLAN (Only for IPv6) :**  
The VLAN ID (VID) of the specific IPv6 interface associated with the gateway.  
The given VID ranges from 1 to 4094 and will be effective only when the corresponding IPv6 interface is valid.  
If the IPv6 gateway address is link-local, it must specify the next hop VLAN for the gateway.  
If the IPv6 gateway address is not link-local, system ignores the next hop VLAN for the gateway.

### **Buttons**

- **Add Interface:**  
Click to add a new IP interface. A maximum of 8 interfaces is supported.
- **Add Route:**  
Click to add a new IP route. A maximum of 32 routes is supported.
- **Apply:**  
Click to save changes.
- **Reset:**  
Click to undo any changes made locally and revert to previously saved values.

Note on Time Settings: Several functions such as PoE Chip reset, logging etc., depend on time settings. The Vi30110 has two-time references. Network Time Protocol (NTP) offers exact time reference but must be linked to an external NTP server and set according to the specific time zone

The Vi30110 contains an internal clock, however it is not accurate and maybe off set from the actual time. If power is lost or reset, the internal clock will default and need to be reset.



## 2-1.3 NTP

NTP is Network Time Protocol and is used to sync the network time-based Greenwich Mean Time (GMT). If use the NTP mode and select a built-in NTP time server or manually specify a user-defined NTP server as well as Time Zone, the switch will sync the time in a short after pressing <Apply> button. Though it synchronizes the time automatically, NTP does not update the time periodically without user's processing.

Time Zone is an offset time off GMT. You have to select the time zone first and then perform time sync via NTP because the switch will combine this time zone offset and updated NTP time to come out the local time, otherwise, you will not able to get the correct time. The switch supports configurable time zone from -12 to +13 step 1 hour.

Default Time zone: +8 Hrs.

### Web Interface

To configure NTP in the web interface:

1. Click Configuration, System and NTP.
2. Specify the Time parameter in manual parameters.
3. Click Apply.

Automatic	Disabled ▾
Server address via DHCP	
Server address 1	
Server address 2	
Server address 3	
Server address 4	
Server address 5	

Apply Reset

Figure 2-1.3: The NTP configuration

### Parameter Description:

- **Automatic :**
  - Indicates the Automatic mode operation. Possible modes are:
    - **Enabled:** NTP servers available from the DHCP.
    - **Disabled:** NTP servers available from the config.
- **Server Address via DHCP :**
  - Specify a list of IP addresses indicating NTP servers available to the client.
- **Server 1 to 5 :**
  - Provide the NTP IPv4 or IPv6 address of this switch. IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon separating each field (:). For example, 'fe80::215:c5ff:fe03:4dc7'. The symbol '::' is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; but it can only appear once. It can also represent a legally valid IPv4 address. For example, '::192.1.2.34'.

### Buttons

- **Apply:**
  - Click to save changes.
- **Reset:**
  - Click to undo any changes made locally and revert to previously saved values.

## 2-1.4 Time

The switch provides manual and automatic ways to set the system time via NTP. Manual setting is simple and you just input "Year", "Month", "Day", "Hour" and "Minute" within the valid value range indicated in each item.

### Web Interface

To configure Time in the web interface:

1. Click Configuration, System and Time.
2. Specify the Time parameter.
3. Click Apply.

Time Configuration	
Clock Source	Use NTP Server ▼
Date Format	mm-dd-yyyy ▼
Time Format	12-hour ▼
System Date	01-01-2011 (mm-dd-yyyy)
System Time	12:01:52 am (hh:mm:ss am)

Time Zone Configuration	
Time Zone	None ▼
Acronym	(0 - 16 characters)

Daylight Saving Time Configuration	
Daylight Saving Time	Disabled ▼
<b>Start Time settings</b>	
Month	Jan ▼
Date	1 ▼
Year	2000 ▼
Hours	0 ▼
Minutes	0 ▼
<b>End Time settings</b>	
Month	Jan ▼
Date	1 ▼
Year	2000 ▼
Hours	0 ▼
Minutes	0 ▼
<b>Offset settings</b>	
Offset	1 (1 - 1440) Minutes

Apply Reset

Figure 2-1.4: The Time Configuration

## Parameter Description:

### Time Configuration

- **Clock Source:**

There are two modes for configuring how the Clock Source from. Select "Use Local Settings" : Clock Source from Local Time. Select "Use NTP Server" : Clock Source from NTP Server.

- **Date and Time Format:**

The drop bar is for choose appropriate time format. Three selections are provided as below.

- YYYY-MM-DD HH:MM:SS
- MM-DD-YYYY HH:MM:SS
- DD-MM-YYYY HH:MM:SS

24 hours: The time is always represented in the 24-hour system

12 hours: The time is always represented in the 12-hour system

- **System Date:**

Show the current time of the system. The year of system date limits between 2011 and 2037.

### Time Zone Configuration

- **Time Zone:**

Lists various Time Zones worldwide. Select appropriate Time Zone from the drop down and click Apply to set.

- **Acronym:**

User can set the acronym of the time zone. This is a User configurable acronym to identify the time zone. (Range: Up to 16 characters)

### Daylight Saving Time Configuration

- **Daylight Saving Time:**

This is used to set the clock forward or backward according to the configurations set below for a defined Daylight Saving Time duration. Select 'Disable' to disable the Daylight Saving Time configuration. Select 'Recurring' and configure the Daylight Saving Time duration to repeat the configuration every year. Select 'Non-Recurring' and configure the Daylight Saving Time duration for single time configuration. (Default:Disabled).

### Recurring Configuration

- **Start time settings:**

Week - Select the starting week number.

Day - Select the starting day.

Month - Select the starting month.

Hours - Select the starting hour.

Minutes - Select the starting minute.

- **End time settings:**

Week - Select the ending week number.

Day - Select the ending day.

Month - Select the ending month.

Hours - Select the ending hour.

Minutes - Select the ending minute.

- **Offset settings:**

Offset - Enter the number of minutes to add during Daylight Saving Time. (Range: 1 to 1440)



---

**NOTE:**The under "Start Time Settings" and "End Time Settings" was displayed what you set on the "Start Time Settings" and "End Time Settings" field information.

---

### **Buttons**

- **Apply:**  
Click to save changes.
- **Reset:**  
Click to undo any changes made locally and revert to previously saved values.

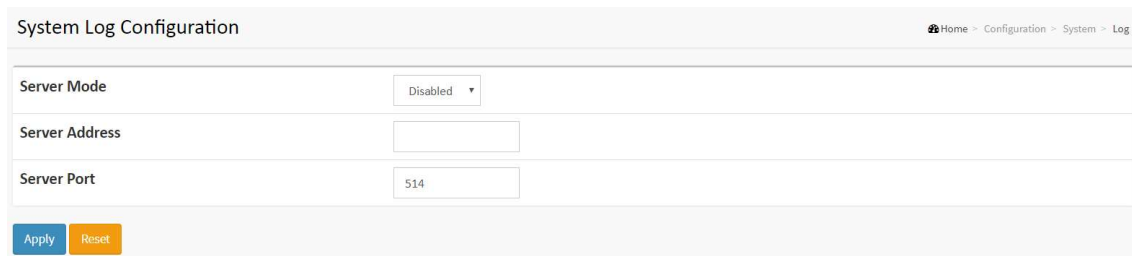
## 2-1.5 Log

The log is a standard for logging program messages . It allows separation of the software that generates messages from the system that stores them and the software that reports and analyzes them. It can be used as well a generalized informational, analysis and debugging messages. It is supported by a wide variety of devices and receivers across multiple platforms.

### Web Interface

To configure log configuration in the web interface:

1. Click Configuration, System and log.
2. Specify the Server Address.
3. Evoke the Syslog to enable it.
4. Click Apply.



System Log Configuration	
Server Mode	Disabled ▾
Server Address	<input type="text"/>
Server Port	514
<input type="button" value="Apply"/> <input type="button" value="Reset"/>	

Figure2-1.5: The System Log Configuration

### Parameter Description:

- **Server Mode :**

Indicate the server mode operation. When the mode operation is enabled, the syslog message will send out to syslog server. The syslog protocol is based on UDP communication and received on UDP port 514 and the syslog server will not send acknowledgments back sender since UDP is a connectionless protocol and it does not provide acknowledgments. The syslog packet will always send out even if the syslog server does not exist.

Possible modes are:

- **Enabled:** Enable server mode operation.
- **Disabled:** Disable server mode operation.

- **Server Address :**

Indicates the IPv4 hosts address of syslog server. If the switch provides DNS feature, it also can be a host name.

- **Server Port :**

Indicates the service port of syslog server. The port range is 1-65535.

### Buttons

- **Apply:**

Click to save changes.

- **Reset:**

Click to undo any changes made locally and revert to previously saved values.

## 2-2 Green Ethernet

### 2-2.1 Port Power Savings

EEE is a power saving option that reduces the power usage when there is low or no traffic utilization.

EEE works by powering down circuits when there is no traffic. When a port gets data to be transmitted all circuits are powered up. The time it takes to power up the circuits is named wakeup time. The default wakeup time is 17 us for 1Gbit links and 30 us for other link speeds. EEE devices must agree upon the value of the wakeup time in order to make sure that both the receiving and transmitting device has all circuits powered up when traffic is transmitted. The devices can exchange wakeup time information using the LLDP protocol.

EEE works for ports in auto-negotiation mode, where the port is negotiated to either 1G or 100 Mbit full duplex mode.

For ports that are not EEE-capable the corresponding EEE checkboxes are grayed out and thus impossible to enable EEE for.

When a port is powered down for saving power, outgoing traffic is stored in a buffer until the port is powered up again. Because there is some overhead in turning the port down and up, more power can be saved if the traffic can be buffered up until a large burst of traffic can be transmitted. Buffering traffic will give some latency in the traffic.

#### Web Interface

To configure a Port Power Saving Configuration in the web interface:

1. Click Configuration, Green Ethernet and Port Power Savings.
2. Evoke to enable or disable the ActiPHY, PerfectReach, EEE and EEE Urgent Queues.
3. Click Apply.

Port Configuration		EEE Urgent Queues							
Port	EEE	1	2	3	4	5	6	7	8
*	<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"/>
N-1	<input checked="" 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"/>
N	<input checked="" 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"/>

Figure 2-2.1: The Port Power Saving Configuration

#### Parameter Description:

##### Optimize EEE for :

The switch can be set to optimize EEE for either best power saving or least traffic latency.

##### ● Port :

The switch port number of the logical port.

- **EEE :**  
Controls whether EEE is enabled for this switch port.  
For maximizing power savings, the circuit isn't started at once transmit data is ready for a port, but is instead queued until a burst of data is ready to be transmitted. This will give some traffic latency.  
If desired it is possible to minimize the latency for specific frames, by mapping the frames to a specific queue (done with QOS), and then mark the queue as an urgent queue. When an urgent queue gets data to be transmitted, the circuits will be powered up at once and the latency will be reduced to the wakeup time.
- **EEE Urgent Queues :**  
Queues set will activate transmission of frames as soon as data is available. Otherwise the queue will postpone transmission until a burst of frames can be transmitted.

#### **Buttons**

- **Apply:**  
Click to save changes.
- **Reset:**  
Click to undo any changes made locally and revert to previously saved values.

## 2-3 Ports Configuration

The section describes to configure the Port detail parameters of the switch. Others you could using the Port configure to enable or disable the Port of the switch. Monitor the ports content or status in the function.

### 2-3.1 Ports

This page displays current port configurations. Ports can also be configured here.

#### Web Interface

To configure a Current Port Configuration in the web interface:

1. Click Configuration, Ports Configuration and Ports.
2. Specify the Speed Configured, Flow Control, Maximum Frame size.
3. Click Apply.

Port	Link	Speed		Flow Control			Maximum Frame Size
		Current	Configured	Current Rx	Current Tx	Configured	
*			<input type="text" value="⊞"/>			<input type="checkbox"/>	9600
1	<span style="color: green;">●</span>	1Gfdx	Auto	<span style="color: red;">⊘</span>	<span style="color: red;">⊘</span>	<input type="checkbox"/>	9600
N-1	<span style="color: red;">●</span>	Down	SFP_Auto_AMS	<span style="color: red;">⊘</span>	<span style="color: red;">⊘</span>	<input type="checkbox"/>	9600
N	<span style="color: red;">●</span>	Down	SFP_Auto_AMS	<span style="color: red;">⊘</span>	<span style="color: red;">⊘</span>	<input type="checkbox"/>	9600

Figure 2-3.1: The Port Configuration

#### Parameter Description:

- **Port :**  
This is the logical port number for this row.
- **Link :**  
The current link state is displayed graphically. Green indicates the link is up and red that it is down.
- **Current Link Speed :**  
Provides the current link speed of the port.
- **Configured Link Speed :**  
Selects any available link speed for the given switch port. Only speeds supported by the specific port is shown. Possible speeds are:
  - Disabled - Disables the switch port operation.
  - Auto - Port auto negotiating speed with the link partner and selects the highest speed that is compatible with the link partner.



- 10Mbps HDX - Forces the cu port in 10Mbps half duplex mode.
- 10Mbps FDX - Forces the cu port in 10Mbps full duplex mode.
- 100Mbps HDX - Forces the cu port in 100Mbps half duplex mode.
- 100Mbps FDX - Forces the cu port in 100Mbps full duplex mode.
- 1Gbps FDX - Forces the port in 1Gbps full duplex
- SFP\_Auto\_AMS - Automatically determines the speed of the SFP. Note: There is no standardized way to do SFP auto detect, so here it is done by reading the SFP rom. Due to the missing standardized way of doing SFP auto detect some SFPs might not be detectable. The port is set in AMS mode. Cu port is set in Auto mode.
- 100-FX - SFP port in 100-FX speed. Cu port disabled.
- 100-FX\_AMS - Port in AMS mode. SFP port in 100-FX speed. Cu port in Auto mode.
- 1000-X - SFP port in 1000-X speed. Cu port disabled.
- 1000-X\_AMS - Port in AMS mode. SFP port in 1000-X speed. Cu port in Auto mode.

Ports in AMS mode with 1000-X speed has Cu port preferred.

Ports in AMS mode with 100-FX speed has fiber port preferred.

- **Flow Control :**

When Auto Speed is selected on a port, this section indicates the flow control capability that is advertised to the link partner. When a fixed-speed setting is selected, that is what is used. The Current Rx column indicates whether pause frames on the port are obeyed, and the Current Tx column indicates whether pause frames on the port are transmitted. The Rx and Tx settings are determined by the result of the last Auto-Negotiation.

Check the configured column to use flow control. This setting is related to the setting for Configured Link Speed.

- **Maximum Frame Size :**

Enter the maximum frame size allowed for the switch port, including FCS.

**Buttons**

- **Apply:**

Click to save changes.

- **Reset:**

Click to undo any changes made locally and revert to previously saved values.

- **Upper left icon (Refresh) :**

Click to refresh the page. Any changes made locally will be undone.

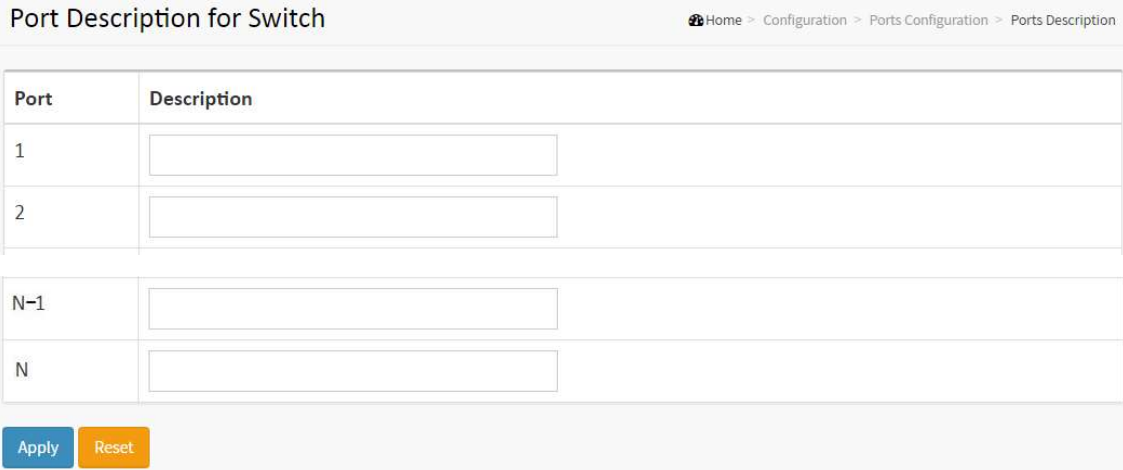
## 2-3.2 Ports Description

The section describes to configure the Port's alias or any descriptions for the Port Identity. It provides user to write down an alphanumeric string describing the full name and version identification for the system's hardware type, software version, and networking application

### Web Interface

To configure a Port Description in the web interface:

1. Click Configuration, Port Configuration and Port Description.
2. Specify the detail Port alias or description an alphanumeric string describing the full name and version identification for the system's hardware type, software version, and networking application.
3. Click Apply.



Port	Description
1	<input type="text"/>
2	<input type="text"/>
N-1	<input type="text"/>
N	<input type="text"/>

Apply Reset

Figure 2-3.2: The Port Configuration

### Parameter Description:

- **Port :**  
This is the logical port number for this row.
  - **Description :**  
Enter up to 47 characters to be descriptive name for identifies this port.
- Buttons**
- **Apply:**  
Click to save changes.
  - **Reset:**  
Click to undo any changes made locally and revert to previously saved values.

## 2-4 DHCP

The section describes to configure the DHCP Snooping parameters of the switch. The DHCP Snooping can prevent attackers from adding their own DHCP servers to the network.

### 2-4.1 Server

#### 2-4.1.1 Mode

This page configures global mode and VLAN mode to enable/disable DHCP server per system and per VLAN.

#### Web Interface

To configure DHCP server mode in the web interface:

1. Click Configuration, DHCP, Server and Mode.
2. Select "Enabled" in the Global Mode of DHCP Server Mode Configuration.
3. Add Vlan range.
4. Click Apply.

The figure displays two screenshots of the DHCP Server Mode Configuration web interface. The top screenshot shows the 'Global Mode' set to 'Disabled' and the 'VLAN Mode' table empty. A red box highlights the 'Add VLAN Range' button, with a red arrow pointing to the bottom screenshot. The bottom screenshot shows the 'Global Mode' still 'Disabled', but the 'VLAN Mode' table now has one entry with 'Delete' button, an empty 'VLAN Range' field, and 'Mode' set to 'Enabled'.

Figure 2-4.1.1: The DHCP Server Mode

## Parameter Description:

### Global Mode

- **Mode :**

Configure the operation mode per system. Possible modes are:

- **Enable:** Enable DHCP server per system.
- **Disable:** Disable DHCP server per system.

### VLAN Mode

- **VLAN Range :**

Indicate the VLAN range in which DHCP server is enabled or disabled. The first VLAN ID must be smaller than or equal to the second VLAN ID. BUT, if the VLAN range contains only 1 VLAN ID, then you can just input it into either one of the first and second VLAN ID or both.

On the other hand, if you want to disable existed VLAN range, then you can follow the steps.

1. Press "ADD VLAN Range" to add a new VLAN range.
2. Input the VLAN range that you want to disable.
3. Choose Mode to be disabled.
4. Press Apply to apply the change.

Then, you will see the disabled VLAN range is removed from the DHCP Server Mode configuration page.

- **Mode :**

Indicate the operation mode per VLAN. Possible modes are:

- **Enable:** Enable DHCP server per VLAN.
- **Disable:** Disable DHCP server per VLAN.

### Buttons

- **Delete :**

Check to delete the entry. It will be deleted during the next save.

- **Add VLAN Range :**

Click to add a new VLAN range.

- **Apply:**

Click to save changes.

- **Reset:**

Click to undo any changes made locally and revert to previously saved values.

## 2-4.1.2 Excluded IP

This page configures excluded IP addresses. DHCP server will not allocate these excluded IP addresses to DHCP client.

### Web Interface

To configure DHCP server excluded IP in the web interface:

1. Click Configuration, DHCP, Server and Excluded IP.
2. Click Add IP Range then you can create new IP Range on the switch.
3. Click Apply.

The figure shows two screenshots of the DHCP Server Excluded IP Configuration web interface. The top screenshot shows the 'Add IP Range' button highlighted with a red box and a red arrow pointing to the 'Add IP Range' button in the bottom screenshot. The bottom screenshot shows the 'IP Range' field with two input boxes separated by a hyphen, and the 'Delete' button highlighted in orange.

Figure 2-4.1.2: The DHCP Server Excluded IP

### Parameter Description:

- **IP Range :**

Define the IP range to be excluded IP addresses. The first excluded IP must be smaller than or equal to the second excluded IP. BUT, if the IP range contains only 1 excluded IP, then you can just input it to either one of the first and second excluded IP or both.

### Buttons

- **Delete :**

Check to delete the entry. It will be deleted during the next save.

- **Add IP Range :**

Click to add a new excluded IP range.

- **Apply:**  
Click to save changes.
- **Reset:**  
Click to undo any changes made locally and revert to previously saved values.

## 2-4.1.3 Pool

This page manages DHCP pools. According to the DHCP pool, DHCP server will allocate IP address and deliver configuration parameters to DHCP client.

### Web Interface

To configure DHCP server pool in the web interface:

1. Click Configuration, DHCP, Server and Pool.
2. Click Add New Pool then you can create new Pool on the switch.
3. Click Apply.

The figure displays two screenshots of the DHCP Server Pool Configuration web interface. The top screenshot shows the 'Add New Pool' button highlighted with a red box and a red arrow pointing down to the bottom screenshot. The bottom screenshot shows a table with one row containing a 'Delete' button, an empty name field, dashes for Type, IP, and Subnet Mask, and a lease time of '1 days 0 hours 0 minutes'.

Delete	Name	Type	IP	Subnet Mask	Lease Time
<a href="#">Delete</a>	<input type="text"/>	-	-	-	1 days 0 hours 0 minutes

Figure 2-4.1.3: The DHCP Server Pool

### Parameter Description:

#### Pool Setting

Add or delete pools.

Adding a pool and giving a name is to create a new pool with "default" configuration. If you want to configure all settings including type, IP subnet mask and lease time, you can click the pool name to go into the configuration page.

- **Name :**

Configure the pool name that accepts all printable characters, except white space. If you want to configure the detail settings, you can click the pool name to go into the configuration page.

- **Type :**  
Display which type of the pool is.  
Network: the pool defines a pool of IP addresses to service more than one DHCP client.  
Host: the pool services for a specific DHCP client identified by client identifier or hardware address.  
If "-" is displayed, it means not defined.
- **IP :**  
Display network number of the DHCP address pool.  
If "-" is displayed, it means not defined.
- **Subnet Mask :**  
Display subnet mask of the DHCP address pool.  
If "-" is displayed, it means not defined.
- **Lease Time :**  
Display lease time of the pool.

#### **Buttons**

- **Delete :**  
Check to delete the entry. It will be deleted during the next save.
- **Add New Pool:**  
Click to add a new DHCP pool.
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.



## 2-4.2 Snooping

DHCP Snooping is used to block intruder on the untrusted ports of the switch device when it tries to intervene by injecting a bogus DHCP reply packet to a legitimate conversation between the DHCP client and server.

The section describes to configure the DHCP Snooping parameters of the switch. The DHCP Snooping can prevent attackers from adding their own DHCP servers to the network.

### Web Interface

To configure DHCP snooping in the web interface:

1. Click Configuration, DHCP and Snooping.
2. Select "Enabled" in the Mode of DHCP Snooping Configuration.
3. Select "Trusted" of the specific port in the Mode of Port Mode Configuration.
4. Click Apply.

DHCP Snooping Configuration	
Snooping Mode	Disabled
Port Mode Configuration	
Port	Mode
*	
1	Trusted
N-1	Trusted
N	Trusted

Apply Reset

Figure 2-4.2: The DHCP Snooping Configuration

### Parameter Description:

- **Snooping Mode :**

Indicates the DHCP snooping mode operation. Possible modes are:

Enabled: Enable DHCP snooping mode operation. When DHCP snooping mode operation is enabled, the DHCP request messages will be forwarded to trusted ports and only allow reply packets from trusted ports.

Disabled: Disable DHCP snooping mode operation.

- **Port Mode Configuration**

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.

### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-4.3 Relay

A DHCP relay agent is used to forward and to transfer DHCP messages between the clients and the server when they are not in the same subnet domain. It stores the incoming interface IP address in the GIADDR field of the DHCP packet. The DHCP server can use the value of GIADDR field to determine the assigned subnet. For such condition, please make sure the switch configuration of VLAN interface IP address and PVID (Port VLAN ID) correctly.

### Web Interface

To configure DHCP Relay in the web interface:

1. Click Configuration, DHCP and Relay
2. Specify the Relay Mode, Relay server, Relay Information Mode, Relay Information police.
3. Click Apply.

DHCP Relay Configuration	
Relay Mode	Disabled
Relay Server	0.0.0.0
Relay Information Mode	Disabled
Relay Information Policy	Keep

Apply Reset

Figure 2-4.3: The DHCP Relay Configuration

### Parameter Description:

- **Relay Mode :**
  - Indicates the DHCP relay mode operation. Possible modes are:
    - **Enabled:** Enable DHCP relay mode operation. When DHCP relay mode operation is enabled, the agent forwards and transfers DHCP messages between the clients and the server when they are not in the same subnet domain. And the DHCP broadcast message won't be flooded for security considerations.
    - **Disabled:** Disable DHCP relay mode operation.
- **Relay Server :**
  - Indicates the DHCP relay server IP address.
- **Relay Information Mode :**
  - Indicates the DHCP relay information mode option operation. The option 82 circuit ID format as "[vlan\_id][module\_id][port\_no]". The first four characters represent the VLAN ID, the fifth and sixth characters are the module ID (in standalone device it always equal 0, in stackable device it means switch ID), and the last two characters are the port number. For example, "00030108" means the DHCP message receive form VLAN ID 3, switch ID 1, port No 8. And the option 82 remote ID value is equal the switch MAC address. Possible modes are:

- **Enabled:** Enable DHCP relay information mode operation. When DHCP relay information mode operation is enabled, the agent inserts specific information (option 82) into a DHCP message when forwarding to DHCP server and removes it from a DHCP message when transferring to DHCP client. It only works when DHCP relay operation mode is enabled.
  - **Disabled:** Disable DHCP relay information mode operation.
- **Relay Information Policy :**

Indicates the DHCP relay information option policy. When DHCP relay information mode operation is enabled, if the agent receives a DHCP message that already contains relay agent information it will enforce the policy. The 'Replace' policy is invalid when relay information mode is disabled. Possible policies are:

  - **Replace:** Replace the original relay information when a DHCP message that already contains it is received.
  - **Keep:** Keep the original relay information when a DHCP message that already contains it is received.
  - **Drop:** Drop the package when a DHCP message that already contains relay information is received.

#### **Buttons**

- **Apply :**

Click to save changes.
- **Reset :**

Click to undo any changes made locally and revert to previously saved values.

## 2-5 Security

This section shows you to configure the Port Security settings of the Switch. You can use the Port Security feature to restrict input to an interface by limiting and identifying MAC addresses.

### 2-5.1 Switch

#### 2-5.1.1 Users

This page provides an overview of the current users. Currently the only way to login as another user on the web server is to close and reopen the browser

#### Web Interface

To configure User in the web interface:

1. Click Configuration, Security, Switch and Users.
2. Click Add new user
3. Specify the User Name parameter.
4. Click Apply.

The screenshot shows two parts of the web interface. The top part is titled 'Users Configuration' and contains a table with two columns: 'User Name' and 'Privilege Level'. The table has one row with 'admin' in the 'User Name' column and '15' in the 'Privilege Level' column. Below the table is a blue button labeled 'Add New User' with a red arrow pointing down to the second part of the interface. The second part is titled 'Add User' and contains a form with the following fields: 'User Name' (text input), 'Password' (text input), 'Password (again)' (text input), and 'Privilege Level' (dropdown menu with '1' selected). At the bottom of the form are three buttons: 'Apply' (blue), 'Reset' (orange), and 'Cancel' (blue).

Figure 2-5.1.1: The Users Configuration

#### Parameter Description:

- **User Name :**  
The name identifying the user. This is also a link to Add/Edit User.
- **Password :**  
To type the password. The allowed string length is 0 to 255, and the allowed content is the ASCII characters from 32 to 126.

- **Password (again) :**  
To type the password again. You must type the same password again in the field.
- **Privilege Level :**  
The privilege level of the user. The allowed range is 1 to 15. If the privilege level value is 15, it can access all groups, i.e. that is granted the fully control of the device. But others value needs to refer to each group privilege level. User's privilege should be same or greater than the group privilege level to have the access of that group. By default setting, most groups privilege level 5 has the read-only access and privilege level 10 has the read-write access. And the system maintenance (software upload, factory defaults and etc.) need user privilege level 15. Generally, the privilege level 15 can be used for an administrator account, privilege level 10 for a standard user account and privilege level 5 for a guest account.

#### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Cancel :**  
Click to undo any changes made locally and return to the Users.
- **Delete User :**  
Delete the current user. This button is not available for new configurations (Add new user)

## 2-5.1.2 Privilege Level

This page provides an overview of the privilege levels. The switch provides user set Account, Aggregation, Diagnostics, EEE, GARP, GVRP, IP, IPMC Snooping LACP LLDP LLDP MED MAC Table MRP MVR MVRP Maintenance Mirroring Ports Private VLANs QoS SMTP SNMP Security Spanning Tree System Trap Event VCL VLANs Voice VLAN Privilege Levels from 1 to 15.

### Web Interface

To configure Privilege Level in the web interface:

1. Click Configuration, Security, Switch and Privilege Level.
2. Specify the Privilege parameter.
3. Click Apply.

Privilege Level Configuration Home > Configuration > Security > Switch > Privilege Levels

Group Name	Privilege Levels			
	Configuration Read-only	Configuration/Execute Read/write	Status/Statistics Read-only	Status/Statistics Read/write
ACTIVATE	5 ▼	10 ▼	5 ▼	10 ▼
Aggregation	5 ▼	10 ▼	5 ▼	10 ▼
cloud_management	5 ▼	10 ▼	5 ▼	10 ▼
Debug	15 ▼	15 ▼	15 ▼	15 ▼
VLANs	5 ▼	10 ▼	5 ▼	10 ▼
Voice_VLAN	5 ▼	10 ▼	5 ▼	10 ▼
VTUN	5 ▼	10 ▼	5 ▼	10 ▼
XXRP	5 ▼	10 ▼	5 ▼	10 ▼

Apply
Reset

**Figure2-5.1.2: The Privilege Level Configuration**

### Parameter Description:

- **Group Name :**

The name identifying the privilege group. In most cases, a privilege level group consists of a single module (e.g. LACP, RSTP or QoS), but a few of them contains more than one. The following description defines these privilege level groups in details:

- System: Contact, Name, Location, Time zone, Daylight Saving Time, Log.
- Security: Authentication, System Access Management, Port (contains Dot1x port, MAC based and the MAC Address Limit), ACL, HTTPS, SSH, ARP Inspection, IP source guard.
- IP: Everything except 'ping'.
- Port: Everything except 'VeriPHY'.

- Diagnostics: 'ping' and 'VeriPHY'.
- Maintenance: CLI- System Reboot, System Restore Default, System Password, Configuration Save, Configuration Load and Firmware Load. Web- Users, Privilege Levels and everything in Maintenance.
- Debug: Only present in CLI.
- **Privilege Levels :**

Every group has an authorization Privilege level for the following sub groups: configuration read-only, configuration/execute read-write, status/statistics read-only, and status/statistics read-write (e.g. for clearing of statistics). User Privilege should be same or greater than the authorization Privilege level to have the access to that group.

#### **Buttons**

- **Apply :**

Click to save changes.
- **Reset :**

Click to undo any changes made locally and revert to previously saved values.



### 2-5.1.3 Auth Method

This page shows how to configure a user with authenticated when he logs into the switch via one of the management client interfaces.

#### Web Interface

To configure an Authentication Method Configuration in the web interface:

1. Click Configuration, Security, Switch and Auth Method.
2. Specify the Client (console, telnet, ssh, http, https) which you want to monitor.
3. Specify the Authentication Method (none, local, radius, tacacs+)
4. Specify service port.
5. Click Apply.

Client	Methods			Service Port
console	local	no	no	
telnet	local	no	no	23
ssh	local	no	no	22
http	local	no	no	80
https	no	no	no	443

Figure 2-5.1.3: The Authentication Method Configuration

#### Parameter Description:

- **Client :**

The management client for which the configuration below applies.

- **Method :**

Method can be set to one of the following values:

- no: Authentication is disabled and login is not possible.
- redirect: When HTTPS is enabled, enable HTTPS automatic redirect on the switch.
- local: Use the local user database on the switch for authentication.
- radius: Use remote RADIUS server(s) for authentication.
- tacacs: Use remote TACACS+ server(s) for authentication.

Methods that involves remote servers are timed out if the remote servers are offline. In this case the next method is tried. Each method is tried from left to right and continues until a method either approves or rejects a user. If a remote server is used for primary authentication it is recommended to configure secondary authentication as 'local'. This will enable the management client to login via the local user database if none of the configured authentication servers are alive.

- **Service Port :**

The TCP port for each client service. The valid port number is 1 ~ 65534.

#### Buttons

- **Apply :**

Click to save changes.

- **Reset :**

Click to undo any changes made locally and revert to previously saved values.

## 2-5.1.4 HTTPS

This page allows you to configure the HTTPS settings and maintain the current certificate on the switch.

### Web Interface

To configure an Access Management Configuration in the web interface:

1. Click Configuration, Security, Switch and HTTPS.
2. Specify the Certificate Maintain, Certificate Pass Phrase, Certificate Upload.
3. Click Browse to select the file to upload.
4. Click Apply.

Certificate Maintain	Upload
Certificate Pass Phrase	
Certificate Upload	Web Browser
File Upload	<b>Browse...</b>
Certificate Status	Switch secure HTTP certificate is presented

Apply Reset

Figure 2-5.1.4: The HTTPS Configuration

### Parameter Description:

- **Certificate Maintain :**

The operation of certificate maintenance. Possible operations are:

- **Upload:** Upload a certificate PEM file. Possible methods are: Web Browser or URL.
- **Generate:** Generate a new self-signed RSA certificate.

- **Certificate Pass Phrase :**

Enter the pass phrase in this field if your uploading certificate is protected by a specific passphrase.

- **Certificate Upload :**

Upload a certificate PEM file into the switch. The file should contain the certificate and private key together. If you have two separated files for saving certificate and private key. Use the Linux cat command to combine them into a single PEM file. For example, cat my.cert my.key > my.pem

Notice that the RSA certificate is recommended since most of the new version of browsers has removed support for DSA in certificate, e.g. Firefox v37 and Chrome v39.

Possible methods are:

- Web Browser: Upload a certificate via Web browser.
- URL: Upload a certificate via URL, the supported protocols are HTTP, HTTPS, TFTP and FTP.
  - The URL format is <protocol>://[<username>[:<password>]@]<host>[:<port>][/<path>]/<file\_name>.
  - For example, tftp://10.10.10.10/new\_image\_path/new\_image.dat, [http://username:password@10.10.10.10:80/new\\_image\\_path/new\\_image.dat](http://username:password@10.10.10.10:80/new_image_path/new_image.dat).

- A valid file name is a text string drawn from alphabet (A-Za-z), digits (0-9), dot (.), hyphen (-), under score (\_). The maximum length is 63 and hyphen must not be first character. The file name content that only contains '.' is not allowed.

- **Certificate Status :**

Display the current status of certificate on the switch.

Possible statuses are:

- Switch secure HTTP certificate is presented.
- Switch secure HTTP certificate is not presented.
- Switch secure HTTP certificate is generating ....

### **Buttons**

- **Apply :**

Click to save changes.

- **Reset :**

Click to undo any changes made locally and revert to previously saved values.

## 2-5.1.5 Access Management

Configure access management table on this page. The maximum number of entries is 16. If the application's type matches any one of the access management entries, it will allow access to the switch.

### Web Interface

To configure an Access Management Configuration in the web interface:

1. Click Configuration, Security, Switch and Access Management.
2. Select "Enabled" in the Mode of Access Management Configuration.
3. Click "Add new entry".
4. Specify the Start IP Address, End IP Address.
5. Checked Access Management method (HTTP/HTTPS, SNMP, and TELNET/SSH) in the entry.
6. Click Apply.

Access Management Configuration Home > Configuration > Security > Switch > Access Management

Mode

Delete	VLAN ID	Start IP Address	End IP Address	HTTP/HTTPS	SNMP	TELNET/SSH
<input type="button" value="Delete"/>	1	0.0.0.0	0.0.0.0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Access Management Configuration Home > Configuration > Security > Switch > Access Management

Mode

Delete	VLAN ID	Start IP Address	End IP Address	HTTP/HTTPS	SNMP	TELNET/SSH
<input type="button" value="Delete"/>	1	0.0.0.0	0.0.0.0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 2-5.1.5: The Access Management Configuration

### Parameter Description:

- **Mode :**
  - Indicates the access management mode operation. Possible modes are:
    - **Enabled:** Enable access management mode operation.
    - **Disabled:** Disable access management mode operation.
- **VLAN ID :**
  - Indicates the VLAN ID for the access management entry.
- **Start IP address :**
  - Indicates the start IP address for the access management entry.
- **End IP address :**
  - Indicates the end IP address for the access management entry.

- **HTTP/HTTPS :**  
Indicates that the host can access the switch from HTTP/HTTPS interface if the host IP address matches the IP address range provided in the entry.
- **SNMP :**  
Indicates that the host can access the switch from SNMP interface if the host IP address matches the IP address range provided in the entry.
- **TELNET/SSH :**  
Indicates that the host can access the switch from TELNET/SSH interface if the host IP address matches the IP address range provided in the entry.

#### **Buttons**

- **Delete :**  
Check to delete the entry. It will be deleted during the next save.
- **Add New Entry :**  
Click to add a new access management entry.
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-5.1.6 SNMP

Any Network Management System (NMS) running the Simple Network Management Protocol (SNMP) can manage the Managed devices equipped with SNMP agent, provided that the Management Information Base (MIB) is installed correctly on the managed devices. The SNMP is a protocol that is used to govern the transfer of information between SNMP manager and agent and traverses the Object Identity (OID) of the management Information Base (MIB), described in the form of SMI syntax. SNMP agent is running on the switch to response the request issued by SNMP manager.

Basically, it is passive except issuing the trap information. The switch supports a switch to turn on or off the SNMP agent. If you set the field SNMP "Enable", SNMP agent will be started up. All supported MIB OIDs, including RMON MIB, can be accessed via SNMP manager. If the field SNMP is set "Disable", SNMP agent will be de-activated, the related Community Name, Trap Host IP Address, Trap and all MIB counters will be ignored.

### 2-5.1.6.1 System

This section describes how to configure SNMP System on the switch. This function is used to configure SNMP settings, community name, trap host and public traps as well as the throttle of SNMP. A SNMP manager must pass the authentication by identifying both community names, then it can access the MIB information of the target device. So, both parties must have the same community name. Once completing the setting, click <Apply> button, the setting takes effect.

#### Web Interface

To configure the configure SNMP System in the web interface:

1. Click Configuration, Security, Switch, SNMP and System.
2. Evoke SNMP State to enable or disable the SNMP function.
3. Specify the Engine ID
4. Click Apply.

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

Apply Reset

Figure2-5.1.6.1: The SNMP System Configuration

### Parameter Description:

- **Mode :**
  - Indicates the SNMP mode operation. Possible modes are:
    - **Enabled:** Enable SNMP mode operation.
    - **Disabled:** Disable SNMP mode operation.
- **Version :**
  - Indicates the SNMP supported version. Possible versions are:
    - **SNMP v1:** Set SNMP supported version 1.
    - **SNMP v2c:** Set SNMP supported version 2c.
    - **SNMP v3:** Set SNMP supported version 3.
- **Read Community :**
  - Indicates the community read access string to permit access to SNMP agent. The allowed string length is 0 to 255, and the allowed content is the ASCII characters from 33 to 126. The field is applicable only when SNMP version is SNMPv1 or SNMPv2c. If SNMP version is SNMPv3, the community string will be associated with SNMPv3 communities table. It provides more flexibility to configure security name than a SNMPv1 or SNMPv2c community string. In addition to community string, a particular range of source addresses can be used to restrict source subnet.
- **Write Community :**
  - Indicates the community write access string to permit access to SNMP agent. The allowed string length is 0 to 255, and the allowed content is the ASCII characters from 33 to 126. The field is applicable only when SNMP version is SNMPv1 or SNMPv2c. If SNMP version is SNMPv3, the community string will be associated with SNMPv3 communities table. It provides more flexibility to configure security name than a SNMPv1 or SNMPv2c community string. In addition to community string, a particular range of source addresses can be used to restrict source subnet.
- **Engine ID**
  - Indicates the SNMPv3 engine ID. The string must contain an even number (in hexadecimal format) with number of digits between 10 and 64, but all-zeros and all-'F's are not allowed. Change of the Engine ID will clear all original local users.

### Buttons

- **Apply :**
  - Click to save changes.
- **Reset :**
  - Click to undo any changes made locally and revert to previously saved values.

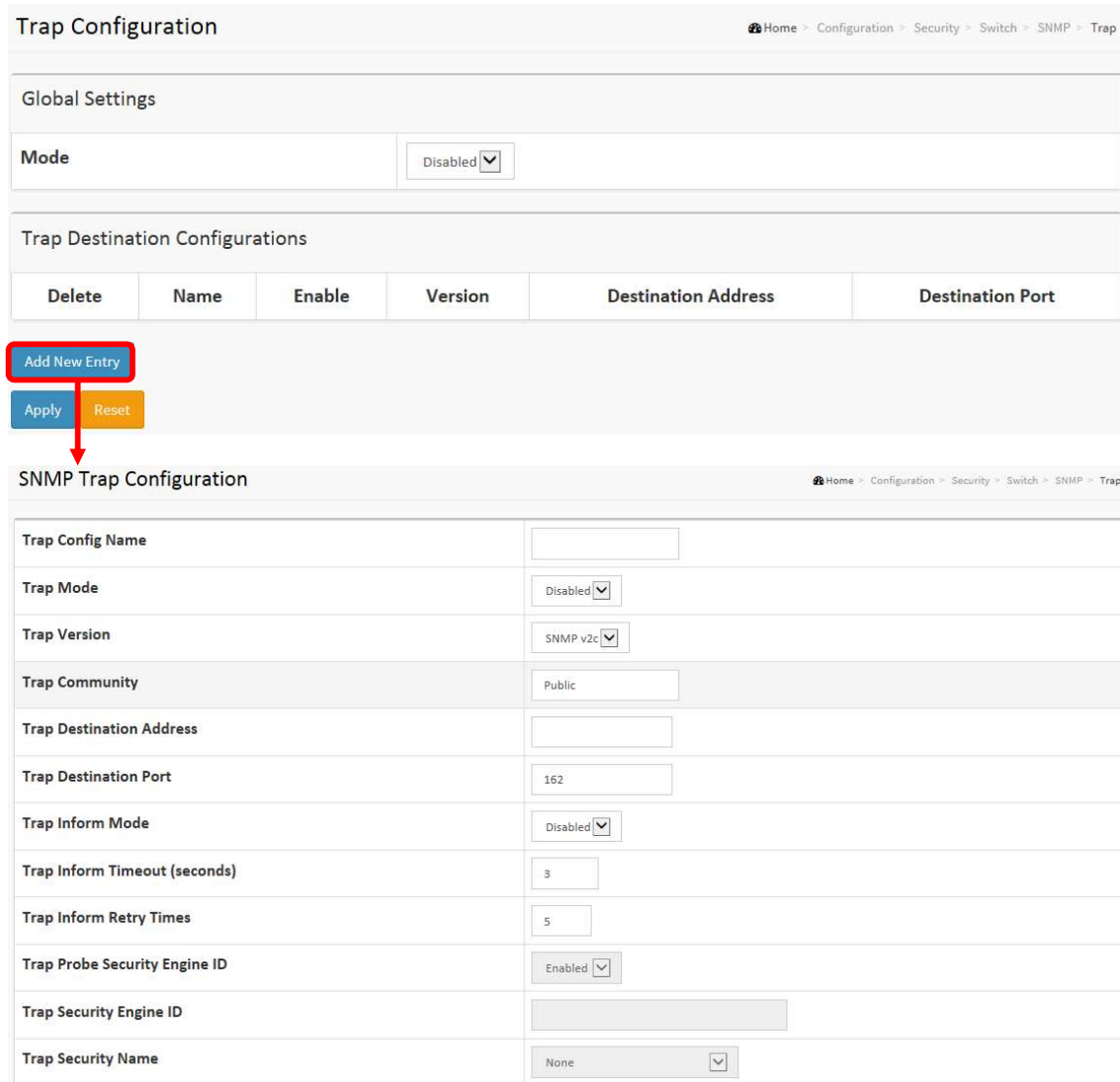
## 2-5.1.6.2 Trap

Configure SNMP trap on this page.

### Web Interface

To configure the configure SNMP Trap Configuration in the web interface:

1. Click Configuration, Security, Switch, SNMP and Trap.
2. Click Add New Entry then you can create new SNMP Trap on the switch.
3. Click Apply



**Trap Configuration** Home > Configuration > Security > Switch > SNMP > Trap

Global Settings

Mode: Disabled

Trap Destination Configurations

Delete	Name	Enable	Version	Destination Address	Destination Port
--------	------	--------	---------	---------------------	------------------

**Add New Entry** (highlighted with a red box and arrow)

Apply Reset

**SNMP Trap Configuration** Home > Configuration > Security > Switch > SNMP > Trap

Trap Config Name:

Trap Mode: Disabled

Trap Version: SNMP v2c

Trap Community: Public

Trap Destination Address:

Trap Destination Port: 162

Trap Inform Mode: Disabled

Trap Inform Timeout (seconds): 3

Trap Inform Retry Times: 5

Trap Probe Security Engine ID: Enabled

Trap Security Engine ID:

Trap Security Name: None

Figure2-5.1.6.2: The SNMPTrap Configuration

### Parameter Description:

#### Global Settings

Configure SNMP trap on this page.



- **Mode :**

Indicates the trap mode operation. Possible modes are:

- **Enabled:** Enable SNMP trap mode operation.
- **Disabled:** Disable SNMP trap mode operation.

### Trap Destination Configurations

Configure trap destinations on this page.

- **Name :**

Indicates the trap Configuration's name. Indicates the trap destination's name.

- **Enable :**

Indicates the trap destination mode operation. Possible modes are:

- **Enabled:** Enable SNMP trap mode operation.
- **Disabled:** Disable SNMP trap mode operation.

- **Version :**

Indicates the SNMP trap supported version. Possible versions are:

- **SNMPv1:** Set SNMP trap supported version 1.
- **SNMPv2c:** Set SNMP trap supported version 2c.
- **SNMPv3:** Set SNMP trap supported version 3.

- **Destination Address :**

Indicates the SNMP trap destination address. It allows a valid IP address in dotted decimal notation ('x.y.z.w').

And it also allows a valid hostname. A valid hostname is a string drawn from the alphabet (A-Za-z), digits (0-9), dot (.), dash (-). Spaces are not allowed, the first character must be an alpha character, and the first and last characters must not be a dot or a dash.

Indicates the SNMP trap destination IPv6 address. IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon separating each field (:). For example, 'fe80::215:c5ff:fe03:4dc7'. The symbol '::' is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; but it can appear only once. It can also represent a legally valid IPv4 address. For example, '::192.1.2.34'.

- **Destination Port :**

Indicates the SNMP trap destination port. SNMP Agent will send SNMP message via this port, the port range is 1~65535.

### SNMP Trap Detailed Configuration

Configure SNMP trap on this page.

- **Trap Config Name :**

Indicates which trap Configuration's name for configuring. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.

- **Trap Mode :**

Indicates the trap mode operation. Possible modes are:

- **Enabled:** Enable SNMP trap mode operation.
- **Disabled:** Disable SNMP trap mode operation.

- **Trap Mode :**

Indicates the SNMP mode operation. Possible modes are:

- **Enabled:** Enable SNMP mode operation.
- **Disabled:** Disable SNMP mode operation.

- **Trap Version :**  
Indicates the SNMP supported version. Possible versions are:
  - **SNMP v1:** Set SNMP supported version 1.
  - **SNMP v2c:** Set SNMP supported version 2c.
  - **SNMP v3:** Set SNMP supported version 3.
- **Trap Community :**  
Indicates the community access string when sending SNMP trap packet. The allowed string length is 0 to 255, and the allowed content is ASCII characters from 33 to 126.
- **Trap Destination Address :**  
Indicates the SNMP trap destination address. It allows a valid IP address in dotted decimal notation ('x.y.z.w').  
And it also allows a valid hostname. A valid hostname is a string drawn from the alphabet (A-Za-z), digits (0-9), dot (.), dash (-). Spaces are not allowed, the first character must be an alpha character, and the first and last characters must not be a dot or a dash.  
Indicates the SNMP trap destination IPv6 address. IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon separating each field (:). For example, 'fe80::215:c5ff:fe03:4dc7'. The symbol '::' is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; but it can appear only once. It can also represent a legally valid IPv4 address. For example, '::192.1.2.34'.
- **Trap Destination port :**  
Indicates the SNMP trap destination port. SNMP Agent will send SNMP message via this port, the port range is 1~65535.
- **Trap Inform Mode :**  
Indicates the SNMP trap inform mode operation. Possible modes are:
  - **Enabled:** Enable SNMP trap inform mode operation.
  - **Disabled:** Disable SNMP trap inform mode operation.
- **Trap Inform Timeout (seconds) :**  
Indicates the SNMP trap inform timeout. The allowed range is 0 to 2147.
- **Trap Inform Retry Times :**  
Indicates the SNMP trap inform retry times. The allowed range is 0 to 255.
- **Trap Probe Security Engine ID :**  
Indicates the SNMP trap probe security engine ID mode of operation. Possible values are:
  - **Enabled:** Enable SNMP trap probe security engine ID mode of operation.
  - **Disabled:** Disable SNMP trap probe security engine ID mode of operation.
- **Trap Security Engine ID :**  
Indicates the SNMP trap security engine ID. SNMPv3 sends traps and informs using USM for authentication and privacy. A unique engine ID for these traps and informs is needed. When "Trap Probe Security Engine ID" is enabled, the ID will be probed automatically. Otherwise, the ID specified in this field is used. The string must contain an even number (in hexadecimal format) with number of digits between 10 and 64, but all-zeros and all-'F's are not allowed.
- **Trap Security Name :**  
Indicates the SNMP trap security name. SNMPv3 traps and informs using USM for authentication and privacy. A unique security name is needed when traps and informs are enabled.

### **Buttons**

- **Delete :**  
Check to delete the entry. It will be deleted during the next save.
- **Add New Entry :**  
Click to add a new user.
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

### 2-5.1.6.3 Communities

The function is used to configure SNMPv3 communities. The Community and UserName is unique. To create a new community account, please check <Add new community> button, and enter the account information then check <Save>. Max Group Number: 4.

#### Web Interface

To configure the SNMP Communities in the web interface:

1. Click Configuration, Security, Switch, SNMP and Communities.
2. Click Add new Entry.
3. Specify the SNMP community parameters.
4. Click Apply.
5. If you want to modify or clear the setting then click Reset.

The screenshot displays the 'SNMPv3 Community Configuration' web interface. It features a breadcrumb trail: Home > Configuration > Security > Switch > SNMP > Communities. The interface is divided into two sections, each containing a table of community configurations and a set of control buttons.

**Top Section:**

Delete	Community	Source IP	Source Mask
<input type="checkbox"/>	public	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>
<input type="checkbox"/>	private	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>

Buttons: Add New Entry (highlighted with a red box), Apply, Reset.

**Bottom Section:**

Delete	Community	Source IP	Source Mask
<input type="checkbox"/>	public	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>
<input type="checkbox"/>	private	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>
<input type="button" value="Delete"/>	<input type="text"/>	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>

Buttons: Add New Entry, Apply, Reset.

Figure2-5.1.6.3: The SNMPv1/v2 Communities Security Configuration

#### Parameter Description:

- **Community :**  
Indicates the community access string to permit access to SNMPv3 agent. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126. The community string will be treated as security name and map a SNMPv1 or SNMPv2c community string.
- **Source IP:**  
Indicates the SNMP access source address. A particular range of source addresses can be used to restrict source subnet when combined with source mask.
- **Source Mask :**  
Indicates the SNMP access source address mask

### **Buttons**

- **Delete :**  
Check to delete the entry. It will be deleted during the next save.
- **Add New Entry :**  
Click to add a new entry.
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-5.1.6.4 Users

The function is used to configure SNMPv3 user. The Entry index key is UserName. To create a new UserName account, please check <Add new user> button, and enter the user information then check <Save>. Max Group Number: 10.

### Web Interface

To configure theSNMP Users in the web interface:

1. Click Configuration, Security, Switch, SNMP and Users.
2. Click Add new Entry.
3. Specify the Privilege parameter.
4. Click Apply.

SNMPv3 User Configuration

Delete	Engine ID	User Name	Security Level	Authentication Protocol	Authentication Password	Privacy Protocol	Privacy Password
<input type="checkbox"/>	800007e5017f000001	default_user	NoAuth, NoPriv	None	None	None	None

Add New Entry

Apply Reset

SNMPv3 User Configuration

Delete	Engine ID	User Name	Security Level	Authentication Protocol	Authentication Password	Privacy Protocol	Privacy Password
<input type="checkbox"/>	800007e5017f000001	default_user	NoAuth, NoPriv	None	None	None	None
Delete	<input type="text"/>	<input type="text"/>	Auth, Priv <input type="text"/>	MD5 <input type="text"/>	<input type="text"/>	DES <input type="text"/>	<input type="text"/>

Add New Entry

Apply Reset

Figure 2-5.1.6.4: The SNMP Users Configuration

### Parameter Description:

- **Engine ID :**

An octet string identifying the engine ID that this entry should belong to. The string must contain an even number(in hexadecimal format) with number of digits between 10 and 64, but all-zeros and all-'F's are not allowed. The SNMPv3 architecture uses the User-based Security Model (USM) for message security and the View-based Access Control Model (VACM) for access control. For the USM entry, the usmUserEngineID and usmUserName are the entry's keys. In a simple agent, usmUserEngineID is always that agent's own snmpEngineID value. The value can also take the value of the snmpEngineID of a remote SNMP engine with which this user can communicate. In other words, if user engine ID equal system engine ID then it is local user; otherwise it's remote user.

- **User Name :**  
A string identifying the user name that this entry should belong to. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.
- **Security Level :**  
Indicates the security model that this entry should belong to. Possible security models are:
  - **NoAuth, NoPriv:** No authentication and no privacy.
  - **Auth, NoPriv:** Authentication and no privacy.
  - **Auth, Priv:** Authentication and privacy.
 The value of security level cannot be modified if entry already exists. That means it must first be ensured that the value is set correctly.
- **Authentication Protocol :**  
Indicates the authentication protocol that this entry should belong to. Possible authentication protocols are:
  - **None:** No authentication protocol.
  - **MD5:** An optional flag to indicate that this user uses MD5 authentication protocol.
  - **SHA:** An optional flag to indicate that this user uses SHA authentication protocol.
 The value of security level cannot be modified if entry already exists. That means must first ensure that the value is set correctly.
- **Authentication Password :**  
A string identifying the authentication password phrase. For MD5 authentication protocol, the allowed string length is 8 to 32. For SHA authentication protocol, the allowed string length is 8 to 40. The allowed content is ASCII characters from 33 to 126.
- **Privacy Protocol :**  
Indicates the privacy protocol that this entry should belong to. Possible privacy protocols are:
  - **None:** No privacy protocol.
  - **DES:** An optional flag to indicate that this user uses DES authentication protocol.
  - **AES:** An optional flag to indicate that this user uses AES authentication protocol.
- **Privacy Password :**  
A string identifying the privacy password phrase. The allowed string length is 8 to 32, and the allowed content is ASCII characters from 33 to 126.

#### Buttons

- **Delete :**  
Check to delete the entry. It will be deleted during the next save.
- **Add New Entry :**  
Click to add a newentry.
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-5.1.6.5 Groups

The function is used to configure SNMPv3 group. The Entry index key are Security Model and Security Name. To create a new group account, please check <Add new group> button, and enter the group information then check <Save>. Max Group Number: v1: 2, v2: 2, v3:10.

### Web Interface

To configure the SNMP Groups in the web interface:

1. Click Configuration, Security, Switch, SNMP and Groups.
2. Click Add new Entry.
3. Specify the Privilege parameter.
4. Click Apply.

The screenshot displays the 'SNMPv3 Group Configuration' web interface. It features a table with columns for 'Delete', 'Security Model', 'Security Name', and 'Group Name'. Below the table are buttons for 'Add New Entry', 'Apply', and 'Reset'. A red box highlights the 'Add New Entry' button, with an arrow pointing to a second screenshot. In the second screenshot, a red box highlights the 'Delete' button and the dropdown menus for 'Security Model' (v1) and 'Security Name' (public) in the first row of the table.

Delete	Security Model	Security Name	Group Name
<input type="checkbox"/>	v1	public	default_ro_group
<input type="checkbox"/>	v1	private	default_rw_group
<input type="checkbox"/>	v2c	public	default_ro_group
<input type="checkbox"/>	v2c	private	default_rw_group
<input type="checkbox"/>	usm	default_user	default_rw_group

Buttons: Add New Entry, Apply, Reset

Delete	Security Model	Security Name	Group Name
<input type="checkbox"/>	v1	public	default_ro_group
<input type="checkbox"/>	v1	private	default_rw_group
<input type="checkbox"/>	v2c	public	default_ro_group
<input type="checkbox"/>	v2c	private	default_rw_group
<input type="checkbox"/>	usm	default_user	default_rw_group

Buttons: Delete, v1, public, Add New Entry, Apply, Reset

Figure 2-5.1.6.5: The SNMP Groups Configuration



**Parameter Description:****● Security Model :**

Indicates the security model that this entry should belong to. Possible security models are:

- **v1:** Reserved for SNMPv1.
- **v2c:** Reserved for SNMPv2c.
- **usm:** User-based Security Model (USM).

**● Security Name :**

A string identifying the security name that this entry should belong to. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.

**● Group Name :**

A string identifying the group name that this entry should belong to. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.

**Buttons****● Delete :**

Check to delete the entry. It will be deleted during the next save.

**● Add New Entry :**

Click to add a new entry.

**● Apply :**

Click to save changes.

**● Reset :**

Click to undo any changes made locally and revert to previously saved values.

## 2-5.1.6.6 Views

The function is used to configure SNMPv3 view. The Entry index keys are OID Subtree and View Name. To create a new view account, please check <Add new view> button, and enter the view information then check <Save>. Max Group Number: 28.

Configure SNMPv3 view table on this page. The entry index keys are View Name and OID Subtree.

### Web Interface

To configure the SNMP views in the web interface:

1. Click Configuration, Security, Switch, SNMP and Views.
2. Click Add New Entry.
3. Specify the SNMP View parameters.
4. Click Apply.
5. If you want to modify or clear the setting then click Reset.

The screenshot displays the 'SNMPv3 View Configuration' web interface. At the top, there is a breadcrumb trail: Home > Configuration > Security > Switch > SNMP > Views. Below this is a table with the following columns: Delete, View Name, View Type, and OID Subtree. The table contains one entry with 'default\_view' as the View Name, 'included' as the View Type, and '.1' as the OID Subtree. Below the table, there are three buttons: 'Add New Entry' (highlighted with a red box), 'Apply', and 'Reset'. A red arrow points from the 'Add New Entry' button to the configuration form below. The configuration form has the same breadcrumb trail and table structure. It contains the same 'default\_view' entry. Below this entry, there is a 'Delete' button, followed by three input fields for 'View Name', 'View Type', and 'OID Subtree'. At the bottom of the form, there are three buttons: 'Add New Entry', 'Apply', and 'Reset'.

Figure 2-5.1.6.6: The SNMP Views Configuration

### Parameter Description:

- **View Name :**

A string identifying the view name that this entry should belong to. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.

- **View Type :**

Indicates the view type that this entry should belong to. Possible view types are:

- **Included:** An optional flag to indicate that this view subtree should be included.
- **Excluded:** An optional flag to indicate that this view subtree should be excluded.

In general, if a view entry's view type is 'excluded', there should be another view entry existing with view type as 'included' and its OID subtree should overstep the 'excluded' view entry.

- **OID Subtree :**  
The OID defining the root of the subtree to add to the named view. The allowed OID length is 1 to 128. The allowed string content is digital number or asterisk (\*).

#### **Buttons**

- **Delete :**  
Check to delete the entry. It will be deleted during the next save.
- **Add New Entry :**  
Click to add a newentry.
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-5.1.6.7 Access

The function is used to configure SNMPv3 accesses. The Entry index key are Group Name, Security Model and Security level. To create a new access account, please check <Add new access> button, and enter the access information then check <Save>. Max Group Number : 14

### Web Interface

To configure the SNMP Access in the web interface:

1. Click Configuration, Security, Switch, SNMP and Accesses.
2. Click Add new Access.
3. Specify the SNMP Access parameters.
4. Click Apply.
5. If you want to modify or clear the setting then click Reset.

The screenshot displays the 'SNMPv3 Access Configuration' web interface. At the top, there is a breadcrumb trail: Home > Configuration > Security > Switch > SNMP > Access. Below this is a table with the following columns: Delete, Group Name, Security Model, Security Level, Read View Name, and Write View Name. The table contains two entries: 'default\_ro\_group' and 'default\_rw\_group'. Below the table are three buttons: 'Add New Entry', 'Apply', and 'Reset'. The 'Apply' button is highlighted with a red box, and a red arrow points from it to the 'Delete' button in the table below. The second screenshot shows the same interface but with the 'Delete' button highlighted in orange, and the 'Add New Entry', 'Apply', and 'Reset' buttons are now at the bottom of the page.

Delete	Group Name	Security Model	Security Level	Read View Name	Write View Name
<input type="checkbox"/>	default_ro_group	any	NoAuth, NoPriv	default_view	None
<input type="checkbox"/>	default_rw_group	any	NoAuth, NoPriv	default_view	default_view

Buttons: Add New Entry, Apply, Reset

Delete	Group Name	Security Model	Security Level	Read View Name	Write View Name
<input type="checkbox"/>	default_ro_group	any	NoAuth, NoPriv	default_view	None
<input type="checkbox"/>	default_rw_group	any	NoAuth, NoPriv	default_view	default_view
Delete	default_ro_group	any	NoAuth, NoPriv	None	None

Buttons: Add New Entry, Apply, Reset

Figure 2-5.1.6.7: The SNMP Accesses Configuration

### Parameter Description:

- **Group Name :**

A string identifying the group name that this entry should belong to. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.

- **Security Model :**

Indicates the security model that this entry should belong to. Possible security models are:

- **Any:** Any security model accepted(v1|v2c|usm).
- **v1:** Reserved for SNMPv1.
- **v2c:** Reserved for SNMPv2c.
- **usm:** User-based Security Model (USM).

- **Security Level :**  
Indicates the security model that this entry should belong to. Possible security models are:
  - **NoAuth, NoPriv:** No authentication and no privacy.
  - **Auth, NoPriv:** Authentication and no privacy.
  - **Auth, Priv:** Authentication and privacy.
- **Read View Name :**  
The name of the MIB view defining the MIB objects for which this request may request the current values. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.
- **Write View Name :**  
The name of the MIB view defining the MIB objects for which this request may potentially set new values. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.

#### **Buttons**

- **Delete :**  
Check to delete the entry. It will be deleted during the next save.
- **Add New Entry :**  
Click to add a newentry.
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-5.1.6.8 Trap Event Severity

This page displays current trap event severity configurations. Trap event severity can also be configured here.

### Web Interface

To configure the Trap Event Severity in the web interface:

1. Click Configuration, Security, Switch, SNMP and Trap Event Severity.
2. Scroll to select the Group name and Severity Level
3. Click the Apply to save the setting
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values

Trap Event Severity Configuration Home > Configuration > Security > Switch > SNMP > Trap Event Severity

Group Name	Severity Level	Syslog	Trap	SMTP
ACL	Info	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ACL-Log	Info	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Access-Mgmt	Info	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Auth-Failed	Warning	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cold-Start	Warning	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Port-Security	Info	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spanning-Tree	Info	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Warm-Start	Warning	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 2-5.1.6.8: The Trap Event Severity Configuration

### Parameter Description:

- **Group Name :**  
The name identifying the severity group.
- **Severity Level :**  
Every group has a severity level. The following level types are supported:
  - <0> **Emergency:** System is unusable.
  - <1> **Alert:** Action must be taken immediately.
  - <2> **Critical:** Critical conditions.
  - <3> **Error:** Error conditions.
  - <4> **Warning:** Warning conditions.
  - <5> **Notice:** Normal but significant conditions.
  - <6> **Information:** Information messages.
  - <7> **Debug:** Debug-level messages.
- **Syslog :**  
Enable - Select this Group Name in Syslog.
- **Trap :**  
Enable - Select this Group Name in Trap.

### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-5.1.7 RMON

An RMON implementation typically operates in a client/server model. Monitoring devices contain RMON software agents that collect information and analyze packets. These probes act as servers and the Network Management applications that communicate with them act as clients.

### 2-5.1.7.1 Statistics

Configure RMON Statistics table on this page. The entry index key is **ID**.

#### Web Interface

To configure the RMON configuration in the web interface:

1. Click Configuration, Security, Switch, RMON and Statistics.
2. Click Add New Entry.
3. Specify the ID parameters.
4. Click Apply.

The screenshot displays the 'RMON Statistics Configuration' web interface. At the top, there is a breadcrumb trail: Home > Configuration > Security > Switch > RMON > Statistics. Below this, there is a table with three columns: 'Delete', 'ID', and 'Data Source'. The 'Delete' column contains a 'Delete' button. The 'ID' column is empty. The 'Data Source' column contains the value '.1.3.6.1.2.1.2.2.1.1.' followed by a small input field containing '0'. Below the table, there are three buttons: 'Add New Entry' (highlighted with a red box and a red arrow pointing to the 'ID' column), 'Apply', and 'Reset'.

Figure 2-5.1.7.1: The RMONStatistics Configuration

#### Parameter Description:

These parameters are displayed on the RMON Statistics Configuration page:

- **ID :**  
Indicates the index of the entry. The range is from 1 to 65535.
- **Data Source :**  
Indicates the port ID which wants to be monitored. If in stacking switch, the value must add 1000\*(switch ID-1), for example, if the port is switch 3 port 5, the value is 2005



### **Buttons**

- **Delete :**  
Check to delete the entry. It will be deleted during the next save.
- **Add New Entry :**  
Click to add a new entry.
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-5.1.7.2 History

Configure RMON History table on this page. The entry index key is **ID**.

### Web Interface

theRMON History in the web interface:

1. Click Configuration, Security, Switch,RMON andHistory.
2. Click Add New Entry.
3. Specify the ID parameters.
4. Click Apply.

The screenshot shows the RMON History Configuration page in a web browser. The page title is "RMON History Configuration" and the breadcrumb is "Home > Configuration > Security > Switch > RMON > History". The page contains a table with the following columns: Delete, ID, Data Source, Interval, Buckets, and Buckets Granted. Below the table, there are buttons for "Add New Entry", "Apply", and "Reset". A red box highlights the "Add New Entry" button, and a red arrow points to the "Add New Entry" button in the second screenshot. The second screenshot shows the same page with the "Add New Entry" button highlighted in blue, and the "Delete" button in the table highlighted in orange. The "Data Source" field contains ".1.3.6.1.2.1.2.2.1.1." and the "Interval" field contains "1800".

Delete	ID	Data Source	Interval	Buckets	Buckets Granted
Delete		.1.3.6.1.2.1.2.2.1.1.	0	1800	50

Figure 2-5.1.7.2: The RMON History Configuration

### Parameter Description:

These parameters are displayed on the RMON History Configuration page:

- **ID :**  
Indicates the index of the entry. The range is from 1 to 65535.
- **Data Source :**  
Indicates the port ID which wants to be monitored. If in stacking switch, the value must add 1000\*(switch ID-1), for example, if the port is switch 3 port 5, the value is 2005
- **Interval :**  
Indicates the interval in seconds for sampling the history statistics data. The range is from 1 to 3600, default value is 1800 seconds.
- **Buckets :**  
Indicates the maximum data entries associated this History control entry stored in RMON. The range is from 1 to 3600, default value is 50.
- **Buckets Granted :**  
The number of data shall be saved in the RMON.

### **Buttons**

- **Delete :**  
Check to delete the entry. It will be deleted during the next save.
- **Add New Entry :**  
Click to add a new entry.
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

### 2-5.1.7.3 Alarm

Configure RMON Alarm table on this page. The entry index key is **ID**.

#### Web Interface

To display the configure RMON Alarm in the web interface:

1. Click Configuration, Security, Switch, RMON and Alarm.
2. Click Add New Entry.
3. Specify the ID parameters.
4. Click Apply.

RMON Alarm Configuration

Delete	ID	Interval	Variable	Sample Type	Value	Startup Alarm	Rising Threshold	Rising Index	Falling Threshold	Falling Index

Add New Entry

Apply Reset

RMON Alarm Configuration

Delete	ID	Interval	Variable	Sample Type	Value	Startup Alarm	Rising Threshold	Rising Index	Falling Threshold	Falling Index
Delete		30	.1.3.6.1.2.1.2.2.1	Delta	0	RisingOrFalling	0	0	0	0

Add New Entry

Apply Reset

Figure 2-5.1.7.3: The RMON Alarm Configuration

#### Parameter Description:

These parameters are displayed on the RMON Alarm Configuration page:

- **ID :**  
Indicates the index of the entry. The range is from 1 to 65535.
- **Interval :**  
Indicates the interval in seconds for sampling and comparing the rising and falling threshold. The range is from 1 to  $2^{31}-1$ .
- **Variable :**  
Indicates the particular variable to be sampled, the possible variables are:
  - InOctets:**  
The total number of octets received on the interface, including framing characters.
  - InUcastPkts:**  
The number of uni-cast packets delivered to a higher-layer protocol.
  - InNUcastPkts:**  
The number of broad-cast and multi-cast packets delivered to a higher-layer protocol.
  - InDiscards:**  
The number of inbound packets that are discarded even the packets are normal.
  - InErrors:**  
The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.

**InUnknownProtos:**

the number of the inbound packets that were discarded because of the unknown or unsupported protocol.

**OutOctets:**

The number of octets transmitted out of the interface, including framing characters.

**OutUcastPkts:**

The number of uni-cast packets that request to transmit.

**OutNUcastPkts:**

The number of broad-cast and multi-cast packets that request to transmit.

**OutDiscards:**

The number of outbound packets that are discarded even the packets are normal.

**OutErrors:**

The number of outbound packets that could not be transmitted because of errors.

**OutQLen:**

The length of the output packet queue (in packets).

- **Sample Type :**  
The method of sampling the selected variable and calculating the value to be compared against the thresholds, possible sample types are:  
**Absolute:** Get the sample directly.  
**Delta:** Calculate the difference between samples (default).
- **Value :**  
The value of the statistic during the last sampling period.
- **Startup Alarm :**  
The method of sampling the selected variable and calculating the value to be compared against the thresholds, possible sample types are:  
**RisingTrigger** alarm when the first value is larger than the rising threshold.  
**FallingTrigger** alarm when the first value is less than the falling threshold.  
**RisingOrFallingTrigger** alarm when the first value is larger than the rising threshold or less than the falling threshold (default).
- **Rising Threshold :**  
Rising threshold value (-2147483648-2147483647).
- **Rising Index :**  
Rising event index (1-65535).
- **Falling Threshold :**  
Falling threshold value (-2147483648-2147483647)
- **Falling Index :**  
Falling event index (1-65535).

**Buttons**

- **Delete :**  
Check to delete the entry. It will be deleted during the next save.
- **Add New Entry :**  
Click to add a new entry.
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-5.1.7.4 Event

Configure RMON Event table on this page. The entry index key is **ID**.

### Web Interface

To display the configure RMON Event in the web interface:

1. Click Configuration, Security, Switch, RMON and Event.
2. Click Add New Entry.
3. Specify the ID parameters.
4. Click Apply.

The screenshot shows the RMON Event Configuration page in a web browser. The page title is "RMON Event Configuration" and the breadcrumb is "Home > Configuration > Security > Switch > RMON > Event". The interface features a table with columns: Delete, ID, Desc, Type, Community, and Event Last Time. Below the table, there are buttons for "Add New Entry", "Apply", and "Reset". A red box highlights the "Add New Entry" button, and a red arrow points from it to the "Apply" button. The table below shows a single entry with a "Delete" button, an empty "ID" field, an empty "Desc" field, a "Type" dropdown menu set to "none", a "Community" field set to "public", and an "Event Last Time" field set to "0".

Figure 2-5.1.7.4: The RMON Event Configuration

### Parameter Description:

These parameters are displayed on the RMON History Configuration page:

- **ID :**  
Indicates the index of the entry. The range is from 1 to 65535.
- **Desc :**  
Indicates this event, the string length is from 0 to 127, default is a null string.
- **Type :**  
Indicates the notification of the event, the possible types are:
  - **None:** No SNMP log is created; no SNMP trap is sent.
  - **Log:** Create SNMP log entry when the event is triggered.
  - **Snmpttrap:** Send SNMP trap when the event is triggered.
  - **Logandtrap:** Create SNMP log entry and sent SNMP trap when the event is triggered.
- **Community :**  
Specify the community when trap is sent, the string length is from 0 to 127, default is "public".
- **Event Last Time :**  
Indicates the value of sysUpTime at the time this event entry last generated an event.

### **Buttons**

- **Delete :**  
Check to delete the entry. It will be deleted during the next save.
- **Add New Entry :**  
Click to add a new entry.
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-5.2 Network

### 2-5.2.1 Limit Control

This section shows you to configure the Port Security settings of the Switch. You can use the Port Security feature to restrict input to an interface by limiting and identifying MAC addresses.

#### Web Interface

To configure a System Configuration of Limit Control in the web interface:

1. Select "Enabled" in the Mode of System Configuration.
2. Checked Aging Enabled.
3. Set Aging Period (Default is 3600 seconds).

To configure a Port Configuration of Limit Control in the web interface:

1. Select "Enabled" in the Mode of Port Configuration.
2. Specify the maximum number of MAC addresses in the Limit of Port Configuration.
3. Set Action (Trap, Shutdown, Trap & Shutdown)
4. Click Apply.

Port Security Limit Control Configuration					
Home > Configuration > Security > Network > Limit Control					
System Configuration					
Mode	Disabled				
Aging Enabled	<input type="checkbox"/>				
Aging Period	3600 seconds				
Port Configuration					
Port	Mode	Limit	Action	State	Re-open
*	<>	4	<>		
1	Enabled	4	None	Ready	Reopen
2	Disabled	4	None	Disabled	Reopen
N-1	Disabled	4	None	Disabled	Reopen
N	Disabled	4	None	Disabled	Reopen
Apply Reset					

Figure 2-5.2.1: The Port Security Limit Control Configuration

#### Parameter Description:

##### System Configuration

- **Mode :**

Indicates if Limit Control is globally enabled or disabled on the switch. If globally disabled, other modules may still use the underlying functionality, but limit checks and corresponding actions are disabled.



- **Aging Enabled :**  
If checked, secured MAC addresses are subject to aging as discussed under Aging Period.
- **Aging Period :**  
If Aging Enabled is checked, then the aging period is controlled with this input. If other modules are using the underlying port security for securing MAC addresses, they may have other requirements to the aging period. The underlying port security will use the shorter requested aging period of all modules that use the functionality.  
The Aging Period can be set to a number between 10 and 10,000,000 seconds.

To understand why aging may be desired, consider the following scenario: Suppose an end-host is connected to a 3rd party switch or hub, which in turn is connected to a port on this switch on which Limit Control is enabled. The end-host will be allowed to forward if the limit is not exceeded. Now suppose that the end-host logs off or powers down. If it wasn't for aging, the end-host would still take up resources on this switch and will be allowed to forward. To overcome this situation, enable aging. With aging enabled, a timer is started once the end-host gets secured. When the timer expires, the switch starts looking for frames from the end-host, and if such frames are not seen within the next Aging Period, the end-host is assumed to be disconnected, and the corresponding resources are freed on the switch.

### Port Configuration

The table has one row for each port on the selected switch and a number of columns, which are:

- **Port :**  
The port number to which the configuration below applies.
- **Mode :**  
Controls whether Limit Control is enabled on this port. Both this and the Global Mode must be set to Enabled for Limit Control to be in effect. Notice that other modules may still use the underlying port security features without enabling Limit Control on a given port.
- **Limit :**  
The maximum number of MAC addresses that can be secured on this port. This number cannot exceed 1024. If the limit is exceeded, the corresponding action is taken.  
The switch is "born" with a total number of MAC addresses from which all ports draw whenever a new MAC address is seen on a Port Security-enabled port. Since all ports draw from the same pool, it may happen that a configured maximum cannot be granted, if the remaining ports have already used all available MAC addresses.
- **Action :**  
If Limit is reached, the switch can take one of the following actions:
  - **None:** Do not allow more than Limit MAC addresses on the port, but take no further action.
  - **Trap:** If Limit + 1 MAC addresses is seen on the port, send an SNMP trap. If Aging is disabled, only one SNMP trap will be sent, but with Aging enabled, new SNMP traps will be sent every time the limit gets exceeded.
  - **Shutdown:** If Limit + 1 MAC addresses is seen on the port, shut down the port. This implies that all secured MAC addresses will be removed from the port, and no new address will be learned. Even if the link is physically disconnected and reconnected on the port (by disconnecting the cable), the port will remain shut down.

There are three ways to re-open the port:

- 1) Boot the switch,
- 2) Disable and re-enable Limit Control on the port or the switch,
- 3) Click the Reopen button.

**Trap & Shutdown:** If Limit + 1 MAC addresses is seen on the port, both the "Trap" and the "Shutdown" actions described above will be taken.

- **State :**

This column shows the current state of the port as seen from the Limit Control's point of view. The state takes one of four values:

- **Disabled:** Limit Control is either globally disabled or disabled on the port.
- **Ready:** The limit is not yet reached. This can be shown for all actions.
- **Limit Reached:** Indicates that the limit is reached on this port. This state can only be shown if Action is set to none or Trap.
- **Shutdown:** Indicates that the port is shut down by the Limit Control module. This state can only be shown if Action is set to shut down or Trap & Shutdown.

- **Re-open Button :**

If a port is shut down by this module, you may reopen it by clicking this button, which will only be enabled if this is the case. For other methods, refer to shut down in the Action section.



---

**NOTE:** That clicking the reopen button causes the page to be refreshed, so non-committed changes will be lost.

---

### Buttons

- **Refresh:**

You can click them for refresh the Port Security information by manual.

- **Apply :**

Click to save changes.

- **Reset :**

Click to undo any changes made locally and revert to previously saved values.


The section describes to configure the NAS parameters of the switch. The NAS server can be employed to connect users to a variety of resources including Internet access, conference calls, printing documents on shared printers, or by simply logging on to the Internet.

### Web Interface

To configure a Network Access Server in the web interface:

1. Click Configuration, Security, Network and NAS.
2. Select "Enabled" in the Mode of Network Access Server Configuration.
3. Checked Reauthentication Enabled.
4. Set Reauthentication Period (Default is 3600 seconds).
5. Set EAPOL Timeout (Default is 30 seconds).
6. Set Aging Period (Default is 300 seconds).
7. Set Hold Time (Default is 10 seconds).
8. Checked RADIUS-Assigned QoS Enabled.
9. Checked RADIUS-Assigned VLAN Enabled.
10. Checked Guest VLAN Enabled.
11. Specify Guest VLAN ID.
12. Specify Max. Reauth. Count.
13. Checked Allow Guest VLAN if EAPOL Seen.
14. Click Apply.

**Network Access Server Configuration** Home > Configuration > Security > Network > NAS



System Configuration

<b>Mode</b>	Disabled ▾
<b>Reauthentication Enabled</b>	<input type="checkbox"/>
<b>Reauthentication Period</b>	<input type="text" value="3600"/> seconds
<b>EAPOL Timeout</b>	<input type="text" value="30"/> seconds
<b>Aging Period</b>	<input type="text" value="300"/> seconds
<b>Hold Time</b>	<input type="text" value="10"/> seconds
<b>RADIUS-Assigned QoS Enabled</b>	<input type="checkbox"/>
<b>RADIUS-Assigned VLAN Enabled</b>	<input type="checkbox"/>
<b>Guest VLAN Enabled</b>	<input type="checkbox"/>
<b>Guest VLAN ID</b>	<input type="text" value="1"/>
<b>Max. Reauth. Count</b>	<input type="text" value="2"/>
<b>Allow Guest VLAN if EAPOL Seen</b>	<input type="checkbox"/>

Port Configuration						
Port	Admin State	RADIUS- Assigned QoS Enabled	RADIUS- Assigned VLAN Enabled	Guest VLAN Enabled	Port State	Restart
*	<input type="text" value="&lt;"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
1	Force Authorized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Globally Disabled	<input type="button" value="Reauthenticate"/> <input type="button" value="Reinitialize"/>
N-1	Force Authorized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Globally Disabled	<input type="button" value="Reauthenticate"/> <input type="button" value="Reinitialize"/>
N	Force Authorized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Globally Disabled	<input type="button" value="Reauthenticate"/> <input type="button" value="Reinitialize"/>

Figure 2-5.2.2: The Network Access Server Configuration

**Parameter Description:**

**System Configuration**

● **Mode :**

Indicates if NAS is globally enabled or disabled on the switch. If globally disabled, all ports are allowed forwarding of frames.

● **Reauthentication Enabled :**

If checked, successfully authenticated supplicants/clients are reauthenticated after the interval specified by the Reauthentication Period. Reauthentication for 802.1X-enabled ports can be used to detect if a new device is plugged into a switch port or if a supplicant is no longer attached.

For MAC-based ports, reauthentication is only useful if the RADIUS server configuration has changed. It does not involve communication between the switch and the client, and therefore doesn't imply that a client is still present on a port (see Aging Period below).

● **Reauthentication Period :**

Determines the period, in seconds, after which a connected client must be reauthenticated. This is only active if the Reauthentication Enabled checkbox is checked. Valid values are in the range 1 to 3600 seconds.

● **EAPOL Timeout :**

Determines the time for retransmission of Request Identity EAPOL frames. Valid values are in the range 1 to 255 seconds. This has no effect for MAC-based ports.

● **Aging Period :**

This setting applies to the following modes, i.e. modes using the Port Security functionality to secure MAC addresses:

- **Single 802.1X**
- **Multi 802.1X**
- **MAC-Based Auth.**

When the NAS module uses the Port Security module to secure MAC addresses, the Port Security module needs to check for activity on the MAC address in question at regular

intervals and free resources if no activity is seen within a given period of time. This parameter controls exactly this period and can be set to a number between 10 and 1000000 seconds. If reauthentication is enabled and the port is in an 802.1X-based mode, this is not so critical, since supplicants that are no longer attached to the port will get removed upon the next re-authentication, which will fail. But if re-authentication is not enabled, the only way to free resources is by aging the entries.

For ports in MAC-based Auth. mode, reauthentication doesn't cause direct communication between the switch and the client, so this will not detect whether the client is still attached or not, and the only way to free any resources is to age the entry.

- **Hold Time :**

This setting applies to the following modes, i.e. modes using the Port Security functionality to secure MAC addresses:

- **Single 802.1X**
- **Multi 802.1X**
- **MAC-Based Auth.**

If a client is denied access - either because the RADIUS server denies the client access or because the RADIUS server request times out (according to the timeout specified on the "Configuration→Security→AAA" page) - the client is put on hold in the Un-authorized state. The hold timer does not count during an on-going authentication.

In MAC-based Auth. mode, the switch will ignore new frames coming from the client during the hold time.

The Hold Time can be set to a number between 10 and 1000000 seconds.

- **RADIUS-Assigned QoS Enabled :**

RADIUS-assigned QoS provides a means to centrally control the traffic class to which traffic coming from a successfully authenticated supplicant is assigned on the switch. The RADIUS server must be configured to transmit special RADIUS attributes to take advantage of this feature (see RADIUS-Assigned QoS Enabled below for a detailed description).

The "RADIUS-Assigned QoS Enabled" checkbox provides a quick way to globally enable/disable RADIUS-server assigned QoS Class functionality. When checked, the individual ports' ditto setting determines whether RADIUS-assigned QoS Class is enabled on that port. When unchecked, RADIUS-server assigned QoS Class is disabled on all ports.

- **RADIUS-Assigned VLAN Enabled :**

RADIUS-assigned VLAN provides a means to centrally control the VLAN on which a successfully authenticated supplicant is placed on the switch. Incoming traffic will be classified to and switched on the RADIUS-assigned VLAN. The RADIUS server must be configured to transmit special RADIUS attributes to take advantage of this feature (see RADIUS-Assigned VLAN Enabled below for a detailed description).

The "RADIUS-Assigned VLAN Enabled" checkbox provides a quick way to globally enable/disable RADIUS-server assigned VLAN functionality. When checked, the individual ports' ditto setting determines whether RADIUS-assigned VLAN is enabled on that port. When unchecked, RADIUS-server assigned VLAN is disabled on all ports.

- **Guest VLAN Enabled :**

A Guest VLAN is a special VLAN - typically with limited network access - on which 802.1X-unaware clients are placed after a network administrator-defined timeout. The switch follows a set of rules for entering and leaving the Guest VLAN as listed below.

The "Guest VLAN Enabled" checkbox provides a quick way to globally enable/disable Guest VLAN functionality. When checked, the individual ports' ditto setting determines whether the port can be moved into Guest VLAN. When unchecked, the ability to move to the Guest VLAN is disabled on all ports.

- **Guest VLAN ID :**

This is the value that a port's Port VLAN ID is set to if a port is moved into the Guest VLAN. It is only changeable if the Guest VLAN option is globally enabled.

Valid values are in the range [1; 4095].

- **Max. Reauth. Count :**

The number of times the switch transmits an EAPOL Request Identity frame without response before considering entering the Guest VLAN is adjusted with this setting. The value can only be changed if the Guest VLAN option is globally enabled.

Valid values are in the range [1; 255].

- **Allow Guest VLAN if EAPOL Seen :**

The switch remembers if an EAPOL frame has been received on the port for the life-time of the port. Once the switch considers whether to enter the Guest VLAN, it will first check if this option is enabled or disabled. If disabled (unchecked; default), the switch will only enter the Guest VLAN if an EAPOL frame has not been received on the port for the life-time of the port. If enabled (checked), the switch will consider entering the Guest VLAN even if an EAPOL frame has been received on the port for the life-time of the port.

The value can only be changed if the Guest VLAN option is globally enabled.

### **Port Configuration**

The table has one row for each port on the selected switch and a number of columns, which are:

- **Port :**

The port number for which the configuration below applies.

- **Admin State :**

If NAS is globally enabled, this selection controls the port's authentication mode.

The following modes are available:

- **Force Authorized :**

- In this mode, the switch will send one EAPOL Success frame when the port link comes up, and any client on the port will be allowed network access without authentication.

- **Force Unauthorized :**

- In this mode, the switch will send one EAPOL Failure frame when the port link comes up, and any client on the port will be disallowed network access.

- **Port-based 802.1X :**

- In the 802.1X-world, the user is called the supplicant, the switch is the authenticator, and the RADIUS server is the authentication server. The authenticator acts as the man-in-the-middle, forwarding requests and responses between the supplicant and the authentication server. Frames sent between the supplicant and the switch are special 802.1X frames, known as EAPOL (EAP Over LANs) frames. EAPOL frames encapsulate EAP PDUs (RFC3748). Frames sent between the switch and the RADIUS server are RADIUS packets. RADIUS packets also encapsulate EAP PDUs together with other attributes like the switch's IP address, name, and the supplicant's port number on the switch. EAP is very flexible, in that it allows for different

authentication methods, like MD5-Challenge, PEAP, and TLS. The important thing is that the authenticator (the switch) doesn't need to know which authentication method the supplicant and the authentication server are using, or how many information exchange frames are needed for a particular method. The switch simply encapsulates the EAP part of the frame into the relevant type (EAPOL or RADIUS) and forwards it.

- When authentication is complete, the RADIUS server sends a special packet containing a success or failure indication. Besides forwarding this decision to the supplicant, the switch uses it to open up or block traffic on the switch port connected to the supplicant



---

**NOTE:** Suppose two backend servers are enabled and that the server timeout is configured to X seconds (using the AAA configuration page), and suppose that the first server in the list is currently down (but not considered dead).

Now, if the supplicant retransmits EAPOL starts frames at a rate faster than X seconds, then it will never get authenticated because the switch will cancel on-going backend authentication server requests whenever it receives a new EAPOL Start frame from the supplicant.

And since the server hasn't yet failed (because the X seconds haven't expired), the same server will be contacted upon the next backend authentication server request from the switch. This scenario will loop forever. Therefore, the server timeout should be smaller than the supplicant's EAPOL Start frame retransmission rate.

---

- **Single 802.1X :**
  - In port-based 802.1X authentication, once a supplicant is successfully authenticated on a port, the whole port is opened for network traffic. This allows other clients connected to the port (for instance through a hub) to piggy-back on the successfully authenticated client and get network access even though they really aren't authenticated. To overcome this security breach, use the Single 802.1X variant. Single 802.1X is really not an IEEE standard, but features many of the same characteristics as does port-based 802.1X. In Single 802.1X, at most one supplicant can get authenticated on the port at a time. Normal EAPOL frames are used in the communication between the supplicant and the switch. If more than one supplicant is connected to a port, the one that comes first when the port's link comes up will be the first one considered. If that supplicant doesn't provide valid credentials within a certain amount of time, another supplicant will get a chance. Once a supplicant is successfully authenticated, only that supplicant will be allowed access. This is the most secure of all the supported modes. In this mode, the Port Security module is used to secure a supplicant's MAC address once successfully authenticated.
- **Multi 802.1X :**
  - In port-based 802.1X authentication, once a supplicant is successfully authenticated on a port, the whole port is opened for network traffic. This allows other clients connected to the port (for instance through a hub) to piggy-back on the successfully authenticated client and get network access

even though they really aren't authenticated. To overcome this security breach, use the Multi 802.1X variant.

- Multi 802.1X is really not an IEEE standard, but features many of the same characteristics as does port-based 802.1X. Multi 802.1X is - like Single 802.1X - not an IEEE standard, but a variant that features many of the same characteristics. In Multi 802.1X, one or more supplicants can get authenticated on the same port at the same time. Each supplicant is authenticated individually and secured in the MAC table using the Port Security module.
- In Multi 802.1X it is not possible to use the multicast BPDU MAC address as destination MAC address for EAPOL frames sent from the switch towards the supplicant, since that would cause all supplicants attached to the port to reply to requests sent from the switch. Instead, the switch uses the supplicant's MAC address, which is obtained from the first EAPOL Start or EAPOL Response Identity frame sent by the supplicant. An exception to this is when no supplicants are attached. In this case, the switch sends EAPOL Request Identity frames using the BPDU multicast MAC address as destination - to wake up any supplicants that might be on the port.
- The maximum number of supplicants that can be attached to a port can be limited using the Port Security Limit Control functionality.
- **MAC-based Auth.:**
  - Unlike port-based 802.1X, MAC-based authentication is not a standard, but merely a best-practices method adopted by the industry. In MAC-based authentication, users are called clients, and the switch acts as the supplicant on behalf of clients. The initial frame (any kind of frame) sent by a client is snooped by the switch, which in turn uses the client's MAC address as both username and password in the subsequent EAP exchange with the RADIUS server. The 6-byte MAC address is converted to a string on the following form "xx-xx-xx-xx-xx-xx", that is, a dash (-) is used as separator between the lower-cased hexadecimal digits. The switch only supports the MD5-Challenge authentication method, so the RADIUS server must be configured accordingly.
  - When authentication is complete, the RADIUS server sends a success or failure indication, which in turn causes the switch to open up or block traffic for that particular client, using the Port Security module. Only then will frames from the client be forwarded on the switch. There are no EAPOL frames involved in this authentication, and therefore, MAC-based Authentication has nothing to do with the 802.1X standard.
  - The advantage of MAC-based authentication over port-based 802.1X is that several clients can be connected to the same port (e.g. through a 3rd party switch or a hub) and still require individual authentication, and that the clients don't need special supplicant software to authenticate. The advantage of MAC-based authentication over 802.1X-based authentication is that the clients don't need special supplicant software to authenticate. The disadvantage is that MAC addresses can be spoofed by malicious users - equipment whose MAC address is a valid RADIUS user can be used by anyone. Also, only the MD5-Challenge method is supported. The maximum number of clients that can be attached to a port can be limited using the



Port Security Limit Control functionality.

- **RADIUS-Assigned QoS Enabled :**

When RADIUS-Assigned QoS is both globally enabled and enabled (checked) on a given port, the switch reacts to QoS Class information carried in the RADIUS Access-Accept packet transmitted by the RADIUS server when a supplicant is successfully authenticated. If present and valid, traffic received on the supplicant's port will be classified to the given QoS Class. If (re-)authentication fails or the RADIUS Access-Accept packet no longer carries a QoS Class or it's invalid, or the supplicant is otherwise no longer present on the port, the port's QoS Class is immediately reverted to the original QoS Class (which may be changed by the administrator in the meanwhile without affecting the RADIUS-assigned).

This option is only available for single-client modes, i.e.

- **Port-based 802.1X**
- **Single 802.1X**

RADIUS attributes used in identifying a QoS Class:

- Refer to the written documentation for a description of the RADIUS attributes needed in order to successfully identify a QoS Class. The User-Priority-Table attribute defined in RFC4675 forms the basis for identifying the QoS Class in an Access-Accept packet.

Only the first occurrence of the attribute in the packet will be considered, and to be valid, it must follow this rule:

- All 8 octets in the attribute's value must be identical and consist of ASCII characters in the range '0' - '3', which translates into the desired QoS Class in the range [0; 3].

- **RADIUS-Assigned VLAN Enabled :**

When RADIUS-Assigned VLAN is both globally enabled and enabled (checked) for a given port, the switch reacts to VLAN ID information carried in the RADIUS Access-Accept packet transmitted by the RADIUS server when a supplicant is successfully authenticated. If present and valid, the port's Port VLAN ID will be changed to this VLAN ID, the port will be set to be a member of that VLAN ID, and the port will be forced into VLAN unaware mode. Once assigned, all traffic arriving on the port will be classified and switched on the RADIUS-assigned VLAN ID.

If (re-)authentication fails or the RADIUS Access-Accept packet no longer carries a VLAN ID or it's invalid, or the supplicant is otherwise no longer present on the port, the port's VLAN ID is immediately reverted to the original VLAN ID (which may be changed by the administrator in the meanwhile without affecting the RADIUS-assigned).

This option is only available for single-client modes, i.e.

- **Port-based 802.1X**
- **Single 802.1X**

For trouble-shooting VLAN assignments, use the "Monitor→VLANs→VLAN Membership and VLAN Port" pages. These pages show which modules have (temporarily) overridden the current Port VLAN configuration.

RADIUS attributes used in identifying a VLAN ID:

RFC2868 and RFC3580 form the basis for the attributes used in identifying a VLAN ID in an Access-Accept packet. The following criteria are used:

- The Tunnel-Medium-Type, Tunnel-Type, and Tunnel-Private-Group-ID attributes must all be present at least once in the Access-Accept packet.
- The switch looks for the first set of these attributes that have the same Tag value and fulfil the following requirements (if Tag == 0 is used, the Tunnel-Private-Group-ID

does not need to include a Tag):

- Value of Tunnel-Medium-Type must be set to "IEEE-802" (ordinal 6).
- Value of Tunnel-Type must be set to "VLAN" (ordinal 13).
- Value of Tunnel-Private-Group-ID must be a string of ASCII chars in the range '0' - '9', which is interpreted as a decimal string representing the VLAN ID. Leading '0's are discarded. The final value must be in the range [1; 4095].

- **Guest VLAN Enabled :**

When Guest VLAN is both globally enabled and enabled (checked) for a given port, the switch considers moving the port into the Guest VLAN according to the rules outlined below.

This option is only available for EAPOL-based modes, i.e.:

- **Port-based 802.1X**
- **Single 802.1X**
- **Multi 802.1X**

For trouble-shooting VLAN assignments, use the "Monitor→VLANs→VLAN Membership and VLAN Port" pages. These pages show which modules have (temporarily) overridden the current Port VLAN configuration.

Guest VLAN Operation:

- When a Guest VLAN enabled port's link comes up, the switch starts transmitting EAPOL Request Identity frames. If the number of transmissions of such frames exceeds Max. Reauth. Count and no EAPOL frames have been received in the meanwhile, the switch considers entering the Guest VLAN. The interval between transmissions of EAPOL Request Identity frames is configured with EAPOL Timeout. If Allow Guest VLAN if EAPOL Seen is enabled, the port will now be placed in the Guest VLAN. If disabled, the switch will first check its history to see if an EAPOL frame has previously been received on the port (this history is cleared if the port link goes down or the port's Admin State is changed), and if not, the port will be placed in the Guest VLAN. Otherwise it will not move to the Guest VLAN, but continue transmitting EAPOL Request Identity frames at the rate given by EAPOL Timeout.
- Once in the Guest VLAN, the port is considered authenticated, and all attached clients on the port are allowed access on this VLAN. The switch will not transmit an EAPOL Success frame when entering the Guest VLAN.
- While in the Guest VLAN, the switch monitors the link for EAPOL frames, and if one such frame is received, the switch immediately takes the port out of the Guest VLAN and starts authenticating the supplicant according to the port mode. If an EAPOL frame is received, the port will never be able to go back into the Guest VLAN if the "Allow Guest VLAN if EAPOL Seen" is disabled.

- **Port State :**

The current state of the port. It can undertake one of the following values:

- **Globally Disabled:** NAS is globally disabled.
- **Link Down:** NAS is globally enabled, but there is no link on the port.
- **Authorized:** The port is in Force Authorized or a single-supplicant mode and the supplicant is authorized.
- **Unauthorized:** The port is in Force Unauthorized or a single-supplicant mode and the supplicant is not successfully authorized by the RADIUS server.
- **X Auth/Y Unauth:** The port is in a multi-supplicant mode. Currently X clients are authorized and Y are unauthorized.

- **Restart :**

Two buttons are available for each row. The buttons are only enabled when authentication is globally enabled and the port's Admin State is in an EAPOL-based or MAC-based mode.

Clicking these buttons will not cause settings changed on the page to take effect.

Re-authenticate: Schedules a re-authentication whenever the quiet-period of the port runs out (EAPOL-based authentication). For MAC-based authentication, re-authentication will be attempted immediately.

The button only has effect for successfully authenticated clients on the port and will not cause the clients to get temporarily unauthorized.

Reinitialize: Forces a re-initialization of the clients on the port and thereby a re-authentication immediately. The clients will transfer to the unauthorized state while the re-authentication is in progress.

### **Buttons**

- **Refresh:**

You can click them for refresh the NAS Configuration by manual.

- **Apply :**

Click to save changes.

- **Reset :**

Click to undo any changes made locally and revert to previously saved values.

### 2-5.2.3 ACL

The Vi30110switch access control list (ACL) is probably the most commonly used object in the IOS. It is used for packet filtering but also for selecting types of traffic to be analyzed, forwarded, or influenced in some way. The ACLs are divided into EtherTypes, IPv4, ARP protocol, MAC and VLAN parameters etc. Here we will just go over the standard and extended access lists for TCP/IP. As you create ACEs for ingress classification, you can assign a policy for each port, the policy number is 1-8, and however, each policy can be applied to any port. This makes it very easy to determine what type of ACL policy you will be working with.

#### 2-5.2.3.1 Ports

The section describes how to configure the ACL parameters (ACE) of each switch port. These parameters will affect frames received on a port unless the frame matches a specific ACE

#### Web Interface

To configure the ACL Ports Configuration in the web interface:

1. Click Configuration, Security, Network, ACL and Ports.
2. To scroll the specific parameter value to select the correct value for port ACL setting.
3. Click the save to save the setting
4. If you want to cancel the setting then you need to click the reset button. It will revert to previously saved values.
5. After you configure complete then you could see the Counter of the port. Then you could click refresh to update the counter or Clear the information.

ACL Ports Configuration Home > Configuration > Security > Network > ACL > Ports

Port	Policy ID	Action	Rate Limiter ID	Port Redirect	Mirror	Logging	Shutdown	State	Counter
*	0	<>	<>	Disabled Port 1 Port 2	<>	<>	<>	<>	*
1	0	Permit	Disabled	Disabled Port 1 Port 2	Disabled	Disabled	Disabled	Enabled	33836
N-1	0	Permit	Disabled	Disabled Port 1 Port 2	Disabled	Disabled	Disabled	Enabled	0
N	0	Permit	Disabled	Disabled Port 1 Port 2	Disabled	Disabled	Disabled	Enabled	0

Apply Reset

Figure 2-5.2.3.1: The ACL Ports Configuration

### Parameter Description:

- **Port :**  
The logical port for the settings contained in the same row.
- **Policy ID :**  
Select the policy to apply to this port. The allowed values are 1 through 8. The default value is 1.
- **Action :**  
Select whether forwarding is permitted ("Permit") or denied ("Deny"). The default value is "Permit".
- **Rate Limiter ID :**  
Select which rate limiter to apply on this port. The allowed values are Disabled or the values 1 through 16. The default value is "Disabled".
- **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".
- **Logging :**  
Specify the logging operation of this port. The allowed values are:
  - **Enabled:** Frames received on the port are stored in the System Log.
  - **Disabled:** Frames received on the port are not logged.The default value is "Disabled". Please note that the System Log memory size and logging rate is limited.
- **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".
- **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 ACE.

### Buttons

- **Refresh, clear:**  
You can click them for refresh the ACL Port Configuration or clear them by manual.
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

### 2-5.2.3.2 Rate Limiters

The section describes how to configure the switch's ACL Rate Limiter parameters. The Rate Limiter Level from 1 to 16 that allow user to set rate limiter value and units with pps.

#### Web Interface

To configure ACL Rate Limiter in the web interface:

1. Click Configuration, Security, Network, ACL and Rate Limiter.
2. To specific the Rate field and the range from 0 to 3276700.
3. Click the Apply to save the setting
4. If you want to cancel the setting then you need to click the reset button. It will revert to previously saved values.

Rate Limiter ID	Rate	Unit
*	<input type="text" value="1"/>	<input type="text" value="pps"/>
1	<input type="text" value="1"/>	<input type="text" value="pps"/>
2	<input type="text" value="1"/>	<input type="text" value="pps"/>
15	<input type="text" value="1"/>	<input type="text" value="pps"/>
16	<input type="text" value="1"/>	<input type="text" value="pps"/>

Figure 2-5.2.3.2: The ACL Rate Limiter Configuration

#### Parameter Description:

- **Rate Limiter ID :**  
The rate limiter ID for the settings contained in the same row.
- **Rate**  
The rate range is located 0-3276700 in pps.  
or 0, 100, 200, 300, ..., 1000000 in kbps.
- **Unit**  
Specify the rate unit. The allowed values are:
  - **pps:** packets per second.
  - **kbps:** Kbits per second.

#### Buttons


- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

### 2-5.2.3.3 Access Control List

The section describes how to configure Access Control List rule. An Access Control List (ACL) is a sequential list of permits or deny conditions that apply to IP addresses, MAC addresses, or other more specific criteria. This switch tests ingress packets against the conditions in an ACL one by one. A packet will be accepted as soon as it matches a permit rule, or dropped as soon as it matches a deny rule. If no rules match, the frame is accepted. Other actions can also be invoked when a matching packet is found, including rate limiting, copying matching packets to another port or to the system log, or shutting down a port.

This page shows the Access Control List (ACL), which is made up of the ACEs defined on this switch. Each row describes the ACE that is defined. The maximum number of ACEs is 256 on each switch. Click on the lowest plus sign to add a new ACE to the list. The reserved ACEs used for internal protocol, cannot be edited or deleted; the order sequence cannot be changed the priority is highest.

#### **Web Interface**

1. To configure Access Control List in the web interface:
2. Click Configuration, Security, Network, ACL and Access Control List.
3. Click the  button to add a new ACL, or use the other ACL modification buttons to specify the editing action (i.e., edit, delete, or moving the relative position of entry in the list)
4. To specify the parameter of the ACE
5. Click the save to save the setting
6. If you want to cancel the setting then you need to click the reset button. It will revert to previously saved values.
7. When editing an entry on the ACE Configuration page, note that the items displayed depend on various selections, such as Frame Type and IP Protocol Type. Specify the relevant criteria to be matched for this rule, and set the actions to take when a rule is matched (such as Rate Limiter, Port Copy, Logging, and Shutdown).

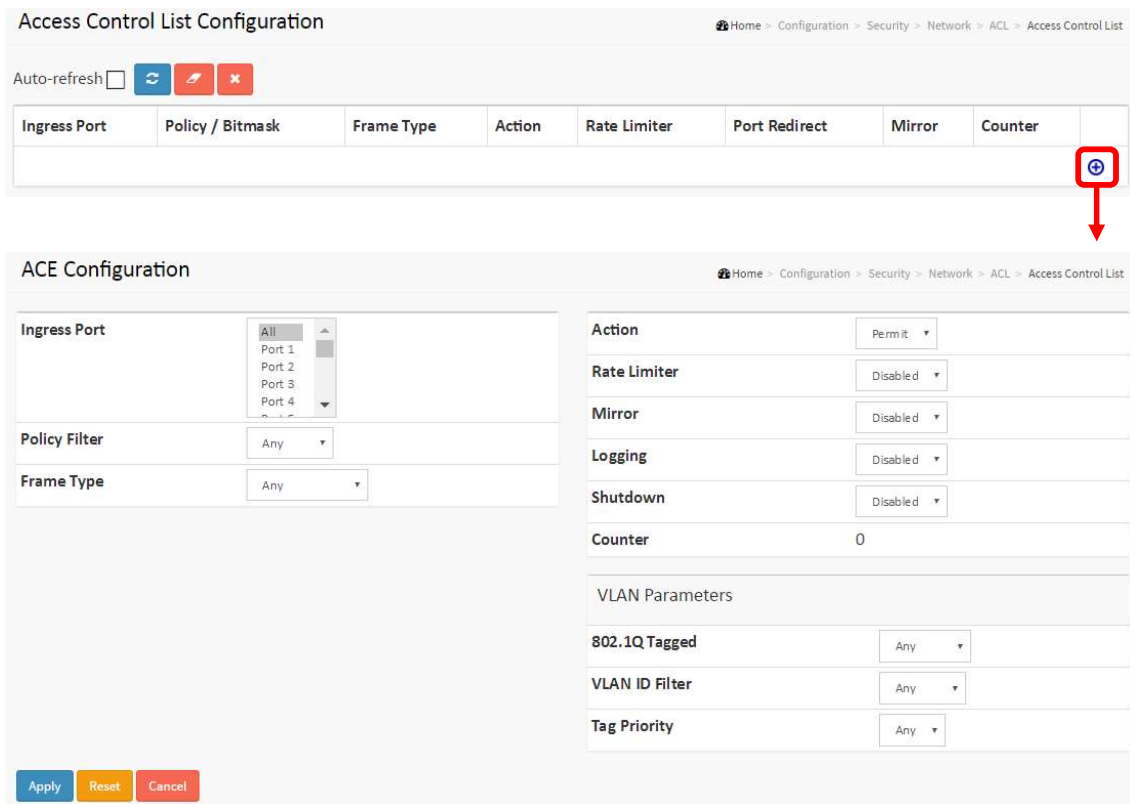


Figure 2-5.2.3.3: The ACL Rate Limiter Configuration

**Parameter Description:**

- **Ingress Port :**

Indicates the ingress port of the ACE. Possible values are:

- **Any:** The ACE will match any ingress port.
- **Policy:** The ACE will match ingress ports with a specific policy.
- **Port:** The ACE will match a specific ingress port.

- **Policy / Bitmask :**







Indicates the policy number and bitmask of the ACE.

- **Frame Type :**

Indicates the frame type of the ACE. Possible values are:

- **Any:** The ACE will match any frame type.
- **EType:** The ACE will match Ethernet Type frames. Note that an Ethernet Type based ACE will not get matched by IP and ARP frames.
- **ARP:** The ACE will match ARP/RARP frames.
- **IPv4:** The ACE will match all IPv4 frames.
- **IPv4/ICMP:** The ACE will match IPv4 frames with ICMP protocol.
- **IPv4/UDP:** The ACE will match IPv4 frames with UDP protocol.
- **IPv4/TCP:** The ACE will match IPv4 frames with TCP protocol.
- **IPv4/Other:** The ACE will match IPv4 frames, which are not ICMP/UDP/TCP.
- **IPv6:** The ACE will match all IPv6 standard frames.



- **Action :**  
Indicates the forwarding action of the ACE.
  - **Permit:** Frames matching the ACE may be forwarded and learned.
  - **Deny:** Frames matching the ACE are dropped.
  - **Filter:** Frames matching the ACE are filtered.
- **Rate Limiter :**  
Indicates the rate limiter number of the ACE. The allowed range is 1 to 16. When Disabled is displayed, the rate limiter operation is disabled.
- **Port Redirect :**  
Indicates the port redirect operation of the ACE. Frames matching the ACE are redirected to the port number. The allowed values are Disabled or a specific port number. When Disabled is displayed, the port redirect operation is disabled.
- **Mirror :**  
Specify the mirror operation of this port. Frames matching the ACE are mirrored to the destination mirror 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".
- **Counter :**  
The counter indicates the number of times the ACE was hit by a frame.
- **Modification Buttons :**  
You can modify each ACE (Access Control Entry) in the table using the following buttons:
  - : Inserts a new ACE before the current row.
  - : Edits the ACE row.
  - : Moves the ACE up the list.
  - : Moves the ACE down the list.
  - : Deletes the ACE.
  - : The lowest plus sign adds a new entry at the bottom of the ACE listings.

### ACE Configuration

An ACE consists of several parameters. These parameters vary according to the frame type that you select. First select the ingress port for the ACE, and then select the frame type. Different parameter options are displayed depending on the frame type selected. A frame that hits this ACE matches the configuration that is defined here.

- **Ingress Port :**  
Select the ingress port for which this ACE applies.  
**All:** The ACE applies to all port.  
**Port n:** The ACE applies to this port number, where n is the number of the switch port.
- **Policy Filter :**  
Specify the policy number filter for this ACE.  
**Any:** No policy filter is specified. (policy filter status is "don't-care".)  
**Specific:** If you want to filter a specific policy with this ACE, choose this value. Two field for entering a policy value and bitmask appears.
- **Policy Value :**  
When "Specific" is selected for the policy filter, you can enter a specific policy value. The allowed range is 0 to 255.

- **Policy Bitmask :**

When "Specific" is selected for the policy filter, you can enter a specific policy bitmask. The allowed range is 0x0 to 0xff. Notice the usage of bitmask, if the binary bit value is "0", it means this bit is "don't-care". The real matched pattern is [policy\_value & policy\_bitmask]. For example, if the policy value is 3 and the policy bitmask is 0x10(bit 0 is "don't-care" bit), then policy 2 and 3 are applied to this rule.
- **Frame Type :**

Select the frame type for this ACE. These frame types are mutually exclusive.

  - **Any:** Any frame can match this ACE.
  - **Ethernet Type:** Only Ethernet Type frames can match this ACE. The IEEE 802.3 describes the value of Length/Type Field specifications to be greater than or equal to 1536 decimal (equal to 0600 hexadecimal).
  - **ARP:** Only ARP frames can match this ACE. Notice the ARP frames won't match the ACE with ethernet type.
  - **IPv4:** Only IPv4 frames can match this ACE. Notice the IPv4 frames won't match the ACE with ethernet type.
  - **IPv6:** Only IPv6 frames can match this ACE. Notice the IPv6 frames won't match the ACE with Ethernet type.
- **Action :**

Specify the action to take with a frame that hits this ACE.

  - Permit: The frame that hits this ACE is granted permission for the ACE operation.
  - Deny: The frame that hits this ACE is dropped.
  - Filter: Frames matching the ACE are filtered.
- **Rate Limiter :**

Specify the rate limiter in number of base units. The allowed range is 1 to 16. Disabled indicates that the rate limiter operation is disabled.
- **Port Redirect :**

Frames that hit the ACE are redirected to the port number specified here. The rate limiter will affect these ports. The allowed range is the same as the switch port number range. Disabled indicates that the port redirect operation is disabled and the specific port number of 'Port Redirect' can't be set when action is permitted.
- **Mirror :**

Specify the mirror operation of this port. Frames matching the ACE are mirrored to the destination mirror port. The rate limiter will not affect frames on the mirror 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 :**

Specify the logging operation of the ACE. Notice that the logging message doesn't include the 4 bytes CRC information. The allowed values are:

  - **Enabled:** Frames matching the ACE are stored in the System Log.
  - **Disabled:** Frames matching the ACE are not logged.

Note: The logging feature only works when the packet length is less than 1518(without VLAN tags) and the System Log memory size and logging rate is limited.

- **Shutdown :**  
Specify the port shut down operation of the ACE. The allowed values are:
  - **Enabled:** If a frame matches the ACE, the ingress port will be disabled.
  - **Disabled:** Port shut down is disabled for the ACE.
 Note: The shutdown feature only works when the packet length is less than 1518(without VLAN tags).

- **Counter :**  
The counter indicates the number of times the ACE was hit by a frame.

### MAC Parameter

- **SMAC Filter :**  
(Only displayed when the frame type is Ethernet Type or ARP.)  
Specify the source MAC filter for this ACE.
  - **Any:** No SMAC filter is specified. (SMAC filter status is "don't-care".)
  - **Specific:** If you want to filter a specific source MAC address with this ACE, choose this value. A field for entering a SMAC value appears.
- **SMAC Value :**  
When "Specific" is selected for the SMAC filter, you can enter a specific source MAC address. The legal format is "xx-xx-xx-xx-xx-xx" or "xx.xx.xx.xx.xx.xx" or "xxxxxxxxxxx" (x is a hexadecimal digit). A frame that hits this ACE matches this SMAC value.
- **DMAC Filter :**  
Specify the destination MAC filter for this ACE.
  - **Any:** No DMAC filter is specified. (DMAC filter status is "don't-care".)
  - **MC:** Frame must be multicast.
  - **BC:** Frame must be broadcast.
  - **UC:** Frame must be unicast.
  - **Specific:** If you want to filter a specific destination MAC address with this ACE, choose this value. A field for entering a DMAC value appears.
- **DMAC Value :**  
When "Specific" is selected for the DMAC filter, you can enter a specific destination MAC address. The legal format is "xx-xx-xx-xx-xx-xx" or "xx.xx.xx.xx.xx.xx" or "xxxxxxxxxxx" (x is a hexadecimal digit). A frame that hits this ACE matches this DMAC value.

### VLAN Parameters

- **802.1Q Tagged :**  
Specify whether frames can hit the action according to the 802.1Q tagged. The allowed values are:
  - **Any:** Any value is allowed ("don't-care").
  - **Enabled:** Tagged frame only.
  - **Disabled:** Untagged frame only.
 The default value is "Any".
- **VLAN ID Filter :**  
Specify the VLAN ID filter for this ACE.
  - **Any:** No VLAN ID filter is specified. (VLAN ID filter status is "don't-care".)
  - **Specific:** If you want to filter a specific VLAN ID with this ACE, choose this value. A field for entering a VLAN ID number appears

- **VLAN ID :**  
When "Specific" is selected for the VLAN ID filter, you can enter a specific VLAN ID number. The allowed range is 1 to 4095. A frame that hits this ACE matches this VLAN ID value.
- **Tag Priority :**  
Specify the tag priority for this ACE. A frame that hits this ACE matches this tag priority. The allowed number range is 0 to 7 or range 0-1, 2-3, 4-5, 6-7, 0-3 and 4-7. The value Any means that no tag priority is specified (tag priority is "don't-care".)

#### **ARP Parameters**

The ARP parameters can be configured when Frame Type "ARP" is selected.

- **ARP/RARP :**  
Specify the available ARP/RARP opcode (OP) flag for this ACE.
  - **Any:** No ARP/RARP OP flag is specified. (OP is "don't-care".)
  - **ARP:** Frame must have ARP opcode set to ARP.
  - **RARP:** Frame must have RARP opcode set to RARP.
  - **Other:** Frame has unknown ARP/RARP Opcode flag.
- **Request/Reply :**  
Specify the available Request/Reply opcode (OP) flag for this ACE.
  - **Any:** No Request/Reply OP flag is specified. (OP is "don't-care".)
  - **Request:** Frame must have ARP Request or RARP Request OP flag set.
  - **Reply:** Frame must have ARP Reply or RARP Reply OP flag.
- **Sender IP Filter :**  
Specify the sender IP filter for this ACE.
  - **Any:** No sender IP filter is specified. (Sender IP filter is "don't-care".)
  - **Host:** Sender IP filter is set to Host. Specify the sender IP address in the SIP Address field that appears.
  - **Network:** Sender IP filter is set to Network. Specify the sender IP address and sender IP mask in the SIP Address and SIP Mask fields that appear.
- **Sender IP Address :**  
When "Host" or "Network" is selected for the sender IP filter, you can enter a specific sender IP address in dotted decimal notation.
- **Sender IP Mask :**  
When "Network" is selected for the sender IP filter, you can enter a specific sender IP mask in dotted decimal notation.
- **Target IP Filter :**  
Specify the target IP filter for this specific ACE.
  - **Any:** No target IP filter is specified. (Target IP filter is "don't-care".)
  - **Host:** Target IP filter is set to Host. Specify the target IP address in the Target IP Address field that appears. Network: Target IP filter is set to Network. Specify the target IP address and target IP mask in the Target IP Address and Target IP Mask fields that appear.
- **Target IP Address :**  
When "Host" or "Network" is selected for the target IP filter, you can enter a specific target IP address in dotted decimal notation.
- **Target IP Mask :**  
When "Network" is selected for the target IP filter, you can enter a specific target IP mask in dotted decimal notation.

- **ARP Sender MAC Match :**  
Specify whether frames can hit the action according to their sender hardware address field (SHA) settings.
  - **0:** ARP frames where SHA is not equal to the SMAC address.
  - **1:** ARP frames where SHA is equal to the SMAC address.
  - **Any:** Any value is allowed ("don't-care").
- **RARP Target MAC Match :**  
Specify whether frames can hit the action according to their target hardware address field (THA) settings.
  - **0:** RARP frames where THA is not equal to the target MAC address.
  - **1:** RARP frames where THA is equal to the target MAC address.
  - **Any:** Any value is allowed ("don't-care").
- **IP/Ethernet Length :**  
Specify whether frames can hit the action according to their ARP/RARP hardware address length (HLN) and protocol address length (PLN) settings.
  - **0:** ARP/RARP frames where the HLN is not equal to Ethernet (0x06) or the (PLN) is not equal to IPv4 (0x04).
  - **1:** ARP/RARP frames where the HLN is equal to Ethernet (0x06) and the (PLN) is equal to IPv4 (0x04).
  - **Any:** Any value is allowed ("don't-care").
- **Ethernet :**  
Specify whether frames can hit the action according to their ARP/RARP hardware address space (HRD) settings.
  - **0:** ARP/RARP frames where the HLD is not equal to Ethernet (1).
  - **1:** ARP/RARP frames where the HLD is equal to Ethernet (1).
  - **Any:** Any value is allowed ("don't-care").
- **IP :**  
Specify whether frames can hit the action according to their ARP/RARP protocol address space (PRO) settings.
  - **0:** ARP/RARP frames where the PRO is not equal to IP (0x800).
  - **1:** ARP/RARP frames where the PRO is equal to IP (0x800).
  - **Any:** Any value is allowed ("don't-care").

#### **IP Parameters**

The IP parameters can be configured when Frame Type "IPv4" is selected.

- **IP Protocol Filter :**  
Specify the IP protocol filter for this ACE.
  - **Any:** No IP protocol filter is specified ("don't-care").
  - **Specific:** If you want to filter a specific IP protocol filter with this ACE, choose this value. A field for entering an IP protocol filter appears.
  - **ICMP:** Select ICMP to filter IPv4 ICMP protocol frames. Extra fields for defining ICMP parameters will appear. These fields are explained later in this help file.
  - **UDP:** Select UDP to filter IPv4 UDP protocol frames. Extra fields for defining UDP parameters will appear. These fields are explained later in this help file.
  - **TCP:** Select TCP to filter IPv4 TCP protocol frames. Extra fields for defining TCP parameters will appear. These fields are explained later in this help file.

- **IP Protocol Value :**  
When "Specific" is selected for the IP protocol value, you can enter a specific value. The allowed range is 0 to 255. A frame that hits this ACE matches this IP protocol value.
- **IP TTL :**  
Specify the Time-to-Live settings for this ACE.
  - **zero:** IPv4 frames with a Time-to-Live field greater than zero must not be able to match this entry.
  - **non-zero:** IPv4 frames with a Time-to-Live field greater than zero must be able to match this entry.
  - **Any:** Any value is allowed ("don't-care").
- **IP Fragment :**  
Specify the fragment offset settings for this ACE. This involves the settings for the More Fragments (MF) bit and the Fragment Offset (FRAG OFFSET) field for an IPv4 frame.
  - **No:** IPv4 frames where the MF bit is set or the FRAG OFFSET field is greater than zero must not be able to match this entry.
  - **Yes:** IPv4 frames where the MF bit is set or the FRAG OFFSET field is greater than zero must be able to match this entry.
  - **Any:** Any value is allowed ("don't-care").
- **IP Option :**  
Specify the options flag setting for this ACE.
  - **No:** IPv4 frames where the options flag is set must not be able to match this entry.
  - **Yes:** IPv4 frames where the options flag is set must be able to match this entry.
  - **Any:** Any value is allowed ("don't-care").
- **SIP Filter :**  
Specify the source IP filter for this ACE.
  - **Any:** No source IP filter is specified. (Source IP filter is "don't-care".)
  - **Host:** Source IP filter is set to Host. Specify the source IP address in the SIP Address field that appears.
  - **Network:** Source IP filter is set to Network. Specify the source IP address and source IP mask in the SIP Address and SIP Mask fields that appear.
- **SIP Address :**  
When "Host" or "Network" is selected for the source IP filter, you can enter a specific SIP address in dotted decimal notation.
- **SIP Mask :**  
When "Network" is selected for the source IP filter, you can enter a specific SIP mask in dotted decimal notation.
- **DIP Filter :**  
Specify the destination IP filter for this ACE.  
Any: No destination IP filter is specified. (Destination IP filter is "don't-care".)  
Host: Destination IP filter is set to Host. Specify the destination IP address in the DIP Address field that appears.  
Network: Destination IP filter is set to Network. Specify the destination IP address and destination IP mask in the DIP Address and DIP Mask fields that appear.
- **DIP Address :**  
When "Host" or "Network" is selected for the destination IP filter, you can enter a specific DIP address in dotted decimal notation.

- **DIP Mask :**  
When "Network" is selected for the destination IP filter, you can enter a specific DIP mask in dotted decimal notation.
- IPv6 Parameters**  
The IPv6 parameters can be configured when Frame Type "IPv6" is selected.
- **Next Header Filter :**  
Specify the IPv6 next header filter for this ACE.
  - **Any:** No IPv6 next header filter is specified ("don't-care").
  - **Specific:** If you want to filter a specific IPv6 next header filter with this ACE, choose this value. A field for entering an IPv6 next header filter appears.
  - **ICMP:** Select ICMP to filter IPv6 ICMP protocol frames. Extra fields for defining ICMP parameters will appear. These fields are explained later in this help file.
  - **UDP:** Select UDP to filter IPv6 UDP protocol frames. Extra fields for defining UDP parameters will appear. These fields are explained later in this help file.
  - **TCP:** Select TCP to filter IPv6 TCP protocol frames. Extra fields for defining TCP parameters will appear. These fields are explained later in this help file.
- **Next Header Value :**  
When "Specific" is selected for the IPv6 next header value, you can enter a specific value. The allowed range is 0 to 255. A frame that hits this ACE matches this IPv6 protocol value.
- **SIP Filter :**  
Specify the source IPv6 filter for this ACE.
  - **Any:** No source IPv6 filter is specified. (Source IPv6 filter is "don't-care".)
  - **Specific:** Source IPv6 filter is set to Network. Specify the source IPv6 address and source IPv6 mask in the SIP Address fields that appear.
- **SIP Address :**  
When "Specific" is selected for the source IPv6 filter, you can enter a specific SIPv6 address. The field only supported last 32 bits for IPv6 address.
- **SIP BitMask :**  
When "Specific" is selected for the source IPv6 filter, you can enter a specific SIPv6 mask. The field only supported last 32 bits for IPv6 address. Notice the usage of bitmask, if the binary bit value is "0", it means this bit is "don't-care". The real matched pattern is [sipv6\_address & sipv6\_bitmask] (last 32 bits). For example, if the SIPv6 address is 2001::3 and the SIPv6 bitmask is 0xFFFFFFE (bit 0 is "don't-care" bit), then SIPv6 address 2001::2 and 2001::3 are applied to this rule.
- **Hop Limit :**  
Specify the hop limit settings for this ACE.
  - **zero:** IPv6 frames with a hop limit field greater than zero must not be able to match this entry.
  - **non-zero:** IPv6 frames with a hop limit field greater than zero must be able to match this entry.
  - **Any:** Any value is allowed ("don't-care").
- ICMP Parameters**
- **ICMP Type Filter :**  
Specify the ICMP filter for this ACE.
  - **Any:** No ICMP filter is specified (ICMP filter status is "don't-care").
  - **Specific:** If you want to filter a specific ICMP filter with this ACE, you can enter a specific ICMP value. A field for entering an ICMP value appears.

- **ICMP Type Value :**  
When "Specific" is selected for the ICMP filter, you can enter a specific ICMP value. The allowed range is 0 to 255. A frame that hits this ACE matches this ICMP value.
- **ICMP Code Filter :**  
Specify the ICMP code filter for this ACE.
  - **Any:** No ICMP code filter is specified (ICMP code filter status is "don't-care").
  - **Specific:** If you want to filter a specific ICMP code filter with this ACE, you can enter a specific ICMP code value. A field for entering an ICMP code value appears.
- **ICMP Code Value :**  
When "Specific" is selected for the ICMP code filter, you can enter a specific ICMP code value. The allowed range is 0 to 255. A frame that hits this ACE matches this ICMP code value.

#### **TCP/UDP Parameters**

- **TCP/UDP Source Filter :**  
Specify the TCP/UDP source filter for this ACE.
  - **Any:** No TCP/UDP source filter is specified (TCP/UDP source filter status is "don't-care").
  - **Specific:** If you want to filter a specific TCP/UDP source filter with this ACE, you can enter a specific TCP/UDP source value. A field for entering a TCP/UDP source value appears.
  - **Range:** If you want to filter a specific TCP/UDP source range filter with this ACE, you can enter a specific TCP/UDP source range value. A field for entering a TCP/UDP source value appears.
- **TCP/UDP Source No. :**  
When "Specific" is selected for the TCP/UDP source filter, you can enter a specific TCP/UDP source value. The allowed range is 0 to 65535. A frame that hits this ACE matches this TCP/UDP source value.
- **TCP/UDP Source Range :**  
When "Range" is selected for the TCP/UDP source filter, you can enter a specific TCP/UDP source range value. The allowed range is 0 to 65535. A frame that hits this ACE matches this TCP/UDP source value.
- **TCP/UDP Destination Filter :**  
Specify the TCP/UDP destination filter for this ACE.
  - **Any:** No TCP/UDP destination filter is specified (TCP/UDP destination filter status is "don't-care").
  - **Specific:** If you want to filter a specific TCP/UDP destination filter with this ACE, you can enter a specific TCP/UDP destination value. A field for entering a TCP/UDP destination value appears.
  - **Range:** If you want to filter a specific range TCP/UDP destination filter with this ACE, you can enter a specific TCP/UDP destination range value. A field for entering a TCP/UDP destination value appears.
- **TCP/UDP Destination Number :**  
When "Specific" is selected for the TCP/UDP destination filter, you can enter a specific TCP/UDP destination value. The allowed range is 0 to 65535. A frame that hits this ACE matches this TCP/UDP destination value.



- **TCP/UDP Destination Range :**  
When "Range" is selected for the TCP/UDP destination filter, you can enter a specific TCP/UDP destination range value. The allowed range is 0 to 65535. A frame that hits this ACE matches this TCP/UDP destination value.
- **TCP FIN :**  
Specify the TCP "No more data from sender" (FIN) value for this ACE.
  - **0:** TCP frames where the FIN field is set must not be able to match this entry.
  - **1:** TCP frames where the FIN field is set must be able to match this entry.
  - **Any:** Any value is allowed ("don't-care").
- **TCP SYN :**  
Specify the TCP "Synchronize sequence numbers" (SYN) value for this ACE.
  - **0:** TCP frames where the SYN field is set must not be able to match this entry.
  - **1:** TCP frames where the SYN field is set must be able to match this entry.
  - **Any:** Any value is allowed ("don't-care").
- **TCP RST :**  
Specify the TCP "Reset the connection" (RST) value for this ACE.
  - **0:** TCP frames where the RST field is set must not be able to match this entry.
  - **1:** TCP frames where the RST field is set must be able to match this entry.
  - **Any:** Any value is allowed ("don't-care").
- **TCP PSH :**  
Specify the TCP "Push Function" (PSH) value for this ACE.
  - **0:** TCP frames where the PSH field is set must not be able to match this entry.
  - **1:** TCP frames where the PSH field is set must be able to match this entry.
  - **Any:** Any value is allowed ("don't-care").
- **TCP ACK :**  
Specify the TCP "Acknowledgment field significant" (ACK) value for this ACE.
  - **0:** TCP frames where the ACK field is set must not be able to match this entry.
  - **1:** TCP frames where the ACK field is set must be able to match this entry.
  - **Any:** Any value is allowed ("don't-care").
- **TCP URG :**  
Specify the TCP "Urgent Pointer field significant" (URG) value for this ACE.
  - **0:** TCP frames where the URG field is set must not be able to match this entry.
  - **1:** TCP frames where the URG field is set must be able to match this entry.
  - **Any:** Any value is allowed ("don't-care").

#### **Ethernet Type Parameters**

The Ethernet Type parameters can be configured when Frame Type "Ethernet Type" is selected.

- **EtherType Filter :**  
Specify the Ethernet type filter for this ACE.
  - **Any:** No EtherType filter is specified (EtherType filter status is "don't-care").
  - **Specific:** If you want to filter a specific EtherType filter with this ACE, you can enter a specific EtherType value. A field for entering an EtherType value appears.
- **Ethernet Type Value :**  
When "Specific" is selected for the EtherType filter, you can enter a specific EtherType value. The allowed range is 0x600 to 0xFFFF but excluding 0x800(IPv4), 0x806(ARP) and 0x86DD(IPv6). A frame that hits this ACE matches this EtherType value.

### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Auto-refresh:**  
To evoke the auto-refresh to refresh the information automatically.
- **Refresh, clear, Remove All :**  
You can click them for refresh the ACL configuration or clear them by manual. Others remove all to clean up all ACL configurations on the table.
- **Cancel :**  
Return to the previous page.

## 2-5.2.4 IP Source Guard

The section describes to configure the IP Source Guard detail parameters of the switch. You could use the IP Source Guard configure to enable or disable with the Port of the switch.

### 2-5.2.4.1 Configuration

This section describes how to configure IP Source Guard setting including:

Mode (Enabled and Disabled)

Maximum Dynamic Clients (0, 1, 2, Unlimited)

#### Web Interface

To configure an IP Source Guard Configuration in the web interface:

1. Click Configuration, Security, Network, IP Source Guard and Configuration.
2. Select "Enabled" in the Mode of IP Source Guard Configuration.
3. Select "Enabled" of the specific port in the Mode of Port Mode Configuration.
4. Select Maximum Dynamic Clients (0, 1, 2, Unlimited) of the specific port in the Mode of Port Mode Configuration.
5. Click Apply.

Port	Mode	Max Dynamic Clients
*	<>	<>
1	Disabled	Unlimited
N-1	Disabled	Unlimited
N	Disabled	Unlimited

Figure 2-5.2.4.1: The IP Source Guard Configuration

#### Parameter Description:

- **Mode of IP Source Guard Configuration :**  
Enable the Global IP Source Guard or disable the Global IP Source Guard. All configured ACEs will be lost when the mode is enabled.
- **Port Mode Configuration :**  
Specify IP Source Guard is enabled on which ports. Only when both Global Mode and Port Mode on a given port are enabled, IP Source Guard is enabled on this given port.

- **Max Dynamic Clients :**

Specify the maximum number of dynamic clients that can be learned on given port. This value can be 0, 1, 2 or unlimited. If the port mode is enabled and the value of max dynamic client is equal to 0, it means only allow the IP packets forwarding that are matched in static entries on the specific port.

**Buttons**

- **Translate dynamic to static :**

Click to translate all dynamic entries to static entries.

- **Apply :**

Click to save changes.

- **Reset :**

Click to undo any changes made locally and revert to previously saved values.

## 2-5.2.4.2 Static Table

The section describes to configure the Static IP Source Guard Table parameters of the switch. You could use the Static IP Source Guard Table configure to manage the entries.

### Web Interface

To configure a Static IP Source Guard Table Configuration in the web interface:

1. Click Configuration, Security, Network, IP Source Guard and Static Table.
2. Click "Add New Entry".
3. Specify the Port, VLAN ID, IP Address, and MAC address in the entry.
4. Click Apply.

The figure consists of two screenshots of the web interface for the Static IP Source Guard Table. The top screenshot shows the 'Add New Entry' button highlighted with a red box, and a red arrow pointing to the 'Apply' button. The bottom screenshot shows the table with one entry: Port 1, MAC address 08-ED-02-5D-10-AA.

Delete	Port	VLAN ID	IP Address	MAC address
<input type="button" value="Delete"/>	1			08-ED-02-5D-10-AA

Figure 2-5.2.4.2: The Static IP Source Guard Table

### Parameter Description:

- **Port :**  
The logical port for the settings.
- **VLAN ID :**  
The VLAN id for the settings.
- **IP Address :**  
Allowed Source IP address.
- **MAC address :**  
Allowed Source MAC address.

### **Buttons**

- **Adding new entry :**  
Click to add a new entry to the Static IP Source Guard table. Specify the Port, VLAN ID, IP address, and IP Mask for the new entry. Click "Save".
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Delete :**  
Check to delete the entry. It will be deleted during the next save.

## 2-5.2.5 ARP Inspection

The section describes to configure the ARP Inspection parameters of the switch. You could use the ARP Inspection configure to manage the ARP table.

### 2-5.2.5.1 Port Configuration

This section describes how to configure ARP Inspection setting including:

Mode (Enabled and Disabled)

Port (Enabled and Disabled)

#### Web Interface

To configure an ARP Inspection Configuration in the web interface:

1. Click Configuration, Security, Network, ARP Inspection and Configuration.
2. Select "Enabled" in the Mode of ARP Inspection Configuration.
3. Select "Enabled" of the specific port in the Mode of Port Mode Configuration.
4. Click Apply.

ARP Inspection Configuration

Home > Configuration > Security > Network > ARP Inspection > Port Configuration

Mode: Disabled

Translate dynamic to static

Port Mode Configuration

Port	Mode	Check VLAN	Log Type
*	<>	<>	<>
1	Disabled	Disabled	None
N-1	Disabled	Disabled	None
N	Disabled	Disabled	None

Apply Reset

Figure 2-5.2.5.1: The ARP Inspection Configuration.

#### Parameter Description:

- **Mode of ARP Inspection Configuration :**

Enable the Global ARP Inspection or disable the Global ARP Inspection.

- **Port Mode Configuration :**

Specify ARP Inspection is enabled on which ports. Only when both Global Mode and Port Mode on a given port are enabled, ARP Inspection is enabled on this given port.

Possible modes are:

- **Enabled:** Enable ARP Inspection operation.
- **Disabled:** Disable ARP Inspection operation.

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.

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.

#### **Buttons**

- **Translate dynamic to static :**  
Click to translate all dynamic entries to static entries.
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.



## 2-5.2.5.2 VLAN Configuration

Each page shows up to 9999 entries from the VLAN table, default being 20, selected through the "entries per page" input field. When first visited, the web page will show the first 20 entries from the beginning of the VLAN Table. The first displayed will be the one with the lowest VLAN ID found in the VLAN Table.

The "VLAN" input fields allow the user to select the starting point in the VLAN Table. Clicking the button will update the displayed table starting from that or the closest next VLAN Table match. They will use the next entry of the currently displayed VLAN entry as a basis for the next lookup. When the end is reached the warning, message is shown in the displayed table. Use the button to start over.

### Web Interface

To configure a VLAN Mode Configuration in the web interface:

1. Click Configuration, Security, Network, ARP Inspection and VLAN Mode Configuration.
2. Click "Add new entry".
3. Specify the VLAN ID, Log Type
4. Click Apply.

The figure consists of two screenshots of the VLAN Mode Configuration web interface. The top screenshot shows the interface with the "Add New Entry" button highlighted in a red box, and a red arrow pointing to the "Apply" button. The bottom screenshot shows the interface after a new entry has been added, with a table containing one entry for VLAN ID 3 and Log Type None.

**VLAN Mode Configuration** Home > Configuration > Security > Network > ARP Inspection > VLAN Configuration

Start from VLAN  with  entries per page.

Delete	VLAN ID	Log Type
<input type="checkbox"/>	3	None
<input type="button" value="Delete"/>	<input type="text"/>	None <input type="button" value="v"/>

Figure 2-5.2.5.2: The VLAN Mode Configuration

**Parameter Description:****● VLAN Mode Configuration :**

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.

**Buttons****● Delete :**

Check to delete the entry. It will be deleted during the next save.

**● Apply :**

Click to save changes.

**● Reset :**

Click to undo any changes made locally and revert to previously saved values.

**● Add New Entry:**

Click to add a new VLAN to the ARP Inspection VLAN table.

### 2-5.2.5.3 Static Table

The section describes to configure the Static ARP Inspection Table parameters of the switch. You could use the Static ARP Inspection Table configure to manage the ARP entries.

#### Web Interface

To configure a Static ARP Inspection Table Configuration in the web interface:

1. Click Configuration, Security, Network, ARP Inspection and Static Table.
2. Click "Add New Entry".
3. Specify the Port, VLAN ID, IP Address, and MAC address in the entry.
4. Click Apply.

The figure shows two screenshots of the Static ARP Inspection Table web interface. The top screenshot shows the 'Add New Entry' button highlighted with a red box and a red arrow pointing to the 'Apply' button. The bottom screenshot shows the table with one entry: Port 1, MAC Address 08-ED-02-5D-10-AA, and an empty IP Address field.

Delete	Port	VLAN ID	MAC Address	IP Address
<input type="button" value="Delete"/>	1		08-ED-02-5D-10-AA	

Figure 2-5.2.5.3: The Static ARP Inspection Table

#### Parameter Description:

- **Port :**  
The logical port for the settings.
- **VLAN ID :**  
The vlan id for the settings.
- **MAC Address :**  
Allowed Source MAC address in ARP request packets.
- **IP Address :**  
Allowed Source IP address in ARP request packets.

#### Buttons

- **Delete :**  
Check to delete the entry. It will be deleted during the next save.
- **Apply :**  
Click to save changes.

- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Add New Entry:**  
Click to add a new entry to the Static ARP Inspection table. Specify the Port, VLAN ID, MAC address, and IP address for the new entry. Click "Save".

## 2-5.2.5.4 Dynamic Table

Entries in the Dynamic ARP Inspection Table are shown on this page. The Dynamic ARP Inspection Table contains up to 1024 entries, and is sorted first by port, then by VLAN ID, then by MAC address, and then by IP address.

### Navigating the ARP Inspection Table

Each page shows up to 99 entries from the Dynamic ARP Inspection table, default being 20, selected through the "entries per page" input field. When first visited, the web page will show the first 20 entries from the beginning of the Dynamic ARP Inspection Table.

The "Start from port address", "VLAN", "MAC address" and "IP address" input fields allow the user to select the starting point in the Dynamic ARP Inspection Table. Clicking the button will update the displayed table starting from that or the closest next Dynamic ARP Inspection Table match. In addition, the two input fields will - upon a button click - assume the value of the first displayed entry, allowing for continuous refresh with the same start address.

They will use the last entry of the currently displayed table as a basis for the next lookup. When the end is reached the text "No more entries" is shown in the displayed table. Use the button to start over.

### Web Interface

To configure a Dynamic ARP Inspection Table Configuration in the web interface:

1. Click Configuration, Security, Network, ARP Inspection and Dynamic Table.
2. Select "Port" in the Mode of Dynamic ARP Inspection Table.
3. Click Apply.

Dynamic ARP Inspection Table Home > Configuration > Security > Network > ARP Inspection > Dynamic Table

Auto-refresh

Start from  , VLAN  , MAC address  and IP address  with  entries per page.

System Configuration

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

Figure 2-5.2.5.4: The Dynamic ARP Inspection Table

### Parameter Description:

- **Port :**  
Switch Port Number for which the entries are displayed.
- **VLAN ID :**  
VLAN-ID in which the ARP traffic is permitted.

- **MAC Address :**  
User MAC address of the entry.
- **IP Address :**  
User IP address of the entry.
- **Translate to static :**  
Select the checkbox to translate the entry to static entry.

#### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Auto-refresh:**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- **Refresh:**  
Refreshes the displayed table starting from the input fields.
- **Save:**  
Click to save changes.
- **<<:**  
Updates the table starting from the first entry in the Dynamic ARP Inspection Table.
- **>>:**  
Updates the table, starting with the entry after the last entry currently displayed

## 2-5.3 AAA

This section shows you to use a AAA (Authentication, Authorization, and Accounting) server to provide access control to your network. The AAA server can be a TACACS+ or RADIUS server to create and manage objects that contain settings for using AAA servers.

### 2-5.3.1 RADIUS

#### Web Interface

To configure a Common Configuration of AAA, RADIUS in the web interface:

1. Click Configuration, Security, AAA and RADIUS.
2. Click "Add New Server".
3. Specify the Hostname, Auth Port, Acct Port, Timeout, Retransmit and Key in the server.
4. Click Apply.

RADIUS Server Configuration Home > Configuration > Security > AAA > RADIUS

---

Global Configuration

Timeout	<input type="text" value="5"/> seconds
Retransmit	<input type="text" value="3"/> times
Deadtime	<input type="text" value="0"/> minutes
Key	<input type="text"/>
NAS-IP-Address	<input type="text"/>
NAS-IPv6-Address	<input type="text"/>
NAS-Identifier	<input type="text"/>

---

Server Configuration

Delete	Hostname	Auth Port	Acct Port	Timeout	Retransmit	Key
<input type="button" value="Add New Server"/>						
<input type="button" value="Apply"/>						
<input type="button" value="Reset"/>						

---

Server Configuration

Delete	Hostname	Auth Port	Acct Port	Timeout	Retransmit	Key
<input type="button" value="Delete"/>	<input type="text"/>	<input type="text" value="1812"/>	<input type="text" value="1813"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

---

Figure 2-5.3.1: The RADIUS Server Configuration

## Parameter Description:

### Global Configuration

These settings are common for all of the RADIUS servers.

- **Timeout :**  
Timeout is the number of seconds, in the range 1 to 1000, to wait for a reply from a RADIUS server before retransmitting the request.
- **Retransmit :**  
Retransmit is the number of times, in the range 1 to 1000, a RADIUS request is retransmitted to a server that is not responding. If the server has not responded after the last retransmit it is considered to be dead.
- **Deadtime :**  
Deadtime, which can be set to a number between 0 to 1440 minutes, is the period during which the switch will not send new requests to a server that has failed to respond to a previous request. This will stop the switch from continually trying to contact a server that it has already determined as dead.  
Setting the Deadtime to a value greater than 0 (zero) will enable this feature, but only if more than one server has been configured.
- **Key :**  
The secret key - up to 63 characters long - shared between the RADIUS server and the switch.
- **NAS-IP-Address (Attribute 4) :**  
The IPv4 address to be used as attribute 4 in RADIUS Access-Request packets. If this field is left blank, the IP address of the outgoing interface is used.
- **NAS-IPv6-Address (Attribute 95) :**  
The IPv6 address to be used as attribute 95 in RADIUS Access-Request packets. If this field is left blank, the IP address of the outgoing interface is used.
- **NAS-Identifier (Attribute 32) :**  
The identifier - up to 255 characters long - to be used as attribute 32 in RADIUS Access-Request packets. If this field is left blank, the NAS-Identifier is not included in the packet.

### Server Configuration

The table has one row for each RADIUS server and a number of columns, which are:

- **Hostname :**  
The IP address or hostname of the RADIUS server.
- **Auth Port :**  
The UDP port to use on the RADIUS server for authentication.
- **Acct Port :**  
The UDP port to use on the RADIUS server for accounting.
- **Timeout :**  
This optional setting overrides the global timeout value. Leaving it blank will use the global timeout value.
- **Retransmit :**  
This optional setting overrides the global retransmit value. Leaving it blank will use the global retransmit value.
- **Key :**  
This optional setting overrides the global key. Leaving it blank will use the global key.



### **Buttons**

- **Delete :**  
This button can be used to undo the addition of the new server.
- **Add New Server :**  
Click to add a new RADIUS server. An empty row is added to the table, and the RADIUS server can be configured as needed. Up to 5 servers are supported.  
The button can be used to undo the addition of the new server.
- **Apply:**  
Click to save changes.
- **Reset:**  
Click to undo any changes made locally and revert to previously saved values.

## 2-5.3.2 TACACS+

This page allows you to configure the TACACS+ servers.

### Web Interface

To configure the TACACS+ servers in the web interface:

1. Click Configuration, Security, AAA and TACACS+.
2. Click "Add New Server".
3. Specify the Hostname, Port, Timeout and Key in the server.
4. Click Apply.

TACACS+ Server Configuration Home > Configuration > Security > AAA > TACACS+

Global Configuration

Timeout	<input type="text" value="5"/> seconds
Deadtime	<input type="text" value="0"/> minutes
Key	<input type="text"/>

Server Configuration

Delete	Hostname	Port	Timeout	Key
<input type="button" value="Delete"/>	<input type="text"/>	<input type="text" value="49"/>	<input type="text"/>	<input type="text"/>

Server Configuration

Delete	Hostname	Port	Timeout	Key
<input type="button" value="Delete"/>	<input type="text"/>	<input type="text" value="49"/>	<input type="text"/>	<input type="text"/>

Figure 2-5.3.2: The TACACS+ Server Configuration

### Parameter Description:

#### Global Configuration

These settings are common for all of the TACACS+ servers.

- **Timeout :**

Timeout is the number of seconds, in the range 1 to 1000, to wait for a reply from a TACACS+ server before it is considered to be dead.

- **Deadtime :**  
Deadtime, which can be set to a number between 0 to 1440 minutes, is the period during which the switch will not send new requests to a server that has failed to respond to a previous request. This will stop the switch from continually trying to contact a server that it has already determined as dead.  
Setting the Deadtime to a value greater than 0 (zero) will enable this feature, but only if more than one server has been configured.

- **Key :**  
The secret key - up to 63 characters long - shared between the TACACS+ server and the switch.

### Server Configuration

The table has one row for each TACACS+ server and a number of columns, which are:

- **Delete :**  
To delete a TACACS+ server entry, check this box. The entry will be deleted during the next Save.
- **Hostname :**  
The IP address or hostname of the TACACS+ server.
- **Port :**  
The TCP port to use on the TACACS+ server for authentication.
- **Timeout :**  
This optional setting overrides the global timeout value. Leaving it blank will use the global timeout value.
- **Key :**  
This optional setting overrides the global key. Leaving it blank will use the global key.

### Buttons

- **Delete :**  
This button can be used to undo the addition of the new server.
- **Add New Server :**  
Click to add a new TACACS+ server. An empty row is added to the table, and the TACACS+ server can be configured as needed. Up to 5 servers are supported.
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-6 Aggregation

### 2-6.1 Static

#### Web Interface

To configure the Aggregation hash mode and the aggregation group in the web interface:

1. Click Configuration, Aggregation and Static.
2. Evoke to enable or disable the aggregation mode function.
3. Evoke Aggregation Group ID and Port members.
4. Click Apply to save the setting.
5. If you want to cancel the setting then you need to click the reset button. It will revert to previously saved values.

Hash Code Contributors	
Source MAC Address	<input checked="" type="checkbox"/>
Destination MAC Address	<input type="checkbox"/>
IP Address	<input checked="" type="checkbox"/>
TCP/UDP Port Number	<input checked="" type="checkbox"/>

Aggregation Group Configuration																											
		Port Members																									
Group ID		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	N-1	N
Normal		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
1		<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"/>	<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"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2		<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"/>	<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"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12		<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"/>	<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"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13		<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"/>	<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"/>	<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 Reset

Figure 2-6.1: The Aggregation Mode Configuration

#### Parameter Description:

##### Hash Code Contributors

- **Source MAC Address :**

The Source MAC address can be used to calculate the destination port for the frame. Check to enable the use of the Source MAC address, or uncheck to disable. By default, Source MAC Address is enabled.

- **Destination MAC Address :**

The Destination MAC Address can be used to calculate the destination port for the frame. Check to enable the use of the Destination MAC Address, or uncheck to disable. By default, Destination MAC Address is disabled.

- **IP Address :**  
The IP address can be used to calculate the destination port for the frame. Check to enable the use of the IP Address, or uncheck to disable. By default, IP Address is enabled.
- **TCP/UDP Port Number :**  
The TCP/UDP port number can be used to calculate the destination port for the frame. Check to enable the use of the TCP/UDP Port Number, or uncheck to disable. By default, TCP/UDP Port Number is enabled.

#### **Aggregation Group Configuration**

- **Group ID :**  
Indicates the group ID for the settings contained in the same row. Group ID "Normal" indicates there is no aggregation. Only one group ID is valid per port.
- **Port Members :**  
Each switch port is listed for each group ID. Select a radio button to include a port in an aggregation, or clear the radio button to remove the port from the aggregation. By default, no ports belong to any aggregation group. Only full duplex ports can join an aggregation and ports must be in the same speed in each group.

#### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-6.2 LACP

This page allows the user to inspect the current LACP port configurations, and possibly change them as well.

### Web Interface

To configure the LACP PortConfiguration in the web interface:

1. Click Configuration, Aggregation and LACP.
2. Evoke to enable or disable the LACP on the port of the switch.
3. Scroll the Key parameter with Auto or Specific. Default is Auto.
4. Scroll the Role with Active or Passive. Default is Active.
5. Click Apply to save the setting.
6. If you want to cancel the setting then you need to click the reset button. It will revert to previously saved values.

Port	LACP Enabled	Key	Role	Timeout	Prio
*	<input type="checkbox"/>	<> ▾	<> ▾	<> ▾	32768
1	<input type="checkbox"/>	Auto ▾	Active ▾	Fast ▾	32768
2	<input type="checkbox"/>	Auto ▾	Active ▾	Fast ▾	32768
N-2	<input type="checkbox"/>	Auto ▾	Active ▾	Fast ▾	32768
N-1	<input type="checkbox"/>	Auto ▾	Active ▾	Fast ▾	32768
N	<input type="checkbox"/>	Auto ▾	Active ▾	Fast ▾	32768

Apply Reset

Figure 2-6.2: The LACP Port Configuration

### Parameter Description:

- **Port :**  
The switch port number.
- **LACP Enabled :**  
Controls whether LACP is enabled on this switch port. LACP will form an aggregation when 2 or more ports are connected to the same partner.
- **Key :**  
The Key value incurred by the port, range 1-65535. The Auto setting will set the key as appropriate by the physical link speed, 10Mb = 1, 100Mb = 2, 1Gb = 3. Using the Specific setting, a user-defined value can be entered. Ports with the same Key value can participate in the same aggregation group, while ports with different keys cannot.
- **Role :**  
The Role shows the LACP activity status. The Active will transmit LACP packets each second, while Passive will wait for a LACP packet from a partner (speak if spoken to).

- **Timeout :**  
The Timeout controls the period between BPDU transmissions. Fast will transmit LACP packets each second, while Slow will wait for 30 seconds before sending a LACP packet.
- **Prio :**  
The Prio controls the priority of the port. If the LACP partner wants to form a larger group than is supported by this device then this parameter will control which ports will be active and which ports will be in a backup role. Lower number means greater priority.

#### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-7 Loop Protection

This page allows the user to inspect the current Loop Protection configurations, and possibly change them as well.

### Web Interface

To configure the Loop Protection parameters in the web interface:

1. Click Configuration, Loop Protection.
2. Evoke to select enable or disable the port loop Protection.
3. Click the Apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

Loop Protection Configuration			
Home > Configuration > Loop Protection			
Global Configuration			
Enable Loop Protection	Disable		
Transmission Time	5	seconds	
Shutdown Time	180	seconds	
Port Configuration			
Port	Enable	Action	Tx Mode
*	<input checked="" type="checkbox"/>	<>	<>
1	<input checked="" type="checkbox"/>	Shutdown Port	Enable
N-1	<input checked="" type="checkbox"/>	Shutdown Port	Enable
N	<input checked="" type="checkbox"/>	Shutdown Port	Enable
Apply Reset			

Figure 2-8: The Loop Protection Configuration

### Parameter Description:

#### General Settings

- **Enable Loop Protection:**  
Controls whether loop protections are enabled (as a whole).
- **Transmission Time:**  
The interval between each loop protection PDU sent on each port. Valid values are 1 to 10 seconds.
- **Shutdown Time:**  
The period (in seconds) for which a port will be kept disabled in the event of a loop is detected (and the port action shuts down the port). Valid values are 0 to 604800 seconds (7 days). A value of zero will keep a port disabled (until next device restart).



### **Port Configuration**

- **Port No:**  
The switch port number of the port.
- **Enable :**  
Controls whether loop protection is enabled on this switch port
- **Action:**  
Configures the action performed when a loop is detected on a port. Valid values are Shutdown Port, Shutdown Port and Log or Log Only.
- **Tx Mode :**  
Controls whether the port is actively generating loop protection PDU's, or whether it is just passively looking for looped PDU's.

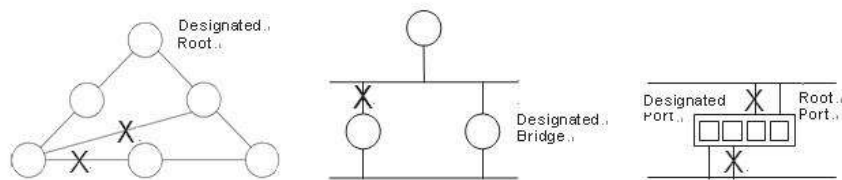
### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-8 Spanning Tree

The Spanning Tree Protocol (STP) can be used to detect and disable network loops, and to provide backup links between switches, bridges or routers. This allows the switch to interact with other bridging devices (that is, an STP-compliant switch, bridge or router) in your network to ensure that only one route exists between any two stations on the network, and provide backup links which automatically take over when a primary link goes down.

**STP** - STP uses a distributed algorithm to select a bridging device (STP-compliant switch, bridge or router) that serves as the root of the spanning tree network. It selects a root port on each bridging device (except for the root device) which incurs the lowest path cost when forwarding a packet from that device to the root device. Then it selects a designated bridging device from each LAN which incurs the lowest path cost when forwarding a packet from that LAN to the root device. All ports connected to designated bridging devices are assigned as designated ports. After determining the lowest cost spanning tree, it enables all root ports and designated ports, and disables all other ports. Network packets are therefore only forwarded between root ports and designated ports, eliminating any possible network loops.



Once a stable network topology has been established, all bridges listen for Hello BPDUs (Bridge Protocol Data Units) transmitted from the Root Bridge. If a bridge does not get a Hello BPDU after a predefined interval (Maximum Age), the bridge assumes that the link to the Root Bridge is down. This bridge will then initiate negotiations with other bridges to reconfigure the network to reestablish a valid network topology.

## 2-8.1 Bridge Setting

The section describes that how to configure the Spanning Tree Bridge and STP System settings. It allows you to configure STP System settings are used by all STP Bridge instance in the switch.

### Web Interface

To configure the Spanning Tree Bridge Settings parameters in the web interface:

1. Click Configuration, Spanning Tree, Bridge Settings.
2. Scroll to select the parameters and write down available value of parameters in blank field in Basic Settings.
3. Evoke to enable or disable the parameters and write down available value of parameters in blank field in Advanced settings.
4. Click the apply to save the setting.
5. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

The screenshot displays the 'STP Bridge Configuration' web interface. At the top right, there is a breadcrumb trail: Home > Configuration > Spanning Tree > Bridge Settings. The interface is divided into two main sections: 'Basic Settings' and 'Advanced Settings'. The 'Basic Settings' section contains a table with the following parameters and values:

Parameter	Value
Protocol Version	MSTP
Bridge Priority	32768
Forward Delay	15
Max Age	20
Maximum Hop Count	20
Transmit Hold Count	6

The 'Advanced Settings' section contains a table with the following parameters and values:

Parameter	Value
Edge Port BPDU Filtering	<input type="checkbox"/>
Edge Port BPDU Guard	<input type="checkbox"/>
Port Error Recovery	<input type="checkbox"/>
Port Error Recovery Timeout	

At the bottom of the interface, there are two buttons: 'Apply' (blue) and 'Reset' (orange).

Figure 2-8.1: The STP Bridge Configuration

## Parameter Description:

### Basic Settings

- **Protocol Version :**  
The MSTP / RSTP / STP protocol version setting. Valid values are STP, RSTP and MSTP.
- **Bridge Priority :**  
Controls 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. For MSTP operation, this is the priority of the CIST. Otherwise, this is the priority of the STP/RSTP Bridge.
- **Forward Delay :**  
The delay used by STP Bridges to transit Root and Designated Ports to Forwarding (used in STP compatible mode). Valid values are in the range 4 to 30 seconds.
- **Max Age :**  
The maximum age of the information transmitted by the Bridge when it is the Root Bridge. Valid values are in the range 6 to 40 seconds, and MaxAge must be  $\leq (\text{FwdDelay}-1)*2$ .
- **Maximum Hop Count :**  
This defines the initial value of remaining Hops for MSTI information generated at the boundary of an MSTI region. It defines how many bridges a root bridge can distribute its BPDU information to. Valid values are in the range 6 to 40 hops.
- **Transmit Hold Count :**  
The number of BPDU's a bridge port can send per second. When exceeded, transmission of the next BPDU will be delayed. Valid values are in the range 1 to 10 BPDU's per second.

### Advanced Settings

- **Edge Port BPDU Filtering :**  
Control whether a port explicitly configured as Edge will transmit and receive BPDUs.
- **Edge Port BPDU Guard :**  
Control whether a port explicitly configured as Edge will disable itself upon reception of a BPDU. The port will enter the error-disabled state, and will be removed from the active topology.
- **Port Error Recovery :**  
Control whether a port in the error-disabled state automatically will be enabled after a certain time. If recovery is not enabled, ports have to be disabled and re-enabled for normal STP operation. The condition is also cleared by a system reboot.
- **Port Error Recovery Timeout :**  
The time to pass before a port in the error-disabled state can be enabled. Valid values are between 30 and 86400 seconds (24 hours).

### Buttons

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-8.2 MSTI Mapping

When you implement a Spanning Tree protocol on the switch that the bridge instance. The CIST is not available for explicit mapping, as it will receive the VLANs not explicitly mapped. Due to the reason that you need to set the list of VLANs mapped to the MSTI. The VLANs must be separated with comma and/or space. A VLAN can only be mapped to one MSTI. An unused MSTI should just be left empty. (I.e. not having any VLANs mapped to it.)

This section describes it allows the user to inspect the current STP MSTI bridge instance priority configurations, and possibly change them as well.

### Web Interface

To configure the Spanning Tree MSTI Mapping parameters in the web interface:

1. Click Configuration, Spanning Tree, MSTI Mapping.
2. Specify the configuration identification parameters in the field. Specify the VLANs Mapped blank field.
3. Click the Apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

**MSTI Configuration** Home > Configuration > Spanning Tree > MSTI Mapping

Add VLANs separated by spaces or comma.

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

Configuration Identification

Configuration Name	<input type="text" value="08-ed-02-50-10-aa"/>
Configuration Revision	<input type="text" value="0"/>

MSTI Mapping

- Add VLANs separated by spaces or comma.
- Unmapped VLANs are mapped to the CIST. (The default bridge instance).

MSTI	VLANs Mapped
MSTI1	<input type="text"/>
MSTI2	<input type="text"/>
MSTI3	<input type="text"/>
MSTI4	<input type="text"/>
MSTI5	<input type="text"/>
MSTI6	<input type="text"/>
MSTI7	<input type="text"/>

Figure 2-8.2: The MSTI Configuration

**Parameter Description:****Configuration Identification****● Configuration Name :**

The name identifying the VLAN to MSTI mapping. Bridges must share the name and revision (see below), as well as the VLAN-to-MSTI mapping configuration in order to share spanning trees for MSTI's (Intra-region). The name is at most 32 characters.

**● Configuration Revision :**

The revision of the MSTI configuration named above. This must be an integer between 0 and 65535.

**MSTI Mapping****● MSTI :**

The bridge instance. The CIST is not available for explicit mapping, as it will receive the VLANs not explicitly mapped.

**● VLANs Mapped :**

The list of VLANs mapped to the MSTI. The VLANs can be given as a single (xx, xx being between 1 and 4094) VLAN, or a range (xx-yy), each of which must be separated with comma and/or space. A VLAN can only be mapped to one MSTI. An unused MSTI should just be left empty. (I.e. not having any VLANs mapped to it.) Example: 2,5,20-40.

**Buttons****● Apply :**

Click to save changes.

**● Reset :**

Click to undo any changes made locally and revert to previously saved values.

## 2-8.3 MSTI Priorities

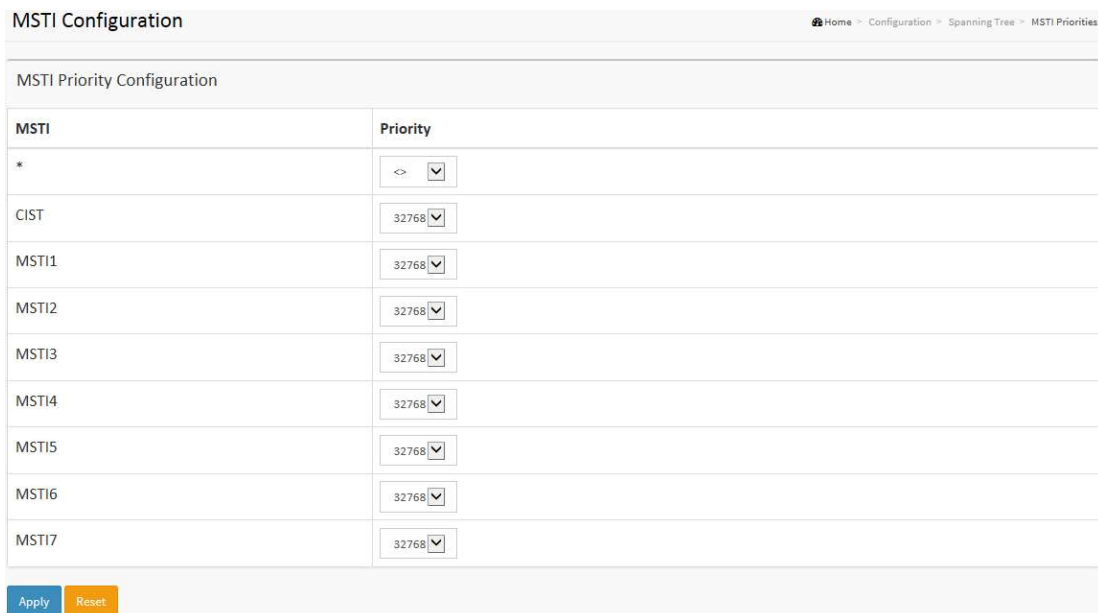
When you implement a Spanning Tree protocol on the switch that the bridge instance. The CIST is the default instance which is always active. For controls the bridge priority. Lower numeric values have better priority. The bridge priority plus the MSTI instance number, concatenated with the 6-byte MAC address of the switch forms a Bridge Identifier

The section describes it allows the user to inspect the current STP MSTI bridge instance priority configurations, and possibly change them as well.

### Web Interface

To configure the Spanning Tree MSTI Priorities parameters in the web interface:

1. Click Configuration, Spanning Tree, MSTI Priorities.
2. Scroll the Priority.
3. Click the Apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.



The screenshot shows the 'MSTI Configuration' web interface. At the top, there is a breadcrumb trail: Home > Configuration > Spanning Tree > MSTI Priorities. Below this is a section titled 'MSTI Priority Configuration'. It contains a table with two columns: 'MSTI' and 'Priority'. The 'MSTI' column lists instances from '\*' to 'MSTI7'. The 'Priority' column shows a dropdown menu for each instance, with the value '32768' selected. At the bottom of the table, there are two buttons: 'Apply' (blue) and 'Reset' (orange).

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

Figure 2-8.3: The MSTI Configuration

### Parameter Description:

- **MSTI :**  
The bridge instance. The CIST is the default instance, which is always active.
- **Priority :**  
Controls 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.

### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.



## 2-8.4 CIST Port

When you implement a Spanning Tree protocol on the switch that the bridge instance. You need to configure the CIST Ports. The section describes it allows the user to inspect the current STP CIST port configurations, and possibly change them as well. This page contains settings for physical and aggregated ports.

### Web Interface

To configure the Spanning Tree CIST Ports parameters in the web interface:

1. Click Configuration, Spanning Tree, CIST Port.
2. Scroll and evoke to set all parameters of CIST Aggregated Port Configuration.
3. Evoke to enable or disable the STP, then scroll and evoke to set all parameters of the CIST normal Port configuration.
4. Click the apply to save the setting.
5. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

The screenshot displays the 'STP CIST Port Configuration' web interface. It is divided into two main configuration sections: 'CIST Aggregated Port Configuration' and 'CIST Normal Port Configuration'. Each section contains a table with the following columns: Port, STP Enabled, Path Cost, Priority, Admin Edge, Auto Edge, Restricted (Role, TCN), BPDU Guard, and Point-to-point. The 'CIST Aggregated Port Configuration' table has one row for port '-'. The 'CIST Normal Port Configuration' table has three rows for ports '\*', '1', and 'N-1', and a fourth row for port 'N'. At the bottom of the interface, there are 'Apply' and 'Reset' buttons.

Figure 2-8.4: The STP CIST Port Configuration

### Parameter Description:

- **Port :**  
The switch port number of the logical STP port.
- **STP Enabled :**  
Controls whether STP is enabled on this switch port. This field will be readonly if Voice VLAN feature is enabled. The Voice VLAN port mode will be readonly if this field be Enabled.
- **Path Cost :**  
Controls 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 1 to 200000000.

- **Priority :**  
Controls the port priority. This can be used to control priority of ports having identical port cost. (See above).
- **operEdge (state flag) :**  
Operational flag describing whether the port is connecting directly to edge devices. (No Bridges attached). Transition to the forwarding state is faster for edge ports (having operEdge true) than for other ports. The value of this flag is based on AdminEdge and AutoEdge fields. This flag is displayed as Edge in Monitor->Spanning Tree -> STP Detailed Bridge Status.
- **AdminEdge :**  
Controls whether the operEdge flag should start as set or cleared. (The initial operEdge state when a port is initialized).
- **AutoEdge :**  
Controls whether the bridge should enable automatic edge detection on the bridge port. This allows operEdge to be derived from whether BPDU's are received on the port or not.
- **Restricted Role :**  
If enabled, causes the port not to be selected as Root Port for the CIST or any MSTI, even if it has the best spanning tree priority vector. Such a port will be selected as an Alternate Port after the Root Port has been selected. If set, it can cause lack of spanning tree connectivity. It can be set by a network administrator to prevent bridges external to a core region of the network influence the spanning tree active topology, possibly because those bridges are not under the full control of the administrator. This feature is also known as Root Guard.
- **Restricted TCN :**  
If enabled, causes the port not to propagate received topology change notifications and topology changes to other ports. If set it can cause temporary loss of connectivity after changes in a spanning tree's active topology as a result of persistently incorrect learned station location information. It is set by a network administrator to prevent bridges external to a core region of the network, causing address flushing in that region, possibly because those bridges are not under the full control of the administrator or the physical link state of the attached LANs transits frequently.
- **BPDU Guard :**  
If enabled, causes the port to disable itself upon receiving valid BPDU's. Contrary to the similar bridge setting, the port Edge status does not affect this setting. A port entering error-disabled state due to this setting is subject to the bridge Port Error Recovery setting as well.
- **Point to Point**  
Controls whether the port connects to a point-to-point LAN rather than to a shared medium. This can be automatically determined, or forced either true or false. Transition to the forwarding state is faster for point-to-point LANs than for shared media.

#### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-8.5 MSTI Ports

The section describes it allows the user to inspect the current STP MSTI port configurations, and possibly change them as well.

An MSTI port is a virtual port, which is instantiated separately for each active CIST (physical) port for each MSTI instance configured on and applicable to the port. The MSTI instance must be selected before displaying actual MSTI port configuration options. It contains MSTI port settings for physical and aggregated ports.

### Web Interface

To configure the Spanning Tree MSTI Port Configuration parameters in the web interface:

1. Click Configuration, Spanning Tree, MSTI Ports
2. Scroll to select the MST1 or other MSTI Port
3. Click Get to set the detail parameters of the MSTI Ports.
4. Scroll to set all parameters of the MSTI Port configuration.
5. Click the save to save the setting
6. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values

STP CIST Port Configuration Home > Configuration > Spanning Tree > MSTI Ports

Select MSTI

MST1

STP MSTI Port Configuration Home > Configuration > Spanning Tree > MSTI Ports

MSTI Aggregated Ports Configuration

Port	Path Cost	Priority
-	Auto <input type="text"/>	128 <input type="text"/>

MSTI Normal Ports Configuration - MST1

Port	Path Cost	Priority
*	<> <input type="text"/>	<> <input type="text"/>
1	Auto <input type="text"/>	128 <input type="text"/>
N-1	Auto <input type="text"/>	128 <input type="text"/>
N	Auto <input type="text"/>	128 <input type="text"/>

Figure 2-8.5: The MSTI Port Configuration

### Parameter Description:

- **Port :**  
The switch port number of the corresponding STP CIST (and MSTI) port.

- **Path Cost :**  
Controls 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 1 to 200000000.
- **Priority :**  
Controls the port priority. This can be used to control priority of ports having identical port cost. (See above).

#### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-9 IPMC Profile


This page provides IPMC Profile related configurations.

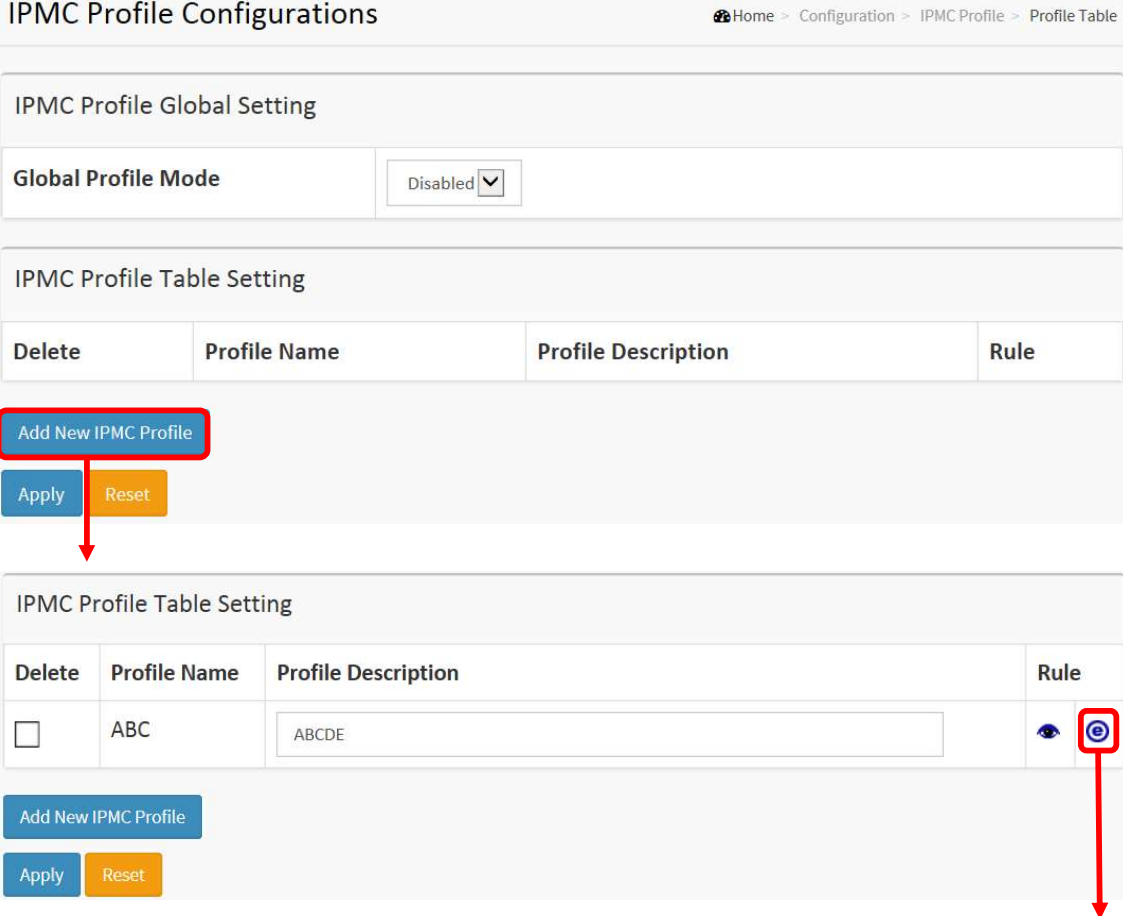
### 2-9.1 Profile Table

The IPMC profile is used to deploy the access control on IP multicast streams. It is allowed to create at maximum 64 Profiles with at maximum 128 corresponding rules for each.

#### Web Interface

To configure the IPMC Profile Configuration in the web interface:

1. Click Configuration, IPMC Profile and Profile Table.
2. Select "Enabled" in the Mode of Global Profile Mode.
3. Click Add New IPMC Profile.
4. Specify the IPMC Profile Table Setting parameters in the field. Specify the Profile Name and Profile Description blank field.
5. Click Apply.
6. Click the  button to specify IPMC Profile Rule Settings.
7. Click Add Last Rule and can manage the rules.



The screenshot displays the 'IPMC Profile Configurations' web interface. At the top, a breadcrumb trail reads 'Home > Configuration > IPMC Profile > Profile Table'. The interface is divided into two main sections: 'IPMC Profile Global Setting' and 'IPMC Profile Table Setting'.

**IPMC Profile Global Setting:** This section contains a 'Global Profile Mode' dropdown menu currently set to 'Disabled'. Below this is a table with columns for 'Delete', 'Profile Name', 'Profile Description', and 'Rule'. At the bottom of this section are buttons for 'Add New IPMC Profile', 'Apply', and 'Reset'. A red box highlights the 'Add New IPMC Profile' button, with a red arrow pointing down to the next section.

**IPMC Profile Table Setting:** This section shows a table with the same columns as above. The 'Profile Name' column contains 'ABC' and the 'Profile Description' column contains 'ABCDE'. The 'Rule' column contains an eye icon and a gear icon. A red box highlights the gear icon, with a red arrow pointing down from it.

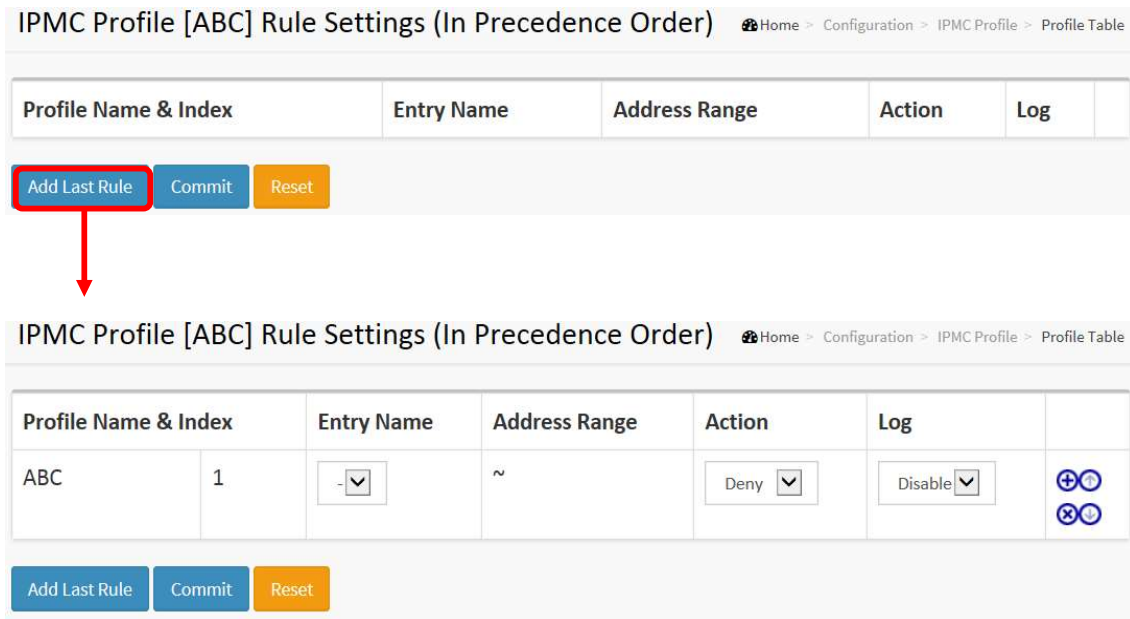


Figure 2-9.1: The IPMC Profile Configuration



**Parameter Description:**

- **Global Profile Mode :**  
Enable/Disable the Global IPMC Profile.  
System starts to do filtering based on profile settings only when the global profile mode is enabled.
- **Delete :**  
Check to delete the entry.  
The designated entry will be deleted during the next save.
- **Profile Name :**  
The name used for indexing the profile table.  
Each entry has the unique name which is composed of at maximum 16 alphabetic and numeric characters. At least one alphabet must be present.
- **Profile Description :**  
Additional description, which is composed of at maximum 64 alphabetic and numeric characters, about the profile.  
No blank or space characters are permitted as part of description. Use "\_" or "-" to separate the description sentence.

**Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Add New IPMC Profile :**  
Click to add new IPMC profile. Specify the name and configure the new entry. Click "Save".
- **Rule :**  
When the profile is created, click the edit button to enter the rule setting page of the designated profile. Summary about the designated profile will be shown by clicking the

view button. You can manage or inspect the rules of the designated profile by using the following buttons:





- : List the rules associated with the designated profile.
- : Adjust the rules associated with the designated profile.

### IPMC Profile Rule Settings Table

This page provides the filtering rule settings for a specific IPMC profile. It displays the configured rule entries in precedence order. First rule entry has highest priority in lookup, while the last rule entry has lowest priority in lookup.

- **Profile Name :**  
The name of the designated profile to be associated. This field is not editable.
- **Entry Name :**  
The name used in specifying the address range used for this rule.  
Only the existing profile address entries will be chosen in the selected box. This field is not allowed to be selected as none ("-") while the Rule Settings Table is committed.
- **Address Range :**  
The corresponding address range of the selected profile entry. This field is not editable and will be adjusted automatically according to the selected profile entry.
- **Action :**  
Indicates the learning action upon receiving the Join/Report frame that has the group address matches the address range of the rule.  
Permit: Group address matches the range specified in the rule will be learned.  
Deny: Group address matches the range specified in the rule will be dropped.
- **Log :**  
Indicates the logging preference upon receiving the Join/Report frame that has the group address matches the address range of the rule.  
Enable: Corresponding information of the group address, that matches the range specified in the rule, will be logged.  
Disable: Corresponding information of the group address, that matches the range specified in the rule, will not be logged.

### Buttons

- **Add Last Rule**  
Click to add a new rule in the end of the specific profile's rule list. Specify the address entry and configure the new entry. Click "Commit"
- **Commit**  
Click to commit rule changes for the designated profile.
- **Reset**  
Click to undo any changes made locally and revert to previously saved values.
- **Rule Management Buttons :**  
You can manage rules and the corresponding precedence order by using the following buttons:
  - : Insert a new rule before the current entry of rule.
  - : Delete the current entry of rule.
  - : Moves the current entry of rule up in the list.
  - : Moves the current entry of rule down in the list.

## 2-9.2 Address Entry

This page provides address range settings used in IPMC profile.

The address entry is used to specify the address range that will be associated with IPMC Profile. It is allowed to create at maximum 128 address entries in the system.

### Web Interface

To configure the IPMC Profile Address Configuration in the web interface:

1. Click Configuration, IPMC Profile and Address Entry.
2. Click Add New Address (Range) Entry.
3. Specify the IPMC Profile Address Configuration parameters in the field. Specify the Entry Name and Start Address and End Address blank field.
4. Click Apply.

The figure shows two screenshots of the IPMC Profile Address Configuration web interface. The top screenshot shows the 'Add New Address (Range) Entry' button highlighted with a red box and an arrow pointing to the 'Add New Address (Range) Entry' button in the second screenshot. The interface includes a breadcrumb trail (Home > Configuration > IPMC Profile > Address Entry), a pagination control (20 entries per page), and a table with columns: Delete, Entry Name, Start Address, and End Address. Below the table are buttons for 'Add New Address (Range) Entry', 'Apply', and 'Reset'.




Figure 2-9.2: The IPMC ProfileAddress Configuration

### Parameter Description:

- **Entry Name :**  
The name used for indexing the address entry table.  
Each entry has the unique name which is composed of at maximum 16 alphabetic and numeric characters. At least one alphabet must be present.
- **Start Address :**  
The starting IPv4/IPv6 Multicast Group Address that will be used as an address range.
- **End Address :**  
The ending IPv4/IPv6 Multicast Group Address that will be used as an address range.



## Buttons

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Delete :**  
Check to delete the entry.  
The designated entry will be deleted during the next save.
- **Add New Address (Range) Entry :**  
Click to add new address range. Specify the name and configure the addresses. Click "Save"
-  **Refresh :**  
Refreshes the displayed table starting from the input fields.
-  << :  
Updates the table starting from the first entry in the IPMC Profile Address Configuration.
-  >> :  
Updates the table, starting with the entry after the last entry currently displayed.

## 2-10 MVR

The MVR feature enables multicast traffic forwarding on the Multicast VLANs.

In a multicast television application, a PC or a network television or a set-top box can receive the multicast stream. Multiple set-top boxes or PCs can be connected to one subscriber port, which is a switch port configured as an MVR receiver port. When a subscriber selects a channel, the set-top box or PC sends an IGMP/MLD report message to Switch A to join the appropriate multicast group address. Uplink ports that send and receive multicast data to and from the multicast VLAN are called MVR source ports.

It is allowed to create at maximum 4 MVR VLANs with corresponding channel profile for each Multicast VLAN.

The channel profile is defined by the IPMC Profile which provides the filtering conditions.

### Web Interface

To configure the MVR Configuration in the web interface:

1. Click Configuration, MVR.
2. Scroll the MVR mode to enable or disable and Scroll to set all parameters.
3. Click the save to save the setting.
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

**MVR Configurations** Home > Configuration > MVR

Global Setting

**MVR Mode** Disabled ▾

VLAN Interface Setting (Role [I:Inactive / S:Source / R:Receiver])

Delete	MVR VID	MVR Name	IGMP Address	Mode	Tagging	Priority	LLQI	Interface Channel Profile
<a href="#">Add New MVR VLAN</a>								

Immediate Leave Setting

Port	Immediate Leave
*	<span style="border: 1px solid #ccc; padding: 2px;">&lt;&gt; ▾</span>
1	<span style="border: 1px solid #ccc; padding: 2px;">Disabled ▾</span>
N-1	<span style="border: 1px solid #ccc; padding: 2px;">Disabled ▾</span>
N	<span style="border: 1px solid #ccc; padding: 2px;">Disabled ▾</span>

Apply Reset

Figure 2-10: The MVR Configuration

**Parameter Description:**

- **MVR Mode :**

Enable/Disable the Global MVR.

The Unregistered Flooding control depends on the current configuration in IGMP/MLD Snooping. It is suggested to enable Unregistered Flooding control when the MVR group table is full.
- **MVR VID :**

Specify the Multicast VLAN ID.

  - **Be Caution:** MVR source ports are not recommended to be overlapped with management VLAN ports.
- **MVR Name :**

MVR Name is an optional attribute to indicate the name of the specific MVR VLAN. Maximum length of the MVR VLAN Name string is 32. MVR VLAN Name can only contain alphabets or numbers. When the optional MVR VLAN name is given, it should contain at least one alphabet. MVR VLAN name can be edited for the existing MVR VLAN entries or it can be added to the new entries.
- **IGMP Address :**

Define the IPv4 address as source address used in IP header for IGMP control frames. The default IGMP address is not set (0.0.0.0).

When the IGMP 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.
- **Mode :**

Specify the MVR mode of operation. In Dynamic mode, MVR allows dynamic MVR membership reports on source ports. In Compatible mode, MVR membership reports are forbidden on source ports. The default is Dynamic mode.
- **Tagging :**

Specify whether the traversed IGMP/MLD control frames will be sent as Untagged or Tagged with MVR VID. The default is tagged.
- **Priority :**

Specify how the traversed IGMP/MLD control frames will be sent in prioritized manner. The default Priority is 0.
- **LLQI :**

Define the maximum time to wait for IGMP/MLD report memberships on a receiver port before removing the port from multicast group membership. The value is in units of tenths of a second. The range is from 0 to 31744. The default LLQI is 5 tenths or one-half second.
- **Interface Channel Setting :**

When the MVR VLAN is created, click the Edit symbol to expand the corresponding multicast channel settings for the specific MVR VLAN. Summary about the Interface Channel Setting (of the MVR VLAN) will be shown besides the Edit symbol.
- **Profile Management Button :**

You can inspect the rules of the designated profile by using the following button:  
Navigate: List the rules associated with the designated profile.

- **Port :**  
The logical port for the settings.
- **Port Role :**  
Configure an MVR port of the designated MVR VLAN as one of the following roles.
  - **Inactive:** The designated port does not participate MVR operations.
  - **Source:** Configure uplink ports that receive and send multicast data as source ports. Subscribers cannot be directly connected to source ports.
  - **Receiver:** Configure a port as a receiver port if it is a subscriber port and should only receive multicast data. It does not receive data unless it becomes a member of the multicast group by issuing IGMP/MLD messages.
  - **Be Caution:** MVR source ports are not recommended to be overlapped with management VLAN ports. Select the port role by clicking the Role symbol to switch the setting. I indicate Inactive; S indicates Source; R indicates Receiver. The default Role is Inactive.
- **Immediate Leave :**  
Enable the fast leave on the port.

#### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Delete :**  
Check to delete the entry.  
The designated entry will be deleted during the next save.
- **Add New MVR VLAN :**  
Click to add new MVR VLAN. Specify the VID and configure the new entry. Click "Apply".

## 2-11 IPMC

### 2-11.1 IGMP Snooping

The function, is used to establish the multicast groups to forward the multicast packet to the member ports, and, in nature, avoids wasting the bandwidth while IP multicast packets are running over the network. This is because a switch that does not support IGMP or IGMP Snooping cannot tell the multicast packet from the broadcast packet, so it can only treat them all as the broadcast packet. Without IGMP Snooping, the multicast packet forwarding function is plain and nothing is different from broadcast packet.

A switch supported IGMP Snooping with the functions of query, report and leave, a type of packet exchanged between IP Multicast Router/Switch and IP Multicast Host, can update the information of the Multicast table when a member (port) joins or leaves an IP Multicast Destination Address. With this function, once a switch receives an IP multicast packet, it will forward the packet to the members who joined in a specified IP multicast group before.

The packets will be discarded by the IGMP Snooping if the user transmits multicast packets to the multicast group that had not been built up in advance. IGMP mode enables the switch to issue IGMP function that you enable IGMP proxy or snooping on the switch, which connects to a router closer to the root of the tree. This interface is the upstream interface. The router on the upstream interface should be running IGMP.

#### 2-11.1.1 Basic Configuration

This page provides IGMP Snooping related configuration.

#### **Web Interface**

To configure the IGMP Snooping Configuration in the web interface:

1. Click Configuration, IPMC, IGMP Snooping, Basic Configuration.
2. Evoke to select enable or disable the parameter in the Global Configuration and Port Related Configuration Mode.
3. Click the Apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

IGMP Snooping Configuration Home > Configuration > IPMC > IGMP Snooping > Basic Configuration

---

Global Configuration

Snooping Enabled	<input type="checkbox"/>
Unregistered IPMCv4 Flooding Enabled	<input checked="" type="checkbox"/>
IGMP SSM Range	232.0.0.0 / 8
Leave Proxy Enabled	<input type="checkbox"/>
Proxy Enabled	<input type="checkbox"/>

---

Port Related Configuration

Port	Router Port	Fast Leave	Throttling
*	<input type="checkbox"/>	<input type="checkbox"/>	<> ▼
1	<input type="checkbox"/>	<input type="checkbox"/>	unlimited ▼
N-1	<input type="checkbox"/>	<input type="checkbox"/>	unlimited ▼
N	<input type="checkbox"/>	<input type="checkbox"/>	unlimited ▼

Apply Reset

**Figure 2-11.1.1: The IGMP Snooping Configuration.**

**Parameter Description:**

- **Snooping Enabled :**  
Enable the Global IGMP Snooping.
- **Unregistered IPMCv4 Flooding Enabled :**  
Enable unregistered IPMCv4 traffic flooding.  
The flooding control takes effect only when IGMP Snooping is enabled.  
When IGMP Snooping is disabled, unregistered IPMCv4 traffic flooding is always active in spite of this setting.
- **IGMP SSM Range :**  
SSM (Source-Specific Multicast) Range allows the SSM-aware hosts and routers run the SSM service model for the groups in the address range.
- **Leave Proxy Enabled :**  
Enable IGMP Leave Proxy. This feature can be used to avoid forwarding unnecessary leave messages to the router side.
- **Proxy Enabled :**  
Enable IGMP Proxy. This feature can be used to avoid forwarding unnecessary join and leave messages to the router side.
- **Router Port :**  
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 :**  
Enable the fast leave on the port.
- **Throttling :**  
Enable to limit the number of multicast groups to which a switch port can belong.

#### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-11.1.2 VLAN Configuration

The section describes the VLAN configuration setting process integrated with IGMP Snooping function. For each setting page shows up to 99 entries from the VLAN table, default being 20, selected through the "entries per page" input field. When first visited, the web page will show the first 20 entries from the beginning of the VLAN Table. The first displayed will be the one with the lowest VLAN ID found in the VLAN Table. The "VLAN" input fields allow the user to select the starting point in the VLAN Table. Clicking the button will update the displayed table starting from that or the next closest VLAN Table match.

### Web Interface

To configure the IGMP Snooping VLAN Configuration in the web interface:

1. Click Configuration, IPMC, IGMP Snooping and VLAN Configuration.
2. Click Add New IGMP VLAN.
3. Evoke to select enable or disable Snooping, Querier Address. Specify the parameters in the blank field.
4. Click the refresh to update the data or click << or > to display previous entry or next entry.
5. Click the Apply to save the setting
6. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values

IGMP Snooping VLAN Configuration

Start from VLAN  with  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)
<input type="button" value="Delete"/>	<input type="text"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="text" value="0.0.0.0"/>	<input type="text" value="IGMP-Auto"/>	<input type="text" value="0"/>	<input type="text" value="2"/>	<input type="text" value="125"/>	<input type="text" value="100"/>	<input type="text" value="10"/>	<input type="text" value="1"/>

Figure 2-11.1.2: The IGMP Snooping VLAN Configuration.

### Parameter Description:




- **VLAN ID :**  
It displays the VLAN ID of the entry.
- **IGMP Snooping Enabled :**  
Enable the per-VLAN IGMP Snooping. Only up to 32 VLANs can be selected.
- **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.
- **Compatibility :**  
 Compatibility is maintained by hosts and routers taking appropriate actions depending on the versions of IGMP operating on hosts and routers within a network. The allowed selection is IGMP-Auto, Forced IGMPv1, Forced IGMPv2, Forced IGMPv3, default compatibility value is IGMP-Auto.
- **PRI :**  
 Priority of Interface.  
 It indicates the IGMP control frame priority level generated by the system. These values can be used to prioritize different classes of traffic.  
 The allowed range is 0 (best effort) to 7 (highest), default interface priority value is 0.
- **RV :**  
 Robustness Variable. The Robustness Variable allows tuning for the expected packet loss on a network. The allowed range is 1 to 255; default robustness variable value is 2.
- **QI :**  
 Query Interval. The Query Interval is the interval between General Queries sent by the Querier. The allowed range is 1 to 31744 seconds; default query interval is 125 seconds.
- **QRI :**  
 Query Response Interval. The Max Response Time used to calculate the Max Resp Code inserted into the periodic General Queries. The allowed range is 0 to 31744 in tenths of seconds; default query response interval is 100 in tenths of seconds (10 seconds).
- **LLQI (LMQI for IGMP) :**  
 Last Member Query Interval. The Last Member Query Time is the time value represented by the Last Member Query Interval, multiplied by the Last Member Query Count. The allowed range is 0 to 31744 in tenths of seconds; default last member query interval is 10 in tenths of seconds (1 second).
- **URI :**  
 Unsolicited Report Interval. The Unsolicited Report Interval is the time between repetitions of a host's initial report of membership in a group. The allowed range is 0 to 31744 seconds, default unsolicited report interval is 1 second.

#### **Buttons**

- **Apply :**  
 Click to save changes.
- **Reset :**  
 Click to undo any changes made locally and revert to previously saved values.
- **Delete :**  
 Check to delete the entry. The designated entry will be deleted during the next save.
- **Add New IGMP VLAN :**  
 Click to add new IGMP VLAN. Specify the VID and configure the new entry. Click "Apply". The specific IGMP VLAN starts working after the corresponding static VLAN is also created.

-  **Refresh :**  
Refreshes the displayed table starting from the "VLAN" input fields.
-  **<< :**  
Updates the table starting from the first entry in the VLAN Table, i.e. the entry with the lowest VLAN ID.
-  **> :**  
Updates the table, starting with the entry after the last entry currently displayed.

### 2-11.1.3 Port Filtering Profile

The section describes how to set the IGMP Port Group Filtering with the IGMP filtering feature, a user can exert this type of control. In some network Application environments, as like the metropolitan or multiple-dwelling unit (MDU) installations, a user might want to control the multicast groups to which a user on a switch port can belong. It allows the user to control the distribution of multicast services, such as IP/TV, based on some type of subscription or service plan.

With this feature, you can filter multicast joins on a per-port basis by configuring IP multicast profiles and associating them with individual switch ports. An IGMP profile can contain one or more multicast groups and specifies whether access to the group is permitted or denied. If an IGMP profile denying access to a multicast group is applied to a switch port, the IGMP join report requesting the stream of IP multicast traffic is dropped, and the port is not allowed to receive IP multicast traffic from that group. If the filtering action permits access to the multicast group, the IGMP report from the port is forwarded for normal processing.

IGMP filtering controls only IGMP membership join reports and has no relationship to the function that directs the forwarding of IP multicast traffic.

#### Web Interface

To configure the IGMP Snooping Port Filtering Profile Configuration in the web interface:

1. Click Configuration, IPMC, IGMP Snooping and Port Filtering Profile.
2. Scroll the Port to enable the Port Group Filtering. Specify the Filtering Groups in the blank field.
3. Click the apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.





Port	Filtering Profile
1	 <input type="text" value="-"/> ▾
2	 <input type="text" value="-"/> ▾
N-1	 <input type="text" value="-"/> ▾
N	 <input type="text" value="-"/> ▾


Figure 2-11.1.3: The IGMP Snooping Port Group Filtering Profile

#### Parameter Description:

- **Port :**  
The logical port for the settings.
- **Filtering Profile :**  
Select the IPMC Profile as the filtering condition for the specific port. Summary about the designated profile will be shown by clicking the view button.

- **Profile Management Button :**

You can inspect the rules of the designated profile by using the following button:

: List the rules associated with the designated profile.

**Buttons**

- **Apply :**

Click to save changes.

- **Reset :**

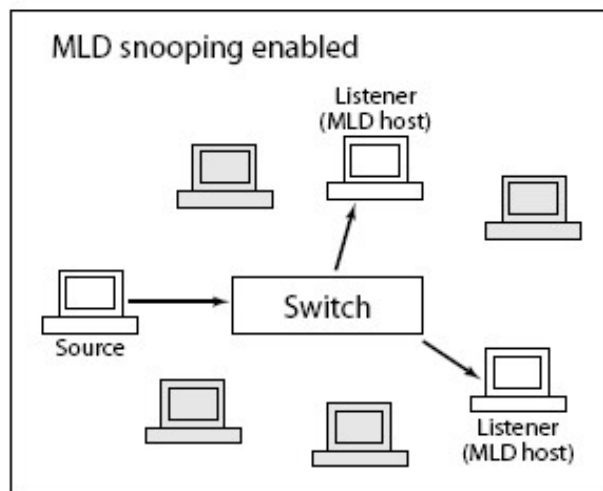
Click to undo any changes made locally and revert to previously saved values.

## 2-11.2 MLD Snooping

Curiously enough, a network node that acts as a source of IPv6 multicast traffic is only an indirect participant in MLD snooping—it just provides multicast traffic, and MLD doesn't interact with it. (Note, however, that in an application like desktop conferencing a network node may act as both a source and an MLD host; but MLD interacts with that node only in its role as an MLD host.)

A source node creates multicast traffic by sending packets to a multicast address. In IPv6, addresses with the first eight bits set (that is, "FF" as the first two characters of the address) are multicast addresses, and any node that listens to such an address will receive the traffic sent to that address. Application software running on the source and destination systems cooperates to determine what multicast address to use. (Note that this is a function of the application software, not of MLD.)

When MLD snooping is enabled on a VLAN, the switch acts to minimize unnecessary multicast traffic. If the switch receives multicast traffic destined for a given multicast address, it forwards that traffic only to ports on the VLAN that have MLD hosts for that address. It drops that traffic for ports on the VLAN that have no MLD hosts



### 2-11.2.1 Basic Configuration

The section will let you understand how to configure the MLD Snooping basic configuration and the parameters.

#### Web Interface

To configure the MLD Snooping Configuration in the web interface:

1. Click Configuration, IPMC, MLD Snooping and Basic Configuration.
2. Evoke to enable or disable the Global configuration parameters. Evoke the port to join Router port and Fast Leave.
3. Scroll to select the Throttling mode with unlimited or 1 to 10.
4. Click apply to save the setting.
5. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

MLD Snooping Configuration Home > Configuration > IPMC > MLD Snooping > Basic Configuration

---

Global Configuration

Snooping Enabled	<input type="checkbox"/>
Unregistered IPMCv6 Flooding Enabled	<input checked="" type="checkbox"/>
MLD SSM Range	ff3e:: / 96
Leave Proxy Enabled	<input type="checkbox"/>
Proxy Enabled	<input type="checkbox"/>

---

Port Related Configuration

Port	Router Port	Fast Leave	Throttling
*	<input type="checkbox"/>	<input type="checkbox"/>	<>
1	<input type="checkbox"/>	<input type="checkbox"/>	unlimited
N-1	<input type="checkbox"/>	<input type="checkbox"/>	unlimited
N	<input type="checkbox"/>	<input type="checkbox"/>	unlimited

Apply Reset

Figure 2-11.2.1: The MLD Snooping Configuration.

**Parameter Description:**

- **Snooping Enabled :**  
Enable the Global MLD Snooping.
- **Unregistered IPMCv6 Flooding Enabled :**  
Enable unregistered IPMCv6 traffic flooding.  
The flooding control takes effect only when MLD Snooping is enabled.  
When MLD Snooping is disabled, unregistered IPMCv6 traffic flooding is always active in spite of this setting.
- **MLD SSM Range :**  
SSM (Source-Specific Multicast) Range allows the SSM-aware hosts and routers run the SSM service model for the groups in the address (Using IPv6 Address) range.
- **Leave Proxy Enabled :**  
Enable MLD Leave Proxy. This feature can be used to avoid forwarding unnecessary leave messages to the router side.
- **Proxy Enabled :**  
Enable MLD Proxy. This feature can be used to avoid forwarding unnecessary join and leave messages to the router side.
- **Fast Leave :**  
To evoke to enable the fast leave on the port.
- **Router Port :**  
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.

- **Throttling :**  
Enable to limit the number of multicast groups to which a switch port can belong.
  
- **Buttons**
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-11.2.2 VLAN Configuration

When MLD snooping is enabled on a VLAN, the switch acts to minimize unnecessary multicast traffic. If the switch receives multicast traffic destined for a given multicast address, it forwards that traffic only to ports on the VLAN that have MLD hosts for that address. It drops that traffic for ports on the VLAN that have no MLD hosts

They will use the last entry of the currently displayed entry as a basis for the next lookup. When the end is reached the text "No more entries" is shown in the displayed table. Use the button to start over.

### Web Interface

To configure the MLD Snooping VLAN Configuration in the web interface:

1. Click Configuration, IPMC, MLD Snooping and VLAN Configuration.
2. Specify the VLAN ID with entries per page.
3. Click "Refresh" to refresh an entry of the MLD Snooping VLAN Configuration Information.
4. Click "<< or >>" to move to previous or next entry.

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

Figure 2-11.2.2: The MLD Snooping VLAN Configuration




### Parameter Description:

- **VLAN ID :**  
It displays the VLAN ID of the entry.
- **MLD Snooping Enabled :**  
Enable the per-VLAN MLD Snooping. Up to 32 VLANs can be selected for MLD Snooping.
- **Querier Election :**  
Enable to join MLD Querier election in the VLAN. Disable to act as a MLD Non-Querier.
- **Compatibility :**  
Compatibility is maintained by hosts and routers taking appropriate actions depending on the versions of MLD operating on hosts and routers within a network.  
The allowed selection is MLD-Auto, Forced MLDv1, default compatibility value is MLD-Auto.
- **PRI :**  
Priority of Interface.  
It indicates the MLD control frame priority level generated by the system. These values can be used to prioritize different classes of traffic.  
The allowed range is 0 (best effort) to 7 (highest), default interface priority value is 0.



- **RV :**  
Robustness Variable.  
The Robustness Variable allows tuning for the expected packet loss on a link.  
The allowed range is 1 to 255, default robustness variable value is 2.
- **QI :**  
Query Interval.  
The Query Interval is the interval between General Queries sent by the Querier.  
The allowed range is 1 to 31744 seconds, default query interval is 125 seconds.
- **QRI :**  
Query Response Interval.  
The Maximum Response Delay used to calculate the Maximum Response Code inserted into the periodic General Queries.  
The allowed range is 0 to 31744 in tenths of seconds, default query response interval is 100 in tenths of seconds (10 seconds).
- **LLQI :**  
Last Listener Query Interval.  
The Last Listener Query Interval is the Maximum Response Delay used to calculate the Maximum Response Code inserted into Multicast Address Specific Queries sent in response to Version 1 Multicast Listener Done messages. It is also the Maximum Response Delay used to calculate the Maximum Response Code inserted into Multicast Address and Source Specific Query messages.  
The allowed range is 0 to 31744 in tenths of seconds, default last listener query interval is 10 in tenths of seconds (1 second).
- **URI :**  
Unsolicited Report Interval.  
The Unsolicited Report Interval is the time between repetitions of a node's initial report of interest in a multicast address.  
The allowed range is 0 to 31744 seconds, default unsolicited report interval is 1 second.

#### Buttons

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Delete :**  
Check to delete the entry. The designated entry will be deleted during the next save.
- **Add New MLD VLAN :**  
Click to add new MLD VLAN. Specify the VID and configure the new entry. Click "Apply". The specific MLD VLAN starts working after the corresponding static VLAN is also created.
-  **Refresh :**  
Refreshes the displayed table starting from the "VLAN" input fields.
-  **<< :**  
Updates the table starting from the first entry in the VLAN Table, i.e. the entry with the lowest VLAN ID.
-  **> :**  
Updates the table, starting with the entry after the last entry currently displayed.

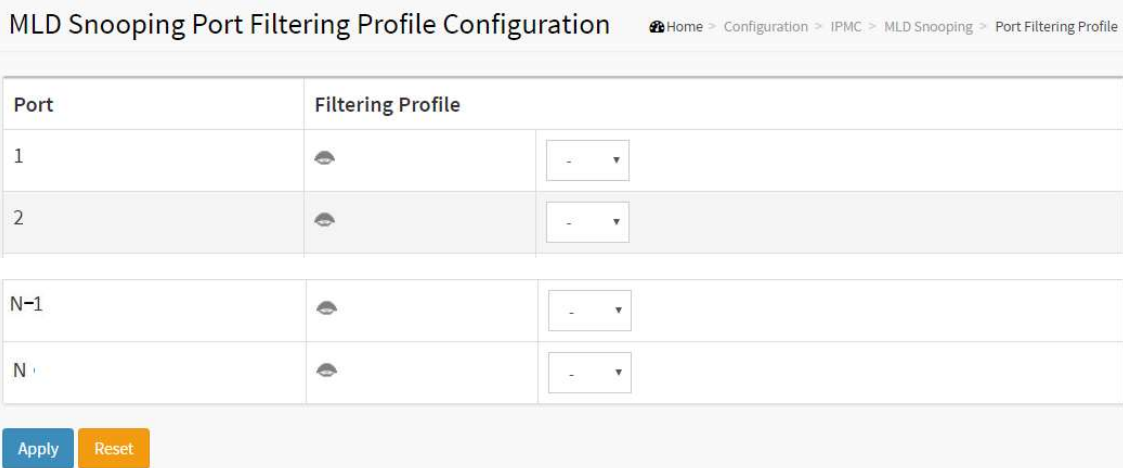
### 2-11.2.3 Port Filtering Profile

The section describes that you could to set the Port Group Filtering in the MLD Snooping function. On the UI that you could add new filtering group and safety policy.

#### Web Interface

To configure the Port Filtering Profile in the web interface:

1. Click Configuration, IPMC, MLD Snooping and Port Filtering Profile.
2. Scroll the Port to enable the Port Group Filtering. Specify the Filtering Groups in the blank field.
3. Click the Apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.








Port	Filtering Profile
1	 <input type="text" value=""/>
2	 <input type="text" value=""/>
N-1	 <input type="text" value=""/>
N	 <input type="text" value=""/>

Figure 2-11.2.3: The MLD Snooping Port Group Filtering Configuration

#### Parameter Description:

- **Port :**  
The logical port for the settings.
- **Filtering Profile :**  
Select the IPMC Profile as the filtering condition for the specific port. Summary about the designated profile will be shown by clicking the view button.

#### Buttons

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Profile Management Button :**  
You can inspect the rules of the designated profile by using the following button:  
: List the rules associated with the designated profile.

## 2-12 LLDP

The switch supports the LLDP. For current information on your switch model, The Link Layer Discovery Protocol (LLDP) provides a standards-based method for enabling switches to advertise themselves to adjacent devices and to learn about adjacent LLDP devices. The Link Layer Discovery Protocol (LLDP) is a vendor-neutral Link Layer protocol in the Internet Protocol Suite used by network devices for advertising their identity, capabilities, and neighbors on an IEEE 802 local area network, principally wired Ethernet. The protocol is formally referred to by the IEEE as Station and Media Access Control Connectivity Discovery specified in standards document IEEE 802.1AB.

### 2-12.1 LLDP

You can per port to do the LLDP configuration and the detail parameters, the settings will take effect immediately. This page allows the user to inspect and configure the current LLDP port settings.

#### Web Interface

To configure the LLDP in the web interface:

1. Click Configuration, LLDP and LLDP.
2. Modify LLDP parameters
3. Set the required mode for transmitting or receiving LLDP messages
4. Specify the information to include in the TLV field of advertised messages
5. Click the Apply to save the setting.
6. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

LLDP Configuration Home > Configuration > LLDP > LLDP

---

LLDP Parameters

Tx Interval	<input type="text" value="30"/>	seconds
Tx Hold	<input type="text" value="4"/>	times
Tx Delay	<input type="text" value="2"/>	seconds
Tx Reinit	<input type="text" value="2"/>	seconds

LLDP Port Configuration

			Optional TLVs				
Port	Mode	CDP aware	Port Descr	Sys Name	Sys Descr	Sys Capa	Mgmt Addr
*	<input type="text" value="&lt;&gt;"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
1	<input type="text" value="Enabled"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

N-1	Enabled ▾	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
N	Enabled ▾	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Apply Reset

Figure 2-12.1: The LLDP Configuration

### Parameter Description:

#### LLDP Parameters

- **Tx Interval :**  
The switch periodically transmits LLDP frames to its neighbors for having the network discovery information up-to-date. The interval between each LLDP frame is determined by the Tx Interval value. Valid values are restricted to 5 - 32768 seconds.
- **Tx Hold :**  
Each LLDP frame contains information about how long the information in the LLDP frame shall be considered valid. The LLDP information valid period is set to Tx Hold multiplied by Tx Interval seconds. Valid values are restricted to 2 - 10 times.
- **Tx Delay :**  
If some configuration is changed (e.g. the IP address) a new LLDP frame is transmitted, but the time between the LLDP frames will always be at least the value of Tx Delay seconds. Tx Delay cannot be larger than 1/4 of the Tx Interval value. Valid values are restricted to 1 - 8192 seconds.
- **Tx Reinit :**  
When a port is disabled, LLDP is disabled or the switch is rebooted, an LLDP shutdown frame is transmitted to the neighboring units, signaling that the LLDP information isn't valid anymore. Tx Reinit controls the number of seconds between the shutdown frame and a new LLDP initialization. Valid values are restricted to 1 - 10 seconds.

#### LLDP Port Configuration

- **Port :**  
The switch port number of the logical LLDP port.
- **Mode :**  
Select LLDP mode.  
Rx only: The switch will not send out LLDP information, but LLDP information from neighbor units is analyzed.  
Tx only: The switch will drop LLDP information received from neighbors, but will send out LLDP information.  
Disabled: The switch will not send out LLDP information, and will drop LLDP information received from neighbors.  
Enabled: the switch will send out LLDP information, and will analyze LLDP information received from neighbors.
- **CDP Aware :**  
Select CDP awareness.  
The CDP operation is restricted to decoding incoming CDP frames (The switch doesn't transmit CDP frames). CDP frames are only decoded if LLDP on the port is enabled.

Only CDP TLVs that can be mapped to a corresponding field in the LLDP neighbors' table are decoded. All other TLVs are discarded (Unrecognized CDP TLVs and discarded CDP frames are not shown in the LLDP statistics.). CDP TLVs are mapped onto LLDP neighbors' table as shown below.

CDP TLV "Device ID" is mapped to the LLDP "Chassis ID" field.

CDP TLV "Address" is mapped to the LLDP "Management Address" field. The CDP address TLV can contain multiple addresses, but only the first address is shown in the LLDP neighbors' table.

CDP TLV "Port ID" is mapped to the LLDP "Port ID" field.

CDP TLV "Version and Platform" is mapped to the LLDP "System Description" field.

Both the CDP and LLDP support "system capabilities", but the CDP capabilities cover capabilities that are not part of the LLDP. These capabilities are shown as "others" in the LLDP neighbors' table.

If all ports have CDP awareness disabled the switch forwards CDP frames received from neighbor devices. If at least one port has CDP awareness enabled all CDP frames are terminated by the switch.



---

**NOTE:**When CDP awareness on a port is disabled the CDP information isn't removed immediately, but gets when the hold time is exceeded.

---

- **Port Descr :**  
Optional TLV: When checked the "port description" is included in LLDP information transmitted.
- **Sys Name :**  
Optional TLV: When checked the "system name" is included in LLDP information transmitted.
- **Sys Descr :**  
Optional TLV: When checked the "system description" is included in LLDP information transmitted.
- **Sys Capa :**  
Optional TLV: When checked the "system capability" is included in LLDP information transmitted.
- **Mgmt Addr :**  
Optional TLV: When checked the "management address" is included in LLDP information transmitted.

#### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-12.2 LLDP-MED

Media Endpoint Discovery is an enhancement of LLDP, known as LLDP-MED that provides the following facilities:

Auto-discovery of LAN policies (such as VLAN, Layer 2 Priority and Differentiated services (Diffserv) settings) enabling plug and play networking.

Device location discovery to allow creation of location databases and, in the case of Voice over Internet Protocol (VoIP), Enhanced 911 services.

Inventory management, allowing network administrators to track their network devices, and determine their characteristics (manufacturer, software and hardware versions, and serial or asset number).

This page allows you to configure the LLDP-MED. This function applies to VoIP devices which support LLDP-MED.

### Web Interface

To configure the LLDP-MED in the web interface:

1. Click Configuration, LLDP and LLDP-MED Configuration.
2. Modify Fast start repeat count parameter, default is 4
3. Modify Coordinates Location parameters
4. Fill Civic Address Location parameters
5. Add new policy
6. Click Apply, will show following Policy Port Configuration
7. Select Policy ID for each port
8. Click the Apply to save the setting.
9. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

LLDP-MED Configuration				Home > Configuration > LLDP > LLDP-MED			
Fast Start Repeat Count							
Fast start repeat count		<input type="text" value="4"/>					
Coordinates Location							
Latitude	<input type="text" value="0"/>	North	Longitude	<input type="text" value="0"/>	East		
Altitude	<input type="text" value="0"/>	Meters	Map Datum	<input type="text" value="WGS84"/>			

Civic Address Location					
Country code	<input type="text"/>	State	<input type="text"/>	County	<input type="text"/>
City	<input type="text"/>	City district	<input type="text"/>	Block (Neighborhood)	<input type="text"/>
Street	<input type="text"/>	Leading street direction	<input type="text"/>	Trailing street suffix	<input type="text"/>
Street suffix	<input type="text"/>	House no.	<input type="text"/>	House no. suffix	<input type="text"/>
Landmark	<input type="text"/>	Additional location info	<input type="text"/>	Name	<input type="text"/>
Zip code	<input type="text"/>	Building	<input type="text"/>	Apartment	<input type="text"/>
Floor	<input type="text"/>	Room no.	<input type="text"/>	Place type	<input type="text"/>
Postal community name	<input type="text"/>	P.O. Box	<input type="text"/>	Additional code	<input type="text"/>

**Emergency Call Service**

Emergency Call Service

---

**Policies**

Delete	Policy ID	Application Type	Tag	VLAN ID	L2 Priority	DSCP
No entries present						

[Add New Policy](#)

[Apply](#)
[Reset](#)

**Figure 2-12.2: The LLDP-MED Configuration**

**Parameter Description:**

**Fast Start Repeat Count**

Rapid startup and Emergency Call Service Location Identification Discovery of endpoints is a critically important aspect of VoIP systems in general. In addition, it is best to advertise only those pieces of information which are specifically relevant to particular endpoint types (for example only advertise the voice network policy to permitted voice-capable devices), both in order to conserve the limited LLDPDU space and to reduce security and system integrity issues that can come with inappropriate knowledge of the network policy. With this in mind LLDP-MED defines an LLDP-MED Fast Start interaction between the protocol and the application layers on top of the protocol, in order to achieve these related properties. Initially, a Network Connectivity Device will only transmit LLDP TLVs in an LLDPDU. Only after an LLDP-MED Endpoint Device is detected, will an LLDP-MED capable Network Connectivity Device start to advertise LLDP-MED TLVs in outgoing LLDPDUs on the associated port. The LLDP-MED application will temporarily speed up the transmission of the LLDPDU to start within a second, when a new LLDP-MED neighbor has been detected in order share LLDP-MED information as fast as possible to new neighbors. Because there is a risk of an LLDP frame being lost during transmission between neighbors, it is recommended to repeat the fast start transmission multiple times to increase the possibility of the neighbors receiving the LLDP frame. With Fast start repeat count it is possible to specify the number of times the fast start transmission would be repeated. The

recommended value is 4 times, given that 4 LLDP frames with a 1 second interval will be transmitted, when an LLDP frame with new information is received.

It should be noted that LLDP-MED and the LLDP-MED Fast Start mechanism is only intended to run on links between LLDP-MED Network Connectivity Devices and Endpoint Devices, and as such does not apply to links between LAN infrastructure elements, including Network Connectivity Devices, or other types of links.

### **Coordinates Location**

- **Latitude :**

Latitude SHOULD be normalized to within 0-90 degrees with a maximum of 4 digits.

It is possible to specify the direction to either North of the equator or South of the equator.

- **Longitude :**

Longitude SHOULD be normalized to within 0-180 degrees with a maximum of 4 digits.

It is possible to specify the direction to either East of the prime meridian or West of the prime meridian.

- **Altitude :**

Altitude SHOULD be normalized to within -32767 to 32767 with a maximum of 4 digits.

It is possible to select between two altitude types (floors or meters).

Meters: Representing meters of Altitude defined by the vertical datum specified.

Floors: Representing altitude in a form more relevant in buildings which have different floor-to-floor dimensions. An altitude = 0.0 is meaningful even outside a building, and represents ground level at the given latitude and longitude. Inside a building, 0.0 represents the floor level associated with ground level at the main entrance.

- **Map Datum :**

The Map Datum is used for the coordinates given in these options:

- **WGS84:** (Geographical 3D) - World Geodesic System 1984, CRS Code 4327, and Prime Meridian Name: Greenwich.
- **NAD83/NAVD88:** North American Datum 1983, CRS Code 4269, Prime Meridian Name: Greenwich; the associated vertical datum is the North American Vertical Datum of 1988 (NAVD88). This datum pair is to be used when referencing locations on land, not near tidal water (which would use Datum = NAD83/MLLW).
- **NAD83/MLLW:** North American Datum 1983, CRS Code 4269, Prime Meridian Name: Greenwich; the associated vertical datum is Mean Lower Low Water (MLLW). This datum pair is to be used when referencing locations on water/sea/ocean.

### **Civic Address Location**

IETF Geopriv Civic Address based Location Configuration Information (Civic Address LCI).

- **Country code :**

The two-letter ISO 3166 country code in capital ASCII letters - Example: DK, DE or US.

- **State :**

National subdivisions (state, canton, region, province, prefecture).

- **County :**

County, parish, gun (Japan), district.

- **City :**

City, township, shi (Japan) - Example: Copenhagen.

- **City district :**

City division, borough, city district, ward, chou (Japan).



- **Block (Neighborhood) :**  
Neighborhood, block.
- **Street :**  
Street - Example: Poppelvej.
- **Leading street direction :**  
Leading street direction - Example: N.
- **Trailing street suffix :**  
Trailing street suffix - Example: SW.
- **Street suffix :**  
Street suffix - Example: Ave, Platz.
- **House no. :**  
House number - Example: 21.
- **House no. suffix :**  
House number suffix - Example: A, 1/2.
- **Landmark :**  
Landmark or vanity address - Example: Columbia University.
- **Additional location info :**  
Additional location info - Example: South Wing.
- **Name :**  
Name (residence and office occupant) - Example: Flemming Jahn.
- **Zip code :**  
Postal/zip code - Example: 2791.
- **Building :**  
Building (structure) - Example: Low Library.
- **Apartment :**  
Unit (Apartment, suite) - Example: Apt 42.
- **Floor :**  
Floor - Example: 4.
- **Room no. :**  
Room number - Example: 450F.
- **Place type :**  
Place type - Example: Office.
- **Postal community name :**  
Postal community name - Example: Leonia.
- **P.O. Box :**  
Post office box (P.O. BOX) - Example: 12345.
- **Additional code :**  
Additional code - Example: 1320300003.

#### **Emergency Call Service**

Emergency Call Service (e.g. E911 and others), such as defined by TIA or NENA.

- **Emergency Call Service :**  
Emergency Call Service ELIN identifier data format is defined to carry the ELIN identifier as used during emergency call setup to a traditional CAMA or ISDN trunk-based PSAP. This format consists of a numerical digit string, corresponding to the ELIN to be used for emergency calling.

## Policies

Network Policy Discovery enables the efficient discovery and diagnosis of mismatch issues with the VLAN configuration, along with the associated Layer 2 and Layer 3 attributes, which apply for a set of specific protocol applications on that port. Improper network policy configurations are a very significant issue in VoIP environments that frequently result in voice quality degradation or loss of service.

Policies are only intended for use with applications that have specific 'real-time' network policy requirements, such as interactive voice and/or video services.

The network policy attributes advertised are:

- 1) Layer 2 VLAN ID (IEEE 802.1Q-2003)
- 2) Layer 2 priority value (IEEE 802.1D-2004)
- 3) Layer 3 Diffserv code point (DSCP) value (IETF RFC 2474)

This network policy is potentially advertised and associated with multiple sets of application types supported on a given port. The application types specifically addressed are:

- 1) Voice
- 2) Guest Voice
- 3) Softphone Voice
- 4) Video Conferencing
- 5) Streaming Video
- 6) Control / Signaling (conditionally support a separate network policy for the media types above)

A large network may support multiple VoIP policies across the entire organization, and different policies per application type. LLDP-MED allows multiple policies to be advertised per port, each corresponding to a different application type. Different ports on the same Network Connectivity Device may advertise different sets of policies, based on the authenticated user identity or port configuration.

It should be noted that LLDP-MED is not intended to run on links other than between Network Connectivity Devices and Endpoints, and therefore does not need to advertise the multitude of network policies that frequently run on an aggregated link interior to the LAN.

- **Policy ID :**

ID for the policy. This is auto generated and shall be used when selecting the policies that shall be mapped to the specific ports.

- **Application Type :**

Intended use of the application types:

- 1) **Voice:** for use by dedicated IP Telephony handsets and other similar appliances supporting interactive voice services. These devices are typically deployed on a separate VLAN for ease of deployment and enhanced security by isolation from data applications.
- 2) **Voice Signalling (conditional):** for use in network topologies that require a different policy for the voice signalling than for the voice media. This application type should not be advertised if all the same network policies apply as those advertised in the Voice application policy.
- 3) **Guest Voice:** support a separate 'limited feature-set' voice service for guest users and visitors with their own IP Telephony handsets and other similar appliances supporting interactive voice services.

- 4) **Guest Voice Signalling (conditional):** for use in network topologies that require a different policy for the guest voice signalling than for the guest voice media. This application type should not be advertised if all the same network policies apply as those advertised in the Guest Voice application policy.
- 5) **Softphone Voice:** for use by softphone applications on typical data centric devices, such as PCs or laptops. This class of endpoints frequently does not support multiple VLANs, if at all, and are typically configured to use an 'untagged' VLAN or a single 'tagged' data specific VLAN. When a network policy is defined for use with an 'untagged' VLAN (see Tagged flag below), then the L2 priority field is ignored and only the DSCP value has relevance.
- 6) **Video Conferencing:** for use by dedicated Video Conferencing equipment and other similar appliances supporting real-time interactive video/audio services.
- 7) **Streaming Video:** for use by broadcast or multicast-based video content distribution and other similar applications supporting streaming video services that require specific network policy treatment. Video applications relying on TCP with buffering would not be an intended use of this application type.
- 8) **Video Signalling (conditional):** for use in network topologies that require a separate policy for the video signalling than for the video media. This application type should not be advertised if all the same network policies apply as those advertised in the Video Conferencing application policy.

- **Tag :**

Tag indicating whether the specified application type is using a 'tagged' or an 'untagged' VLAN.

Untagged indicates that the device is using an untagged frame format and as such does not include a tag header as defined by IEEE 802.1Q-2003. In this case, both the VLAN ID and the Layer 2 priority fields are ignored and only the DSCP value has relevance.

Tagged indicates that the device is using the IEEE 802.1Q tagged frame format, and that both the VLAN ID and the Layer 2 priority values are being used, as well as the DSCP value. The tagged format includes an additional field, known as the tag header. The tagged frame format also includes priority tagged frames as defined by IEEE 802.1Q-2003.

- **VLAN ID :**

VLAN identifier (VID) for the port as defined in IEEE 802.1Q-2003.

- **L2 Priority :**

L2 Priority is the Layer 2 priority to be used for the specified application type. L2 Priority may specify one of eight priority levels (0 through 7), as defined by IEEE 802.1D-2004. A value of 0 represents use of the default priority as defined in IEEE 802.1D-2004.

- **DSCP :**

DSCP value to be used to provide Diffserv node behavior for the specified application type as defined in IETF RFC 2474. DSCP may contain one of 64 code point values (0 through 63). A value of 0 represents use of the default DSCP value as defined in RFC 2475.

- **Adding a new policy :**

Click to add a new policy. Specify the Application type, Tag, VLAN ID, L2 Priority and DSCP for the new policy. Click "Save".

### **Port Policies Configuration**

Every port may advertise a unique set of network policies or different attributes for the same network policies, based on the authenticated user identity or port configuration.

- **Port :**  
The port number to which the configuration applies.
- **Policy ID :**  
The set of policies that shall apply to a given port. The set of policies is selected by check marking the checkboxes that corresponds to the policies.

### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Delete**  
Check to delete the policy. It will be deleted during the next save

## 2-13 PoE

PoE is an acronym for Power over Ethernet.

Power over Ethernet is used to transmit electrical power, to remote devices over standard Ethernet cable. It could for example be used for powering IP telephones, wireless LAN access points and other equipment, where it would be difficult or expensive to connect the equipment to main power supply.

The PoE detect function is follow the table:

### Stages of Powering up a PoE Link

Stage	Action	Volts Specified [V]	
		802.3af	802.3at
Detection	PSE detects if the PD has the correct signature resistance of 19–26.5 kΩ	2.7-10.1	
Classification	PSE detects resistor indicating power range	14.5-20.5	
Mark 1	Signals PSE is 802.3at capable. PD presents a 0.25–4 mA load.	–	7-10
Class 2	PSE outputs classification voltage again to indicate 802.3at capability	–	14.5-20.5
Mark 2	Signals PSE is 802.3at capable. PD presents a 0.25–4 mA load.	–	7-10
Startup	Startup voltage	>42	>42
Normal Operation	Supply power to device	37-45	42.5-57

### Power levels available

Class	Usage	Power Range [Watt]	Class Description
0	Default	15.4	Classification Unimplemented
1	Optional	4	Very Low Power
2	Optional	7	Low Power
3	Optional	15.4	Mid Power
4	Valid for 802.3at (Type 2) devices, not allowed for 802.3af devices	36	High Power

## 2-13.1 Configuration

This page allows the user to inspect and configure the current PoE port settings and show all PoE Supply W.

### Web Interface

To configure Power over Ethernet in the web interface:

1. Click configuration, PoE, and configuration
2. Specify the Reserved Power determined and Power Management mode. Specify the PoE or PoE+ and Priority.
3. Click Apply.

Port	PoE Mode	PoE Schedule	Priority	Maximum Power [W]
*	<>	<>	<>	30
1	Enabled	Disabled	Low	30
2	Enabled	Disabled	Low	30
Y-1	Enabled	Disabled	Low	30
Y	Enabled	Disabled	Low	30

Figure 2-13.1: The PoE Configuration

### Parameter Description:

#### Power Over Ethernet Configuration

- **Reserved Power determined by :**

There are three modes for configuring how the ports/PDs may reserve power.

- 1) **Allocated Mode:** In this mode the user allocates the amount of power that each port may reserve. The allocated/reserved power for each port/PD is specified in the Maximum Power fields.
- 2) **Class Mode:** In this mode each port automatically determines how much power to reserve according to the class the connected PD belongs to, and reserves the power accordingly. Four different port classes exist and one for 4, 7, 15.4 or 30 Watts. In this mode the Maximum Power fields have no effect.
- 3) **LLDP-MED Mode:** This mode is similar to the Class mode expect that each port determines the amount power it reserves by exchanging PoE information using the LLDP protocol and reserves power accordingly. If no LLDP information is available

for a port, the port will reserve power using the class mode. In this mode the Maximum Power fields have no effect for all modes: If a port uses more power than the reserved power for the port, the port is shut down.

- **Power Management Mode :**

There are 2 modes for configuring when to shut down the ports:

- 1) **Actual Consumption:** In this mode the ports are shut down when the actual power consumption for all ports exceeds the amount of power that the power supply can deliver or if the actual power consumption for a given port exceeds the reserved power for that port. The ports are shut down according to the port's priority. If two ports have the same priority the port with the highest port number is shut down.
- 2) **Reserved Power:** In this mode the ports are shut down when total reserved powered exceeds the amount of power that the power supply can deliver. In this mode the port power is not turned on if the PD requests more power than available from the power supply.

### **Capacitor Detection Configuration**

- **Capacitor Detection :**

The Capacitor Detection mode enabled.

### **Power Supply Configuration**

- **Primary and Backup Power Source :**

Some switches support having two PoE power supplies. One is used as primary power source, and one as backup power source. If the switch doesn't support backup power supply only the primary power supply settings will be shown. In case that the primary power source fails the backup power source will take over. For being able to determine the amount of power the PD may use, it must be defined what amount of power the primary and backup power sources can deliver.

Valid values are in the range 0 to 2000 Watts.

### **Port Configuration**

- **Port :**

This is the logical port number for this row.

Ports that are not PoE-capable are grayed out and thus impossible to configure PoE for.

- **PoE Mode :**

The PoE Mode represents the PoE operating mode for the port.

- **Disabled:** PoE disabled for the port.
- **PoE :** Enables PoE IEEE 802.3af (Class 4 PDs limited to 15.4W)
- **PoE+ :** Enables PoE+ IEEE 802.3at (Class 4 PDs limited to 30W)

- **PoE Schedule :**

The Poe Schedule is defined by Schedule Profile. User can define the profiles for the scheduling.

- **Priority :**

The Priority represents the ports priority. There are three levels of power priority named Low, High and Critical.

The priority is used in the case where the remote devices requires more power than the power supply can deliver. In this case the port with the lowest priority will be turn off starting from the port with the highest port number.

- **Maximum Power :**

The Maximum Power value contains a numerical value that indicates the maximum power in watts that can be delivered to a remote device.

The maximum allowed value is 30 W.

**Buttons**

- **Apply :**

Click to save changes.

- **Reset :**

Click to undo any changes made locally and revert to previously saved values.



## 2-13.2 Power Delay

This page allows the user to setting the delay time of power providing after device rebooted.

### Web Interface

To configure Power over Ethernet Status in the web interface:

1. Click Configuration, PoE, and Power delay.
2. Enable the port to the power device.
3. Specify the power providing delay time when reboot.
4. Click Apply to apply the change.

Port	Delay Mode	Delay Time(0~300 sec)
*	<input type="text" value="&lt;"/>	<input type="text" value="0"/>
1	Disabled	<input type="text" value="0"/>
Y-1	Disabled	<input type="text" value="0"/>
Y	Disabled	<input type="text" value="0"/>

Apply Reset

Figure 2-13.2: The PoE Power Delay

### Parameter Description:

- **Port :**  
This is the logical port number for this row.
- **Delay Mode :**  
Turn on / off the power delay function.
  - **Enabled:** Enable POE Power Delay.
  - **Disabled:** Disable POE Power Delay.
- **Delay Time(0~300sec) :**  
When rebooting, the PoE port will start to provide power to the PD when it out of delay time.  
Default: 0, range: 0-300 sec.

### Buttons

- **Apply :**  
Click to save changes.

## 2-13.3 Schedule Profile

This page allows the user to make a perfect schedule of PoE power supply. PoE Scheduling not only makes PoE management easier but also saves more energy

### Web Interface

To configure Power Over Ethernet Scheduling in the web interface:

1. Click Configuration, PoE, and Scheduling.
2. Select the local port and enable.
3. Select time and day to supply power.
4. Click Apply to apply the change.

Week Day	Start Time		End Time	
	HH	MM	HH	MM
*	<> ▼	<> ▼	<> ▼	<> ▼
Monday	0 ▼	0 ▼	0 ▼	0 ▼
Tuesday	0 ▼	0 ▼	0 ▼	0 ▼
Wednesday	0 ▼	0 ▼	0 ▼	0 ▼
Thursday	0 ▼	0 ▼	0 ▼	0 ▼
Friday	0 ▼	0 ▼	0 ▼	0 ▼
Saturday	0 ▼	0 ▼	0 ▼	0 ▼
Sunday	0 ▼	0 ▼	0 ▼	0 ▼

Apply Reset

Figure 2-13.3: The Schedule Profile

### Parameter Description:

- **Profile :**  
The index of profile. There are 16 profiles in the configuration.
- **Name :**  
The name of profile. The default name is "Profile #". User can define the name for identifying the profile.
- **Week Day :**  
The day to schedule PoE.
- **Start Time :**  
The time to start PoE. The time 00:00 means the first second of this day.

- **End Time :**

The time to stop PoE. The time 00:00 means the last second of this day.

**Buttons**

- **Apply :**

Click to save changes.

- **Reset :**

Click to undo any changes made locally and revert to previously saved values.

## 2-13.4 Auto Checking

This page allows the user to specify the auto detection parameters to check the linking status between PoE ports and PDs. When it detected the fail connect, will reboot remote PD automatically.

### Web Interface

To configure Power over Ethernet Auto Checking in the web interface:

1. Click Configuration, PoE, and Auto checking.
2. Enable the Ping Check function.
3. Specify the PD's IP address, checking interval, retry time, failure action and reboot time.
4. Click Apply to apply the change.
- 5.

Port	Ping IP Address	Startup Time	Interval Time(sec)	Retry Time	Failure Log	Failure Action	Reboot Time(sec)	Max. Reboot Times
1	0.0.0.0	60	30	3	error=0, total=0	Nothing	15	3
2	0.0.0.0	60	30	3	error=0, total=0	Nothing	15	3
3	0.0.0.0	60	30	3	error=0, total=0	Nothing	15	3
4	0.0.0.0	60	30	3	error=0, total=0	Nothing	15	3
5	0.0.0.0	60	30	3	error=0, total=0	Nothing	15	3
6	0.0.0.0	60	30	3	error=0, total=0	Nothing	15	3
Y-1	0.0.0.0	60	30	3	error=0, total=0	Nothing	15	3
Y	0.0.0.0	60	30	3	error=0, total=0	Nothing	15	3

Figure 2-13.4: The PoE Scheduling

### Parameter Description:

- **Ping Check :**  
Enable: Ping Check function can detect the connection between PoE port and power device.  
Disable: Will turn off the detection.
- **Port :**  
This is the logical port number for this row.
- **Ping IP Address :**  
The PD's IP Address the system should ping.
- **Startup Time(sec) :**  
When PD has been started up, the Switch will wait Start up time to do PoE Auto Checking.  
default: 60, range: 30-600 sec.
- **Interval Time(sec) :**  
Device will send checking message to PD each interval time. Default: 30, range: 10-120 sec.
- **Retry Time :**  
When PoE port can't ping the PD, it will retry to send detection again. When the third time, it will trigger failure action. Default: 3, range: 1-5.
- **Failure Log :**  
Failure loggings counter.

- **Failure Action :**  
The action when the third fail detection.
  - **Nothing:** Keep Ping the remote PD but does nothing further.
  - **Reboot Remote PD:** Cut off the power of the PoE port, make PD rebooted.
- **Reboot Time(sec) :**  
When PD has been rebooted, the PoE port restored power after the specified time. Default: 15, range: 3-120 sec.
- **Max. Reboot Times :**  
When Failure Action is Reboot Remote PD, it limits times of Reboot. default: 3, range: 0-10. 0 means without reboot limits.

#### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-13.5 Chip Reset Schedule

This page allows user to schedule when to reset PoE chip

### Web Interface

To configure Power over Ethernet Chip Reset Schedule in the web interface:

1. Click Configuration, PoE, and Chip Reset Schedule.
2. Evoke to enable or disable the Mode.
3. Click Apply to apply the change.



PoE Chip Reset Schedule

Home > Configuration > PoE > Chip Reset Schedule

Mode: Disabled

Apply Reset

Figure 2-13.5: The Chip Reset Schedule

### Parameter Description:

- **Mode :**

Indicates the chip reset scheduling mode operation. Possible modes are:

- **Enabled:** Enable PoE chip reset.
- **Disabled:** Disable PoE chip reset.

- **Week Day :**

The day to reset PoE chip.

- **PoE Chip Reset Time :**

The time to reset PoE chip.

### Buttons

- **Apply :**

Click to save changes.

- **Reset :**

Click to undo any changes made locally and revert to previously saved values.

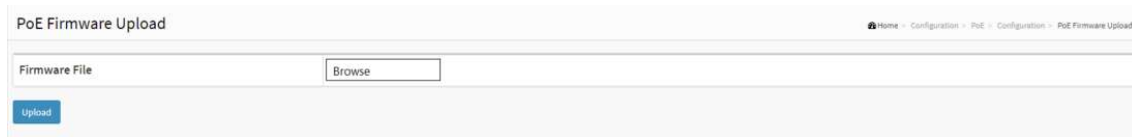
## 2-13.6 PoE Firmware Upload

This page facilitates an update of the PoE firmware controlling the switch.

### Web Interface

To upgrade the PoE firmware in the web interface:

1. Click Configuration, PoE, and PoE Firmware Upload.
2. Click Browse to the location of a PoE firmware file,
3. Click Upload to upgrade the firmware.



PoE Firmware Upload

Home > Configuration > PoE > Configuration > PoE Firmware Upload

Firmware File

**Figure 2-13.6: PoE Firmware Upload**

### Parameter Description:

- After the PoE firmware is uploaded, a page announces that the firmware update is initiated. After about a minute, the firmware is updated and the switch restarts.
- Warning: While the PoE firmware is being updated, Web access appears to be defunct. Do not restart or power off the device at this time or the switch may fail to function afterwards.

## 2-14 MAC Table

Switching of frames is based upon the DMAC address contained in the frame. The switch builds up a table that maps MAC addresses to switch ports for knowing which ports the frames should go to (based upon the DMAC address in the frame). This table contains both static and dynamic entries. The static entries are configured by the network administrator if the administrator wants to do a fixed mapping between the DMAC address and switch ports.

The frames also contain a MAC address (SMACaddress), which shows the MAC address of the equipment sending the frame. The SMAC address is used by the switch to automatically update the MAC table with these dynamic MAC addresses. Dynamic entries are removed from the MAC table if no frame with the corresponding SMAC address have been seen after a configurable age time

### Web Interface

To configure MAC Address Table in the web interface:

#### Aging Configuration

1. Click configuration and MAC Table.
2. Specify the Disable Automatic Aging and Aging Time.
3. Click the Apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

#### MAC Table Learning

1. Click configuration and MAC Table.
2. Specify the Port Members (Auto,Disable,Secure).
3. Click the Apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

#### Static MAC Table Configuration

1. Click configuration, MAC Table and Add new Static entry.
2. Specify the VLAN IP and Mac address, Port Members.
3. Click the Apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

MAC Address Table Configuration Home > Configuration > MAC Table

---

Aging Configuration

Disable Automatic Aging

Aging Time  seconds

---

MAC Table Learning

	Port Members																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	N-2	N-1	N
Auto	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Disable	<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"/>	<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"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Secure	<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"/>	<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"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Static MAC Table Configuration																										
Delete	VLAN ID	MAC Address	Port Members																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Add New Static Entry																										
Apply <input type="button" value="Reset"/>																										

**Figure 2-14: The MAC Address Table Configuration**

**Parameter Description:**

**Aging Configuration**

By default, dynamic entries are removed from the MAC table after 300 seconds. This removal is also called aging.

Configure aging time by entering a value here in seconds; for example, Age time  seconds.

The allowed range is 10 to 1000000 seconds.

Disable the automatic aging of dynamic entries by checking  Disable automatic aging.

**MAC Table Learning**

If the learning mode for a given port is greyed out, another module is in control of the mode, so that it cannot be changed by the user. An example of such a module is the MAC-Based Authentication under 802.1X. Each port can do learning based upon the following settings:

- **Auto :**  
Learning is done automatically as soon as a frame with unknown SMAC is received.
- **Disable :**  
No learning is done.
- **Secure :**  
Only static MAC entries are learned, all other frames are dropped.



**NOTE:**Make sure that the link used for managing the switch is added to the Static Mac Table before changing to secure learning mode, otherwise the management link is lost and can only be restored by using another non-secure port or by connecting to the switch via the serial interface.

**Static MAC Table Configuration**

The static entries in the MAC table are shown in this table. The static MAC table can contain 64 entries. The maximum of 64 entries is for the whole stack, and not per switch.

The MAC table is sorted first by VLAN ID and then by MAC address.

- **VLAN ID :**  
The VLAN ID of the entry.
- **MAC Address :**  
The MAC address of the entry.
- **Port Members :**  
Checkmarks indicate which ports are members of the entry. Check or uncheck as needed to modify the entry.

**Buttons**

- **Adding a New Static Entry :**  
Click Add New Static Entry to add a new entry to the static MAC table. Specify the VLAN ID, MAC address, and port members for the new entry. Click "Apply".
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Delete :**  
Check to delete the entry. It will be deleted during the next save.

## 2-15 VLANs

To assign a specific VLAN for management purpose. The management VLAN is used to establish an IP connection to the switch from a workstation connected to a port in the VLAN. This connection supports a VSM, SNMP, and Telnet session. By default, the active management VLAN is VLAN 1, but you can designate any VLAN as the management VLAN using the Management VLAN window. Only one management VLAN can be active at a time. When you specify a new management VLAN, your HTTP connection to the old management VLAN is lost. For this reason, you should have a connection between your management station and a port in the new management VLAN or connect to the new management VLAN through a multi-VLAN route

### Web Interface

To configure VLAN membership configuration in the web interface:

1. Click Configuration and VLANs.
2. Modify Global VLAN Configuration parameter.
3. Scroll the Mode, Port VLAN and Port Type to enable the Port VLAN Configuration parameter.
4. Click the Apply to save the setting.
5. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

Port	Mode	Port VLAN	Port Type	Ingress Filtering	Ingress Acceptance	Egress Tagging	Allowed VLANs	Forbidden VLANs
*	<>	1	<>	<input checked="" type="checkbox"/>	<>	<>	1	
1	Access	1	C-Port	<input checked="" type="checkbox"/>	Tagged and Untagged	Untag Port VLAN	1	
N-1	Access	1	C-Port	<input checked="" type="checkbox"/>	Tagged and Untagged	Untag Port VLAN	1	
N	Access	1	C-Port	<input checked="" type="checkbox"/>	Tagged and Untagged	Untag Port VLAN	1	

Figure 2-15.1: The VLAN Configuration

### Parameter Description:

#### Global VLAN Configuration

- **Allowed Access VLANs :**

This field shows the allowed Access VLANs, i.e. it only affects ports configured as Access ports. Ports in other modes are members of all VLANs specified in the Allowed VLANs field. By default, only VLAN 1 is enabled. More VLANs may be created by using a list syntax where the individual elements are separated by commas. Ranges are specified with a dash separating the lower and upper bound.

The following example will create VLANs 1, 10, 11, 12, 13, 200, and 300: 1,10-13,200,300. Spaces are allowed in between the delimiters.

- **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.

### **Port VLAN Configuration**

- **Port :**

This is the logical port number of this row.

- **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.

1) Access:

- Access ports are normally used to connect to end stations. Dynamic features like Voice VLAN may add the port to more VLANs behind the scenes. 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 frames and C-tagged frames,
- discards all frames that are not classified to the Access VLAN,
- on egress all frames are transmitted untagged.

2) Trunk:

- Trunk ports can carry traffic 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 existing VLANs. This may be limited by the use of Allowed VLANs,
- unless VLAN Trunking is enabled on the port, frames classified to a VLAN that the port is not a member of will be 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,
- VLAN trunking may be enabled.

3) 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, 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 4095, 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.
  - 1) 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.
  - 2) 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.
  - 3) 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.
  - 4) 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 Filtering :**
  - 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 disabled, frames classified to a VLAN that the port is not a member of are accepted and forwarded to the switch engine. However, the port will never transmit frames classified to VLANs that it is not a member of.
- **VLAN Trunking :**
  - Trunk and Hybrid ports allow for enabling VLAN trunking.
  - When VLAN trunking is enabled, frames classified to unknown VLANs are accepted on the port whether ingress filtering is enabled or not.
  - This is useful in scenarios where a cloud of intermediary switches must bridge VLANs that haven't been created. By configuring the ports that connect the cloud of switches as trunking ports, they can seamlessly carry those VLANs from one end to the other.

- **Ingress Acceptance :**

Hybrid ports allow for changing the type of frames that are accepted on ingress.

- 1) Tagged and Untagged
  - Both tagged and untagged frames are accepted.
- 2) Tagged Only
  - Only tagged frames are accepted on ingress. Untagged frames are discarded.
- 3) 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.

- 1) Untag Port VLAN
  - Frames classified to the Port VLAN are transmitted untagged. Other frames are transmitted with the relevant tag.
- 2) Tag All
  - All frames, whether classified to the Port VLAN or not, are transmitted with a tag.
- 3) 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 Existing VLANs field. By default, a port may become member of all possible VLANs, and is therefore set to 1-4095.

The field may be left empty, which means that the port will not be member of any of the existing VLANs, but if it is configured for VLAN Trunking it will still be able to carry all unknown 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 Existing VLANs field.

By default, the field is left blank, which means that the port may become a member of all possible VLANs.

### **Buttons**

- **Apply :**

Click to save changes.

- **Reset :**

Click to undo any changes made locally and revert to previously saved values.

## 2-16 Private VLANs

### 2-16.1 Membership

The Private VLAN membership configurations for the switch can be monitored and modified here. Private VLANs can be added or deleted here. Port members of each Private VLAN can be added or removed here.

Private VLANs are based on the source port mask, and there are no connections to VLANs. This means that VLAN IDs and Private VLAN IDs can be identical.

A port must be a member of both a VLAN and a Private VLAN to be able to forward packets. By default, all ports are VLAN unaware and members of VLAN 1 and Private VLAN 1.

A VLAN unaware port can only be a member of one VLAN, but it can be a member of multiple Private VLANs.

#### Web Interface

To configure Private VLAN Membership Configuration in the web interface:

1. Click Configuration, Private VLAN and Membership.
2. Evoke Private VLAN Membership Configuration.
3. Click the Apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.


		Port Members																									
Delete	PVLAN ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	N-1	N
<input type="checkbox"/>	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Figure 2-16.1: The Private VLAN Membership Configuration

#### Parameter Description:

- **Private VLAN ID :**  
Indicates the ID of this particular private VLAN.
- **Port Members :**  
A row of check boxes for each port is displayed for each private VLAN ID. To include a port in a Private VLAN, check the box. To remove or exclude the port from the Private VLAN, make sure the box is unchecked. By default, no ports are members, and all boxes are unchecked.

## Buttons

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Auto-refresh  :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page immediately.
- **Delete :**  
To delete a private VLAN entry, check this box. The entry will be deleted during the next save.
- **Adding a New Private VLAN :**  
Click Add New Private VLAN to add a new private VLAN ID. An empty row is added to the table, and the private VLAN can be configured as needed. The allowed range for a private VLAN ID is the same as the switch port number range. Any values outside this range are not accepted, and a warning message appears. Click "OK" to discard the incorrect entry, or click "Cancel" to return to the editing and make a correction.  
The Private VLAN is enabled when you click "Save".  
The Delete button can be used to undo the addition of new Private VLANs.



## 2-16.2 Port Isolation

The Private VLAN membership configurations for the switch can be monitored and modified here. Private VLANs can be added or deleted here. Port members of each Private VLAN can be added or removed here.

Private VLANs are based on the source port mask, and there are no connections to VLANs. This means that VLAN IDs and Private VLAN IDs can be identical.

A port must be a member of both a VLAN and a Private VLAN to be able to forward packets. By default, all ports are VLAN unaware and members of VLAN 1 and Private VLAN 1.

A VLAN unaware port can only be a member of one VLAN, but it can be a member of multiple Private VLANs.

### Web Interface

To configure Port Isolation Configuration in the web interface:

1. Click Configuration, Private VLAN and Port Isolation.
2. Evoke Port Isolation Configuration.
3. Click the Apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	N-1	N
<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"/>	<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"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 2-16.2: The Port Isolation Configuration

### Parameter Description:

- **Port Members :**

A check box is provided for each port of a private VLAN. When checked, port isolation is enabled on that port. When unchecked, port isolation is disabled on that port. By default, port isolation is disabled on all ports.

#### Buttons

- **Apply :**

Click to save changes.

- **Reset :**

Click to undo any changes made locally and revert to previously saved values.

- **Auto-refresh**  :

Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.

-  **Refresh :**

Click to refresh the page immediately.

## 2-17 VCL

### 2-17.1 MAC-based VLAN

The MAC-based VLAN entries can be configured here. This page allows for adding and deleting MAC-based VLAN entries and assigning the entries to different ports. This page shows only static entries.

#### Web Interface

To configure MAC-based VLAN Membership Configuration in the web interface:

1. Click Configuration, VCL and MAC-based VLAN configuration.
2. Specify the MAC address and VLAN ID.
3. Click the Apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

			Port Members																									
Delete	MAC Address	VLAN ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	N-1	N
Currently no entries present																												

Figure 2-17.1: The MAC-based VLAN Membership Configuration

#### Parameter Description:

- **MAC Address :**  
Indicates the MAC address.
- **VLAN ID :**  
Indicates the VLAN ID.
- **Port Members :**  
A row of check boxes for each port is displayed for each MAC-based VLAN entry. To include a port in a MAC-based VLAN, check the box. To remove or exclude the port from the MAC-based VLAN, make sure the box is unchecked. By default, no ports are members, and all boxes are unchecked.

#### Buttons


- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Delete :**  
To delete a MAC-based VLAN entry, check this box and press save. The entry will be deleted on the selected switch in the stack.


- **Adding a New MAC-based VLAN :**


Click Add New Entry to add a new MAC-based VLAN entry. An empty row is added to the table, and the MAC-based VLAN entry can be configured as needed. Any unicast MAC address can be configured for the MAC-based VLAN entry. No broadcast or multicast MAC addresses are allowed. Legal values for a VLAN ID are 1 through 4095.

The MAC-based VLAN entry is enabled when you click on "Apply". A MAC-based VLAN without any port members will be deleted when you click "Apply".

The Delete button can be used to undo the addition of new MAC-based VLANs. The
- **Auto-refresh  :**

Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**

Refreshes the displayed table starting from the "VLAN" input fields.
-  **<< :**

Updates the table starting from the first entry in the VLAN Table, i.e. the entry with the lowest VLAN ID.
-  **> :**

Updates the table, starting with the entry after the last entry currently displayed.

## 2-17.2 Protocol-based VLAN

This section describes Protocol -based VLAN, The Switch support Protocol include Ethernet LLC SNAP Protocol,

### LLC

The Logical Link Control (LLC) data communication protocol layer is the upper sub-layer of the Data Link Layer (which is itself layer 2, just above the Physical Layer) in the seven-layer OSI reference model. It provides multiplexing mechanisms that make it possible for several network protocols (IP, IPX, Decnet and AppleTalk) to coexist within a multipoint network and to be transported over the same network media, and can also provide flow control and automatic repeat request (ARQ) error management mechanisms.

### SNAP

The Subnetwork Access Protocol (SNAP) is a mechanism for multiplexing, on networks using IEEE 802.2 LLC, more protocols than can be distinguished by the 8-bit 802.2 Service Access Point (SAP) fields. SNAP supports identifying protocols by Ethernet type field values; it also supports vendor-private protocol identifier spaces. It is used with IEEE 802.3, IEEE 802.4, IEEE 802.5, IEEE 802.11 and other IEEE 802 physical network layers, as well as with non-IEEE 802 physical network layers such as FDDI that use 802.2 LLC.

### 2-17.2.1 Protocol to Group

This page allows you to add new protocols to Group Name (unique for each Group) mapping entries as well as allow you to see and delete already mapped entries for the selected stack switch unit switch.

#### Web Interface

To configure Protocol to Group Mapping Table configuration in the web interface:

1. Click Configuration, VLC, Protocol-based VLAN configuration and Protocol to Group.
2. Specify the Protocol to Group Mapping Table.
3. Click the Apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.



Figure 2-17.2.1: The Protocol to Group Mapping Table

### Parameter Description:

- **Frame Type :**

Frame Type can have one of the following values:

1. Ethernet
2. LLC
3. SNAP



---

**NOTE:**On changing the Frame type field, valid value of the following text field will vary depending on the new frame type you selected.

---

- **Value :**

Valid value that can be entered in this text field depends on the option selected from the preceding Frame Type selection menu. Below are the criteria for three different Frame Types:

For Ethernet: Values in the text field when Ethernet is selected as a Frame Type is called etype. Valid values for etype ranges from 0x0600-0xffff

For LLC: Valid value in this case is comprised of two different sub-values.

- a. DSAP: 1-byte long string (0x00-0xff)
- b. SSAP: 1-byte long string (0x00-0xff)

For SNAP: Valid value in this case also is comprised of two different sub-values.

- a. OUI: OUI (Organizationally Unique Identifier) is value in format of xx-xx-xx where each pair (xx) in string is a hexadecimal value range from 0x00-0xff.
- b. PID: If the OUI is hexadecimal 000000, the protocol ID is the Ethernet type (EtherType) field value for the protocol running on top of SNAP; if the OUI is an OUI for a particular organization, the protocol ID is a value assigned by that organization to the protocol running on top of SNAP. In other words, if value of OUI field is 00-00-00 then value of PID will be etype (0x0600-0xffff) and if value of OUI is other than 00-00-00 then valid value of PID will be any value from 0x0000 to 0xffff.

- **Group Name :**

A valid Group Name is a unique 16-character long string for every entry which consists of a combination of alphabets (a-z or A-Z) and integers (0-9).



---

**NOTE:**Special character and underscore (\_) are not allowed.

---

### Buttons

- **Apply :**


Click to save changes.

- **Reset :**

Click to undo any changes made locally and revert to previously saved values.


- **Delete :**

To delete a Protocol to Group Name map entry, check this box. The entry will be deleted on the switch during the next Save.

- **Adding a New Group to VLAN mapping entry :**  
Click to add a new entry in mapping table. An empty row is added to the table; Frame Type, Value and the Group Name can be configured as needed.  
The button can be used to undo the addition of new entry.
- **Auto-refresh  :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- ** Refresh :**  
Refreshes the displayed table starting from the "VLAN" input fields.





- **Delete :**  
To delete a Group Name to VLAN map entry, check this box. The entry will be deleted on the switch during the next save
- **Adding a New Group to VLAN mapping entry :**  
Click Add New Entry to add a new entry in mapping table. An empty row is added to the table, the Group Name, VLAN ID and port members can be configured as needed. Legal values for a VLAN ID are 1 through 4095.  
The Delete button can be used to undo the addition of new entry. The maximum possible Group to VLAN mappings is limited to 64.
- **Auto-refresh  :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- ** Refresh :**  
Refreshes the displayed table starting from the "VLAN" input fields.

## 2-17.3 IP Subnet-based VLAN

The IP subnet-based VLAN entries can be configured here. This page allows for adding, updating and deleting IP subnet-based VLAN entries and assigning the entries to different ports. This page shows only static entries.

### Web Interface

To configure IP Subnet-based VLAN Membership Configuration in the web interface:

1. Click Configuration, VCL and IP Subnet-based VLAN.
2. Click Add New Entry.
3. Specify the IP Subnet-based VLAN Membership Configuration.
4. Click the Apply to save the setting.
5. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.


Delete	VCE ID	IP Address	Mask Length	VLAN ID	Port Members																								
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	N-1
Currently no entries present																													

Figure 2-17.3: IP Subnet-based VLAN Membership Configuration

### Parameter Description:

- **VCE ID :**  
Indicates the index of the entry. It is user configurable. Its value ranges from 0-128. If a VCE ID is 0, application will auto-generate the VCE ID for that entry. Deletion and lookup of IP subnet-based VLAN are based on VCE ID.
- **IP Address :**  
Indicates the IP address.
- **Mask Length :**  
Indicates the network mask length.
- **VLAN ID :**  
Indicates the VLAN ID. VLAN ID can be changed for the existing entries.
- **Port Members :**  
A row of check boxes for each port is displayed for each IP subnet-based VLAN entry. To include a port in an IP subnet-based VLAN, check the box. To remove or exclude the port from the IP subnet-based VLAN, make sure the box is unchecked. By default, no ports are members, and all boxes are unchecked.

## Buttons

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Delete :**  
To delete an IP subnet-based VLAN entry, check this box and press save. The entry will be deleted on the selected switch in the stack.
- **Adding a New IP subnet-based VLAN**  
Click "Add New Entry" to add a new IP subnet-based VLAN entry. An empty row is added to the table, and the IP subnet-based VLAN entry can be configured as needed. Any IP address/mask can be configured for the IP subnet-based VLAN entry. Legal values for a VLAN ID are 1 through 4095.  
The IP subnet-based VLAN entry is enabled on the selected stack switch unit when you click on "Save". The "Delete" button can be used to undo the addition of new IP subnet-based VLANs. The maximum possible IP subnet-based VLAN entries are limited to 128.
- **Auto-refresh  :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Refreshes the displayed table starting from the "VLAN" input fields.

## 2-18 VOICE VLAN

Voice VLAN is VLAN configured specially for voice traffic. By adding the ports with voice devices attached to voice VLAN, we can perform QoS-related configuration for voice data, ensuring the transmission priority of voice traffic and voice quality.

### 2-18.1 Configuration

The Voice VLAN feature enables voice traffic forwarding on the Voice VLAN, then the switch can classify and schedule network traffic. It is recommended that there be two VLANs on a port - one for voice, one for data. Before connecting the IP device to the switch, the IP phone should configure the voice VLAN ID correctly. It should be configured through its own GUI.

#### Web Interface

To configure Voice VLAN in the web interface:

1. Click Configuration, Voice VLAN and Configuration.
2. Select "Enabled" in the Voice VLAN Configuration.
3. Specify VLAN ID, Aging Time and Traffic Class.
4. Specify the Port Configuration.
5. Click the Apply to save the setting.
6. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

Voice VLAN Configuration

Home > Configuration > Voice VLAN > Configuration

Voice VLAN Configuration

Mode	Disabled
VLAN ID	1000
Aging Time	86400 seconds
Traffic	7 (High)

Port Configuration

Port	Mode	Security	Discovery Protocol
*	Disabled	<>	<>
1	Disabled	Disabled	OUI
N-2	Disabled	Disabled	OUI
N-1	Disabled	Disabled	OUI
N	Disabled	Disabled	OUI

Apply Reset

Figure 2-18.1: The Voice VLAN Configuration

### Parameter Description:

- **Mode :**

Indicates the Voice VLAN mode operation. We must disable MSTP feature before we enable Voice VLAN. It can avoid the conflict of ingress filtering. Possible modes are:

  - **Enabled:** Enable Voice VLAN mode operation.
  - **Disabled:** Disable Voice VLAN mode operation.
- **VLAN ID :**

Indicates the Voice VLAN ID. It should be a unique VLAN ID in the system and cannot equal each port PVID. It is a conflict in configuration if the value equals management VID, MVR VID, PVID etc. The allowed range is 1 to 4095.
- **Aging Time :**

Indicates the Voice VLAN secure learning aging time. The allowed range is 10 to 10000000 seconds. It is used when security mode or auto detect mode is enabled. In other cases, it will be based on hardware aging time. The actual aging time will be situated between the [age\_time; 2 \* age\_time] interval.
- **Traffic :**

Indicates the Voice VLAN traffic class. All traffic on the Voice VLAN will apply this class.
- **Port Mode :**

Indicates the Voice VLAN port mode. Possible port modes are:

  - **Disabled:** Disjoin from Voice VLAN.
  - **Auto:** Enable auto detect mode. It detects whether there is VoIP phone attached to the specific port and configures the Voice VLAN members automatically.
  - **Forced:** Force join to Voice VLAN.

This field will be read-only if STP feature is enabled. And the STP port mode will be read-only if this field be set to the mode other than Disabled.
- **Port Security :**

Indicates the Voice VLAN port security mode. When the function is enabled, all non-telephonic MAC addresses in the Voice VLAN will be blocked for 10 seconds. Possible port modes are:

  - **Enabled:** Enable Voice VLAN security mode operation.
  - **Disabled:** Disable Voice VLAN security mode operation.
- **Port Discovery Protocol**

Indicates the Voice VLAN port discovery protocol. It will only work when auto detect mode is enabled. We should enable LLDP feature before configuring discovery protocol to "LLDP" or "Both". Changing the discovery protocol to "OUI" or "LLDP" will restart auto detect process. Possible discovery protocols are:

  - **OUI:** Detect telephony device by OUI address.
  - **LLDP:** Detect telephony device by LLDP.
  - **Both:** Both OUI and LLDP.

### Buttons

- **Apply :**

Click to save changes.
- **Reset :**

Click to undo any changes made locally and revert to previously saved values.
- **Delete :**

To delete an IP subnet-based VLAN entry, check this box and press save. The entry will be deleted on the selected switch in the stack.

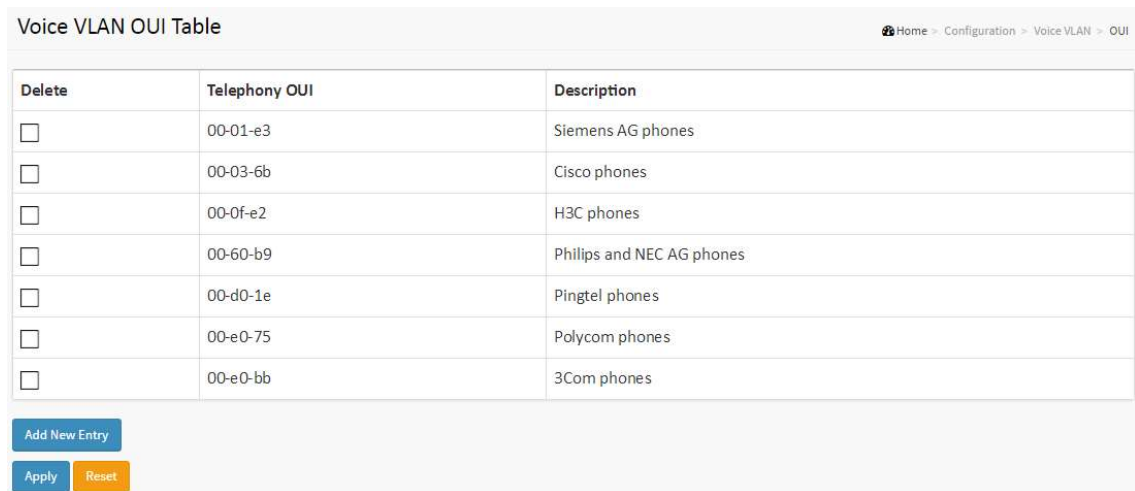
## 2-18.2 OUI

Configure VOICE VLAN OUI table on this page. The maximum number of entries is 16. Modifying the OUI table will restart auto detection of OUI process.

### Web Interface

To configure Voice VLAN OUI Table in the web interface:

1. Click Configuration, Voice VLAN and OUI.
2. Click Add New Entry.
3. Specify the Voice VLAN OUI Table.
4. Click the Apply to save the setting.
5. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.



Delete	Telephony OUI	Description
<input type="checkbox"/>	00-01-e3	Siemens AG phones
<input type="checkbox"/>	00-03-6b	Cisco phones
<input type="checkbox"/>	00-0f-e2	H3C phones
<input type="checkbox"/>	00-60-b9	Philips and NEC AG phones
<input type="checkbox"/>	00-d0-1e	Pingtel phones
<input type="checkbox"/>	00-e0-75	Polycom phones
<input type="checkbox"/>	00-e0-bb	3Com phones

Buttons: Add New Entry, Apply, Reset

Figure 2-18.2: The Voice VLAN OUI Table

### Parameter Description:

- **Telephony OUI :**  
A telephony OUI address is a globally unique identifier assigned to a vendor by IEEE. It must be 6 characters long and the input format is "xx-xx-xx" (x is a hexadecimal digit).
- **Description :**  
The description of OUI address. Normally, it describes which vendor telephony device it belongs to. The allowed string length is 0 to 32.

### Buttons

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Delete :**  
Check to delete the entry. It will be deleted during the next save.
- **Add New entry :**  
Click to add a new access management entry.

## 2-19 QoS

The switch support four QoS queues per port with strict or weighted fair queuing scheduling. It supports QoS Control Lists (QCL) for advance programmable QoS classification, based on IEEE 802.1p, Ethertype, VID, IPv4/IPv6 DSCP and UDP/TCP ports and ranges.

High flexibility in the classification of incoming frames to a QoS class. The QoS classification looks for information up to Layer 4, including IPv4 and IPv6 DSCP, IPv4 TCP/UDP port numbers, and user priority of tagged frames. This QoS classification mechanism is implemented in a QoS control list (QCL). The QoS class assigned to a frame is used throughout the device for providing queuing, scheduling, and congestion control guarantees to the frame according to what was configured for that specific QoS class.

The switch support advanced memory control mechanisms providing excellent performance of all QoS classes under any traffic scenario, including jumbo frame. A super priority queue with dedicated memory and strict highest priority in the arbitration. The ingress super priority queue allows traffic recognized as CPU traffic to be received and queued for transmission to the CPU even when all the QoS class queues are congested.

### 2-19.1 Port Classification

The section allows you to configure the basic QoS Ingress Classification settings for all switch ports.

#### Web Interface

To configure the QoS Ingress Port Classification parameters in the web interface:

1. Click Configuration, QoS and Port Classification.
2. Scroll to select QoS Ingress Port parameters.
3. Click the Apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

Port	CoS	DPL	PCP	DEI	Tag Class.	DSCP Based	Address Mode
*	<>	<>	<>	<>		<input type="checkbox"/>	<>
1	0	0	0	0	Disabled	<input type="checkbox"/>	Source
2	0	0	0	0	Disabled	<input type="checkbox"/>	Source
N-2	0	0	0	0	Disabled	<input type="checkbox"/>	Source
N-1	0	0	0	0	Disabled	<input type="checkbox"/>	Source
N	0	0	0	0	Disabled	<input type="checkbox"/>	Source

Apply Reset

Figure 2-19.1: The QoS Ingress Port Classification

**Parameter Description:**

- **Port :**

The port number for which the configuration below applies.

- **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.

If the port is VLAN aware and the frame is tagged, then the frame is classified to a CoS that is based on the PCP value in the tag as shown below. Otherwise the frame is classified to the default CoS.

PCP value: 0    1    2    3    4    5    6    7

CoS value: 1    0    2    3    4    5    6    7

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.

If the port is VLAN aware, the frame is tagged and Tag Class. is enabled, then the frame is classified to a DPL that is mapped from the PCP and DEI value in the tag. Otherwise the frame is classified to the default DPL.

The classified DPL can be overruled by a QCL entry.

- **DSCP Based :**

Click to Enable DSCP Based QoS Ingress Port Classification.

**Buttons**

- **Apply :**

Click to save changes.

- **Reset :**

Click to undo any changes made locally and revert to previously saved values.



## 2-19.2 Port Policing

This section provides an overview of f QoS Ingress Port Policers for all switch ports The Port Policing is useful in constraining traffic flows and marking frames above specific rates. Policing is primarily useful for data flows and voice or video flows because voice and video usually maintains a steady rate of traffic

### Web Interface

To configure the QoS Ingress Port Policers in the web interface:

1. Click Configuration, QoS and Port Policing
2. Evoke which port need to enable the QoS Ingress Port Policers and type the Rate limit condition.
3. Scroll to select the column Rate and Unit.
4. Click the Apply to save the setting.
5. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

Port	Enabled	Rate	Unit	Flow Control
*	<input type="checkbox"/>	500	<>	<input type="checkbox"/>
1	<input type="checkbox"/>	500	kbps	<input type="checkbox"/>
2	<input type="checkbox"/>	500	kbps	<input type="checkbox"/>
N-1	<input type="checkbox"/>	500	kbps	<input type="checkbox"/>
N	<input type="checkbox"/>	500	kbps	<input type="checkbox"/>

Apply Reset

Figure 2-19.2: The QoS Ingress Port Policers

### Parameter Description:

- **Port :**  
The port number for which the configuration below applies.
- **Enabled :**  
Controls whether the policer is enabled on this switch port.
- **Rate :**  
Controls the rate for the port policer. This value is restricted to 100-13128072 when "Unit" is kbps, 1-13128 when "Unit" is mbps, 1-131071 when "Unit" is fps, and 1-131 when "Unit" is kfps. The rate is internally rounded up to the nearest value supported by the port policer.
- **Unit :**  
Controls the unit of measure for the port policer rate as kbps, Mbps, fps or kfps.
- **Flow Control :**  
If flow control is enabled and the port is in flow control mode, then pause frames are sent instead of discarding frames.

### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-19.3 Port Schedulers

This page provides an overview of QoS Egress Port Schedulers for all switch ports.

### Web Interface

To configure the QoS Ingress Port Policers in the web interface:

1. Click Configuration, QoS and Port Schedulers.
2. Click the Port and display the QoS Egress Port Schedulers
3. Scroll Port and Scheduler Mode, specify the Queue Shaper parameter.
4. Click the Apply to save the setting.
5. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

QoS Egress Port Schedulers								Home > Configuration > QoS > Port Scheduler	
Port	Mode	Weight							
		Q0	Q1	Q2	Q3	Q4	Q5		
1	Strict Priority	-	-	-	-	-	-		
2	Strict Priority	-	-	-	-	-	-		
3	Strict Priority	-	-	-	-	-	-		

QoS Egress Port Scheduler and Shapers Port 1		Home > Configuration > QoS > Port Scheduler	
Port	<input type="text" value="Port 1"/>		
Scheduler Mode	<input type="text" value="Strict Priority"/>		

Queue Shaper				
Queue	Enable	Rate	Unit	Excess
*	<input type="checkbox"/>	<input type="text" value="500"/>	<input type="text" value="&lt;&gt;"/>	<input type="checkbox"/>
0	<input type="checkbox"/>	<input type="text" value="500"/>	<input type="text" value="kbps"/>	<input type="checkbox"/>
1	<input type="checkbox"/>	<input type="text" value="500"/>	<input type="text" value="kbps"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="text" value="500"/>	<input type="text" value="kbps"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="text" value="500"/>	<input type="text" value="kbps"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="text" value="500"/>	<input type="text" value="kbps"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="text" value="500"/>	<input type="text" value="kbps"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="text" value="500"/>	<input type="text" value="kbps"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="text" value="500"/>	<input type="text" value="kbps"/>	<input type="checkbox"/>

Port Shaper		
Enable	Rate	Unit
<input type="checkbox"/>	500	kbps

Apply Reset Cancel

QoS Egress Port Scheduler and Shapers Port 1 Home > Configuration > QoS > Port Scheduler

Port	Port 1
Scheduler Mode	Weighted

Queue Shaper					Queue Scheduler	
Queue	Enable	Rate	Unit	Excess	Weight	Percent
*	<input type="checkbox"/>	500	<>	<input type="checkbox"/>		
0	<input type="checkbox"/>	500	kbps	<input type="checkbox"/>	17	
1	<input type="checkbox"/>	500	kbps	<input type="checkbox"/>	17	
2	<input type="checkbox"/>	500	kbps	<input type="checkbox"/>	17	17%
3	<input type="checkbox"/>	500	kbps	<input type="checkbox"/>	17	17%
4	<input type="checkbox"/>	500	kbps	<input type="checkbox"/>	17	17%
5	<input type="checkbox"/>	500	kbps	<input type="checkbox"/>	17	17%
6	<input type="checkbox"/>	500	kbps	<input type="checkbox"/>		
7	<input type="checkbox"/>	500	kbps	<input type="checkbox"/>		

If you select the scheduler mode with weighted, then the screen will change as the figure.

Port Shaper		
Enable	Rate	Unit
<input type="checkbox"/>	500	kbps

Apply Reset Cancel

Figure 2-19.3: The QoS Egress Port Schedules

**Parameter Description:**

- **Port :**  
The logical port for the settings contained in the same row. Click on the port number in order to configure the schedulers.
- **Qn :**  
Shows the weight for this queue and port.
- **Scheduler Mode :**  
Controls whether the scheduler mode is "Strict Priority" or "Weighted" on this switch port.

- **Queue Shaper Enable :**  
Controls whether the queue shaper is enabled for this queue on this switch port.
- **Queue Shaper Rate :**  
Controls the rate for the queue shaper. The default value is 500. This value is restricted to 100-1000000 when the "Unit" is "kbps", and it is restricted to 1-13200 when the "Unit" is "Mbps".
- **Queue Shaper Unit :**  
Controls the unit of measure for the queue shaper rate as "kbps" or "Mbps". The default value is "kbps".
- **Queue Shaper Excess :**  
Controls whether the queue is allowed to use excess bandwidth.
- **Queue Scheduler Weight :**  
Controls the weight for this queue. The default value is "17". This value is restricted to 1-100. This parameter is only shown if "Scheduler Mode" is set to "Weighted".
- **Queue Scheduler Percent :**  
Shows the weight in percent for this queue. This parameter is only shown if "Scheduler Mode" is set to "Weighted"
- **Port Shaper Enable :**  
Controls whether the port shaper is enabled for this switch port.
- **Port Shaper Rate :**  
Controls the rate for the port shaper. The default value is 500. This value is restricted to 100-1000000 when the "Unit" is "kbps", and it is restricted to 1-13200 when the "Unit" is "Mbps".
- **Port Shaper Unit :**  
Controls the unit of measure for the port shaper rate as "kbps" or "Mbps". The default value is "kbps".

#### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Cancel :**  
Click to undo any changes made locally and return to the previous page.

## 2-19.5 Port Tag Remarking

The Section provides user to get an overview of QoS Egress Port Tag Remarking for all switch ports. Others the ports belong to the currently selected stack unit, as reflected by the page header.

### Web Interface

To configure the QoS Port Tag Remarking in the web interface:

1. Click Configuration, QoS and Port Tag Remarking.
2. Click the Port and display the QoS Port Tag Remarking.
3. Scroll the Port and Tag Remarking Mode and specify the Queue Shaper parameter.
4. Click the Apply to save the setting.
5. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values.

QoS Egress Port Tag Remarking Home > Configuration > QoS > Port Tag Remarking

Port	Mode
1	
2	Classified
3	Classified
4	Classified

**Click the Port index to set the QoS Port Tag Remarking.**

QoS Egress Port Tag Remarking Port 1 Home > Configuration > QoS > Port Tag Remarking

Port	Port 1
Tag Remarking Mode	Classified

QoS Egress Port Tag Remarking Port 1 Home > Configuration > QoS > Port Tag Remarking

Port	Port 1
Tag Remarking Mode	Default

PCP/DEI Configuration

Default PCP	0
Default DEI	0

Port	Port 1 <input type="button" value="v"/>
Tag Remarking Mode	Mapped <input type="button" value="v"/>

(QoS class, DP level) to (PCP, DEI) Mapping

QoS class	DP level	PCP	DEI
*	*	<> <input type="button" value="v"/>	<> <input type="button" value="v"/>
0	0	1 <input type="button" value="v"/>	0 <input type="button" value="v"/>
0	1	1 <input type="button" value="v"/>	1 <input type="button" value="v"/>
1	0	0 <input type="button" value="v"/>	0 <input type="button" value="v"/>
1	1	0 <input type="button" value="v"/>	1 <input type="button" value="v"/>
2	0	2 <input type="button" value="v"/>	0 <input type="button" value="v"/>
2	1	2 <input type="button" value="v"/>	1 <input type="button" value="v"/>
3	0	3 <input type="button" value="v"/>	0 <input type="button" value="v"/>
3	1	3 <input type="button" value="v"/>	1 <input type="button" value="v"/>

4	0	4 <input type="button" value="v"/>	0 <input type="button" value="v"/>
4	1	4 <input type="button" value="v"/>	1 <input type="button" value="v"/>
5	0	5 <input type="button" value="v"/>	0 <input type="button" value="v"/>
5	1	5 <input type="button" value="v"/>	1 <input type="button" value="v"/>
6	0	6 <input type="button" value="v"/>	0 <input type="button" value="v"/>
6	1	6 <input type="button" value="v"/>	1 <input type="button" value="v"/>
7	0	7 <input type="button" value="v"/>	0 <input type="button" value="v"/>
7	1	7 <input type="button" value="v"/>	1 <input type="button" value="v"/>

Apply

Figure 2-19.5: The Port Tag Remarking

**Parameter Description:**

- **Port :**

The logical port for the settings contained in the same row.  
Click on the port number in order to configure tag remarking.

- **Mode :**
  - Controls the tag remarking mode for this port.
  - Classified: Use classified PCP/DEI values.
  - Default: Use default PCP/DEI values.
  - Mapped: Use mapped versions of QoS class and DP level.
- **PCP/DEI Configuration :**
  - Controls the default PCP and DEI values used when the mode is set to Default.
- **(QoS class, DP level) to (PCP, DEI) Mapping :**
  - Controls the mapping of the classified (QoS class, DP level) to (PCP, DEI) values when the mode is set to Mapped.

**Buttons**

- **Apply :**
  - Click to save changes.
- **Reset :**
  - Click to undo any changes made locally and revert to previously saved values.
- **Cancel :**
  - Click to undo any changes made locally and return to the previous page.



## 2-19.6 Port DSCP

The section will teach user to set the QoS Port DSCP configuration that was allowed you to configure the basic QoS Port DSCP Configuration settings for all switch ports. Others the settings relate to the currently selected stack unit, as reflected by the page header.

### Web Interface

To configure the QoS Port DSCP parameters in the web interface:

1. Click Configuration, QoS and Port DSCP.
2. Evoke to enable or disable the Ingress Translate and Scroll the Classify parameter.
3. Scroll to select Egress Rewrite parameters
4. Click the apply to save the setting
5. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values

Port	Ingress		Egress
	Translate	Classify	Rewrite
*	<input type="checkbox"/>	<> ▼	<> ▼
1	<input type="checkbox"/>	Disable ▼	Disable ▼
N-2	<input type="checkbox"/>	Disable ▼	Disable ▼
N-1	<input type="checkbox"/>	Disable ▼	Disable ▼
N	<input type="checkbox"/>	Disable ▼	Disable ▼

Apply Reset

Figure 2-19.6: The QoS Port DSCP Configuration

### Parameter Description:

- **Port :**

The Port column shows the list of ports for which you can configure dscp ingress and egress settings.

- **Ingress :**

In Ingress settings you can change ingress translation and classification settings for individual ports.

There are two configuration parameters available in Ingress:

1. **Translate:** To Enable the Ingress Translation click the checkbox
2. **Classify:** Classification for a port have 4 different values
  - Disable: No Ingress DSCP Classification.
  - DSCP=0: Classify if incoming (or translated if enabled) DSCP is 0.
  - Selected: Classify only selected DSCP for which classification is enabled as specified in DSCP Translation window for the specific DSCP.
  - All: Classify all DSCP.

- **Egress :**

Port Egress Rewriting can be one of below parameters

- Disable: No Egress rewrite.
- Enable: Rewrite enable without remapped.
- Remap: DSCP from analyzer is remapped and frame is remarked with remapped DSCP value.

**Buttons**

- **Apply :**

Click to save changes.

- **Reset :**

Click to undo any changes made locally and revert to previously saved values.

## 2-19.7 DSCP-Based QoS

The section will teach user to configure the DSCP-Based QoS mode that This page allows you to configure the basic QoS DSCP based QoS Ingress Classification settings for all switches.

### Web Interface

To configure the DSCP –Based QoS Ingress Classification parameters in the web interface:

1. Click Configuration, QoS and DSCP-Based QoS.
2. Evoke to enable or disable the DSCP for Trust
3. Scroll to select QoS Class and DPL parameters
4. Click the save to save the setting
5. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values

DSCP-Based QoS Ingress Classification Home > Configuration > QoS > DSCP-Based QoS

DSCP	Trust	QoS Class	DPL
*	<input type="checkbox"/>	<> ▼	<> ▼
0 (BE)	<input type="checkbox"/>	0 ▼	0 ▼
1	<input type="checkbox"/>	0 ▼	0 ▼
2	<input type="checkbox"/>	0 ▼	0 ▼
3	<input type="checkbox"/>	0 ▼	0 ▼
59	<input type="checkbox"/>	0 ▼	0 ▼
60	<input type="checkbox"/>	0 ▼	0 ▼
61	<input type="checkbox"/>	0 ▼	0 ▼
62	<input type="checkbox"/>	0 ▼	0 ▼
63	<input type="checkbox"/>	0 ▼	0 ▼

Apply Reset

Figure 2-19.7: The DSCP-Based QoS Ingress Classification Configuration

### Parameter Description:

- **DSCP :**  
Maximum number of supported DSCP values are 64.
- **Trust :**  
Click to check if the DSCP value is trusted.

- **QoS Class :**  
QoS Class value can be any of (0-7)
- **DPL :**  
Drop Precedence Level (0-3)

#### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-19.8 DSCP Translation

The section describes the switch allows you to configure the basic QoS DSCP Translation settings for all switches. DSCP translation can be done in Ingress or Egress.

### Web Interface

To configure the DSCP Translation parameters in the web interface:

1. Click Configuration, QoS and DSCP Translation
2. Scroll to set the Ingress Translate and Egress Remap DP0 and Remap DP1 Parameters
3. Evoke to enable or disable Classify
4. Click the apply to save the setting
5. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values

DSCP Translation Home > Configuration > QoS > DSCP Translation

DSCP	Ingress		Egress	
	Translate	Classify	Remap DP0	Remap DP1
*	<input type="text" value="&lt;&gt;"/> ▼	<input type="checkbox"/>	<input type="text" value="&lt;&gt;"/> ▼	<input type="text" value="&lt;&gt;"/> ▼
0 (BE)	<input type="text" value="0 (BE)"/> ▼	<input type="checkbox"/>	<input type="text" value="0 (BE)"/> ▼	<input type="text" value="0 (BE)"/> ▼
1	<input type="text" value="1"/> ▼	<input type="checkbox"/>	<input type="text" value="1"/> ▼	<input type="text" value="1"/> ▼
2	<input type="text" value="2"/> ▼	<input type="checkbox"/>	<input type="text" value="2"/> ▼	<input type="text" value="2"/> ▼
61	<input type="text" value="61"/> ▼	<input type="checkbox"/>	<input type="text" value="61"/> ▼	<input type="text" value="61"/> ▼
62	<input type="text" value="62"/> ▼	<input type="checkbox"/>	<input type="text" value="62"/> ▼	<input type="text" value="62"/> ▼
63	<input type="text" value="63"/> ▼	<input type="checkbox"/>	<input type="text" value="63"/> ▼	<input type="text" value="63"/> ▼

Apply
Reset

Figure 2-19.8: The DSCP Translation Configuration

### Parameter Description:

- **DSCP :**  
Maximum number of supported DSCP values are 64 and valid DSCP value ranges from 0 to 63.
- **Ingress :**  
Ingress side DSCP can be first translated to new DSCP before using the DSCP for QoS class and DPL map.  
There are two configuration parameters for DSCP Translation –
  1. **Translate:** DSCP at Ingress side can be translated to any of (0-63) DSCP values.
  2. **Classify:** Click to enable Classification at Ingress side.

- **Egress :**  
There are following configurable parameters for Egress side –
  1. **Remap:** Select the DSCP value from select menu to which you want to remap. DSCP value ranges from 0 to 63.
- **Remap DP0 :**  
Select the DSCP value from select menu to which you want to remap. DSCP value ranges from 0 to 63.
- **Remap DP1 :**  
Select the DSCP value from select menu to which you want to remap. DSCP value ranges from 0 to 63.

#### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

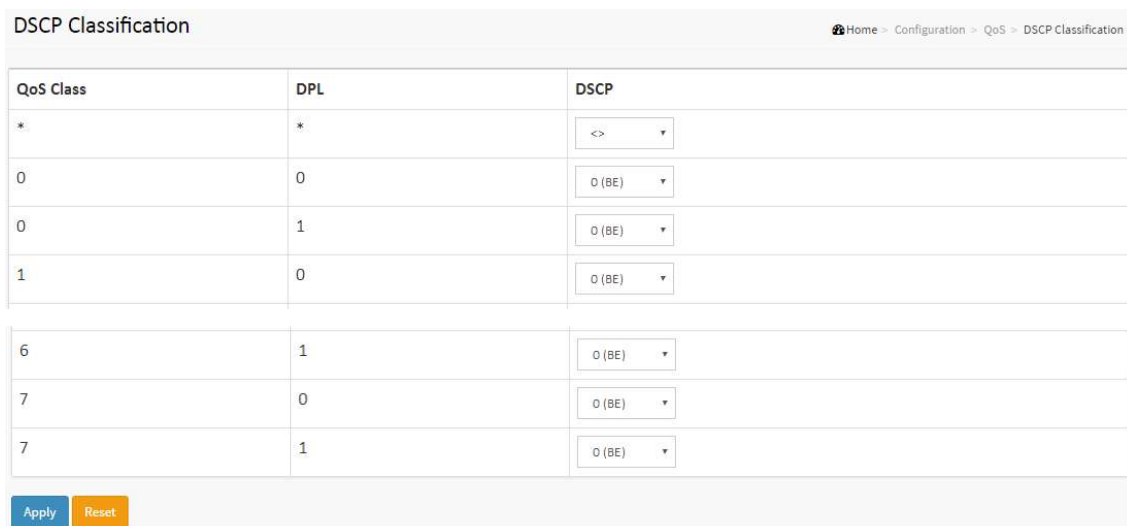
## 2-19.9 DSCP Classification

The section describes to teach user to configure and allows you to map DSCP value to a QoS Class and DPL value. Others the settings relate to the currently selected stack unit, as reflected by the page header.

### Web Interface

To configure the DSCP Classification parameters in the web interface:

1. Click Configuration, QoS and DSCP Translation
2. Scroll to set the DSCP Parameters
3. Click the apply to save the setting
4. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values



QoS Class	DPL	DSCP
*	*	<>
0	0	0 (BE)
0	1	0 (BE)
1	0	0 (BE)
6	1	0 (BE)
7	0	0 (BE)
7	1	0 (BE)

Apply Reset

Figure 2-19.9: The DSCP Classification Configuration

### Parameter Description:

- **QoS Class :**  
Available QoS Class.
- **DPL :**  
Actual Drop Precedence Level.
- **DSCP :**  
Select the classified DSCP value (0-63).

### Buttons

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.





**Parameter Description:**

- **QCE :**  
Indicates the index of QCE.
- **Port :**  
Indicates the list of ports configured with the QCE.
- **DMAC :**  
Indicates the destination MAC address. Possible values are:  
Any: Match any DMAC.  
Unicast: Match unicast DMAC.  
Multicast: Match multicast DMAC.  
Broadcast: Match broadcast DMAC.  
<MAC>: Match specific DMAC.  
The default value is 'Any'.
- **SMAC :**  
Match specific source MAC address or 'Any'.  
If a port is configured to match on DMAC/DIP, this field indicates the DMAC.
- **Tag Type :**  
Indicates tag type. Possible values are:  
Any: Match tagged and untagged frames.  
Untagged: Match untagged frames.  
Tagged: Match tagged frames.  
C-Tagged: Match C-tagged frames.  
S-Tagged: Match S-tagged frames.  
The default value is 'Any'.
- **VID :**  
Indicates (VLAN ID), either a specific VID or range of VIDs. VID can be in the range 1-4095 or 'Any'
- **PCP :**  
Priority Code Point: Valid values of PCP are specific (0, 1, 2, 3, 4, 5, 6, 7) or range (0-1, 2-3, 4-5, 6-7, 0-3, 4-7) or 'Any'.
- **DEI :**  
Drop Eligible Indicator: Valid value of DEI are 0, 1 or 'Any'.
- **Frame Type :**  
Indicates the type of frame to look for incoming frames. Possible frame types are:  
Any: The QCE will match all frame type.  
Ethernet: Only Ethernet frames (with Ether Type 0x600-0xFFFF) are allowed.  
LLC: Only (LLC) frames are allowed.  
SNAP: Only (SNAP) frames are allowed  
IPv4: The QCE will match only IPV4 frames.  
IPv6: The QCE will match only IPV6 frames.
- **Action :**  
Indicates the classification action taken on ingress frame if parameters configured are matched with the frame's content.  
There are three action fields: Class, DPL and DSCP.  
Class: Classified QoS Class; if a frame matches the QCE it will be put in the queue.  
DPL: Drop Precedence Level; if a frame matches the QCE then DP level will set to value displayed under DPL column.

DSCP: If a frame matches the QCE then DSCP will be classified with the value displayed under DSCP column.

- **Modification Buttons :**

You can modify each QCE (QoS Control Entry) in the table using the following buttons:



: Inserts a new QCE before the current row.



: Edits the QCE.



: Moves the QCE up the list.



: Moves the QCE down the list.



: Deletes the QCE.



: The lowest plus sign adds a new entry at the bottom of the QCE listings.

- **Port Members :**

Check the checkbox button in case you want to make any port member of the QCL entry. By default, all ports will be checked

- **Key Parameters :**

Key configurations are described as below:

DMAC Destination MAC address: Possible values are 'Unicast', 'Multicast', 'Broadcast' or 'Any'.

SMAC Source MAC address: xx-xx-xx (24 MS bits OUI) or 'Any'.

Tag Value of Tag field can be 'Untagged', 'Tagged' or 'Any'.

VID Valid value of VLAN ID can be any value in the range 1-4095 or 'Any'; user can enter either a specific value or a range of VIDs.

PCP Valid value PCP are specific (0, 1, 2, 3, 4, 5, 6, 7) or range (0-1, 2-3, 4-5, 6-7, 0-3, 4-7) or 'Any'.

DEI Valid value of DEI can be '0', '1' or 'Any'.

Frame Type Frame Type can have any of the following values

1. Any
2. Ethernet
3. LLC
4. SNAP
5. IPv4
6. IPv6



---

**NOTE:**All frame types are explained below:

**1. Any:**Allow all types of frames.

**2. Ethernet:** Ethernet Type Valid Ethernet type can have value within 0x600-0xFFFF or 'Any', default value is 'Any'.

**3. LLC:** SSAP Address Valid SSAP(Source Service Access Point) can vary from 0x00 to 0xFF or 'Any', the default value is 'Any'  
DSAP Address Valid DSAP(Destination Service Access Point) can vary from 0x00 to 0xFF or 'Any', the default value is 'Any'  
Control Address Valid Control Address can vary from 0x00 to 0xFF or 'Any', the default value is 'Any'

**4. SNAP :** PID Valid PID(a.k.a.Ethernet type) can have value within 0x00-0xFFFF or 'Any', default value is 'Any'

---

---

**5. IPv4:** Protocol IP protocol number: (0-255, TCP or UDP) or 'Any'  
Source IP Specific Source IP address in value/mask format or 'Any'. IP and Mask are in the format x.y.z.w where x, y, z, and w are decimal numbers between 0 and 255. When Mask is converted to a 32-bit binary string and read from left to right, all bits following the first zero must also be zero  
DSCP Diffserv Code Point value (DSCP): It can be specific value, range of value or 'Any'. DSCP values are in the range 0-63 including BE, CS1-CS7, EF or AF11-AF43  
IP Fragment IPv4 frame fragmented option: yes/no/any  
Sport Source TCP/UDP port:(0-65535) or 'Any', specific or port range applicable for IP protocol UDP/TCP  
Dport Destination TCP/UDP port:(0-65535) or 'Any', specific or port range applicable for IP protocol UDP/TCP

**6. IPv6:** Protocol IP protocol number: (0-255, TCP or UDP) or 'Any'  
Source IP IPv6 source address: (a.b.c.d) or 'Any', 32 LS bits  
DSCP Diffserv Code Point value (DSCP): It can be specific value, range of value or 'Any'. DSCP values are in the range 0-63 including BE, CS1-CS7, EF or AF11-AF43  
Sport Source TCP/UDP port:(0-65535) or 'Any', specific or port range applicable for IP protocol UDP/TCP  
Dport Destination TCP/UDP port:(0-65535) or 'Any', specific or port range applicable for IP protocol UDP/TCP

---

- **Action Configuration :**

- Class QoS Class: "class (0-7)", default- basic classification
  - DP Valid DP Level can be (0-3)", default- basic classification
  - DSCP Valid dscp value can be (0-63, BE, CS1-CS7, EF or AF11-AF43) or 'Default'.
  - 'Default' means that the default classified value is not modified by this QCE.

- Buttons**

- **Apply :**

- Click to save changes.

- **Reset :**

- Click to undo any changes made locally and revert to previously saved values.

- **Cancel :**

- Return to the previous page without saving the configuration change.

## 2-19.11 Storm Control

There is a unicast storm rate control, multicast storm rate control, and a broadcast storm rate control. These only affect flooded frames, i.e. frames with a (VLAN ID, DMAC) pair not present on the MAC Address table.

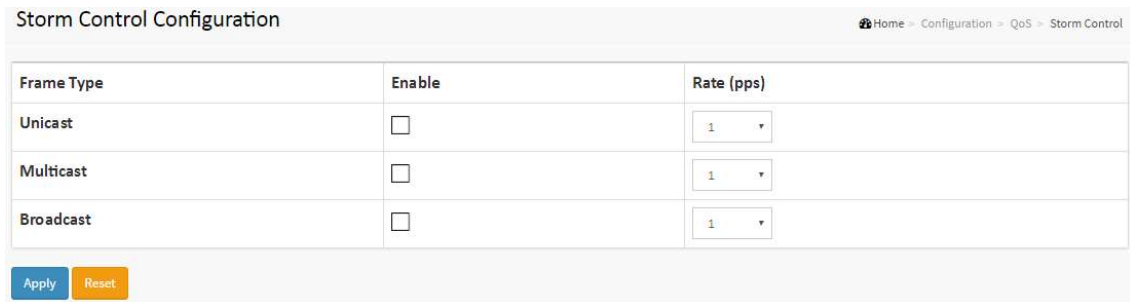
The configuration indicates the permitted packet rate for unicast, multicast or broadcast traffic across the switch.

### Web Interface

To configure the Storm Control Configuration parameters in the web interface:

1. Click Configuration, QoS and Storm Control.
2. Evoke to select the frame type to enable storm control
3. Scroll to set the Rate Parameters
4. Click the apply to save the setting

5. If you want to cancel the setting then you need to click the Reset button. It will revert to previously saved values



Frame Type	Enable	Rate (pps)
Unicast	<input type="checkbox"/>	1 ▾
Multicast	<input type="checkbox"/>	1 ▾
Broadcast	<input type="checkbox"/>	1 ▾

Apply Reset

Figure 2-19.11: The Storm Control Configuration

**Parameter Description:**

- **Port :**  
The port number for which the configuration below applies.
- **Frame Type :**  
The settings in a particular row apply to the frame type listed here: Unicast, Multicast or Broadcast.
- **Enable :**  
Enable or disable the storm control status for the given frame type.
- **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 1024K.Buttons
- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-20 Mirroring

To debug network problems, selected traffic can be copied, or mirrored, on a mirror port where a frame analyzer can be attached to analyze the frame flow.

The traffic to be copied on the mirror port is selected as follows:

All frames received on a given port (also known as ingress or source mirroring).

All frames transmitted on a given port (also known as egress or destination mirroring).

### Web Interface

To configure the Mirror in the web interface:

1. Click Configuration and Mirroring
2. Scroll to select Port to mirror on which port
3. Scroll to disabled, enable, TX Only and RX only to set the Port mirror mode
4. Click the apply to save the setting
5. If you want to cancel the setting then you need to click the Reset button.

It will revert to previously saved values

Mirror Configuration Home > Configuration > Mirroring

Port to mirror to: Disabled

Port	Mode
*	<>
1	Disabled
N-1	Disabled
N	Disabled
CPU	Disabled

Apply Reset

Figure 2-20: The Mirroring Configuration

## Parameter Description:

### Port to mirror on

Port to mirror also known as the mirror port. Frames from ports that have either source (rx) or destination (tx) mirroring enabled are mirrored on this port. Disabled disables mirroring.

### Mirror Port Configuration

The following table is used for Rx and Tx enabling.

- **Port :**  
The logical port for the settings contained in the same row.
- **Mode :**  
Select mirror mode.  
Rx only Frames received on this port are mirrored on the mirror port. Frames transmitted are not mirrored.  
Tx only Frames transmitted on this port are mirrored on the mirror port. Frames received are not mirrored.  
Disabled neither frames transmitted nor frames received are mirrored.  
Enabled Frames received and frames transmitted are mirrored on the mirror port.



---

**NOTE:** For a given port, a frame is only transmitted once. It is therefore not possible to mirror Tx frames on the mirror port. Because of this, mode for the selected mirror port is limited to Disabled or Rx only.

---

### Buttons

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-21 UPnP

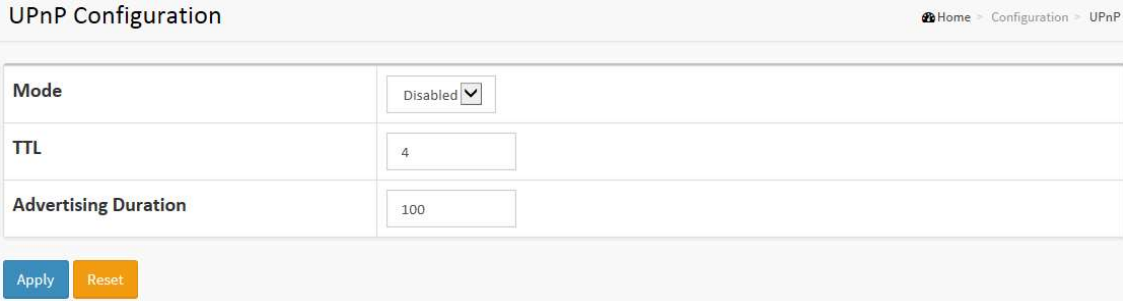
UPnP is an acronym for Universal Plug and Play. The goals of UPnP are to allow devices to connect seamlessly and to simplify the implementation of networks in the home (data sharing, communications, and entertainment) and in corporate environments for simplified installation of computer components

### Web Interface

To configure the UPnP Configuration in the web interface:

1. Click Configuration and UPnP.
2. Scroll to select the mode to enable or disable.
3. Specify the parameters in each blank field.
4. Click apply to save the setting.
5. If you want to cancel the setting then you need to click the Reset button.

It will revert to previously saved values.



UPnP Configuration	
Mode	Disabled
TTL	4
Advertising Duration	100

Apply Reset

Figure 2-21: The UPnP Configuration

### Parameter Description:

- **Mode :**

Indicates the UPnP operation mode. Possible modes are:

- **Enabled:** Enable UPnP mode operation.
- **Disabled:** Disable UPnP mode operation.

When the mode is enabled, two ACEs are added automatically to trap UPnP related packets to CPU. The ACEs are automatically removed when the mode is disabled.

- **TTL :**

The TTL value is used by UPnP to send SSDP advertisement messages. Valid values are in the range 1 to 255.

- **Advertising Duration :**

The duration, carried in SSDP packets, is used to inform a control point or control points how often it or they should receive an SSDP advertisement message from this switch. If a control point does not receive any message within the duration, it will think that the switch no longer exists. Due to the unreliable nature of UDP, in the standard it is recommended that such refreshing of advertisements to be done at less than one-half of the advertising duration. In the implementation, the switch sends SSDP messages periodically at the interval one-half of the advertising duration minus 30 seconds. Valid values are in the range 100 to 86400.

### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.



## 2-22 GVRP

The Generic Attribute Registration Protocol (GARP) provides a generic framework whereby devices in a bridged LAN, e.g. end stations and switches, can register and de-register attribute values, such as VLAN Identifiers, with each other. In doing so, the attributes are propagated to devices in the bridged LAN, and these devices form a 'reachability' tree that is a subset of an active topology. GARP defines the architecture, rules of operation, state machines and variables for the registration and de-registration of attribute values.

A GARP participation in a switch or an end station consists of a GARP application component, and a GARP Information Declaration (GID) component associated with each port or the switch. The propagation of information between GARP participants for the same application in a bridge is carried out by the GARP Information Propagation (GIP) component. Protocol exchanges take place between GARP participants by means of LLC Type 1 services, using the group MAC address and PDU format defined for the GARP application concerned.

### 2-22.1 Global Config

This page allows you to configure the basic GVRP Configuration settings for all switch ports.

#### Web Interface

To configure the GVRP in the web interface:

1. Click Configuration, GVRP and Global Config
2. Evoke to enable or disable the GVRP.
3. Specify Join-time, Leave-time, Leave All-time, Max VLANs
4. Click apply to save the setting.
5. If you want to cancel the setting then you need to click the Reset button.

It will revert to previously saved values.

Parameter	Value
Enable GVRP	<input type="checkbox"/>
Join-time:	20 (1-20)
Leave-time:	60 (60-300)
LeaveAll-time:	1000 (1000-5000)
Max VLANs:	20

Figure 2-22.1: The GVRP Configuration

**Parameter Description:****Enable GVRP globally**

The GVRP feature is enabled by setting the check mark in the checkbox named Enable GVRP.

**GVRP protocol timers**

Join-time is a value in the range 1-20 in the units of centi seconds, i.e. in units of one hundredth of a second. The default is 20.


Leave-time is a value in the range 60-300 in the units of centi seconds, i.e. in units of one hundredth of a second. The default is 60.

Leave All-time is a value in the range 1000-5000 in the units of centi seconds, i.e. in units of one hundredth of a second. The default is 1000.

**Max number of VLANs**

When GVRP is enabled a maximum number of VLANs supported by GVRP is specified. By default, this number is 20. This number can only be changed when GVRP is turned off.

**Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
-  **Refresh :**  
Refreshes the displayed table starting from the input fields.

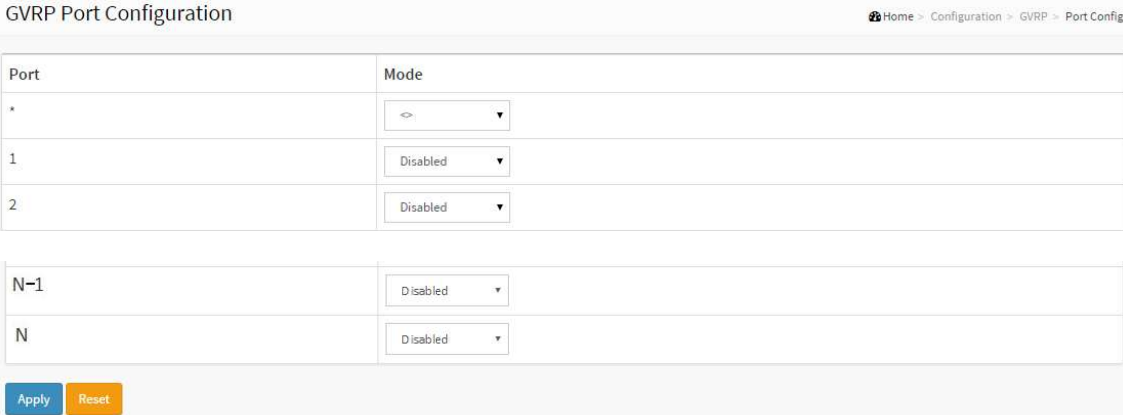
## 2-22.2 Port Config

This page allows you to configure the basic GVRP Configuration settings for all switch ports. The settings relate to the currently selected unit, as reflected by the page header.

### Web Interface

To configure the GVRP in the web interface:

1. Click Configuration, GVRP and Port Config
2. Evoke to enable or disable the Mode.
3. Click apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button.  
It will revert to previously saved values.



Port	Mode
*	<>
1	Disabled
2	Disabled
N-1	Disabled
N	Disabled

Apply Reset

Figure 2-22.2: The GVRP Configuration

### Parameter Description:

- **Port :**  
The Port column shows the list of ports.
- **Mode :**  
This configuration is to enable/disable GVRP Mode on particular port locally.  
Disable: Select to Disable GVRP mode on this port.  
GVRP Enable: Select to Enable GVRP mode on this port.

### Buttons

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.

## 2-23 sFlow

The sFlow Collector configuration for the switch can be monitored and modified here. The configuration is divided into two parts: Configuration of the sFlow receiver (a.k.a. sFlow collector) and configuration of per-port flow and counter samplers.

sFlow configuration is not persisted to non-volatile memory, which means that a reboot or master change will disable sFlow sampling.

### Web Interface

To configure the sFlow in the web interface:

1. Click Configuration and sFlow.
2. Set the parameters.
3. Click apply to save the setting.
4. If you want to cancel the setting then you need to click the Reset button.

It will revert to previously saved values.

#### sFlow Configuration

Home > Configuration > sFlow

##### Agent Configuration

IP Address	<input type="text" value="127.0.0.1"/>
------------	--

##### Receiver Configuration

Owner	<input type="text" value="&lt;none&gt;"/> <a href="#">Release</a>
IP Address/Hostname	<input type="text" value="0.0.0.0"/>
UDP Port	<input type="text" value="6343"/>
Timeout	<input type="text" value="0"/> seconds
Max. Datagram Size	<input type="text" value="1400"/> bytes

##### Port Configuration

Port	Flow Sampler				Counter Poller	
	Enabled	Sampler Type	Sampling Rate	Max. Header	Enabled	Interval
*	<input type="checkbox"/>	<input type="text" value="&lt;&gt;"/>	<input type="text" value="0"/>	<input type="text" value="128"/>	<input type="checkbox"/>	<input type="text" value="0"/>
1	<input type="checkbox"/>	<input type="text" value="Tx"/>	<input type="text" value="0"/>	<input type="text" value="128"/>	<input type="checkbox"/>	<input type="text" value="0"/>
2	<input type="checkbox"/>	<input type="text" value="Tx"/>	<input type="text" value="0"/>	<input type="text" value="128"/>	<input type="checkbox"/>	<input type="text" value="0"/>
N-1	<input type="checkbox"/>	<input type="text" value="Tx"/>	<input type="text" value="0"/>	<input type="text" value="128"/>	<input type="checkbox"/>	<input type="text" value="0"/>
N	<input type="checkbox"/>	<input type="text" value="Tx"/>	<input type="text" value="0"/>	<input type="text" value="128"/>	<input type="checkbox"/>	<input type="text" value="0"/>

[Apply](#) [Reset](#)

Figure 2-23: The sFlow Configuration

## Parameter Description:

### Agent Configuration

- **IP Address :**

The IP address used as Agent IP address in sFlow datagrams. It serves as a unique key that will identify this agent over extended periods of time.

Both IPv4 and IPv6 addresses are supported.

### Receiver Configuration

- **Owner :**

Basically, sFlow can be configured in two ways: Through local management using the Web or CLI interface or through SNMP. This read-only field shows the owner of the current sFlow configuration and assumes values as follows:

- If sFlow is currently unconfigured/unclaimed, Owner contains <none>.
- If sFlow is currently configured through Web or CLI, Owner contains <Configured through local management>.
- If sFlow is currently configured through SNMP, Owner contains a string identifying the sFlow receiver.

If sFlow is configured through SNMP, all controls - except for the Release-button - are disabled to avoid inadvertent reconfiguration.

The Release button allows for releasing the current owner and disable sFlow sampling. The button is disabled if sFlow is currently unclaimed. If configured through SNMP, the release must be confirmed (a confirmation request will appear).

- **IP Address/Hostname :**

The IP address or hostname of the sFlow receiver. Both IPv4 and IPv6 addresses are supported.

- **UDP Port :**

The UDP port on which the sFlow receiver listens to sFlow datagrams. If set to 0 (zero), the default port (6343) is used.

- **Timeout :**

The number of seconds remaining before sampling stops and the current sFlow owner is released. While active, the current time left can be updated with a click on the Refresh-button. If locally managed, the timeout can be changed on the fly without affecting any other settings.

- **Max. Datagram Size :**

The maximum number of data bytes that can be sent in a single sample datagram. This should be set to a value that avoids fragmentation of the sFlow datagrams. Valid range is 200 to 1468 bytes with default being 1400 bytes.

### Port Configuration

- **Port :**

The port number for which the configuration below applies.

- **Flow Sampler Enabled :**

Enables/disables flow sampling on this port.

- **Flow Sampler Sampling Rate :**

The statistical sampling rate for packet sampling. Set to N to sample on average 1/Nth of the packets transmitted/received on the port.

Not all sampling rates are achievable. If an unsupported sampling rate is requested, the switch will automatically adjust it to the closest achievable. This will be reported back in this field.

- **Flow Sampler Max. Header :**  
The maximum number of bytes that should be copied from a sampled packet to the sFlow datagram. Valid range is 14 to 200 bytes with default being 128 bytes.  
If the maximum datagram size does not take into account the maximum header size, samples may be dropped.
- **Counter Poller Enabled :**  
Enables/disables counter polling on this port.
- **Counter Poller Interval :**  
With counter polling enabled, this specifies the interval - in seconds - between counter poller samples.

#### **Buttons**

- **Apply :**  
Click to save changes.
- **Reset :**  
Click to undo any changes made locally and revert to previously saved values.
- **Release :**  
See description under Owner.
- **Refresh :**  
Click to refresh the page. Note that unsaved changes will be lost.

This chapter describes all of the basic network statistics which includes the Ports, Layer 2 network protocol (e.g. NAS, ACL, DHCP, AAA and RMON etc.) and any setting of the Switch.

### 3-1 System

After you login, the switch shows you the system information. This page is default and tells you the basic information of the system, including "Model Name", "System Description", "Contact", "Location", "System Up Time", "Firmware Version", "Host Mac Address", "Device Port". With this information, you will know the software version used, MAC address, serial number, how many ports good and so on. This is helpful while malfunctioning.

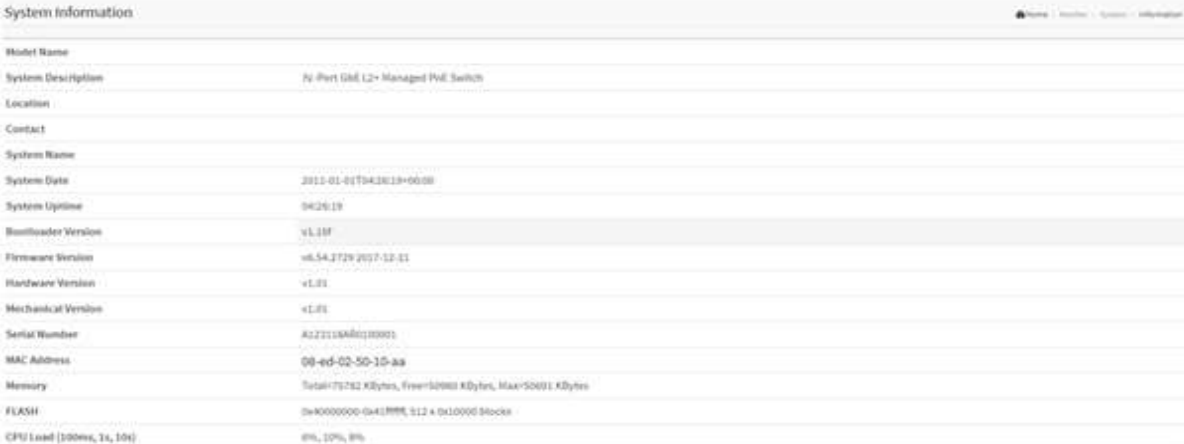
#### 3-1.1 Information

The switch system information is provided here.

##### Web Interface

To display System Information in the web interface:

1. Click Monitor, System and Information.
2. Check the contact information for the system administrator as well as the name and location of the switch. Also indicate the local time zone by configuring the appropriate offset.
3. Click the "Refresh"



System Information	
Model Name	
System Description	79-Port GbE L2+ Managed PVE Switch
Location	
Contact	
System Name	
System Date	2015-01-01T04:30:13+00:00
System Uptime	04:26:19
Bootloader Version	v1.18F
Firmware Version	v6.54.2729.2017-12-11
Hardware Version	v1.01
Mechanical Version	v1.01
Serial Number	KJ2211MA80120001
MAC Address	08-ec-d2-50-10-aa
Memory	Total=75762 KBytes, Free=50960 KBytes, Max=50001 KBytes
FLASH	0x40000000-0x41000000, 512 x 0x10000 blocks
CPU Load (300ms, 1s, 5m)	0%, 10%, 8%

Figure 3-1.1: System Information

**Parameter Description:**

- **Model Name :**  
Displays the factory defined model name for identification purpose.
- **System Description :**  
Displays the system description.
- **Location :**  
The system location configured in Configuration | System | Information | System Location.
- **Contact :**  
The system contact configured in Configuration | System | Information | System Contact.
- **System Name :**  
Displays the user-defined system name that configured in System | System Information | Configuration | System Name.
- **System Date :**  
The current (GMT) system time and date. The system time is obtained through the Timing server running on the switch, if any.
- **System Uptime :**  
The period of time the device has been operational.
- **Bootloader Version :**  
Displays the current boot loader version number.
- **Firmware Version :**  
Displays the current firmware version number.
- **Hardware Version :**  
Displays the hardware version of the device.
- **Mechanical Version :**  
Displays the mechanical version of the device.
- **Serial Number :**  
Displays the unique serial number that assigned to the device.
- **MAC Address :**  
The MAC Address of this switch.
- **Memory :**  
Displays the memory size of the system.
- **FLASH :**  
Displays the flash size of the system.
- **CPU Load (100ms, 1s, 10s) :**  
Displays the cpu loading(100ms, 1s, 10s) of the system.



### 3-1.2 IP Status

This page displays the status of the IP protocol layer. The status is defined by the IP interfaces, the IP routes and the neighbor cache (ARP cache) status.

#### Web Interface

To display the log configuration in the web interface:

1. Click Monitor, System and IP Status.
2. Display the IP address information.

The screenshot shows the 'IP Interfaces' page in a web interface. At the top right, there is a breadcrumb trail: Home > Monitor > System > IP Status. Below the title, there is an 'Auto-refresh' checkbox and a refresh button. The main content is divided into three sections: 'IP Interfaces', 'IP Routes', and 'Neighbour cache'.

**IP Interfaces**

Interface	Type	Address	Status
VLAN1	LINK	08-ed-02-50-10-aa	<UP BROADCAST RUNNING MULTICAST>
VLAN1	IPv4	192.168.1.1/24	
VLAN1	IPv4	169.254.0.1/16	
VLAN1	IPv6	fe80::240:c7ff:fe26:2401/64	
VLAN4096	LINK	08-ed-02-26-24-01	<BROADCAST MULTICAST>
VLAN4097	LINK	08-ed-02-26-24-01	<BROADCAST MULTICAST>

**IP Routes**

Network	Gateway	Status
0.0.0.0/0	192.168.1.254	<UP GATEWAY HW_RT>
127.0.0.0/8	127.0.0.1	<UP>
127.0.0.1/32	127.0.0.1	<UP HOST>
169.254.0.0/16	VLAN1	<UP HW_RT>
192.168.1.0/24	VLAN1	<UP HW_RT>
::1/128	::1	<UP HOST>

**Neighbour cache**

IP Address	Link Address
192.168.1.1	VLAN1:08-ed-02-50-10-aa
192.168.1.123	VLAN1: 08-ed-02-5d-10-aa
fe80::240:c7ff:fe26:2401	VLAN1:08-ed-02-50-10-aa

**DNS Server**

Type	IP Address	Interface
Static	8.8.8.8	

Figure 3-1.2: The IP Status

### Parameter Description:

#### IP Interfaces

- **Interface :**  
Show the name of the interface.
- **Type :**  
Show the address type of the entry. This may be LINK or IPv4.
- **Address :**  
Show the current address of the interface (of the given type).
- **Status :**  
Show the status flags of the interface (and/or address).

#### IP Routes

- **Network :**  
Show the destination IP network or host address of this route.
- **Gateway :**  
Show the gateway address of this route.
- **Status :**  
Show the status flags of the route.

#### NeighborCache

- **IP Address :**  
Show the IP address of the entry.
- **Link Address :**  
Show the Link (MAC) address for which a binding to the IP address given exist.

#### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- **Refresh :**  
Click to refresh the page immediately.

### 3-1.3 Log







The switch system log information is provided here.

#### Web Interface

To display the log configuration in the web interface:

1. Click Monitor, System and Log.
2. Display the system log information.

System Log Information Home > Monitor > System > Log

Auto-refresh       

Level	All <input type="button" value="v"/>
Clear Level	All <input type="button" value="v"/>

The total number of entries is 10 for the given level.  
Start from ID ,  entries per page.

ID	Level	Time	Message	iPush Status
1	Warning	2011-01-01T00:00:15+00:00	Switch just made a cold boot	
2	Warning	2011-01-01T00:00:15+00:00	Link up on port 1	
3	Info	2011-01-01T00:00:16+00:00	topologyChange	
4	Info	2011-01-01T00:00:18+00:00	topologyChange	
5	Info	2011-01-01T00:00:57+00:00	Topology: New Device(192.168.1.3) a ...	
6	Info	2011-01-01T00:01:41+00:00	Login passed for user 'admin'	
7	Info	2011-01-01T00:01:41+00:00	Login passed for user 'admin'	
8	Info	2011-01-01T00:16:21+00:00	User 'admin' logout	
9	Info	2011-01-01T00:16:21+00:00	User 'admin' logout	
10	Info	2011-01-01T00:19:25+00:00	Login passed for user 'admin'	







Figure 3-1.3: The System Log Information

#### Parameter Description:

- **ID :**  
The identification of the system log entry.
- **Level :**  
The level of the system log entry.
  - Emerg: The system log entry is belonged emergency level.
  - Alert: The system log entry is belonged alert level.
  - Crit: The system log entry is belonged critical level.
  - Error: The system log entry is belonged error level.
  - Warning: The system log entry is belonged warning level.
  - Notice: The system log entry is belonged notice level.
  - Info: The system log entry is belonged information level.
  - Debug: The system log entry is belonged debug level.

- **Time :**  
The occurred time of the system log entry.
- **Message :**  
The detail message of the system log entry.
- **iPush Status :**  
The status of sending this syslog to iPush server.

#### **Buttons**

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page immediately.
-  **Clear :**  
Flushes the selected log entries.
-  **:**  
Updates the system log entries, starting from the first available entry ID.
-  **:**  
Updates the system log entries, ending at the last entry currently displayed.
-  **:**  
Updates the system log entries, starting from the last entry currently displayed.
-  **:**  
Updates the system log entries, ending at the last available entry ID.

### 3-1.4 Detailed Log

The switch system detailed log information is provided here.

#### Web Interface

To display the detailed log configuration in the web interface:

1. Click Monitor, System and Detailed Log.
2. Display the log information.

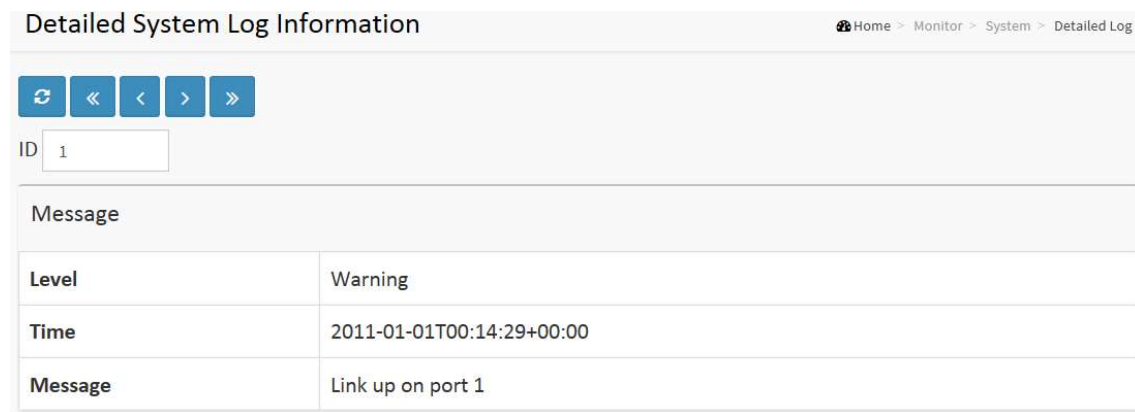







Figure 3-1.4: The Detailed System Log Information

#### Parameter Description:

- **ID :**  
The ID ( $\geq 1$ ) of the system log entry.
- **Message :**  
The detailed message of the system log entry.

#### Buttons

-  **Refresh :**  
Updates the system log entry to the current entry ID.
-  **:**  
Updates the system log entry to the first available entry ID.
-  **:**  
Updates the system log entry to the previously available entry ID.
-  **:**  
Updates the system log entry to the next available entry ID.
-  **:**  
Updates the system log entry to the last available entry ID.

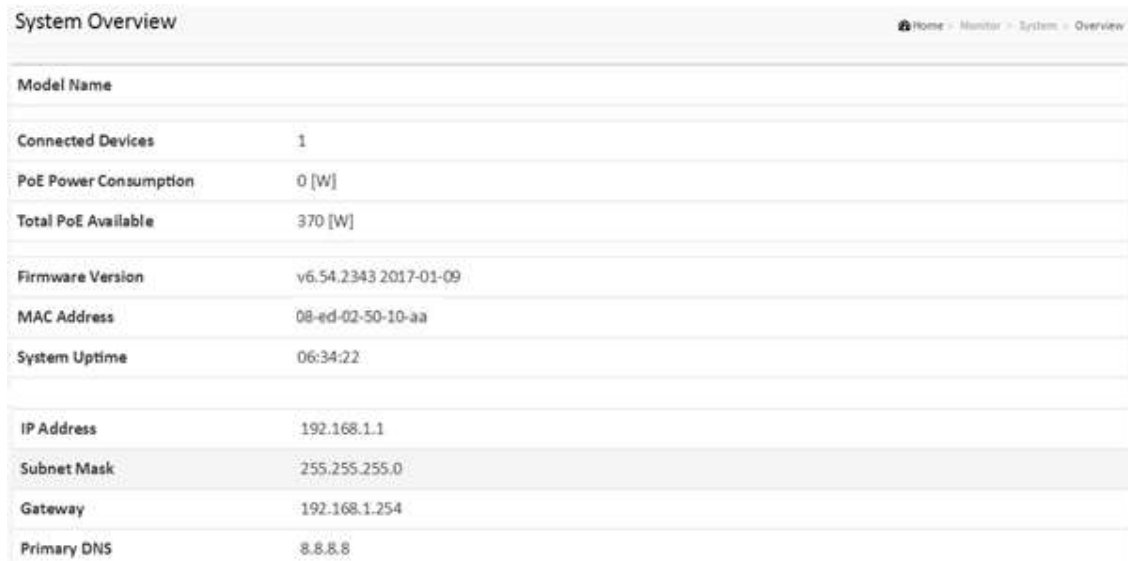
### 3-1.5 Overview

The switch system overview is provided here.

#### Web Interface

To display the switch system overview in the web interface:

1. Click Monitor, System and Detailed Log.
2. Display the switch system overview.



The screenshot shows a web interface titled "System Overview" with a breadcrumb trail: Home > Monitor > System > Overview. The interface displays a table of system parameters:

Model Name	
Connected Devices	1
PoE Power Consumption	0 [W]
Total PoE Available	370 [W]
Firmware Version	v6.54.2343 2017-01-09
MAC Address	08-ed-02-50-10-aa
System Uptime	06:34:22
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Gateway	192.168.1.254
Primary DNS	8.8.8.8

Figure 3-1.5: The System Overview

#### Parameter Description:

- **Model Name :**  
Displays the factory defined model name for identification purpose.
- **Connected Devices :**  
Total of currently connected devices.
- **PoE Power Consumption :**  
Current PoE power consumption.
- **Total PoE Available :**  
Total PoE Budget availability.
- **Firmware Version :**  
Displays the current firmware version number.
- **MAC Address :**  
The MAC Address of this switch.
- **System Uptime :**  
The period of time the device has been operational.
- **IP Address :**  
The IPv4 or IPv6 address of the interface.

- **Subnet Mask :**  
The IPv4 or IPv6 network mask of the interface.
- **Gateway :**  
The IP address of the IP gateway.
- **Primary DNS :**  
The IP address of the DNS Server.

## 3-2 Green Ethernet

### 3-2.1 Port Power Savings

This page provides the current status for EEE.

#### Web Interface

To display the switch system overview in the web interface:

1. Click Monitor, Green Ethernet and Port Power Savings.
2. Display the Port Power Saving Status.




Port	Link	EEE	LP EEE Cap	EEE Savings
1		✗	✓	✗
2		✗	✗	✗
N-2		✗	✗	✗
N-1		✗	✗	✗
N		✗	✗	✗

Figure 3-2.1: The Port Power Saving Status

#### Parameter Description:

- **Local Port :**  
This is the logical port number for this row.
- **Link :**  
Shows if the link is up for the port (green = link up, red = link down).
- **EEE :**  
Shows if EEE is enabled for the port (reflects the settings at the Port Power Savings configuration page).
- **LP EEE Cap :**  
Shows if the link partner is EEE capable.
- **EEE Savings :**  
Shows if the system is currently saving power due to EEE. When EEE is enabled, the system will be powered down if no frame has been received or transmitted in 5 uSec.

#### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.



### 3-3 Ports

The section describes to configure the Port detail parameters of the switch. Others you could using the Port configure to enable or disable the Port of the switch. Monitor the ports content or status in the function.

#### 3-3.1 Traffic Overview

This page provides an overview of general traffic statistics for all switch ports.

##### Web Interface

To Display the Port Statistics Overview in the web interface:

1. Click Monitor, Port and Traffic Overview.
2. If you want to auto-refresh then you need to evoke the "Auto-refresh".
3. Click "Refresh "to refresh the port statistics or clear all information when you click "Clear".



Port	Packets		Bytes		Errors		Drops		Filtered
	Received	Transmitted	Received	Transmitted	Received	Transmitted	Received	Transmitted	Received
1	44536	466367	9920854	55165833	0	0	0	0	4
2	0	0	0	0	0	0	0	0	0
N-2	0	0	0	0	0	0	0	0	0
N-1	0	0	0	0	0	0	0	0	0
N	0	0	0	0	0	0	0	0	0

Figure 3-3.1: The PortStatistics Overview

##### Parameter Description:

- **Port :**  
The logical port for the settings contained in the same row.
- **Packets :**  
The number of received and transmitted packets per port.
- **Bytes :**  
The number of received and transmitted bytes per port.
- **Errors :**  
The number of frames received in error and the number of incomplete transmissions per port.
- **Drops :**  
The number of frames discarded due to ingress or egress congestion.
- **Filtered :**  
The number of received frames filtered by the forwarding

### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.
-  **Clear :**  
Flushes the selected log entries.

### 3-3.2 QoS Statistics

This page provides statistics for the different queues for all switch ports.

#### Web Interface

To Display the Queuing Counters in the web interface:

1. Click Monitor, Ports and QoS Statistics
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
3. Click "Refresh" to refresh the Queuing Counters or clear all information when you click "Clear".



Port	Q0		Q1		Q2		Q3		Q4		Q5		Q6		Q7	
	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx
1	44725	0	0	0	0	0	0	0	0	0	0	0	0	0	0	467753
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 3-3.2: The Queuing Counters Overview

#### Parameter Description:

- **Port :**  
The logical port for the settings contained in the same row.
- **Qn :**  
Qn is the Queue number. There are 8 QoS queues per port. Q0 is the lowest priority queue.
- **Rx/Tx :**  
The number of received and transmitted packets per queue.

#### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.
-  **Clear :**  
Flushes the selected log entries.

### 3-3.3 QCL Status

The section will let you know how to configure and shows the QCL status by different QCL users. Each row describes the QCE that is defined. It is a conflict if a specific QCE is not applied to the hardware due to hardware limitations. The maximum number of QCEs is 256 on each switch.

#### Web Interface

To display the QoS Control List Status in the web interface:

1. Click Monitor, Ports and QCL Status
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
3. Scroll to select the combined, static, Voice VLAN and conflict.
4. To click the "Refresh" to refresh an entry of the MVR Statistics Information.

User	QCE	Port	Frame Type	Action			Conflict
				CoS	DPL	DSCP	
No entries							

Figure 3-3.3: The QoS Control List Status

#### Parameter Description:

- **User :**  
Indicates the QCL user.
- **QCE :**  
Indicates the index of QCE.
- **Port :**  
Indicates the list of ports configured with the QCE.
- **Frame Type :**  
Indicates the type of frame to look for incoming frames. Possible frame types are:  
Any: The QCE will match all frame type.  
Ethernet: Only Ethernet frames (with Ether Type 0x600-0xFFFF) are allowed.  
LLC: Only (LLC) frames are allowed  
LLC: Only (SNAP) frames are allowed.  
IPv4: The QCE will match only IPV4 frames.  
IPv6: The QCE will match only IPV6 frames.
- **Action :**  
Indicates the classification action taken on ingress frame if parameters configured are matched with the frame's content.  
There are three action fields: Class, DPL and DSCP.
  - Class: Classified QoS Class; if a frame matches the QCE it will be put in the queue.
  - DPL: Drop Precedence Level; if a frame matches the QCE then DP level will set to value displayed under DPL column.

- DSCP: If a frame matches the QCE then DSCP will be classified with the value displayed under DSCP column.

- **Conflict :**

Displays Conflict status of QCL entries. It may happen that resources required to add a QCE may not be available, in that case it shows conflict status as 'Yes', otherwise it is always 'No'. Please note that conflict can be resolved by releasing the H/W resources required to add QCL entry on pressing 'Resolve Conflict' button.

### Buttons

- **Auto-refresh :**

Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.

-  **Refresh :**

Click to refresh the page.

-  **Combined :**

Select the QCL status from this drop-down list.

-  **Resolve Conflict :**

Click to release the resources required to add QCL entry, in case the conflict status for any QCL entry is 'yes'.

### 3-3.4 Detailed Statistics



The section describes how to provide detailed traffic statistics for a specific switch port. Use the port select box to select which switch port details to display.

The displayed counters are the totals for receive and transmit, the size counters for receive and transmit, and the error counters for receive and transmit.

#### Web Interface

To Display per port detailed Statistics Overview in the web interface:

1. Click Monitor, Ports and Detailed Port Statistics
2. Scroll the Port Index to select which port you want to show the detailed
3. Port statistics overview.
4. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
5. Click "Refresh" to refresh the port detailed statistics or clear all information when you click "Clear".

Detailed Port Statistics Port 1				Home > Monitor > Ports > Detailed Statistics							
Auto-refresh <input type="checkbox"/>				 				Port 1 <input type="button" value="v"/>			
Receive Total				Transmit Total							
Rx Packets	56754			Tx Packets	39099						
Rx Octets	8138095			Tx Octets	16948240						
Rx Unicast	36253			Tx Unicast	26422						
Rx Multicast	8263			Tx Multicast	12673						
Rx Broadcast	12238			Tx Broadcast	4						
Rx Pause	0			Tx Pause	0						
Receive Size Counters				Transmit Size Counters							
Rx 64 Bytes	34048			Tx 64 Bytes	871						
Rx 65-127 Bytes	7938			Tx 65-127 Bytes	12926						
Rx 128-255 Bytes	5161			Tx 128-255 Bytes	9476						
Rx 256-511 Bytes	9176			Tx 256-511 Bytes	7900						
Rx 512-1023 Bytes	431			Tx 512-1023 Bytes	42						
Rx 1024-1526 Bytes	0			Tx 1024-1526 Bytes	7884						
Rx 1527- Bytes	0			Tx 1527- Bytes	0						

Receive Queue Counters		Transmit Queue Counters	
Rx Q0	56754	Tx Q0	0
Rx Q1	0	Tx Q1	0
Rx Q2	0	Tx Q2	0
Rx Q3	0	Tx Q3	0
Rx Q4	0	Tx Q4	0
Rx Q5	0	Tx Q5	0
Rx Q6	0	Tx Q6	0
Rx Q7	0	Tx Q7	39099

Receive Error Counters		Transmit Error Counters	
Rx Drops	0	Tx Drops	0
Rx CRC/Alignment	0	Tx Late/Exc. Coll.	0
Rx Undersize	0		
Rx Oversize	0		
Rx Fragments	0		
Rx Jabber	0		
Rx Filtered	4614		

**Figure 3-3.4: The Detailed Port Statistics**

**Parameter Description:**

**Receive Total and Transmit Total**

- **Rx and Tx Packets :**  
The number of received and transmitted (good and bad) packets.
- **Rx and Tx Octets :**  
The number of received and transmitted (good and bad) bytes. Includes FCS, but excludes framing bits.
- **Rx and Tx Unicast :**  
The number of received and transmitted (good and bad) unicast packets.
- **Rx and Tx Multicast :**  
The number of received and transmitted (good and bad) multicast packets.
- **Rx and Tx Broadcast :**  
The number of received and transmitted (good and bad) broadcast packets.
- **Rx and Tx Pause :**  
A count of the MAC Control frames received or transmitted on this port that have an opcode indicating a PAUSE operation.

### Receive and Transmit Size Counters

The number of received and transmitted (good and bad) packets split into categories based on their respective frame sizes.

### Receive and Transmit Queue Counters

The number of received and transmitted packets per input and output queue.



### Receive Error Counters

- **Rx Drops :**  
The number of frames dropped due to lack of receive buffers or egress congestion.
- **Rx CRC/Alignment :**  
The number of frames received with CRC or alignment errors.
- **Rx Undersize :**  
The number of short 1 frames received with valid CRC.
- **Rx Oversize :**  
The number of long 2 frames received with valid CRC.
- **Rx Fragments :**  
The number of short 1 frames received with invalid CRC.
- **Rx Jabber :**  
The number of long 2 frames received with invalid CRC.
- **Rx Filtered :**  
The number of received frames filtered by the forwarding process.  
Short frames are frames that are smaller than 64 bytes.  
Long frames are frames that are longer than the configured maximum frame length for this port.

### Transmit Error Counters

- **Tx Drops :**  
The number of frames dropped due to output buffer congestion.
- **Tx Late/Exc. Coll. :**  
The number of frames dropped due to excessive or late collisions.

### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.
-  **Clear :**  
Flushes the selected log entries.



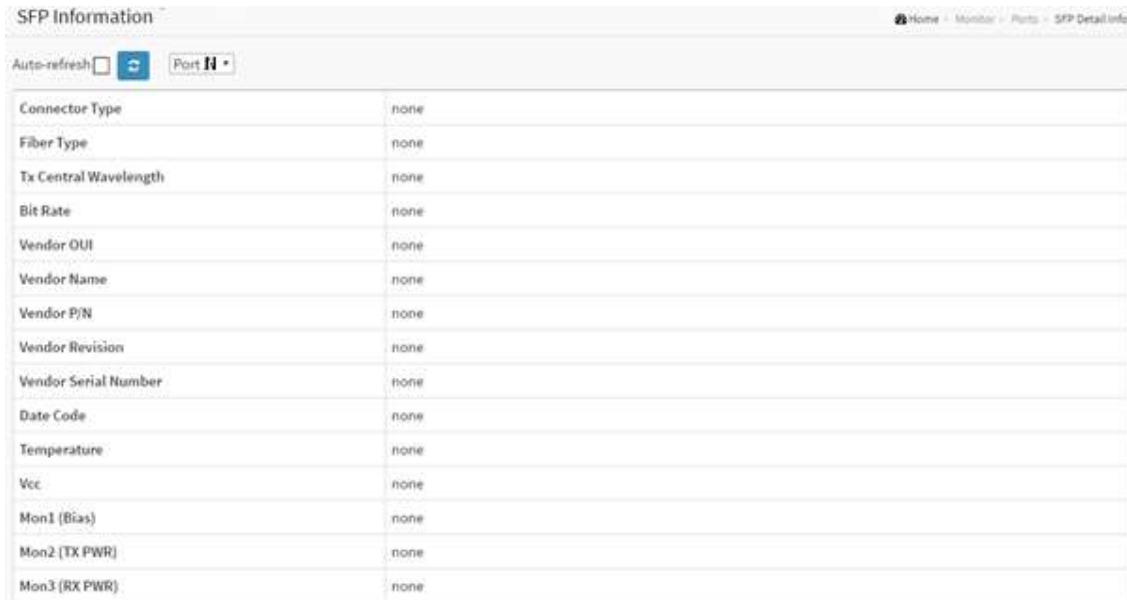
### 3-3.5 SFP Detail Info

This page displays general SFP information and monitoring information.

#### Web Interface

To Display the SFP information in the web interface:

1. Click Monitor, Ports and SFP Detail Info.
2. To display the SFP Information.



The screenshot shows a web interface titled "SFP Information". At the top right, there is a breadcrumb trail: "Home > Monitor > Ports > SFP Detail Info". Below the title, there is an "Auto-refresh" checkbox (unchecked) and a "Port" dropdown menu showing "Port 1". The main content is a table with 15 rows and 2 columns. All values in the table are "none".

Parameter	Value
Connector Type	none
Fiber Type	none
Tx Central Wavelength	none
Bit Rate	none
Vendor OUI	none
Vendor Name	none
Vendor P/N	none
Vendor Revision	none
Vendor Serial Number	none
Date Code	none
Temperature	none
Vcc	none
Mon1 (Bias)	none
Mon2 (TX PWR)	none
Mon3 (RX PWR)	none


Figure 3-3.5: The SFP Detail Information

#### Parameter Description:

- **Connector Type:**  
Display the connector type, for instance, UTP, SC, ST, LC and so on.
- **Fiber Type:**  
Display the fiber mode, for instance, Multi-Mode, Single-Mode.
- **Tx Central Wavelength:**  
Display the fiber optical transmitting central wavelength, for instance, 850nm, 1310nm, 1550nm and so on.
- **Bit Rate:**  
Displays the nominal bit rate of the transceiver.
- **Vendor OUI:**  
Display the Manufacturer's OUI code which is assigned by IEEE.
- **Vendor Name:**  
Display the company name of the module manufacturer.

- **Vendor P/N:**  
Display the product name of the naming by module manufacturer.
- **Vendor Rev (Revision):**  
Display the module revision.
- **Vendor SN (Serial Number):**  
Show the serial number assigned by the manufacturer.
- **Date Code:**  
Show the date this SFP module was made.
- **Temperature:**  
Show the current temperature of SFP module.
- **Vcc:**  
Show the working DC voltage of SFP module.
- **Mon1(Bias) mA:**  
Show the Bias current of SFP module.
- **Mon2(TX PWR):**  
Show the transmit power of SFP module.
- **Mon3(RX PWR):**  
Show the receiver power of SFP module.

#### **Buttons**

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.

## 3-4 DHCP

### 3-4.1 Server

DHCP Server is used to allocate network addresses and deliver configuration parameters to dynamically configured hosts called DHCP client.

#### 3-4.1.1 Statistics

This page displays the database counters and the number of DHCP messages sent and received by DHCP server.

#### Web Interface

To display the DHCP server Statistics Overview in the web interface:

1. Click DHCP, Server and Statistics.
2. To display the DHCP Server Statistics.

Pool	Excluded IP Address	Declined IP Address
0	0	0

Automatic Binding	Manual Binding	Expired Binding
0	0	0

DISCOVER	REQUEST	DECLINE	RELEASE	INFORM
0	0	0	0	0

OFFER	ACK	NAK
0	0	0

Figure 3-4.1.1: The DHCP Server Statistics

#### Parameter Description:

##### Database Counters

Display counters of various databases.

- **Pool :**  
Number of pools.
- **Excluded IP Address :**  
Number of excluded IP address ranges.
- **Declined IP Address :**  
Number of sec lined IP addresses.

### **Binding Counters**

Display counters of various databases

- **Automatic Binding :**  
Number of bindings with network-type pools.
- **Manual Binding :**  
Number of bindings that administrator assigns an IP address to a client. That is, the pool is of host type.
- **Expired Binding :**  
Number of bindings that their lease time expired or they are cleared from Automatic/Manual type bindings.

### **DHCP Message Received Counters**

Display counters of DHCP messages received by DHCP server.



- **DISCOVER :**  
Number of DHCP DISCOVER messages received.
- **REQUEST :**  
Number of DHCP REQUEST messages received.
- **DECLINE :**  
Number of DHCP DECLINE messages received.
- **RELEASE :**  
Number of DHCP RELEASE messages received.
- **INFORM :**  
Number of DHCP INFORM messages received.

### **DHCP Message Sent Counters**

Display counters of DHCP messages sent by DHCP server.

- **OFFER :**  
Number of DHCP OFFER messages sent.
- **ACK :**  
Number of DHCP ACK messages sent.
- **NAK :**  
Number of DHCP NAK messages sent.

### **Buttons**

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.
-  **Clear :**  
Flushes the selected log entries.

### 3-4.1.2 Binding

This page displays bindings generated for DHCP clients.

#### Web Interface

To Display DHCP Server Binding IP in the web interface:

1. Click DHCP, Server and Binding.
2. To display the DHCP Server Binding IP.

Delete	IP	Type	State	Pool Name	Server ID
--------	----	------	-------	-----------	-----------

Figure 3-4.1.2: The DHCP Server Binding IP



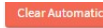

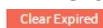
#### Parameter Description:

##### Binding IP Address

Display all bindings.

- **IP :**  
IP address allocated to DHCP client.
- **Type :**  
Type of binding. Possible types are Automatic, Manual, and Expired.
- **State :**  
State of binding. Possible states are Committed, Allocated, and Expired.
- **Pool Name :**  
The pool that generates the binding.
- **Server ID :**  
Server IP address to service the binding.

##### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.
-  **Clear Selected :**  
Click to clear selected bindings. If the selected binding is Automatic or Manual, then it is changed to be Expired. If the selected binding is Expired, then it is freed.
-  **Clear Automatic :**  
Click to clear all Automatic bindings and Change them to Expired bindings.
-  **Clear Manual :**  
Click to clear all Manual bindings and Change them to Expired bindings.
-  **Clear Expired :**  
Click to clear all Expired bindings and free them.

### 3-4.1.3 Declined IP

This page displays declined IP addresses.

#### Web Interface

To Display DHCP Server Declined IP in the web interface:

1. Click DHCP, Server and Declined IP.
2. To display the DHCP Declined IP.



Figure 3-4.1.3: The Declined IP

#### Parameter Description:

##### Declined IP Addresses

Display IP addresses declined by DHCP clients.

- **Declined IP :**

List of IP addresses declined.

##### Buttons

- **Auto-refresh :**

Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.

-  **Refresh :**

Click to refresh the page.

### 3-4.2 Snooping Table

This page displays the dynamic IP assigned information after DHCP Snooping mode is disabled. All DHCP clients obtained the dynamic IP address from the DHCP server will be listed in this table except for local VLAN interface IP addresses. Entries in the Dynamic DHCP snooping Table are shown on this page.

#### Web Interface

To display the DHCP in the web interface:

1. Click Monitor, DHCP and Snooping table
2. To display Dynamic DHCP Snooping Table.

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




Figure 3-4.2: The DHCP snooping table

#### Parameter Description:

##### DHCP snooping Table Columns

- **MAC Address :**  
User MAC address of the entry.
- **VLAN ID :**  
VLAN-ID in which the DHCP traffic is permitted.
- **Source Port:**  
Switch Port Number for which the entries are displayed.
- **IP Address :**  
User IP address of the entry.
- **IP Subnet Mask :**  
User IP subnet mask of the entry.
- **DHCP Server Address :**  
DHCP Server address of the entry.

##### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Refreshes the displayed table starting from the input fields.
-  **:**  
Updates the table starting from the first entry in the Dynamic DHCP snooping Table.
-  **:**  
Updates the table, starting with the entry after the last entry currently displayed.

### 3-4.3 Relay Statistics

This page provides statistics for DHCP relay.

#### Web Interface

To monitor a DHCP Relay statistics in the web interface:

1. Click Monitor, DHCP and Relay Statistics
2. To display DHCP relay statistics.



DHCP Relay Statistics							
Home > Monitor > DHCP > Relay Statistics							
Auto-refresh <input type="checkbox"/>  							
Server Statistics							
Transmit to Server	Transmit Error	Receive from Server	Receive Missing Agent Option	Receive Missing Circuit ID	Receive Missing Remote ID	Receive Bad Circuit ID	Receive Bad Remote ID
0	0	0	0	0	0	0	0
Client Statistics							
Transmit to Client	Transmit Error	Receive from Client	Receive Agent Option	Replace Agent Option	Keep Agent Option	Drop Agent Option	

Figure 3-4.3: The DHCP relay statistics

#### Parameter Description:

##### Server Statistics



- **Transmit to Server :**  
The number of packets that are relayed from client to server.
- **Transmit Error :**  
The number of packets that resulted in errors while being sent to clients.
- **Receive from Server :**  
The number of packets received from server.
- **Receive Missing Agent Option:**  
The number of packets received without agent information options.
- **Receive Missing Circuit ID :**  
The number of packets received with the Circuit ID option missing.
- **Receive Missing Remote ID :**  
The number of packets received with the Remote ID option missing.
- **Receive Bad Circuit ID:**  
The number of packets whose Circuit ID option did not match known circuit ID.
- **Receive Bad Remote ID :**  
The number of packets whose Remote ID option did not match known Remote ID.



### Client Statistics

- **Transmit to Client :**  
The number of relayed packets from server to client.
- **Transmit Error :**  
The number of packets that resulted in error while being sent to servers.
- **Receive from Client :**  
The number of received packets from server.
- **Receive Agent Option :**  
The number of received packets with relay agent information option.
- **Replace Agent Option :**  
The number of packets which were replaced with relay agent information option.
- **Keep Agent Option :**  
The number of packets whose relay agent information was retained.
- **Drop Agent Option :**  
The number of packets that were dropped which were received with relay agent information.

### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.
-  **Clear :**  
Flushes the selected log entries.

### 3-4.4 Detailed Statistics

This page provides statistics for DHCP snooping. Notice that the normal forward per-port TX statistics isn't increased if the incoming DHCP packet is done by L3 forwarding mechanism. And clear the statistics on specific port may not take effect on global statistics since it gathers the different layer overview.

#### Web Interface

To display monitor DHCP Relay statistics in the web interface:

1. Click Monitor, DHCP and Detailed Statistics
2. To display DHCP relay statistics.

Receive Packets		Transmit Packets	
Rx Discover	0	Tx Discover	0
Rx Offer	0	Tx Offer	0
Rx Request	0	Tx Request	0
Rx Decline	0	Tx Decline	0
Rx ACK	0	Tx ACK	0
Rx NAK	0	Tx NAK	0
Rx Release	0	Tx Release	0
Rx Inform	0	Tx Inform	0
Rx Lease Query	0	Tx Lease Query	0
Rx Lease Unassigned	0	Tx Lease Unassigned	0
Rx Lease Unknown	0	Tx Lease Unknown	0
Rx Lease Active	0	Tx Lease Active	0
Rx Discarded Checksum Error	0		
Rx Discarded from Untrusted	0		

Figure 3-4.4: The DHCP Detailed Statistics



#### Parameter Description:

##### Server Statistics

- **Rx and Tx Discover :**  
The number of discover (option 53 with value 1) packets received and transmitted.
- **Rx and Tx Offer :**  
The number of offer (option 53 with value 2) packets received and transmitted.
- **Rx and Tx Request :**  
The number of request (option 53 with value 3) packets received and transmitted.
- **Rx and Tx Decline:**  
The number of decline (option 53 with value 4) packets received and transmitted.

- **Rx and Tx ACK:**  
The number of ACK (option 53 with value 5) packets received and transmitted.
- **Rx and Tx NAK:**  
The number of NAK (option 53 with value 6) packets received and transmitted.
- **Rx and Tx Release:**  
The number of release (option 53 with value 7) packets received and transmitted.
- **Rx and Tx Inform:**  
The number of inform (option 53 with value 8) packets received and transmitted.
- **Rx and Tx Lease Query:**  
The number of lease query (option 53 with value 10) packets received and transmitted.
- **Rx and Tx Lease Unassigned:**  
The number of lease unassigned (option 53 with value 11) packets received and transmitted.
- **Rx and Tx Lease Unknown:**  
The number of lease unknown (option 53 with value 12) packets received and transmitted. Rx and Tx Lease Active
- **Rx and Tx Lease Active:**  
The number of lease active (option 53 with value 13) packets received and transmitted.
- **Rx Discarded checksum error:**  
The number of discard packet that IP/UDP checksum is error.
- **Rx Discarded from Untrusted:**  
The number of discarded packet that are coming from untrusted port.

#### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.
-  **Clear :**  
Flushes the selected log entries.

## 3-5 Security

### 3-5.1 Access Management Statistics

This section shows you a detailed statistic of the Access Management including HTTP, HTTPS, SSH, TELNET, and SSH.

#### Web Interface

To display the Assess Management Statistics in the web interface:

1. Click Security, Access Management Statistics.
2. Checked "Auto-refresh".
3. Click "Refresh" to refresh the port detailed statistics or clear all information when you click "Clear".





Interface	Received Packets	Allowed Packets	Discarded Packets
HTTP	0	0	0
HTTPS	0	0	0
SNMP	0	0	0
TELNET	0	0	0
SSH	0	0	0

Figure 3-5.1: The Access Management Statistics

#### Parameter Description:

- **Interface :**  
The interface type through which the remote host can access the switch.
- **Received Packets :**  
Number of received packets from the interface when access management mode is enabled.
- **Allowed Packets :**  
Number of allowed packets from the interface when access management mode is enabled
- **Discarded Packets :**  
Number of discarded packets from the interface when access management mode is enabled.

#### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.
-  **Clear :**  
Flushes the selected log entries.

## 3-5.2 Network

### 3-5.2.1 Port Security

#### 3-5.2.1.1 Switch

This section shows the Port Security status. Port Security is a module with no direct configuration. Configuration comes indirectly from other modules - the user modules. When a user module has enabled port security on a port, the port is set-up for software-based learning. In this mode, frames from unknown MAC addresses are passed on to the port security module, which in turn asks all user modules whether to allow this new MAC address to forward or block it. For a MAC address to be set in the forwarding state, all enabled user modules must unanimously agree on allowing the MAC address to forward. If only one chooses to block it, it will be blocked until that user module decides otherwise. The status page is divided into two sections - one with a legend of user modules and one with the actual port status.

#### Web Interface

To display the Port Security Switch Status Configuration in the web interface:

1. Click Security, Network, Port Security and Switch
2. Checked "Auto-refresh".
3. Click "Refresh" to refresh the port detailed statistics.

User Module Name	Abbr
Limit Control	L
802.1X	8
Voice VLAN	V

Port	Users	State	MAC Count	
			Current	Limit

Figure 3-5.2.1.1: The Port Security Switch Status

#### Parameter Description:

##### User Module Legend

The legend shows all user modules that may request Port Security services.


- **User Module Name :**  
The full name of a module that may request Port Security services.
- **Abbr :**  
A one-letter abbreviation of the user module. This is used in the Users column in the port status table.

### Port Status

The table has one row for each port on the selected switch and a number of columns, which are:

- **Port :**  
The port number for which the status applies. Click the port number to see the status for this particular port.
- **Users :**  
Each of the user modules has a column that shows whether that module has enabled Port Security or not. A '-' means that the corresponding user module is not enabled, whereas a letter indicates that the user module abbreviated by that letter (see Abbr) has enabled port security.
- **State :**  
Shows the current state of the port. It can take one of four values:  
Disabled: No user modules are currently using the Port Security service.  
Ready: The Port Security service is in use by at least one user module, and is awaiting frames from unknown MAC addresses to arrive.  
Limit Reached: The Port Security service is enabled by at least the Limit Control user module, and that module has indicated that the limit is reached and no more MAC addresses should be taken in.  
Shutdown: The Port Security service is enabled by at least the Limit Control user module, and that module has indicated that the limit is exceeded. No MAC addresses can be learned on the port until it is administratively re-opened on the Limit Control configuration Web-page.
- **MAC Count (Current, Limit) :**  
The two columns indicate the number of currently learned MAC addresses (forwarding as well as blocked) and the maximum number of MAC addresses that can be learned on the port, respectively.  
If no user modules are enabled on the port, the Current column will show a dash (-).

### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.

### 3-5.2.1.2 Port

This section shows the MAC addresses secured by the Port Security module. Port Security is a module with no direct configuration. Configuration comes indirectly from other modules - the user modules. When a user module has enabled port security on a port, the port is set-up for software-based learning. In this mode, frames from unknown MAC addresses are passed on to the port security module, which in turn asks all user modules whether to allow this new MAC address to forward or block it. For a MAC address to be set in the forwarding state, all enabled user modules must unanimously agree on allowing the MAC address to forward. If only one chooses to block it, it will be blocked until that user module decides otherwise.

#### Web Interface

To display the Port Security Switch Status Configuration in the web interface:

1. Click Security, Network, Port Security and then Port.
2. Specify the Port which you want to monitor.
3. Checked "Auto-refresh".
4. Click "Refresh" to refresh the port detailed statistics.





Figure 3-5.2.1.2: The Port Security Port Status

#### Parameter Description:

- **MAC Address & VLAN ID :**  
The MAC address and VLAN ID that is seen on this port. If no MAC addresses are learned, a single row stating "No MAC addresses attached" is displayed.
- **State :**  
Indicates whether the corresponding MAC address is blocked or forwarding. In the blocked state, it will not be allowed to transmit or receive traffic.
- **Time of Addition :**  
Shows the date and time when this MAC address was first seen on the port.
- **Age/Hold :**  
If at least one user module has decided to block this MAC address, it will stay in the blocked state until the hold time (measured in seconds) expires. If all user modules have decided to allow this MAC address to forward, and aging is enabled, the Port Security module will periodically check that this MAC address still forwards traffic. If the age period (measured in seconds) expires and no frames have been seen, the MAC address will be removed from the MAC table. Otherwise a new age period will begin.  
If aging is disabled or a user module has decided to hold the MAC address indefinitely, a dash (-) will be shown.

### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.
-  **Clear :**  
Flushes the selected log entries.



## 3-5.2.2 NAS

### 3-5.2.2.1 Switch

The section describes to show each port NAS status information of the switch. The status includes Admin State Port State, Last Source, Last ID, QoS Class, and Port VLAN ID.

#### Web Interface

To display the NAS Switch Status Configuration in the web interface:

1. Click Security, Network, NAS and then Port.
2. Checked "Auto-refresh".
3. Click "Refresh" to refresh the port detailed statistics.



Port	Admin State	Port State	Last Source	Last ID	QoS Class	Port VLAN ID
1	Force Authorized	Globally Disabled			-	
2	Force Authorized	Globally Disabled			-	
N-2	Force Authorized	Globally Disabled			-	
N-1	Force Authorized	Globally Disabled			-	
N	Force Authorized	Globally Disabled			-	

Figure 3-5.2.2.1: The Network Access Server Switch Status

#### Parameter Description:

- **Port :**  
The switch port number. Click to navigate to detailed NAS statistics for this port.
- **Admin State :**  
The port's current administrative state. Refer to NAS Admin State for a description of possible values.
- **Port State :**  
The current state of the port. Refer to NAS Port State for a description of the individual states.
- **Last Source :**  
The source MAC address carried in the most recently received EAPOL frame for EAPOL-based authentication, and the most recently received frame from a new client for MAC-based authentication.
- **Last ID :**  
The user name (supplicant identity) carried in the most recently received Response Identity EAPOL frame for EAPOL-based authentication, and the source MAC address from the most recently received frame from a new client for MAC-based authentication.
- **QoS Class :**  
QoS Class assigned to the port by the RADIUS server if enabled.

- **Port VLAN ID :**

The VLAN ID that NAS has put the port in. The field is blank, if the Port VLAN ID is not overridden by NAS.

If the VLAN ID is assigned by the RADIUS server, "(RADIUS-assigned)" is appended to the VLAN ID. Read more about RADIUS-assigned VLANs here.

If the port is moved to the Guest VLAN, "(Guest)" is appended to the VLAN ID. Read more about Guest VLANs here.

### **Buttons**

- **Auto-refresh :**

Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.

-  **Refresh :**

Click to refresh the page.

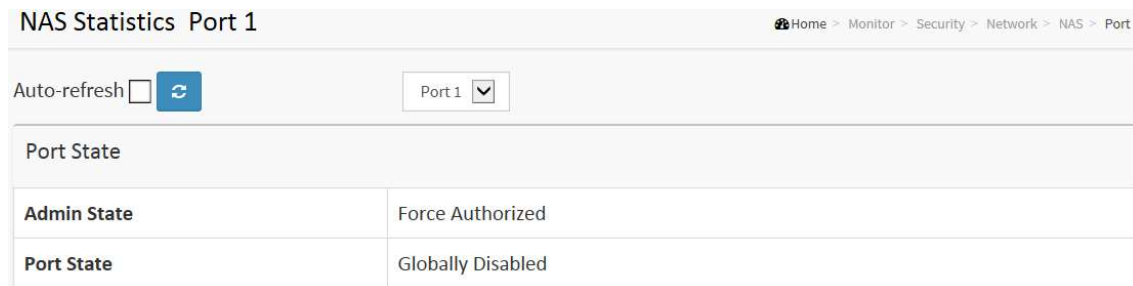
### 3-5.2.2.2 Port

The section describes to provide detailed NAS statistics for a specific switch port running EAPOL-based IEEE 802.1X authentication. For MAC-based ports, it shows selected backend server (RADIUS Authentication Server) statistics, only.

#### Web Interface

To display the NAS Port Status Configuration in the web interface:

1. Click Security, Network, NAS and then Port.
2. Checked "Auto-refresh".
3. Click "Refresh" to refresh the port detailed statistics.




NAS Statistics Port 1	
Auto-refresh <input checked="" type="checkbox"/>  <span>Port 1</span>	
Port State	
Admin State	Force Authorized
Port State	Globally Disabled

Figure 3-5.2.2.2: The NAS Statistics

#### Parameter Description:

##### Port State

- **Admin State :**  
The port's current administrative state. Refer to NAS Admin State for a description of possible values.
- **Port State :**  
The current state of the port. Refer to NAS Port State for a description of the individual states.
- **QoS Class :**  
The QoS class assigned by the RADIUS server. The field is blank if no QoS class is assigned.
- **Port VLAN ID :**  
The VLAN ID that NAS has put the port in. The field is blank, if the Port VLAN ID is not overridden by NAS.  
If the VLAN ID is assigned by the RADIUS server, "(RADIUS-assigned)" is appended to the VLAN ID. Read more about RADIUS-assigned VLANs here.  
If the port is moved to the Guest VLAN, "(Guest)" is appended to the VLAN ID. Read more about Guest VLANs here.

## Port Counters

- **EAPOL Counters :**

These supplicant frame counters are available for the following administrative states:

- Force Authorized
- Force Unauthorized
- Port-based 802.1X
- Single 802.1X
- Multi 802.1X

- **Backend Server Counters :**

These backend (RADIUS) frame counters are available for the following administrative states:

- Port-based 802.1X
- Single 802.1X
- Multi 802.1X
- MAC-based Auth.

- **Last Supplicant/Client Info :**

Information about the last supplicant/client that attempted to authenticate. This information is available for the following administrative states:

- Port-based 802.1X
- Single 802.1X
- Multi 802.1X
- MAC-based Auth.

## Selected Counters

- **Selected Counters :**

The Selected Counters table is visible when the port is in one of the following administrative states:

- Multi 802.1X
- MAC-based Auth.

The table is identical to and is placed next to the Port Counters table, and will be empty if no MAC address is currently selected. To populate the table, select one of the attached MAC Addresses from the table below.

## Attached MAC Addresses

- **Identity :**

Shows the identity of the supplicant, as received in the Response Identity EAPOL frame.

Clicking the link causes the supplicant's EAPOL and Backend Server counters to be shown in the Selected Counters table. If no supplicants are attached, it shows No supplicants attached.

This column is not available for MAC-based Auth.

- **MAC Address :**

For Multi 802.1X, this column holds the MAC address of the attached supplicant. For MAC-based Auth., this column holds the MAC address of the attached client.


Clicking the link causes the client's Backend Server counters to be shown in the Selected Counters table. If no clients are attached, it shows No clients attached.

- **VLAN ID :**

This column holds the VLAN ID that the corresponding client is currently secured through the Port Security module.

- **State :**  
The client can either be authenticated or unauthenticated. In the authenticated state, it is allowed to forward frames on the port, and in the unauthenticated state, it is blocked. As long as the backend server hasn't successfully authenticated the client, it is unauthenticated. If an authentication fails for one or the other reason, the client will remain in the unauthenticated state for Hold Time seconds.
- **Last Authentication :**  
Shows the date and time of the last authentication of the client (successful as well as unsuccessful).

#### **Buttons**

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.

### 3-5.2.3 ACL Status

The section describes how to show the ACL status by different ACL users. Each row describes the ACE that is defined. It is a conflict if a specific ACE is not applied to the hardware due to hardware limitations. The maximum number of ACEs is 512 on each switch.

#### Web Interface

To display the ACL status in the web interface:

1. Click Monitor, Network and ACL status
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
3. Click "Refresh" to refresh the ACL Status

User	ACE	Ingress Port	Frame Type	Action	Rate Limiter	Port Redirect	Mirror	CPU	CPU Once	Counter	Conflict
DMS mDNS	1	1-10	IPv4/UDP 5353	Permit	Disabled	Disabled	Disabled	Yes	No	213	No
DMS Onvif	1	1-10	IPv4/UDP 10100-10107	Permit	Disabled	Disabled	Disabled	Yes	No	0	No
DMS SSDP	1	1-10	IPv4/UDP 1900	Permit	Disabled	Disabled	Disabled	Yes	No	246	No
DMS CLIENT	1	1-10	IPv4/UDP 10012	Permit	Disabled	Disabled	Disabled	Yes	No	0	No

Figure 3-5.2.3: The ACL Status

#### Parameter Description:

- **User :**  
Indicates the ACL user.
- **Ingress Port :**  
Indicates the ingress port of the ACE. Possible values are:  
All: The ACE will match any ingress port.  
Port: The ACE will match a specific ingress port.
- **ACE :**  
Indicates the ACE ID on local switch.
- **Frame Type :**  
Indicates the frame type of the ACE. Possible values are:  
Any: The ACE will match any frame type.  
EType: The ACE will match Ethernet Type frames. Note that an Ethernet Type based ACE will not get matched by IP and ARP frames.  
ARP: The ACE will match ARP/RARP frames.  
IPv4: The ACE will match all IPv4 frames.  
IPv4: The ACE will match all IPv4 frames.  
IPv4/ICMP: The ACE will match IPv4 frames with ICMP protocol.  
IPv4/UDP: The ACE will match IPv4 frames with UDP protocol.  
IPv4/TCP: The ACE will match IPv4 frames with TCP protocol.  
IPv4/Other: The ACE will match IPv4 frames, which are not ICMP / UDP / TCP.  
IPv6: The ACE will match all IPv6 standard frames.

- **Action :**  
Indicates the forwarding action of the ACE.  
**Permit:** Frames matching the ACE may be forwarded and learned.  
**Deny:** Frames matching the ACE are dropped.  
**Filter:** Frames matching the ACE are filtered.
- **Rate Limiter :**  
Indicates the rate limiter number of the ACE. The allowed range is 1 to 16. When Disabled is displayed, the rate limiter operation is disabled.
- **Port Redirect :**  
Indicates the port copy operation of the ACE. Frames matching the ACE are copied to the port number. The allowed values are Disabled or a specific port number. When Disabled is displayed, the port copy operation 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".
- **CPU :**  
Forward packet that matched the specific ACE to CPU.
- **CPU Once :**  
Forward first packet that matched the specific ACE to CPU.
- **Counter :**  
The counter indicates the number of times the ACE was hit by a frame.
- **Conflict :**  
Indicates the hardware status of the specific ACE. The specific ACE is not applied to the hardware due to hardware limitations.

**Buttons**

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- **Refresh :**  
Click to refresh the page.

### 3-5.2.4 ARP Inspection

The section describes to configure the Dynamic ARP Inspection Table parameters of the switch. The Dynamic ARP Inspection Table contains up to 1024 entries, and is sorted first by port, then by VLAN ID, then by MAC address, and then by IP address.

#### Web Interface

To display the Dynamic ARP Inspection Table Configuration in the web interface:

1. Click Security, Network, ARP Inspection.
2. Checked "Auto-refresh".
3. Click "Refresh" to refresh the port detailed statistics.
4. Specify the Start from port, VLAN ID, MAC Address, IP Address, and entries per page.

Dynamic ARP Inspection Table

Home > Monitor > Security > Network > ARP Inspection

Auto-refresh

Start from Port 1, VLAN 1, MAC address 08-ED-02-5D-10-AA and IP address 0.0.0.0, 20 entries per page.

Port	VLAN ID	MAC Address	IP Address
No more entries			

Figure 3-5.2.4: The Dynamic ARP Inspection Table

#### Parameter Description:

##### ARP Inspection Table Columns

- **Port :**  
Switch Port Number for which the entries are displayed.
- **VLAN ID :**  
VLAN-ID in which the ARP traffic is permitted.
- **MAC Address :**  
User MAC address of the entry.
- **IP Address :**  
User IP address of the entry.

##### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- **Refresh :**  
Click to refresh the page.
- **:**  
Updates the table starting from the first entry in the Dynamic ARP Inspection Table.
- **:**  
Updates the table, starting with the entry after the last entry currently displayed.



### 3-5.2.5 IP Source Guard

Entries in the Dynamic IP Source Guard Table are shown on this page. The Dynamic IP Source Guard Table is sorted first by port, then by VLAN ID, then by IP address, and then by MAC address.

#### Web Interface

To display the Dynamic IP Source Guard Table Configuration in the web interface:

1. Click Security, Network and IP Source Guard.
2. Checked "Auto-refresh".
3. Click "Refresh" to refresh the port detailed statistics.
4. Specify the Start from port, VLAN ID, IP Address, and entries per page.

Port	VLAN ID	IP Address	MAC Address
No more entries			




Figure 3-5.2.5: The Dynamic IP Source Table

#### Parameter Description:

##### IP Source Guard Table Columns

- **Port :**  
Switch Port Number for which the entries are displayed.
- **VLAN ID :**  
VLAN-ID in which the IP traffic is permitted.
- **IP Address :**  
User IP address of the entry.
- **MAC Address :**  
Source MAC address.

##### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.
-  **:**  
Updates the table starting from the first entry in the Dynamic ARP Inspection Table.
-  **:**  
Updates the table, starting with the entry after the last entry currently displayed.

## 3-5.3 AAA

### 3-5.3.1 RADIUS Overview

This section shows you an overview of the RADIUS Authentication and Accounting servers' status to ensure the function is workable.

#### Web Interface

To display the RADIUS Overview Configuration in the web interface:

1. Click Security, AAA and RADIUS Overview.
2. Checked "Auto-refresh".
3. Click "Refresh" to refresh the port detailed statistics.

RADIUS Server Status Overview		
RADIUS Authentication Server Status Overview		
#	IP Address	Status
1	0.0.0.0:0	Disabled
2	0.0.0.0:0	Disabled
3	0.0.0.0:0	Disabled
4	0.0.0.0:0	Disabled
5	0.0.0.0:0	Disabled

RADIUS Accounting Server Status Overview		
#	IP Address	Status
1	0.0.0.0:0	Disabled
2	0.0.0.0:0	Disabled
3	0.0.0.0:0	Disabled
4	0.0.0.0:0	Disabled
5	0.0.0.0:0	Disabled

Figure 3-5.3.1: The RADIUS Server Status Overview

#### Parameter Description:

##### RADIUS Authentication Servers

- **# :**  
The RADIUS server number. Click to navigate to detailed statistics for this server.
- **IP Address :**  
The IP address and UDP port number (in <IP Address>:<UDP Port> notation) of this server.
- **State :**  
The current state of the server. This field takes one of the following values:
  - **Disabled:** The server is disabled.
  - **Not Ready:** The server is enabled, but IP communication is not yet up and running.

- **Ready:** The server is enabled, IP communication is up and running, and the RADIUS module is ready to accept access attempts.
- **Dead (X seconds left):** Access attempts were made to this server, but it did not reply within the configured timeout. The server has temporarily been disabled, but will get re-enabled when the dead-time expires. The number of seconds left before this occurs is displayed in parentheses. This state is only reachable when more than one server is enabled.

### **RADIUS Accounting Servers**

- **# :**  
The RADIUS server number. Click to navigate to detailed statistics for this server.
- **IP Address :**  
The IP address and UDP port number (in <IP Address>:<UDP Port> notation) of this server.
- **State :**  
The current state of the server. This field takes one of the following values:  
Disabled: The server is disabled.  
Not Ready: The server is enabled, but IP communication is not yet up and running.  
Ready: The server is enabled, IP communication is up and running, and the RADIUS module is ready to accept accounting attempts.  
Dead (X seconds left): Accounting attempts were made to this server, but it did not reply within the configured timeout. The server has temporarily been disabled, but will get re-enabled when the dead-time expires. The number of seconds left before this occurs is displayed in parentheses. This state is only reachable when more than one server is enabled.

### 3-5.3.2 RADIUS Details

This section shows you a detailed statistic for a particular RADIUS server.

#### Web Interface

To display the RADIUS Details Configuration in the web interface:

1. Specify Port which want to check.
2. Click Security, AAA, RADIUS Overview.
3. Checked "Auto-refresh".
4. Click "Refresh" to refresh the port detailed statistics or clear all information when you click "Clear" & "Fresh".

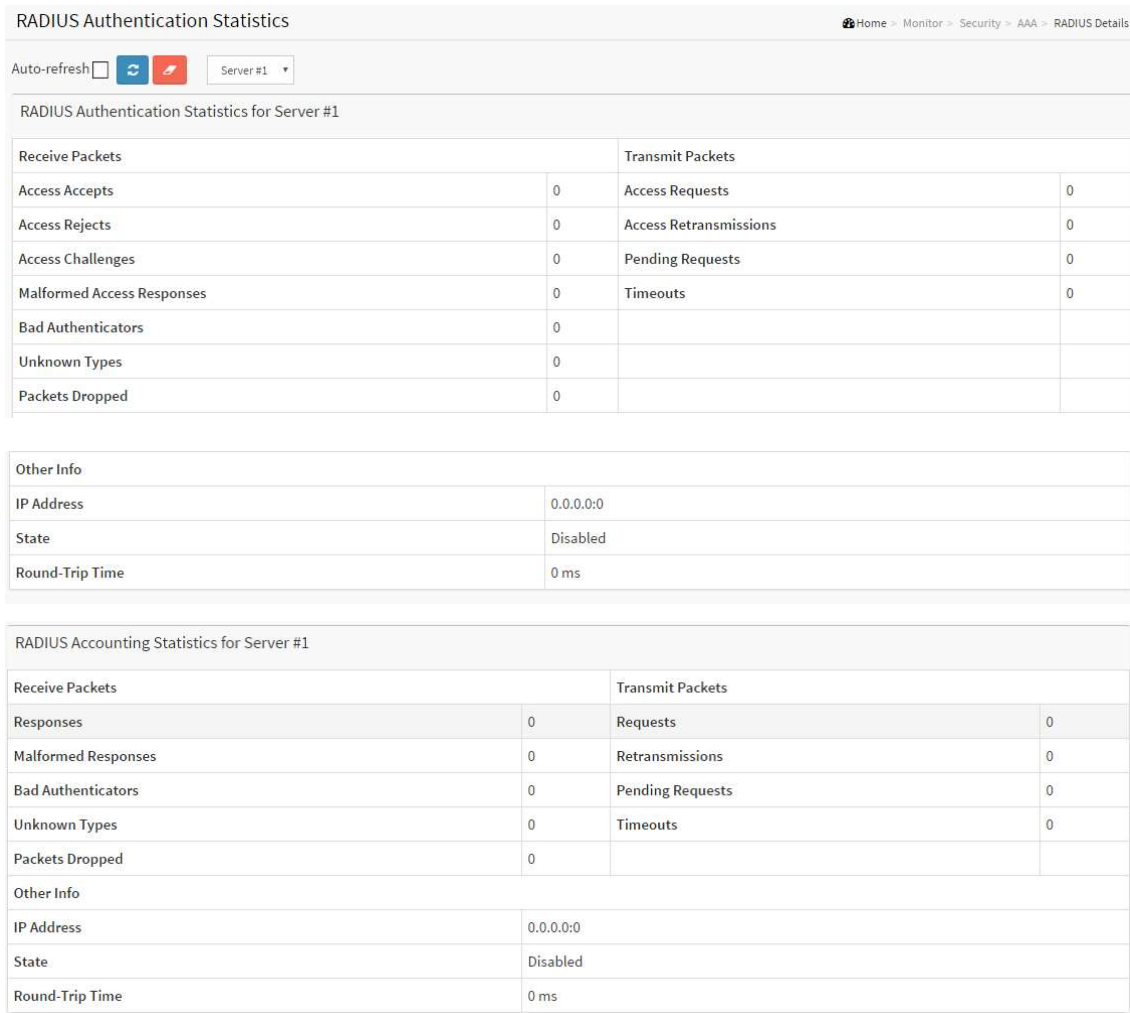


Figure 3-5.3.2: The RADIUS Authentication Statistics Server

**Parameter Description:**

**RADIUS Authentication Statistics**

The statistics map closely to those specified in RFC4668 - RADIUS Authentication Client MIB. Use the server select box to switch between the backend servers to show details for.

- **Packet Counters :**

RADIUS authentication server packet counter. There are seven receive and four transmit counters

- **Other Info :**

This section contains information about the state of the server and the latest round-trip time.

**RADIUS Accounting Statistics**

The statistics map closely to those specified in RFC4670 - RADIUS Accounting Client MIB. Use the server select box to switch between the backend servers to show details for.

- **Packet Counters :**

RADIUS accounting server packet counter. There are five receive and four transmit counters.

- **Other Info :**

This section contains information about the state of the server and the latest round-trip time.

**Buttons**

- **Auto-refresh :**

Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.

-  **Refresh :**

Click to refresh the page.

-  **Clear :**

Clears the counters for the selected server. The "Pending Requests" counter will not be cleared by this operation.

## 3-5.4 Switch

### 3-5.4.1 RMON

#### 3-5.4.1.1 Statistics

This section provides an overview of RMON Statistics entries. Each page shows up to 99 entries from the Statistics table, default being 20, selected through the "entries per page" input field. When first visited, the web page will show the first 20 entries from the beginning of the Statistics table. The first displayed will be the one with the lowest ID found in the Statistics table.

#### Web Interface

To display the RMONStatistics in the web interface:

1. Click Security, Switch, RMON and Statistics.
2. Specify Port which want to check.
3. Checked "Auto-refresh".
4. Click "Refresh" to refresh the port detailed statistics.

ID	Data Source (ifIndex)	Drop	Octets	Pkts	Broad-cast	Multi-cast	CRC Errors	Under-size	Over-size	Frag.	Jabb.	Coll.	Bytes	65	128	256	512	1024
													127	255	511	1023	1588	




Figure 3-5.4.1.1: The RMON Statistics Status Overview

#### Parameter Description:

- **ID :**  
Indicates the index of Statistics entry.
- **Data Source(if Index) :**  
The port ID which wants to be monitored.
- **Drop :**  
The total number of events in which packets were dropped by the probe due to lack of resources.
- **Octets :**  
The total number of octets of data (including those in bad packets) received on the network.
- **Pkts :**  
The total number of packets (including bad packets, broadcast packets, and multicast packets) received.
- **Broad-cast :**  
The total number of good packets received that were directed to the broadcast address.
- **Multi-cast :**  
The total number of good packets received that were directed to a multicast address.

- **CRC Errors :**  
The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
- **Under-size :**  
The total number of packets received that were less than 64 octets.
- **Over-size :**  
The total number of packets received that were longer than 1518 octets.
- **Frag. :**  
The number of frames which size is less than 64 octets received with invalid CRC.
- **Jabb. :**  
The number of frames which size is larger than 64 octets received with invalid CRC.
- **Coll. :**  
The best estimate of the total number of collisions on this Ethernet segment.
- **64 :**  
The total number of packets (including bad packets) received that were 64 octets in length.
- **65~127 :**  
The total number of packets (including bad packets) received that were between 65 to 127 octets in length.
- **128~255 :**  
The total number of packets (including bad packets) received that were between 128 to 255 octets in length.
- **256~511 :**  
The total number of packets (including bad packets) received that were between 256 to 511 octets in length.
- **512~1023 :**  
The total number of packets (including bad packets) received that were between 512 to 1023 octets in length.
- **1024~1588 :**  
The total number of packets (including bad packets) received that were between 1024 to 1588 octets in length.

#### **Buttons**

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Refreshes the displayed table starting from the input fields.
-  **:**  
Updates the table starting from the first entry in the Statistics table, i.e. the entry with the lowest ID
-  **:**  
Updates the table, starting with the entry after the last entry currently displayed.

### 3-5.4.1.2 History

This section provides an overview of RMON History entries. Each page shows up to 99 entries from the History table, default being 20, selected through the "entries per page" input field. When first visited, the web page will show the first 20 entries from the beginning of the History table. The first displayed will be the one with the lowest History Index and Sample Index found in the History table.

#### Web Interface

To display the RMON history Configuration in the web interface:

1. Click Security, Switch, RMON and History.
2. Checked "Auto-refresh".
3. Click "Refresh" to refresh the port detailed statistics or clear all information when you click "Clear".

History Index	Sample Index	Sample Start	Drop	Octets	Pkts	Broad-cast	Multi-cast	CRC Errors	Under-size	Over-size	Frag.	Jabb.	Coll.	Utilization
No more entries														

Figure 3-5.4.1.2: RMON History Overview




#### Parameter Description:

- **History Index :**  
Indicates the index of History control entry.
- **Sample Index :**  
Indicates the index of the data entry associated with the control entry.
- **Sample Start :**  
The value of sysUpTime at the start of the interval over which this sample was measured.
- **Drop :**  
The total number of events in which packets were dropped by the probe due to lack of resources.
- **Octets :**  
The total number of octets of data (including those in bad packets) received on the network.
- **Pkts :**  
The total number of packets (including bad packets, broadcast packets, and multicast packets) received.
- **Broadcast :**  
The total number of good packets received that were directed to the broadcast address.
- **Multicast :**  
The total number of good packets received that were directed to a multicast address.



- **CRRErrors :**  
The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
- **Undersize :**  
The total number of packets received that were less than 64 octets.
- **Oversize :**  
The total number of packets received that were longer than 1518 octets.
- **Frag. :**  
The number of frames which size is less than 64 octets received with invalid CRC.
- **Jabb. :**  
The number of frames which size is larger than 64 octets received with invalid CRC.
- **Coll. :**  
The best estimate of the total number of collisions on this Ethernet segment.
- **Utilization :**  
The best estimate of the mean physical layer network utilization on this interface during this sampling interval, in hundredths of a percent.

**Buttons**

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Refreshes the displayed table starting from the input fields.
-  **:**  
Updates the table starting from the first entry in the Statistics table, i.e. the entry with the lowest ID
-  **:**  
Updates the table, starting with the entry after the last entry currently displayed.

### 3-5.4.1.3 Alarm

This page provides an overview of RMON Alarm entries. Each page shows up to 99 entries from the Alarm table, default being 20, selected through the "entries per page" input field. When first visited, the web page will show the first 20 entries from the beginning of the Alarm table. The first displayed will be the one with the lowest ID found in the Alarm table

#### Web Interface

To display the RMON Alarm Overview in the web interface:

1. Specify Port which wants to check.
2. Click Security, Switch, RMON and Alarm.
3. Checked "Auto-refresh".
4. Click "Refresh" to refresh the port detailed statistics.




ID	Interval	Variable	Sample Type	Value	Startup Alarm	Rising Threshold	Rising Index	Falling Threshold	Falling Index
No more entries									

Figure 3-5.4.1.3: RMON Alarm Overview

#### Parameter Description:

- **ID :**  
Indicates the index of Alarm control entry.
- **Interval :**  
Indicates the interval in seconds for sampling and comparing the rising and falling threshold.
- **Variable :**  
Indicates the particular variable to be sampled
- **Sample Type :**  
The method of sampling the selected variable and calculating the value to be compared against the thresholds.
- **Value :**  
The value of the statistic during the last sampling period.
- **Startup Alarm :**  
The alarm that may be sent when this entry is first set to valid.
- **Rising Threshold :**  
Rising threshold value.
- **Rising Index :**  
Rising event index.
- **Falling Threshold :**  
Falling threshold value.
- **Falling Index :**  
Falling event index.

### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Refreshes the displayed table starting from the input fields.
-  **:**  
Updates the table starting from the first entry in the Statistics table, i.e. the entry with the lowest ID
-  **:**  
Updates the table, starting with the entry after the last entry currently displayed.

### 3-5.4.1.4 Event

This page provides an overview of RMON Event table entries. Each page shows up to 99 entries from the Event table, default being 20, selected through the "entries per page" input field. When first visited, the web page will show the first 20 entries from the beginning of the Event table. The first displayed will be the one with the lowest Event Index and Log Index found in the Event table.

#### Web Interface

To display the RMON Event Overview in the web interface:

1. Click Security, Switch, RMON and Event.
2. Checked "Auto-refresh".
3. Click "Refresh" to refresh the port detailed statistics
4. Specify Port which wants to check.




Event Index	LogIndex	LogTime	LogDescription
No more entries			

Figure 3-5.4.1.4: RMON Event Overview

#### Parameter Description:

- **Event Index :**  
Indicates the index of the event entry.
- **Log Index :**  
Indicates the index of the log entry.
- **LogTime :**  
Indicates Event log time
- **LogDescription :**  
Indicates the Event description.

#### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Refreshes the displayed table starting from the input fields.
-  **:**  
Updates the table starting from the first entry in the Statistics table, i.e. the entry with the lowest ID
-  **:**  
Updates the table, starting with the entry after the last entry currently displayed.

## 3-6 LACP

### 3-6.1 System Status

This section describes that when you complete to set LACP function on the switch then it provides a status overview for all LACP instances

#### Web Interface

To display the LACP System status in the web interface:

1. Click Monitor, LACP and System Status
2. Checked "Auto-refresh".
3. Click "Refresh" to refresh the port detailed statistics.


Aggr ID	Partner System ID	Partner Key	Partner Prio	Last Changed	Local Ports
No ports enabled or no existing partners					

Figure 3-6.1 The LACP System Status

#### Parameter Description:

- **Aggr ID :**  
The Aggregation ID associated with this aggregation instance. For LLAG the id is shown as 'isid: aggr-id' and for GLAGs as 'aggr-id'
- **Partner System ID :**  
The system ID (MAC address) of the aggregation partner.
- **Partner Key :**  
The Key that the partner has assigned to this aggregation ID.
- **Last changed :**  
The time since this aggregation changed.
- **Local Ports :**  
Shows which ports are a part of this aggregation for this switch. The format is: "Switch ID:Port".

#### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Refreshes the displayed table starting from the input fields.

## 3-6.2 Port Status

This section describes that when you complete to set LACP function on the switch then it provides a Port Status overview for all LACP instances

### Web Interface

To display the LACP Port status in the web interface:

1. Click Monitor, LACP and Port Status
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
3. Click "Refresh" to refresh the LACP Port Status.



The screenshot shows the 'LACP Status' web interface. At the top right, there is a breadcrumb trail: Home > Monitor > LACP > Port Status. Below the title, there is an 'Auto-refresh' checkbox and a refresh icon. The main content is a table with the following columns: Port, LACP, Key, Aggr ID, Partner System ID, Partner Port, and Partner Prio. The table contains five rows of data.


Port	LACP	Key	Aggr ID	Partner System ID	Partner Port	Partner Prio
1	No	-	-	-	-	-
N-2	No	-	-	-	-	-
N-1	No	-	-	-	-	-
N	No	-	-	-	-	-

Figure 3-6.2: The LACP Status

### Parameter Description:

- **Port :**  
The switch port number.
- **LACP :**  
'Yes' means that LACP is enabled and the port link is up. 'No' means that LACP is not enabled or that the port link is down. 'Backup' means that the port could not join the aggregation group but will join if other port leaves. Meanwhile it's LACP status is disabled.
- **Key :**  
The key assigned to this port. Only ports with the same key can aggregate together.
- **Aggr ID :**  
The Aggregation ID assigned to this aggregation group. IDs 1 and 2 are GLAGs while IDs 3-14 are LLAGs.
- **Partner System ID :**  
The partner's System ID (MAC address).
- **Partner Port :**  
The partner's port number connected to this port.
- **Partner Prio:**  
The partner's port priority.

### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Refreshes the displayed table starting from the input fields.

### 3-6.3 Port Statistics

This section describes that when you complete to set LACP function on the switch then it provides a Port Statistics overview for all LACP instances

#### Web Interface

To display the LACP Port status in the web interface:

1. Click Monitor, LACP and Port Statistics
2. If you want to auto-refresh the information then you need to evoke the "Auto refresh".
3. 3. Click "Refresh" to refresh the LACP Statistics.



Port	LACP Received	LACP Transmitted	Discarded	
			Unknown	Illegal
1	0	0	0	0
N-2	0	0	0	0
N-1	0	0	0	0
N	0	0	0	0

Figure 3-6.3: The LACP Statistics

#### Parameter Description:

- **Port :**  
The switch port number.
- **LACP Received :**  
Shows how many LACP frames have been received at each port.
- **LACP Transmitted :**  
Shows how many LACP frames have been sent from each port.
- **Discarded :**  
Shows how many unknown or illegal LACP frames have been discarded at each port.

#### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.
-  **Clear :**  
Clears the counters for all ports.

## 3-7 Loop Protection

This section displays the loop protection port status the ports of the currently selected switch.

### Web Interface

To display the Loop Protection status in the web interface:

1. Click Monitor and Loop Protection
2. If you want to auto-refresh the information then you need to evoke the "Auto refresh".
3. Click "Refresh" to refresh the LACP Statistics.


Port	Action	Transmit	Loops	Status	Loop	Time of Last Loop
No ports enabled						

Figure 3-7: Loop Protection Status

### Parameter Description:

- **Port :**  
The switch port number of the logical port.
- **Action:**  
The currently configured port action.
- **Transmit :**  
The currently configured port transmit mode.
- **Loops :**  
The number of loops detected on this port.
- **Status :**  
The current loop protection status of the port.
- **Loop :**  
Whether a loop is currently detected on the port.
- **Time of Last Loop :**  
The time of the last loop event detected.

### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.



## 3-8 Spanning Tree

### 3-8.1 Bridge Status

After you complete the MSTI Port configuration then you could to ask the switch display the Bridge Status. The Section provides a status overview of all STP bridge instances. The displayed table contains a row for each STP bridge instance, where the column displays the following information:

#### Web Interface

To display the STP Bridges status in the web interface:

1. Click Monitor, Spanning Tree and Bridge Status.
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
3. Click "Refresh" to refresh the STP Bridges.
4. Click "CIST" to next page "STP Detailed Bridge Status".




MSTI	Bridge ID	Root			Topology Flag	Topology Change Last
		ID	Port	Cost		
CIST	32768. 08-ed-02-50-10-aa	32768. 08-ed-02-50-10-aa	-	0	Steady	-

Figure 3-8.1: The STP Bridges status

#### Parameter Description:

- **MSTI :**  
The Bridge Instance. This is also a link to the STP Detailed Bridge Status.
- **Bridge ID :**  
The Bridge ID of this Bridge instance.
- **Root ID :**  
The Bridge ID of the currently elected root bridge.
- **Root Port :**  
The switch port currently assigned the root port role.
- **Root Cost :**  
Root Path Cost. For the Root Bridge it is zero. For all other Bridges, it is the sum of the Port Path Costs on the least cost path to the Root Bridge.
- **Topology Flag :**  
The current state of the Topology Change Flag of this Bridge instance.
- **Topology Change Last :**  
The time since last Topology Change occurred.

#### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.

### 3-8.2 Port Status

After you complete the STP configuration then you could to ask the switch display the STP Port Status. The Section provides you to ask switch to display the STP CIST port status for physical ports of the currently selected switch.

#### Web Interface

To display the STP Port status in the web interface:

1. Click Monitor, Spanning Tree and Port Status.
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
3. Click"Refresh" to refresh the STP Bridges.


Port	CIST Role	CIST State	Uptime
1	DesignatedPort	Forwarding	0d 00:33:59
N-2	Disabled	Discarding	-
N-1	Disabled	Discarding	-
N	Disabled	Discarding	-

Figure 3-8.2: The STP Port Status

#### Parameter Description:

- **Port :**  
The switch port number of the logical STP port.
- **CIST Role :**  
The current STP port role of the CIST port. The port role can be one of the following values: AlternatePort, Backup Port, RootPort, DesignatedPort Disabled.
- **CIST State :**  
The current STP port state of the CIST port. The port state can be one of the following values: Blocking Learning Forwarding.
- **Uptime :**  
The time since the bridge port was last initialized.

#### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.

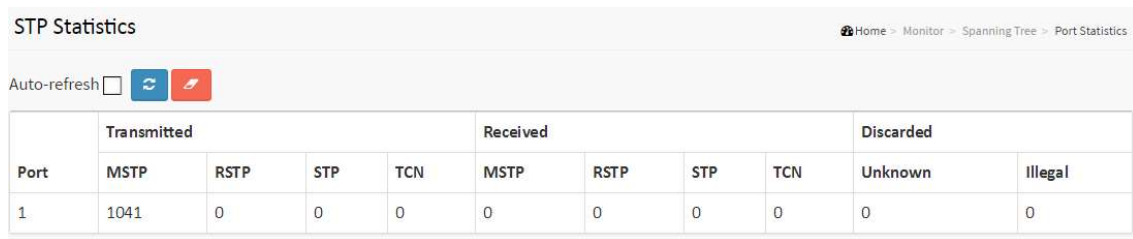
### 3-8.3 Port Statistics

After you complete the STP configuration then you could to let the switch display the STP Statistics. The Section provides you to ask switch to display the STP Statistics detail counters of bridge ports in the currently selected switch.

#### Web Interface

To display the STP Port status in the web interface:

1. Click Monitor, Spanning Tree and Port Statistics
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
3. Click "Refresh" to refresh the STP Bridges.



The screenshot shows the 'STP Statistics' web interface. At the top, there is a breadcrumb trail: Home > Monitor > Spanning Tree > Port Statistics. Below the title, there is an 'Auto-refresh' checkbox which is currently unchecked, followed by a blue circular refresh icon and a red square clear icon. The main content is a table with the following structure:



Port	Transmitted				Received				Discarded	
	MSTP	RSTP	STP	TCN	MSTP	RSTP	STP	TCN	Unknown	Illegal
1	1041	0	0	0	0	0	0	0	0	0

Figure 3-8.3: The STP Statistics

#### Parameter Description:

- **Port :**  
The switch port number of the logical STP port.
- **MSTP :**  
The number of MSTP Configuration BPDU's received/transmitted on the port.
- **RSTP :**  
The number of RSTP Configuration BPDU's received/transmitted on the port.
- **STP :**  
The number of legacy STP Configuration BPDU's received/transmitted on the port.
- **TCN :**  
The number of (legacy) Topology Change Notification BPDU's received/transmitted on the port.
- **Discarded Unknown :**  
The number of unknown Spanning Tree BPDU's received (and discarded) on the port.
- **Discarded Illegal :**  
The number of illegal Spanning Tree BPDU's received (and discarded) on the port.

#### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.
-  **Clear :**  
Click to reset the counters.

## 3-9 MVR

### 3-9.1 Statistics

The section describes the switch will display the MVR detail Statistics after you had configured MVR on the switch. It provides the detail MVR Statistics Information

#### Web Interface

To display the MVR Statistics Information in the web interface:

1. Click Monitor, MVR and Statistics
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
3. To click the "Refresh" to refresh an entry of the MVR Statistics Information.



VLAN ID	IGMP/MLD Queries Received	IGMP/MLD Queries Transmitted	IGMPv1 Joins Received	IGMPv2/MLDv1 Reports Received	IGMPv3/MLDv2 Reports Received	IGMPv2/MLDv1 Leaves Received
No more entries						

Figure 3-9.1: The MVR Statistics Information

#### Parameter Description:

- **VLAN ID :**  
The Multicast VLAN ID.
- **IGMP/MLD Queries Received :**  
The number of Received Queries for IGMP and MLD, respectively.
- **IGMP/MLD Queries Transmitted :**  
The number of Transmitted Queries for IGMP and MLD, respectively.
- **IGMPv1 Joins Received :**  
The number of Received IGMPv1 Join's.
- **IGMPv2/MLDv1 Report's Received :**  
The number of Received IGMPv2 Join's and MLDv1 Report's, respectively.
- **IGMPv3/MLDv2 Report's Received :**  
The number of Received IGMPv1 Join's and MLDv2 Report's, respectively.
- **IGMPv2/MLDv1 Leave's Received :**  
The number of Received IGMPv2 Leave's and MLDv1 Done's, respectively.

#### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page.
-  **Clear :**  
Click to reset the counters

### 3-9.2 MVR Channels Groups

The section describes user could display the MVR Groups detail information on the switch. Entries in the MVR Group Table are shown on this page. The MVR Group Table is sorted first by VLAN ID, and then by group

#### Web Interface

To display the MVR Groups Information in the web interface:

1. Click Monitor, MVR and Groups Information
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
3. To click the "Refresh" to refresh an entry of the MVR Groups Information.
4. Click "<< or >>" to move to previous or next entry.

		Port Members																									
VLAN ID	Groups	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	N-2	N-1	N
No more entries																											





Figure 3-9.2: The MVR Groups Information

#### Parameter Description:

##### MVR Channels (Groups) Information Table Columns

- **VLAN ID :**  
VLAN ID of the group.
- **Groups :**  
Group ID of the group displayed.
- **Port Members :**  
Ports under this group.

##### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page immediately.
-  **Clear :**  
Flushes the selected log entries.
-  **:**  
Updates the table starting from the first entry in the MVR Channels (Groups) Information Table.
-  **:**  
Updates the system log entries, ending at the last entry currently displayed.

### 3-9.3 MVR SFM Information

The MVR SFM (Source-Filtered Multicast) Information Table also contains the SSM (Source-Specific Multicast) information. This table is sorted first by VLAN ID, then by group, and then by Port. Different source addresses belong to the same group are treated as single entry.

#### Web Interface

To display the MVR SFM Information in the web interface:

1. Click Monitor, MVR and MVR SFM Information
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
3. To click the "Refresh" to refresh an entry of the MVR Groups Information.
4. Click "<< or >>" to move to previous or next entry.

VLAN ID	Group	Port	Mode	Source Address	Type	Hardware Filter/Switch
No more entries						




Figure 3-9.2: The MVR SFM Information

#### Parameter Description:

##### MVR SFM Information Table Columns

- **VLAN ID :**  
VLAN ID of the group.
- **Group :**  
Group address of the group displayed.
- **Port :**  
Switch port number.
- **Mode :**  
Indicates the filtering mode maintained per (VLAN ID, port number, Group Address) basis. It can be either Include or Exclude.
- **Source Address :**  
IP Address of the source. Currently, system limits the total number of IP source addresses for filtering to be 128. When there is no any source filtering address, the text "None" is shown in the Source Address field.
- **Type :**  
Indicates the Type. It can be either Allow or Deny.
- **Hardware Filter/Switch :**  
Indicates whether data plane destined to the specific group address from the source IPv4/IPv6 address could be handled by chip or not.

### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page immediately.
-  **:**  
Updates the table starting from the first entry in the MVR Channels (Groups) Information Table.
-  **:**  
Updates the system log entries, ending at the last entry currently displayed.

## 3-10 IPMC

### 3-10.1 IGMP Snooping

#### 3-10.1.1 Status

After you complete the IGMP Snooping configuration, then you could to let the switch display the IGMP Snooping Status. The Section provides you to let switch to display the IGMP Snooping detail status.

#### Web Interface

To display the IGMP Snooping status in the web interface:

1. Click Monitor, IGMP Snooping and Status
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
3. Click "Refresh" to refresh the IGMP Snooping Status.
4. Click "Clear "to clear the IGMP Snooping Status.

VLAN ID	Querier Version	Host Version	Querier Status	Queries Transmitted	Queries Received	V1 Reports Received	V2 Reports Received	V3 Reports Received	V2 Leaves Received
No entries									

Port	Status
1	-
2	-
N-2	-
N-1	-
N	-

Figure 3-10.1.1: The IGMP Snooping Status.



#### Parameter Description:

- **VLAN ID :**  
The VLAN ID of the entry.
- **Querier Version :**  
Working Querier Version currently.
- **Host Version :**  
Working Host Version currently.
- **Querier Status :**  
Shows the Querier status is "ACTIVE" or "IDLE".  
"DISABLE" denotes the specific interface is administratively disabled.



- **Queries Transmitted :**  
The number of Transmitted Queries.
- **Queries Received :**  
The number of Received Queries.
- **V1 Reports Received :**  
The number of Received V1 Reports.
- **V2 Reports Received :**  
The number of Received V2 Reports.
- **V3 Reports Received :**  
The number of Received V3 Reports.
- **V2 Leaves Received :**  
The number of Received V2 Leaves.
- **Router Port :**  
Display 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.  
Static denotes the specific port is configured to be a router port.  
Dynamic denotes the specific port is learnt to be a router port.  
Both denote the specific port is configured or learnt to be a router port.
- **Port :**  
Switch port number.
- **Status :**  
Indicate whether specific port is a router port or not.

**Buttons**

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page immediately.
-  **Clear :**  
Clears all Statistics counters.

### 3-10.1.2 Group Information

After you complete to set the IGMP Snooping function then you could let the switch to display the IGMP Snooping Group Information. Entries in the IGMP Group Table are shown on this page. The IGMP Group Table is sorted first by VLAN ID, and then by group. The will use the last entry of the currently displayed table as a basis for the next lookup. When the end is reached the text "No more entries" is shown in the displayed table. Use the button to start over.

#### Web Interface

To display the IGMP Snooping Group Information in the web interface:

1. Click Monitor, IGMP Snooping, Group Information
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
3. Click "Refresh" to refresh an entry of the IGMP Snooping Groups Information.
4. Click "<< or >>" to move to previous or next entry.

		Port Members																									
VLAN ID	Groups	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	N-2	N-1	N
No more entries																											




Figure 3-10.1.2: The IGMP Snooping Groups Information.

#### Parameter Description:

##### IGMP Group Table Columns

- **VLAN ID :**  
VLAN ID of the group.
- **Groups :**  
Group address of the group displayed.
- **Port Members :**  
Ports under this group.

##### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page immediately.
-  **:**  
Updates the table, starting with the first entry in the IGMP Group Table.
-  **:**  
Updates the system log entries, ending at the last entry currently displayed.

### 3-10.1.3 IPv4 SFM Information

Entries in the IGMP SFM Information Table are shown on this page. The IGMP SFM (Source-Filtered Multicast) Information Table also contains the SSM (Source-Specific Multicast) information. This table is sorted first by VLAN ID, then by group, and then by Port. Different source addresses belong to the same group are treated as single entry.

#### Web Interface

To display the IPv4 SSM Information in the web interface:

1. Click Monitor, IGMP Snooping, IPv4 SSM Information
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
3. Click "Refresh" to refresh an entry of the IPv4 SFM Information.
4. Click "<< or >>" to move to previous or next entry.

VLAN ID	Group	Port	Mode	Source Address	Type	Hardware Filter/Switch
No more entries						




Figure 3-10.1.3: The IPv4 SFM Information.

#### Parameter Description:

##### IGMP SFM Information Table Columns

- **VLAN ID :**  
VLAN ID of the group.
- **Group :**  
Group address of the group displayed.
- **Port :**  
Switch port number.
- **Mode :**  
Indicates the filtering mode maintained per (VLAN ID, port number, Group Address) basis. It can be either Include or Exclude.
- **Source Address :**  
IP Address of the source. Currently, system limits the total number of IP source addresses for filtering to be 128.
- **Type :**  
Indicates the Type. It can be either Allow or Deny.
- **Hardware Filter/Switch**  
Indicates whether data plane destined to the specific group address from the source IPv4 address could be handled by chip or not.  
Ports under this group.

### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page immediately.
-  **:**  
Updates the table, starting with the first entry in the IGMP Group Table.
-  **:**  
Updates the system log entries, ending at the last entry currently displayed.

## 3-10.2 MLD Snooping

### 3-10.2.1 Status

The section describes when you complete the MLD Snooping and how to display the MLD Snooping Status and detail information. It will help you to find out the detail information of MLD Snooping status.

#### Web Interface

To display the MLD Snooping Status in the web interface:

1. Click Monitor, MLD Snooping and Status.
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
3. Click "Refresh" to refresh an entry of the MLD Snooping Status Information.
4. Click "Clear" to clear the MLD Snooping Status.

VLAN ID	Querier Version	Host Version	Querier Status	Queries Transmitted	Queries Received	V1 Reports Received	V2 Reports Received	V1 Leaves Received

Port	Status
1	-
N-2	-
N-1	-
N	-



Figure 3-10.2.1: The MLD Snooping Status

#### Parameter Description:

- **VLAN ID :**  
The VLAN ID of the entry.
- **Querier Version :**  
Working Querier Version currently.
- **Host Version :**  
Working Host Version currently.
- **Querier Status :**  
Show the Querier status is "ACTIVE" or "IDLE".  
"DISABLE" denotes the specific interface is administratively disabled.
- **Queries Transmitted :**  
The number of Transmitted Queries.
- **Queries Received :**  
The number of Received Queries.

- **V1 Reports Received :**  
The number of Received V1 Reports.
- **V2 Reports Received :**  
The number of Received V2 Reports.
- **V1 Leaves Received :**  
The number of Received V1 Leaves.
- **Router Port :**  
Display 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.  
Static denotes the specific port is configured to be a router port.  
Dynamic denotes the specific port is learnt to be a router port.  
Both denote the specific port is configured or learnt to be a router port.
- **Port :**  
Switch port number.
- **Status :**  
Indicate whether specific port is a router port or not.

#### **Buttons**

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page immediately.
-  **Clear :**  
Clears all Statistics counters.

### 3-10.2.2 Group Information

The section describes user could set the MLD Snooping Groups Information. The "Start from VLAN", and "group" input fields allow the user to select the starting point in the MLD Group Table

#### Web Interface

To display the MLD Snooping Group information in the web interface:

1. Click Monitor, MLD Snooping and Group Information
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh"
3. Click "Refresh" to refresh an entry of the MLD Snooping Group Information.
4. Click "Clear" to clear the MLD Snooping Groups information..

		Port Members																									
VLAN ID	Groups	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	N-2	N-1	N
No more entries																											




Figure 3-10.2.2: The MLD Snooping Groups Information

#### Parameter Description:

##### MLD Snooping Information Table Columns

- **VLAN ID :**  
VLAN ID of the group.
- **Groups :**  
Group address of the group displayed.
- **Port Members :**  
Ports under this group.

##### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page immediately.
-  **:**  
Updates the table, starting with the first entry in the IGMP Group Table.
-  **:**  
Updates the system log entries, ending at the last entry currently displayed.

### 3-10.2.3 IPv6 SFM Information

Entries in the MLD SFM Information Table are shown on this page. The MLD SFM (Source-Filtered Multicast) Information Table also contains the SSM (Source-Specific Multicast) information. This table is sorted first by VLAN ID, then by group, and then by Port. Different source addresses belong to the same group are treated as single entry.

#### Web Interface

To display the MLDv2 IPv6 SSM Information in the web interface:

1. Click Monitor, MLD Snooping and IPv6 SFM Information.
2. If you want to auto-refresh the information then you need to evoke the "Auto-refresh".
3. Click "Refresh" to refresh an entry of the MLDv2 IPv6 SSM Information.
4. Click "<< or >>" to move to previous or next entry.

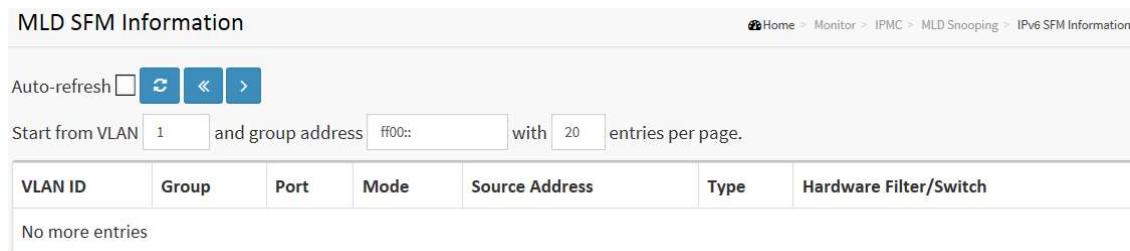


Figure 3-10.2.3: The IPv6 SFM Information




#### Parameter Description:

##### MLD SFM Information Table Columns

- **VLAN ID :**  
VLAN ID of the group.
- **Group :**  
Group address of the group displayed.
- **Port :**  
Switch port number.
- **Mode :**  
Indicates the filtering mode maintained per (VLAN ID, port number, Group Address) basis. It can be either Include or Exclude.
- **Source Address :**  
IP Address of the source. Currently, system limits the total number of IP source addresses for filtering to be 128.
- **Type :**  
Indicates the Type. It can be either Allow or Deny.
- **Hardware Filter/Switch :**  
Indicates whether data plane destined to the specific group address from the source IPv6 address could be handled by chip or not.



### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page immediately.
-  **:**  
Updates the table, starting with the first entry in the IGMP Group Table.
-  **:**  
Updates the system log entries, ending at the last entry currently displayed.

## 3-11 LLDP

### 3-11.1 Neighbor

This page provides a status overview for all LLDP neighbors. The displayed table contains a row for each port on which an LLDP neighbor is detected. The columns hold the following information

#### Web Interface

To display the LLDP neighbors:

1. Click Monitor, LLDP and Neighbors.
2. Click Refresh for manual update web screen
3. Click Auto-refresh for auto-update web screen



Local Port	Chassis ID	Port ID	Port Description	System Name	System Capabilities	System Description	Management Address
No neighbor information found							

Figure 3-11.1: The LLDP Neighbors information



**NOTE:** If your network without any device supports LLDP then the table will show "No LLDP neighbor information found".

#### Parameter Description:

- **Local Port :**  
The port on which the LLDP frame was received.
- **Chassis ID :**  
The Chassis ID is the identification of the neighbor's LLDP frames.
- **Port ID :**  
The Remote Port ID is the identification of the neighbor port.
- **Port Description :**  
Port Description is the port description advertised by the neighbor unit.
- **System Name :**  
System Name is the name advertised by the neighbor unit.
- **System Capabilities :**  
System Capabilities describes the neighbor unit's capabilities. The possible capabilities are:
  1. Other
  2. Repeater
  3. Bridge
  4. WLAN Access Point
  5. Router
  6. Telephone
  7. DOCSIS cable device
  8. Station only
  9. Reserved

When a capability is enabled, the capability is followed by (+). If the capability is disabled, the capability is followed by (-).

- **Management Address :**

Management Address is the neighbor unit's address that is used for higher layer entities to assist discovery by the network management. This could for instance hold the neighbor's IP address.

**Buttons**

- **Auto-refresh :**

Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.

-  **Refresh :**

Click to refresh the page immediately.

### 3-11.2 LLDP-MED Neighbor

This page provides a status overview of all LLDP-MED neighbors. The displayed table contains a row for each port on which an LLDP neighbor is detected. This function applies to VoIP devices which support LLDP-MED. The columns hold the following information:

#### Web Interface

To display the LLDP-MED neighbor:

1. Click Monitor, LLDP and LLDP-MED Neighbor.
2. Click Refresh for manual update web screen
3. Click Auto-refresh for auto-update web screen

LLDP-MED Neighbor Information					
Auto-refresh <input type="checkbox"/>					
Port 5					
Device Type	Capabilities				
Endpoint Class 1	LLDP-MED Capabilities				
Auto-negotiation	Auto-negotiation status	Auto-negotiation Capabilities		MAU Type	
Supported	Enabled	1000BASE-T full duplex mode		Invalid MAU Type	

Figure 3-11.2: The LLDP-MED Neighbors information



**NOTE:** If your network without any device supports LLDP-MED then the table will show "No LLDP-MED neighbor information found".

#### Parameter Description:

- **Port :**

The port on which the LLDP frame was received.

- **Device Type :**

LLDP-MED Devices are comprised of two primary Device Types: Network Connectivity Devices and Endpoint Devices.

#### LLDP-MED Network Connectivity Device Definition

LLDP-MED Network Connectivity Devices, as defined in TIA-1057, provide access to the IEEE 802 based LAN infrastructure for LLDP-MED Endpoint Devices. An LLDP-MED Network Connectivity Device is a LAN access device based on any of the following technologies:

1. LAN Switch/Router
2. IEEE 802.1 Bridge
3. IEEE 802.3 Repeater (included for historical reasons)
4. IEEE 802.11 Wireless Access Point
5. Any device that supports the IEEE 802.1AB and MED extensions defined by TIA-1057 and can relay IEEE 802 frames via any method.

#### LLDP-MED Endpoint Device Definition :

LLDP-MED Endpoint Devices, as defined in TIA-1057, are located at the IEEE 802 LAN network edge, and participate in IP communication service using the LLDP-MED framework.

Within the LLDP-MED Endpoint Device category, the LLDP-MED scheme is broken into further Endpoint Device Classes, as defined in the following.

Each LLDP-MED Endpoint Device Class is defined to build upon the capabilities defined for the previous Endpoint Device Class. For-example will any LLDP-MED Endpoint Device claiming compliance as a Media Endpoint (Class II) also support all aspects of TIA-1057 applicable to Generic Endpoints (Class I), and any LLDP-MED Endpoint Device claiming compliance as a Communication Device (Class III) will also support all aspects of TIA-1057 applicable to both Media Endpoints (Class II) and Generic Endpoints (Class I).

**LLDP-MED Generic Endpoint (Class I) :**

The LLDP-MED Generic Endpoint (Class I) definition is applicable to all endpoint products that require the base LLDP discovery services defined in TIA-1057, however do not support IP media or act as an end-user communication appliance. Such devices may include (but are not limited to) IP Communication Controllers, other communication related servers, or any device requiring basic services as defined in TIA-1057.

Discovery services defined in this class include LAN configuration, device location, network policy, power management, and inventory management.

**LLDP-MED Media Endpoint (Class II) :**

The LLDP-MED Media Endpoint (Class II) definition is applicable to all endpoint products that have IP media capabilities however may or may not be associated with a particular end user. Capabilities include all of the capabilities defined for the previous Generic Endpoint Class (Class I), and are extended to include aspects related to media streaming. Example product categories expected to adhere to this class include (but are not limited to) Voice / Media Gateways, Conference Bridges, Media Servers, and similar.

Discovery services defined in this class include media-type-specific network layer policy discovery.

**LLDP-MED Communication Endpoint (Class III) :**

The LLDP-MED Communication Endpoint (Class III) definition is applicable to all endpoint products that act as end user communication appliances supporting IP media. Capabilities include all of the capabilities defined for the previous Generic Endpoint (Class I) and Media Endpoint (Class II) classes, and are extended to include aspects related to end user devices. Example product categories expected to adhere to this class include (but are not limited to) end user communication appliances, such as IP Phones, PC-based softphones, or other communication appliances that directly support the end user.

Discovery services defined in this class include provision of location identifier (including ECS / E911 information), embedded L2 switch support, inventory management.

- **LLDP-MED Capabilities :**

LLDP-MED Capabilities describes the neighborhood unit's LLDP-MED capabilities. The possible capabilities are:

1. LLDP-MED capabilities
2. Network Policy
3. Location Identification
4. Extended Power via MDI - PSE
5. Extended Power via MDI - PD
6. Inventory
7. Reserved

- **Application Type :**

Application Type indicating the primary function of the application(s) defined for this network policy, advertised by an Endpoint or Network Connectivity Device. The possible application types are shown below.

1. Voice - for use by dedicated IP Telephony handsets and other similar appliances supporting interactive voice services. These devices are typically deployed on a separate VLAN for ease of deployment and enhanced security by isolation from data applications.
2. Voice Signalling - for use in network topologies that require a different policy for the voice signalling than for the voice media.
3. Guest Voice - to support a separate limited feature-set voice service for guest users and visitors with their own IP Telephony handsets and other similar appliances supporting interactive voice services.
4. Guest Voice Signalling - for use in network topologies that require a different policy for the guest voice signalling than for the guest voice media.
5. Softphone Voice - for use by softphone applications on typical data centric devices, such as PCs or laptops.
6. Video Conferencing - for use by dedicated Video Conferencing equipment and other similar appliances supporting real-time interactive video/audio services.
7. Streaming Video - for use by broadcast or multicast-based video content distribution and other similar applications supporting streaming video services that require specific network policy treatment. Video applications relying on TCP with buffering would not be an intended use of this application type.
8. Video Signalling - for use in network topologies that require a separate policy for the video signalling than for the video media.

- **Policy :**

Policy indicates that an Endpoint Device wants to explicitly advertise that the policy is required by the device. Can be either Defined or Unknown

Unknown: The network policy for the specified application type is currently unknown.

Defined: The network policy is defined.

- **TAG :**

TAG is indicative of whether the specified application type is using a tagged or an untagged VLAN. Can be Tagged or Untagged.

Untagged: The device is using an untagged frame format and as such does not include a tag header as defined by IEEE 802.1Q-2003.

Tagged: The device is using the IEEE 802.1Q tagged frame format.

- **VLAN ID :**

VLAN ID is the VLAN identifier (VID) for the port as defined in IEEE 802.1Q-2003. A value of 1 through 4094 is used to define a valid VLAN ID. A value of 0 (Priority Tagged) is used if the device is using priority tagged frames as defined by IEEE 802.1Q-2003, meaning that only the IEEE 802.1D priority level is significant and the default PVID of the ingress port is used instead.

- **Priority :**


Priority is the Layer 2 priority to be used for the specified application type. One of the eight priority levels (0 through 7).

- **DSCP :**

DSCP is the DSCP value to be used to provide Diffserv node behavior for the specified application type as defined in IETF RFC 2474. Contain one of 64 code point values (0 through 63).

- **Auto-negotiation :**  
Auto-negotiation identifies if MAC/PHY auto-negotiation is supported by the link partner.
- **Auto-negotiation status :**  
Auto-negotiation status identifies if auto-negotiation is currently enabled at the link partner. If Auto-negotiation is supported and Auto-negotiation status is disabled, the 802.3 PMD operating mode will be determined the operational MAU type field value rather than by auto-negotiation.
- **Auto-negotiation Capabilities :**  
Auto-negotiation Capabilities shows the link partners MAC/PHY capabilities.

#### **Buttons**

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page immediately.

### 3-11.3 PoE

This page allows the user to inspect the current status for all PoE ports. The section shows all port Power Over Ethernet Status.

#### Web Interface

To display the LLDP Neighbor Power Over Ethernet information:

1. Click Monitor, LLDP, PoE
2. Display Power Over Ethernet Status Information
3. Click Auto-refresh for auto-update web screen

Local Port	Power Type	Power Source	Power Priority	Maximum Power
No PoE neighbor information found				


Figure 3-12.3: The LLDP Neighbors EEE information

#### Parameter Description:

- **Local Port :**  
The port for this switch on which the LLDP frame was received.
- **Power Type :**  
The Power Type represents whether the device is a Power Sourcing Entity (PSE) or Power Device (PD).  
If the Power Type is unknown it is represented as "Reserved".
- **Power Source :**  
The Power Source represents the power source being utilized by a PSE or PD device.  
If the device is a PSE device it can either run on its Primary Power Source or its Backup Power Source. If it is unknown whether the PSE device is using its Primary Power Source or its Backup Power Source it is indicated as "Unknown"  
If the device is a PD device it can either run on its local power supply or it can use the PSE as power source. It can also use both its local power supply and the PSE.  
If it is unknown what power supply the PD device is using it is indicated as "Unknown"
- **Power Priority :**  
Power Priority represents the priority of the PD device, or the power priority associated with the PSE type device's port that is sourcing the power. There are three levels of power priority. The three levels are: Critical, High and Low.  
If the power priority is unknown it is indicated as "Unknown"
- **Maximum Power :**  
The Maximum Power Value contains a numerical value that indicates the maximum power in watts required by a PD device from a PSE device, or the minimum power a PSE device is capable of sourcing over a maximum length cable based on its current configuration.  
The maximum allowed value is 102.3 W. If the device indicates value higher than 102.3 W, it is represented as "reserved"



### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page immediately.

By using EEE power savings can be achieved at the expense of traffic latency. This latency occurs due to that the circuits EEE turn off to save power, need time to boot up before sending traffic over the link. This time is called "wake up time". To achieve minimal latency, devices can use LLDP to exchange information about their respective tx and rx "wake up time ", as a way to agree upon the minimum wake up time they need.


This page provides an overview of EEE information exchanged by LLDP.

### Web Interface

To display the LLDP EEE neighbors:

1. Click Monitor, LLDP then click EEE to show discover EEE devices.
2. Click Refresh for manual update web screen.
3. Click Auto-refresh for auto-update web screen.

LLDP Neighbors EEE Information Home > Monitor > LLDP > EEE

Auto-refresh  

Local Port	Tx Tw	Rx Tw	Fallback Receive Tw	Echo Tx Tw	Echo Rx Tw	Resolved Tx Tw	Resolved Rx Tw	EEE in Sync
No LLDP EEE information found								

**Figure 3-11.4: The LLDP Neighbors EEE information**



**NOTE:** If your network without any devices which enables EEE function then the table will show "No LLDP EEE information found".

### Parameter Description:


#### LLDP Neighbors EEE Information

The displayed table contains a row for each port. The columns hold the following information:

- **Local Port :**  
The port on which LLDP frames are received or transmitted.
- **Tx Tw :**  
The link partner's maximum time that transmit path can hold off sending data after reassertion of LPI.
- **Rx Tw :**  
The link partner's time that receiver would like the transmitter to hold off to allow time for the receiver to wake from sleep.
- **Fallback Receive Tw :**  
The link partner's fallback receives Tw.  
A receiving link partner may inform the transmitter of an alternate desired Tw\_sys\_tx. Since a receiving link partner is likely to have discrete levels for savings, this provides the transmitter with additional information that it may use for a more efficient allocation. Systems that do not implement this option default the value to be the same as that of the Receive Tw\_sys\_tx.

- **Echo Tx Tw :**  
 The link partner's Echo Tx Tw value.  
 The respective echo values shall be defined as the local link partner's reflection (echo) of the remote link partners respective values. When a local link partner receives its echoed values from the remote link partner it can determine whether or not the remote link partner has received, registered and processed its most recent values. For example, if the local link partner receives echoed parameters that do not match the values in its local MIB, then the local link partner infers that the remote link partners request was based on stale information.
- **Echo Rx Tw :**  
 The link partner's Echo Rx Tw value.
- **Resolved Tx Tw :**  
 The resolved Tx Tw for this link. Note: NOT the link partner  
 The resolved value that is the actual "tx wakeup time" used for this link (based on EEE information exchanged via LLDP).
- **Resolved Rx Tw :**  
 The resolved Rx Tw for this link. Note: NOT the link partner  
 The resolved value that is the actual "tx wakeup time" used for this link (based on EEE information exchanged via LLDP).
- **EEE in Sync :**  
 Shows whether the switch and the link partner have agreed on wake times.  
 Red - Switch and link partner have not agreed on wakeup times.  
 Green - Switch and link partner have agreed on wakeup times.

**Buttons**

- **Auto-refresh :**  
 Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
 Click to refresh the page immediately.

### 3-11.5 Port Statistics

Two types of counters are shown. Global counters are counters that refer to the whole switch, while local counters refer to per port counters for the currently selected switch

#### Web Interface

To display the LLDP Statistics:

1. Click Monitor, LLDP, then click Port Statistics to show LLDP counters
2. Click Refresh for manual update web screen
3. Click Auto-refresh for auto-update web screen
4. Click Clear to clear all counters

The screenshot shows the 'LLDP Counters' web interface. At the top, there is a breadcrumb trail: Home > Monitor > LLDP > Port Statistics. Below this, there is an 'Auto-refresh' section with a checkbox and two buttons (refresh and clear). The main content is divided into two sections: 'LLDP Global Counters' and 'LLDP Statistics Local Counters'.

LLDP Global Counters	
Neighbor entries were last changed	2011-01-01T00:00:00+00:00 (9433 secs. ago)
Total Neighbors Entries Added	0
Total Neighbors Entries Deleted	0
Total Neighbors Entries Dropped	0
Total Neighbors Entries Aged Out	0

LLDP Statistics Local Counters								
Local Port	Tx Frames	Rx Frames	Rx Errors	Frames Discarded	TLVs Discarded	TLVs Unrecognized	Org. Discarded	Age-Outs
1	87	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
N-2	422	0	0	0	0	0	0	0
N-1	0	0	0	0	0	0	0	0
N	0	0	0	0	0	0	0	0

Figure 3-11.5: The LLDP Port Statistics Information

#### Parameter Description:

##### Global Counters

- **Neighbor entries were last changed at :**  
It also shows the time when the last entry was last deleted or added. It also shows the time elapsed since the last change was detected.
- **Total Neighbors Entries Added :**  
Shows the number of new entries added since switch reboot.
- **Total Neighbors Entries Deleted :**  
Shows the number of new entries deleted since switch reboot.
- **Total Neighbors Entries Dropped :**  
Shows the number of LLDP frames dropped due to the entry table being full.
- **Total Neighbors Entries Aged Out :**  
Shows the number of entries deleted due to Time-To-Live expiring.



##### Local Counters

The displayed table contains a row for each port. The columns hold the following information:

- **Local Port :**  
The port on which LLDP frames are received or transmitted.

- **Tx Frames :**  
The number of LLDP frames transmitted on the port.
- **Rx Frames :**  
The number of LLDP frames received on the port.
- **Rx Errors :**  
The number of received LLDP frames containing some kind of error.
- **Frames Discarded :**  
If an LLDP frame is received on a port, and the switch's internal table has run full, the LLDP frame is counted and discarded. This situation is known as "Too Many Neighbors" in the LLDP standard. LLDP frames require a new entry in the table when the Chassis ID or Remote Port ID is not already contained within the table. Entries are removed from the table when a given port's link is down, an LLDP shutdown frame is received, or when the entry ages out.
- **TLVs Discarded :**  
Each LLDP frame can contain multiple pieces of information, known as TLVs (TLV is short for "Type Length Value"). If a TLV is malformed, it is counted and discarded.
- **TLVs Unrecognized :**  
The number of well-formed TLVs, but with an unknown type value.
- **Org. Discarded :**  
The number of organizationally received TLVs.
- **Age-Outs :**  
Each LLDP frame contains information about how long time the LLDP information is valid (age-out time). If no new LLDP frame is received within the age out time, the LLDP information is removed, and the Age-Out counter is incremented.

**Buttons**

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page immediately.
-  **Clear :**  
Clears the local counters. All counters (including global counters) are cleared upon reboot.

## 3-12 PoE

This page allows the user to inspect the current status for all PoE ports.

### Web Interface

To Display Power Over Ethernet Statistics in the web interface:

1. Click Monitor, PoE
2. Checked "Auto-refresh".
3. Click "Refresh" to refresh the port detailed statistics.
- 4.

Local Port	PD class	Power Requested	Power Allocated	Power Used	Current Used	Priority	Port Status
1	-	0 [W]	0 [W]	0 [W]	0 [mA]	Low	No PD detected
2	-	0 [W]	0 [W]	0 [W]	0 [mA]	Low	No PD detected
N-3	-	0 [W]	0 [W]	0 [W]	0 [mA]	Low	No PD detected
N-2	-	0 [W]	0 [W]	0 [W]	0 [mA]	Low	No PD detected
Total		0 [W]	0 [W]	0 [W]	0 [mA]		

Figure 3-12: The PoE Statistics

### Parameter Description:

- **Local Port :**

This is the logical port number for this row.

- **PD Class :**

Each PD is classified according to a class that defines the maximum power the PD will use. The PD Class shows the PDs class.

Five Classes are defined:

Class 0: Max. power 15.4 W

Class 1: Max. power 4.0 W

Class 2: Max. power 7.0 W

Class 3: Max. power 15.4 W

Class 4: Max. power 30.0 W -36W

- **Power Requested :**

The Power Requested shows the requested amount of power the PD wants to be reserved.

- **Power Allocated :**

The Power Allocated shows the amount of power the switch has allocated for the PD.

- **Power Used :**

The Power Used shows how much power the PD currently is using.

- **Current Used :**

The Power Used shows how much current the PD currently is using.

- **Priority :**

The Priority shows the port's priority configured by the user.

- **Port Status :**

The Port Status shows the port's status. The status can be one of the following values:

PoE not available - No PoE chip found - PoE not supported for the port.

PoE turned OFF - PoE disabled : PoE is disabled by user.

PoE turned OFF - Power budget exceeded - The total requested or used power by the PDs exceeds the maximum power the Power Supply can deliver, and port(s) with the lowest priority is/are powered down.

No PD detected - No PD detected for the port.

PoE turned OFF - PD overload - The PD has requested or used more power than the port can deliver, and is powered down.

PoE turned OFF - PD is off.

Invalid PD - PD detected, but is not working correctly.

### **Buttons**

- **Auto-refresh :**

Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.

-  **Refresh :**

Click to refresh the page immediately.

### 3-13 MAC Table

Entries in the MAC Table are shown on this page. The MAC Table contains up to 8192 entries, and is sorted first by VLAN ID, then by MAC address.

#### Web Interface

To Display MAC Address Table in the web interface:

1. Click Monitor, Dynamic MAC Table.
2. Specify the VLAN and MAC Address.
3. Display MAC Address Table.

Type	VLAN	MAC Address	Port Members																								
			CPU	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Static	1	08-ed-02-5d-10-aa	✓																								
Dynamic	1	08-ed-02-5d-10-aa		✓																							
Static	1	33-33-00-00-00-01	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Static	1	33-33-00-00-00-02	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Static	1	33-33-ff-1c-a0-f8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓



Figure 3-13: The MAC Address Table

#### Parameter Description:



##### MAC Table Columns

- **Switch (stack only) :**  
The stack unit where the entry is learned.
- **Type :**  
Indicates whether the entry is a static or a dynamic entry.
- **VLAN :**  
The VLAN ID of the entry.
- **MAC address :**  
The MAC address of the entry.
- **Port Members :**  
The ports that are members of the entry.

##### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Refreshes the displayed table starting from the "Start from MAC address" and "VLAN" input fields.
-  **Clear :**  
Flushes the selected log entries.



-  :  
Updates the table starting from the first entry in the MAC Table, i.e. the entry with the lowest VLAN ID and MAC address
-  :  
Updates the system log entries, ending at the last entry currently displayed.



---

**NOTE:**

08-ED-02-5D-10-AA : your switch MAC address (for IPv4)

33-33-00-00-00-01 : Destination MAC (for IPv6 Router Advertisement) (reference IPv6 RA.JPG)

33-33-00-00-00-02 : Destination MAC (for IPv6 Router Solicitation) (reference IPv6 RS.JPG)

33-33-FF-73-01-29 : Destination MAC (for IPv6 Neighbor Solicitation) (reference IPv6 DAD.JPG)

33-33-FF-A8-01-01: your switch MAC address (for IPv6 global IP)

FF-FF-FF-FF-FF-FF: for Broadcast.

---

## 3-14 VLANs

### 3-14.1 Membership

This page provides an overview of membership status of VLAN users.

#### Web Interface

To display the VLAN membership configuration in the web interface:

1. Click Monitor, VLANs and VLAN membership.
2. Scroll the bar to choose which VLANs would like to show up.
3. Click Refresh to update the state.

VLAN Membership Status for Combined users Home > Monitor > VLANs > Membership

Auto-refresh  ↺ ↻ ↷ Combined ▾

Start from VLAN 1, 20 entries per page.

VLAN ID	Port Members																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	N-2	N-1	N
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Figure 3-14.1: VLAN Membership Status for Combined Users

#### Parameter Description:

- **VLAN USER :**

Various internal software modules may use VLAN services to configure VLAN memberships on the fly.

The drop-down list on the right allows for selecting between showing VLAN memberships as configured by an administrator (Admin) or as configured by one of these internal software modules.

The "Combined" entry will show a combination of the administrator and internal software modules configuration, and basically reflects what is actually configured in hardware.

- **VLAN ID :**

VLAN ID for which the Port members are displayed.

- **Port Members :**

A row of check boxes for each port is displayed for each VLAN ID.

If a port is included in a VLAN, an image will be displayed.



If a port is included in a Forbidden port list, an image will be displayed.

If a port is included in a Forbidden port list and dynamic VLAN user register VLAN on same Forbidden port, then conflict port will be displayed as .

- **VLAN Membership**

The VLAN Membership Status Page shall show the current VLAN port members for all VLANs configured by a selected VLAN User (selection shall be allowed by a Combo Box). When ALL VLAN Users are selected, it shall show this information for all the VLAN Users, and this is by default. VLAN membership allows the frames classified to the VLAN ID to be forwarded on the respective VLAN member ports.

### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Refreshes the displayed table starting from the "Start from MAC address" and "VLAN" input fields.
-  **Combined :**  
Select VLAN Users from this drop-down list.

### 3-14.2 Port

The function Port Status gathers the information of all VLAN status and reports it by the order of Static NAS MVRP MVP Voice VLAN MSTP GVRP Combined.

#### Web Interface

To Display VLAN Port Status in the web interface:

1. Click Monitor,VLANand Port Status.
2. Specify the Static NAS MVRP MVP Voice VLAN MSTP GVRP Combined.
3. Display Port Status information.

Port	Port Type	Ingress Filtering	Frame Type	Port VLAN ID	Tx Tag	Untagged VLAN ID	Conflicts
1	C-Port	<input checked="" type="checkbox"/>	All	1	Untag PVID		No
2	C-Port	<input checked="" type="checkbox"/>	All	1	Untag PVID		No
N-2	C-Port	<input checked="" type="checkbox"/>	All	1	Untag PVID		No
N-1	C-Port	<input checked="" type="checkbox"/>	All	1	Untag PVID		No
N	C-Port	<input checked="" type="checkbox"/>	All	1	Untag PVID		No

Figure 3-14.2: The VLAN Port Status for Static User

#### Parameter Description:

- **VLAN USER :**

VLAN User module uses services of the VLAN management functionality to configure VLAN memberships and VLAN port configuration such as PVID, UVID. Currently we support following VLAN User types:

- **CLI/Web/SNMP** : These are referred to as static.
- **NAS** : NAS provides port-based authentication, which involves communications between a Supplicant, Authenticator, and an Authentication Server.
- **MVRP** : Multiple VLAN Registration Protocol (MVRP) allows dynamic registration and deregistration of VLANs on ports on a VLAN bridged network.
- **Voice VLAN** : Voice VLAN is a VLAN configured specially for voice traffic typically originating from IP phones.
- **MVR** : MVR is used to eliminate the need to duplicate multicast traffic for subscribers in each VLAN. Multicast traffic for all channels is sent only on a single (multicast) VLAN.
- **MSTP** : The 802.1s Multiple Spanning Tree protocol (MSTP) uses VLANs to create multiple spanning trees in a network, which significantly improves network resource utilization while maintaining a loop-free environment.

- **Port :**



The logical port for the settings contained in the same row.

- **Port Type :**

Shows the Port Type. Port type can be any of Unaware, C-port, S-port, Custom S-port. If Port Type is Unaware, all frames are classified to the Port VLAN ID and tags are not removed. C-port is Customer Port. S-port is Service port. Custom S-port is S-port with Custom TPID.

- **Ingress Filtering :**  
Shows the ingress filtering on a port. This parameter affects VLAN ingress processing. If ingress filtering is enabled and the ingress port is not a member of the classified VLAN, the frame is discarded.
- **Frame Type :**  
Shows whether the port accepts all frames or only tagged frames. This parameter affects VLAN ingress processing. If the port only accepts tagged frames, untagged frames received on that port are discarded.
- **Port VLAN ID :**  
Shows the Port VLAN ID (PVID) that a given user wants the port to have.  
The field is empty if not overridden by the selected user.
- **Tx Tag :**  
Shows egress filtering frame status whether tagged or untagged.
- **UVID :**  
Shows UVID (untagged VLAN ID). Port's UVID determines the packet's behavior at the egress side.
- **Conflicts :**  
Shows status of Conflicts whether exists or not. When a Volatile VLAN User requests to set VLAN membership or VLAN port configuration, the following conflicts can occur:  
Functional Conflicts between features.  
Conflicts due to hardware limitation.  
Direct conflict between user modules.

#### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page immediately.
-  **Combined :**  
Select VLAN Users from this drop-down list.

## 3-15 VCL

### 3-15.1 MAC-based VLAN

This section shows MAC-based VLAN entries configured by various MAC-based VLAN users. Currently we support following VLAN User types:

CLI/Web/SNMP: These are referred to as static.

NAS: NAS provides port-based authentication, which involves communications between a Supplicant, Authenticator, and an Authentication Server.

#### Web Interface

To Display MAC-based VLAN configuration in the web interface:

1. Click Monitor and MAC-based VLAN Status.
2. Specify the Static, NAS, Combined.
3. Display MAC-based information.

MAC-based VLAN Membership Status for User Static

Home > Monitor > VCL > MAC-based VLAN

Auto-refresh  Static

MAC Address	VLAN ID	Port Members																									
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	N-2	N-1	N
No data exists for the user																											

Figure 3-15.1: The MAC-based VLAN MembershipStatus for User Static

#### Parameter Description:

- **MAC Address :**  
Indicates the MAC address.
- **VLAN ID :**  
Indicates the VLAN ID.
- **Port Members :**  
Port members of the MAC-based VLAN entry.

#### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- **Refresh :**  
Click to refresh the page immediately.

## 3-15.2 Protocol-based VLAN

### 3-15.2.1 Protocol to Group

This page shows you the protocols to Group Name (unique for each Group) mapping entries for the switch.

#### Web Interface

To Display Protocol-based VLAN configuration in the web interface:

1. Click Monitor, VCL and Protocol to Group.
2. Checked "Auto-refresh".
3. Click "Refresh" to refresh the port detailed statistics.

Frame Type	Value	Group Name
No Group entry found!		

Figure 3-15.2.1: The Protocol to Group for Protocol-based VLAN

#### Parameter Description:

- **Frame Type :**

Frame Type can have one of the following values:

1. Ethernet
2. LLC
3. SNAP



**NOTE:** On changing the Frame type field, valid value of the following text field will vary depending on the new frame type you selected.

- **Value :**

Valid value that can be entered in this text field depends on the option selected from the preceding Frame Type selection menu.

Below are the criteria for three different Frame Types:

1. For Ethernet: Values in the text field when Ethernet is selected as a Frame Type is called etype. Valid values for etype ranges from 0x0600-0xffff
2. For LLC: Valid value in this case is comprised of two different sub-values.
  - a. DSAP: 1-byte long string (0x00-0xff)
  - b. SSAP: 1-byte long string (0x00-0xff)
3. For SNAP: Valid value in this case also is comprised of two different sub-values.
  - a. OUI: OUI (Organizationally Unique Identifier) is value in format of xx-xx-xx where each pair (xx) in string is a hexadecimal value range from 0x00-0xff.
  - b. PID: If the OUI is hexadecimal 000000, the protocol ID is the Ethernet type (EtherType) field value for the protocol running on top of SNAP; if the OUI is an OUI for a particular organization, the protocol ID is a value assigned by that organization to the protocol running on top of SNAP.

In other words, if value of OUI field is 00-00-00 then value of PID will be etype (0x0600-0xffff)

and if value of OUI is other than 00-00-00 then valid value of PID will be any value from 0x0000 to 0xffff.

- **Group Name :**

A valid Group Name is a unique 16-character long string for every entry which consists of a combination of alphabets (a-z or A-Z) and integers (0-9).



---

**NOTE:**Special character and underscore (\_) are not allowed.

---

**Buttons**

- **Auto-refresh :**

Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.

-  **Refresh :**

Click to refresh the page immediately.



### 3-15.2.2 Group to VLAN

This page shows you the configured Group Name to a VLAN for the switch.

#### Web Interface

To Display Group toVLAN configuration in the web interface:

1. Click Monitor, VCL, Group to VLAN.
2. Checked "Auto-refresh".
3. Click "Refresh" to refresh the port detailed statistics.

		Port Members																									
Group Name	VLAN ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	N-2	N-1	N
No Group entry found!																											

Figure 3-15.2.2: The Group Name to VLAN mapping Table Status

#### Parameter Description:

- **Group Name :**

A valid Group Name is a string at the most 16 characters which consists of a combination of alphabets (a-z or A-Z) and integers (0-9), no special character is allowed. Whichever Group name you try map to a VLAN must be present in Protocol to Group mapping table and must not be pre-used by any other existing mapping entry on this page.

- **VLAN ID :**

Indicates the ID to which Group Name will be mapped. A valid VLAN ID ranges from 1-4095.

- **Port Members :**

A row of check boxes for each port is displayed for each Group Name to VLAN ID mapping. To include a port in a mapping, check the box. To remove or exclude the port from the mapping, make sure the box is unchecked. By default, no ports are members, and all boxes are unchecked.

#### Buttons

- **Auto-refresh :**

Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.

-  **Refresh :**

Click to refresh the page immediately.

### 3-15.3 IP Subnet-based VLAN

The page shows IP subnet-based VLAN entries. This page shows only static entries.

#### Web Interface

To Display MAC-based VLAN configuration in the web interface:

1. Click Monitor, VCLand IP Subnet-based VLAN.
2. Checked "Auto-refresh".
3. Click "Refresh" to refresh the port detailed statistics.


VCE ID	IP Address	Mask Length	VLAN ID	Port Members																								
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	N-2	N-1
Currently no entries present																												

Figure 3-15.3: The IP Subnet-based VLAN Membership Status

#### Parameter Description:

- **VCE ID :**  
Indicates the index of the entry. It is user configurable. Its value ranges from 0-128. If a VCE ID is 0, application will auto-generate the VCE ID for that entry. Deletion and lookup of IP subnet-based VLAN are based on VCE ID.
- **IP Address :**  
Indicates the IP address.
- **Mask Length :**  
Indicates the network mask length.
- **VLAN ID :**  
Indicates the VLAN ID. VLAN ID can be changed for the existing entries.
- **Port Members :**  
A row of check boxes for each port is displayed for each IP subnet-based VLAN entry. To include a port in an IP subnet-based VLAN, check the box. To remove or exclude the port from the IP subnet-based VLAN, make sure the box is unchecked. By default, no ports are members, and all boxes are unchecked.

#### Buttons

- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
-  **Refresh :**  
Click to refresh the page immediately.

## 3-16 sFlow

This session shows receiver and per-port sFlow statistics

### Web Interface

To Display port sFlow statistics in the web interface:

1. Click Monitor and sFlow.
2. Display sFlow information.

The screenshot shows the 'sFlow Statistics' web interface. At the top right, there is a breadcrumb trail: Home > Monitor > sFlow. Below the title, there is an 'Auto-refresh' checkbox, a refresh icon, and two buttons: 'Clear Receiver' and 'Clear Ports'. The interface is divided into two main sections: 'Receiver Statistics' and 'Port Statistics'.

**Receiver Statistics**

Owner	<none>
IP Address/Hostname	0.0.0.0
Timeout	0
Tx Successes	0
Tx Errors	0
Flow Samples	0
Counter Samples	0

**Port Statistics**

Port	Rx Flow Samples	Tx Flow Samples	Counter Samples
1	0	0	0
2	0	0	0
N-2	0	0	0
N-1	0	0	0
N	0	0	0

Figure 3-16: The sFlow Statistics

### Parameter Description:

#### Receiver Statistics




- **Owner :**

This field shows the current owner of the sFlow configuration. It assumes one of three values as follows:

- If sFlow is currently unconfigured/unclaimed, Owner contains <none>.
- If sFlow is currently configured through Web or CLI, Owner contains <Configured through local management>.
- If sFlow is currently configured through SNMP, Owner contains a string identifying the sFlow receiver.

- **IP Address/Hostname :**

The IP address or hostname of the sFlow receiver.

- **Timeout :**  
The number of seconds remaining before sampling stops and the current sFlow owner is released.
  - **Tx Successes :**  
The number of UDP datagrams successfully sent to the sFlow receiver.
  - **Tx Errors :**  
The number of UDP datagrams that has failed transmission.  
The most common source of errors is invalid sFlow receiver IP/hostname configuration. To diagnose, paste the receiver's IP address/hostname into the Ping Web page (Diagnostics → Ping/Ping6).
  - **Flow Samples :**  
The total number of flow samples sent to the sFlow receiver.
  - **Counter Samples :**  
The total number of counter samples sent to the sFlow receiver.
- Port Statistics**
- **Port :**  
The port number for which the following statistics applies.
  - **Rx and Tx Flow Samples :**  
The number of flow samples sent to the sFlow receiver originating from this port. Here, flow samples are divided into Rx and Tx flow samples, where Rx flow samples contains the number of packets that were sampled upon reception (ingress) on the port and Tx flow samples contains the number of packets that were sampled upon transmission (egress) on the port.
  - **Counter Samples :**  
The total number of counter samples sent to the sFlow receiver originating from this port.
- Buttons**
- **Auto-refresh :**  
Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
  -  **Refresh :**  
Click to refresh the page immediately.
  -  **Clear Receiver :**  
Clears the sFlow receiver counters.
  -  **Clear Ports :**  
Clears the per-port counters.

This chapter provides a set of basic system diagnosis. It let users know that whether the system is health or needs to be fixed. The basic system check includes ICMP Ping, Link OAM, ICMPv6.


## 4-1 Ping

This section allows you to issue ICMP PING packets to troubleshoot IPv6 connectivity issues.

### Web Interface

To configure an ICMP PING Configuration in the web interface:

1. Specify ICMP PING IP Address.
2. Specify ICMP PING Size.
3. Click Start.



ICMP Ping Home > Diagnostics > Ping

IP Address	<input type="text" value="0.0.0.0"/>
Ping Length	<input type="text" value="56"/>
Ping Count	<input type="text" value="5"/>
Ping Interval	<input type="text" value="1"/>

Figure 4-1: The ICMP Ping

### Parameter Description:

- **IP Address :**  
To set the IP Address of device what you want to ping it.
- **Ping Length:**  
The payload size of the ICMP packet. Values range from 2 bytes to 1452 bytes.
- **Ping Count:**  
The count of the ICMP packet. Values range from 1 time to 60 times.
- **Ping Interval:**  
The interval of the ICMP packet. Values range from 0 second to 30 seconds

## Buttons

- **Start:**

Click the "Start" button then the switch will start to ping the device using ICMP packet size what set on the switch.

After you press, 5 ICMP packets are transmitted, and the sequence number and roundtrip time are displayed upon reception of a reply. The page refreshes automatically until responses to all packets are received, or until a timeout occurs.

PING6 server ::10.10.132.20

64 bytes from ::10.10.132.20: icmp\_seq=0, time=0ms

64 bytes from ::10.10.132.20: icmp\_seq=1, time=0ms

64 bytes from ::10.10.132.20: icmp\_seq=2, time=0ms

64 bytes from ::10.10.132.20: icmp\_seq=3, time=0ms

64 bytes from ::10.10.132.20: icmp\_seq=4, time=0ms

Sent 5 packets, received 5 OK, 0 bad

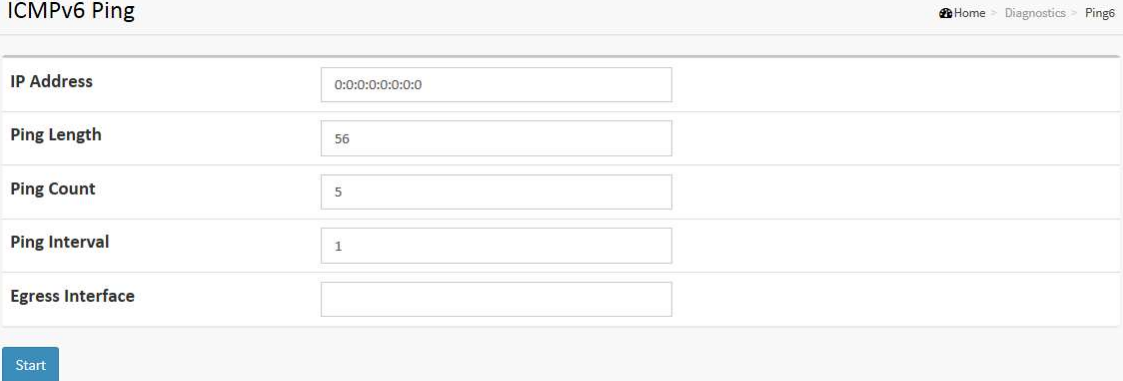
## 4-2 Ping 6

This section allows you to issue ICMPv6 PING packets to troubleshoot IPv6 connectivity issues.

### Web Interface

To configure an ICMPv6 PING Configuration in the web interface:

1. Specify ICMPv6 PING IP Address.
2. Specify ICMPv6 PING Size.
3. Click Start.



The screenshot shows a web interface titled "ICMPv6 Ping". In the top right corner, there is a breadcrumb trail: "Home > Diagnostics > Ping6". The main configuration area consists of five rows, each with a label on the left and a text input field on the right. The first row is "IP Address" with the value "0:0:0:0:0:0:0". The second row is "Ping Length" with the value "56". The third row is "Ping Count" with the value "5". The fourth row is "Ping Interval" with the value "1". The fifth row is "Egress Interface" with an empty field. Below the configuration fields is a blue "Start" button.

Figure 4-2: The ICMPv6 Ping

### Parameter Description:

- **IP Address :**  
The destination IP Address with IPv6
- **Ping Length :**  
The payload size of the ICMP packet. Values range from 2 bytes to 1452 bytes.
- **Ping Count :**  
The count of the ICMP packet. Values range from 1 time to 60 times.
- **Ping Interval :**  
The interval of the ICMP packet. Values range from 0 second to 30 seconds.
- **Egress Interface (Only for IPv6) :**  
The VLAN ID (VID) of the specific egress IPv6 interface which ICMP packet goes.  
The given VID ranges from 1 to 4094 and will be effective only when the corresponding IPv6 interface is valid.  
When the egress interface is not given, PING6 finds the best match interface for destination.  
Do not specify egress interface for loopback address.  
Do specify egress interface for link-local or multicast address.

## Buttons

- **Start:**

Click the "Start" button then the switch will start to ping the device using ICMPv6 packet size what set on the switch.

After you press, 5 ICMPv6 packets are transmitted, and the sequence number and roundtrip time are displayed upon reception of a reply. The page refreshes automatically until responses to all packets are received, or until a timeout occurs.

PING6 server ff02::2, 56 bytes of data.

64 bytes from fe80::219:5bff:fe2f:b47: icmp\_seq=0, time=10ms

64 bytes from fe80::215:58ff:feed:69dd: icmp\_seq=0, time=10ms

64 bytes from fe80::219:5bff:fe2f:b47: icmp\_seq=1, time=0ms

64 bytes from fe80::215:58ff:feed:69dd: icmp\_seq=1, time=0ms

64 bytes from fe80::219:5bff:fe2f:b47: icmp\_seq=2, time=0ms

64 bytes from fe80::215:58ff:feed:69dd: icmp\_seq=2, time=0ms

64 bytes from fe80::219:5bff:fe2f:b47: icmp\_seq=3, time=0ms

64 bytes from fe80::215:58ff:feed:69dd: icmp\_seq=3, time=0ms

64 bytes from fe80::219:5bff:fe2f:b47: icmp\_seq=4, time=0ms

64 bytes from fe80::215:58ff:feed:69dd: icmp\_seq=4, time=0ms

Sent 5 packets, received 10 OK, 0 bad

You can configure the following properties of the issued ICMP packets:



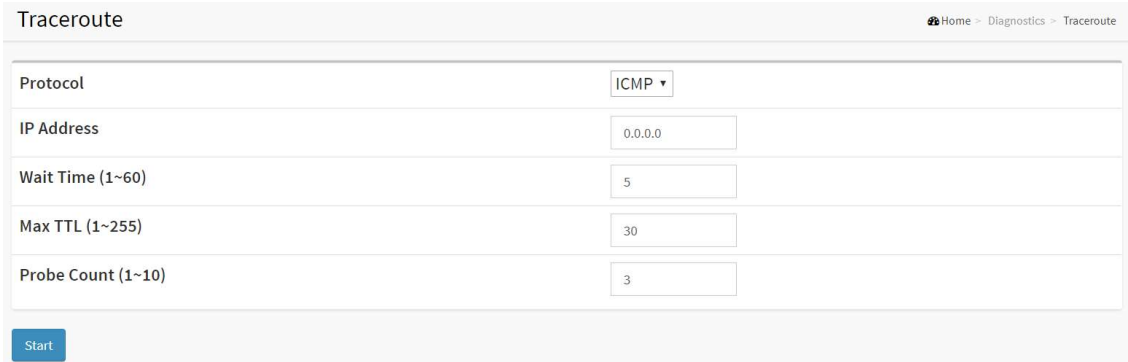
## 4-3 Traceroute

This page allows you to issue ICMP, TCP, or UDP packets to diagnose network connectivity issues.

### Web Interface

To configure an ICMPv6 PING Configuration in the web interface:

1. Specify traceroute IP Address.
2. Specify traceroute Size.
3. Click Start.



The screenshot shows a web interface titled "Traceroute" with a breadcrumb trail "Home > Diagnostics > Traceroute". The interface contains a form with the following fields:

Protocol	ICMP ▾
IP Address	0.0.0.0
Wait Time (1~60)	5
Max TTL (1~255)	30
Probe Count (1~10)	3

At the bottom left of the form is a blue "Start" button.

Figure 4-4: The Traceroute

### Parameter Description:

- **Protocol :**  
The protocol(ICMP, UDP, TCP) packets to send.
- **IP Address :**  
The destination IP Address.
- **Wait Time :**  
Set the time (in seconds) to wait for a response to a probe (default 5.0 sec). Values range from 1 to 60. The payload size of the ICMP packet. Values range from 2 bytes to 1452 bytes.
- **Max TTL :**  
Specifies the maximum number of hops (max time-to-live value) traceroute will probe. Values range from 1 to 255. The default is 30.
- **Probe Count :**  
Sets the number of probe packets per hop. Values range from 1 to 10. The default is 3.

## Buttons

- **Start:**

Click the "Start" button then the switch will start to ping the device using ICMPv6 packet size what set on the switch.

After you press, Traceroute sends packets with gradually increasing TTL value, starting with TTL value of 1. The first router receives the packet, decrements the TTL value and drops the packet because it then has TTL value zero. The router sends an ICMP Time Exceeded message back to the source. The next set of packets are given a TTL value of 2, so the first router forwards the packets, but the second router drops them and replies with ICMP Time Exceeded. Proceeding in this way, traceroute uses the returned ICMP Time Exceeded messages to build a list of routers that packets traverse, until the destination is reached and returns an ICMP Echo Reply message.

traceroute to 202.39.253.11 (202.39.253.11), 30 hops max, 40 byte packets

1 192.168.10.254 ae-2-3508.edge4.Atlanta2.Level3.net. (192.168.10.254) 10 ms 10 ms 10 ms

2 59-125-13-254.HINET-IP.hinet.net. (59.125.13.254) 20 ms 20 ms 20 ms

3 h146.s228.ts.hinet.net. (168.95.228.146) 20 ms 10 ms 20 ms

4 tchn-3011.hinet.net. (220.128.16.194) 20 ms TCHN-3112.hinet.net. (220.128.17.142) 20 ms  
tchn-3011.hinet.net. (220.128.16.202) 20 ms

5 TPDT-3012.hinet.net. (220.128.17.6) 20 ms TPDT-3011.hinet.net. (220.128.16.10) 20 ms  
TPDT-3012.hinet.net. (220.128.17.6) 40 ms

6 CHCH-3112.hinet.net. (220.128.2.13) 20 ms tchn-3011.hinet.net. (220.128.1.9) 10 ms  
CHCH-3112.hinet.net. (220.128.2.13) 30 ms

7 211.22.41.237 CHCH-3112.hinet.net. (211.22.41.237) 20 ms 30 ms 30 ms

8 202-39-253-11.HINET-IP.hinet.net. (202.39.253.11) 10 ms 10 ms

You can configure the following properties:

This chapter describes the entire switch Maintenance configuration tasks to enhance the performance of local network including Restart Device, Firmware upgrade, Save/Restore, Import/Export.

## 5-1 Restart Device

This section describes how to restart switch for any maintenance needs. Any configuration files or scripts that you saved in the switch should still be available afterwards.

### Web Interface

To configure a Restart Device Configuration in the web interface:

1. Click Restart Device.
2. Click Yes.

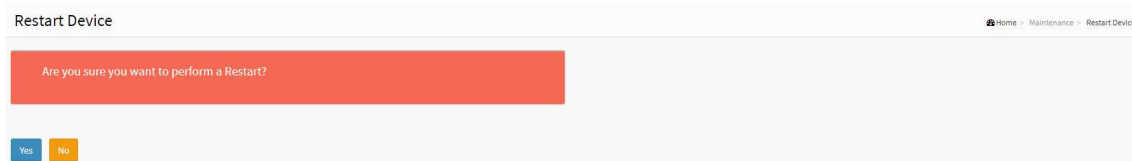


Figure 5-1: Restart Device

### Parameter Description:

#### Restart Device :

You can restart the switch on this page. After restart, the switch will boot normally.

#### Buttons

- **Yes :**  
Click to restart device
- **No :**  
Click to return to the Port State page without restarting.

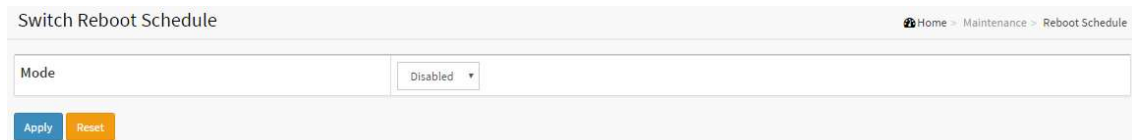
## 5-2 Reboot Schedule

This page allows user to schedule the time to reboot the switch.

### Web Interface

To configure a Reboot Schedule Configuration in the web interface:

1. Click Maintenance and Reboot Schedule.
2. Click apply to save changes.



Switch Reboot Schedule Home > Maintenance > Reboot Schedule

Mode

Figure 5-2: Reboot Schedule

### Parameter Description:

- **Mode :**
  - Indicates the reboot scheduling mode operation. Possible modes are:
    - **Enabled:** Enable switch reboot scheduling.
    - **Disabled:** Disable switch reboot scheduling.
- **Week Day :**
  - The day to reboot this switch.
- **Reboot Time :**
  - The time to reboot the switch.

### Buttons

- **Apply :**
  - Click to save changes.
- **Reset :**
  - Click to undo any changes made locally and revert to previously saved values.

## 5-3 Factory Defaults

You can reset the configuration of the switch on this page. Only the IP configuration is retained.

The new configuration is available immediately, which means that no restart is necessary.

### Web Interface

To configure a Factory Defaults Configuration in the web interface:

1. Click Maintenance and Factory Defaults.
2. Click Yes.

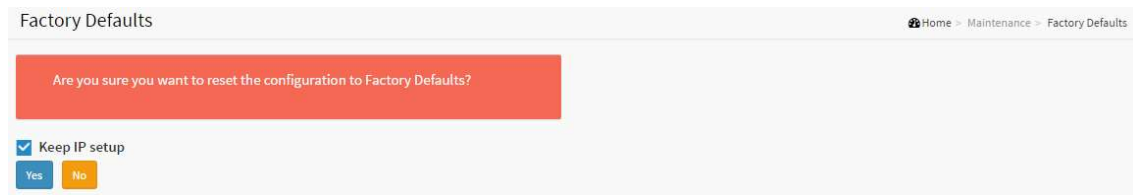


Figure 5-3: The Factory Defaults

### Parameter Description:

#### Buttons

- **Keep IP setup :**  
Check "Keep IP setup" if you want to keep current IP setting
- **Yes :**  
Click to reset the configuration to Factory Defaults.
- **No :**  
Click to return to the Port State page without restarting.



---

#### NOTE:

Restoring factory default can also be performed by making a physical loopback between port 1 and port 2 within the first minute from switch reboot. In the first minute after boot, 'loopback' packets will be transmitted at port 1. If a 'loopback' packet is received at port 2 the switch will do a restore to default.

---

## 5-4 Firmware

This section describes how to upgrade Firmware. The Switch can be enhanced with more value-added functions by installing firmware upgrades.

### 5-4.1 Firmware upgrade

This page facilitates an update of the firmware controlling the switch.

#### Web Interface

To configure a Firmware Upgrade Configuration in the web interface:

1. Click Browse to select Maintenance/Software in your device.
2. Click Download.

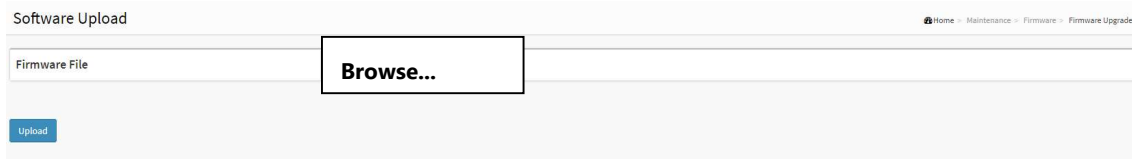


Figure 5-4.1: The Firmware Download

#### Parameter Description:

##### Buttons

- **Browse :**

Click the "Browse..." button to search the Firmware URL and filename and click "Upload".



---

**NOTE:** This page facilitates an update of the firmware controlling the switch. Uploading software will update all managed switches to the location of a software image and click. After the software image is uploaded, a page announces that the firmware update is initiated. After about a minute, the firmware is updated and all managed switches restart. the switch restarts.

---



---

**WARNING:** While the firmware is being updated, Web access appears to be defunct. The front LED flashes Green/Off with a frequency of 10 Hz while the firmware update is in progress. Do not restart or power off the device at this time or the switch may fail to function afterwards.

---

## 5-4.2 Firmware Selection

This page provides information about the active and alternate (backup) firmware images in the device, and allows you to revert to the alternate image.

The web page displays two tables with information about the active and alternate firmware images.



**NOTE:** In case the active firmware image is the alternate image, only the "Active Image" table is shown. In this case, the Activate Alternate Image button is also disabled.

If the alternate image is active (due to a corruption of the primary image or by manual intervention), uploading a new firmware image to the device will automatically use the primary image slot and activate this.

The firmware version and date information may be empty for older firmware releases. This does not constitute an error.

### Web Interface

To configure a Firmware Upgrade Configuration in the web interface:

1. Click Browser to select Maintenance/Software in your device.
2. Click Image Select.

Active Image	
Image	managed
Version	GEPoEL2P-ESW26G (standalone) v6.54.2343
Date	2017-01-09T13:58:31+08:00

Alternate Image	
Image	managed.bk
Version	GEPoEL2P-ESW26G (standalone) v6.54.2305
Date	2016-12-03T00:18:18+08:00

Figure 5-4.2: The Firmware Selection

### Parameter Description:

#### Image Information

- **Image :**  
The flash index name of the firmware image. The name of primary (preferred) image is image, the alternate image is named image.bk.
- **Version :**  
The version of the firmware image.
- **Date :**  
The date where the firmware was produced.

**Buttons**

- **Activate Alternate Image:**  
Click to use the "Activate Alternate Image". This button may be disabled depending on system state.
- **Cancel:**  
Cancel activating the backup image. Navigates away from this page.



## 5-5 Configuration

The switch stores its configuration in a number of text files in CLI format. The files are either virtual (RAM-based) or stored in flash on the switch.

There are three system files:

1. **running-config:** A virtual file that represents the currently active configuration on the switch. This file is volatile.
2. **startup-config:** The startup configuration for the switch, read at boot time.
3. **default-config:** A read-only file with vendor-specific configuration. This file is read when the system is restored to default settings.

It is also possible to store up to two other files and apply them to running-config, thereby switching configuration.

### 5-5.1 Save startup-config

This copies running-config to startup-config, thereby ensuring that the currently active configuration will be used at the next reboot.

#### Web Interface

To save running configuration in the web interface:

1. Click Browser to select Maintenance/Configuration in your device.
2. Click Apply Startup-Config Select.

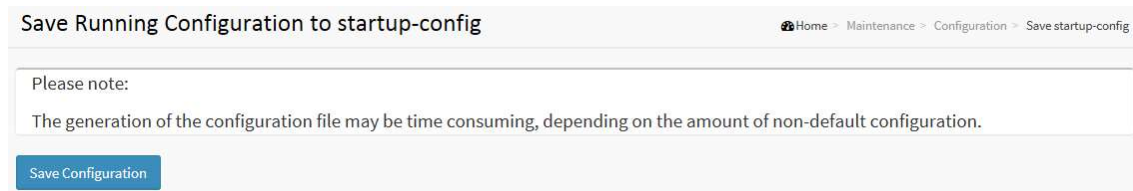


Figure 5-5.1: The Save Startup Configuration

#### Parameter Description:

##### Buttons

- **Save Configuration:**

Click to save configuration, the running configuration will be written to flash memory for system boot up to load this startup configuration file.

## 5-5.2 Download

This section describes to export the Switch Configuration for maintenance needs. Any current configuration files will be exported as text format.

It is possible to download a file from the web browser to all the files on the switch, except default-config, which is read-only.

Select the file to download, select the destination file on the target, and click.

If the destination is running-config, the file will be applied to the switch configuration. This can be done in two ways:

1. **Replace Mode:** The current configuration is fully replaced with the configuration in the downloaded file.
2. **Merge Mode:** The downloaded file is merged into running-config.

If the file system is full (i.e. contains the three system files mentioned above plus two other files), it is not possible to create new files, but an existing file must be overwritten or another deleted first.

### Web Interface

To download configuration in the web interface:

1. Click Browser to select Maintenance/Configuration in your device.
2. Click Download Select.

**Download Configuration** Home > Maintenance > Configuration > Download

Select configuration file to save.

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

File Name

running-config

default-config

icon\_list

[Download Configuration](#)

Figure 5-5.2: Configuration Download

### Parameter Description:

#### Buttons

- **Download:**

Click the "Download" button then the switch will start to download the configuration from configuration stored location PC or Server.

## 5-5.3 Upload

The configuration upload function will be backed up and saved configuration from the switch's configuration into the running web browser PC.

It is possible to upload any of the files on the switch to the web browser. Select the file and click Upload of running-config may take a little while to complete, as the file must be prepared for upload.

### Web Interface

To upload configuration in the web interface:

1. Click Browser to select Maintenance/Configuration in your device.
2. Click upload Select.

File Name	Parameters
<input type="radio"/> running-config	<input checked="" type="radio"/> Replace <input type="radio"/> Merge
<input type="radio"/> startup-config	
<input type="radio"/> Create new file	

Figure 5-5.3: Configuration Upload

### Parameter Description:

- **running-config:**

The file will be applied to the switch configuration. This can be done in two ways:

1. Replace Mode: The current configuration is fully replaced with the configuration in the uploaded file.
2. Merge Mode: The uploaded file is merged into running-config.

- **startup-config:**

The startup configuration for the switch, read at boot time.

- **default-config:**

A read-only file with vendor-specific configuration. This file is read when the system is restored to default settings.

### Buttons

- **Upload Configuration:**

Click the "Upload" button then the running web management PC will start to upload the configuration from the managed switch configuration into the location PC, user can configure web browser's upload file path to keep configuration file.

## 5-5.4 Activate

It is possible to activate any of the configuration files present on the switch, except for running-config which represents the currently active configuration. Select the file to activate and click. This will initiate the process of completely replacing the existing configuration with that of the selected file.

### Web Interface

To activate configuration in the web interface:

1. Click Browser to select Maintenance/Configuration in your device.
2. Click Activate Select.

**Activate Configuration** Home > Maintenance > Configuration > Activate

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

icon\_list

**Activate Configuration**

Figure 5-5.4: Configuration Activation

### Parameter Description:

- **default-config:**  
A read-only file with vendor-specific configuration. This file is read when the system is restored to default settings.

### Buttons

- **Activate Configuration:**  
Click the "Activate" button then the default-config or startup-config file will be activated and to be this switch's running configuration.

## 5-5.5 Delete

It is possible to delete any of the writable files stored in flash, including startup-config. If this is done and the switch is rebooted without a prior save operation, this effectively resets the switch to default configuration.

### Web Interface

To delete configuration in the web interface:

1. Click Browser to select Maintenance/Configuration in your device.
2. Click Delete Select.

Delete Configuration File Home > Maintenance > Configuration > Delete

Select configuration file to delete.

File Name

icon\_list

filename:

[Delete Configuration File](#)

Figure 5-5.5: Delete Configuration

### Parameter Description:

#### Buttons

- **Delete Configuration:**

Click the "Delete" button then the startup-config file will be deleted, this effectively resets the switch to default configuration.

## 5-6 Server Report

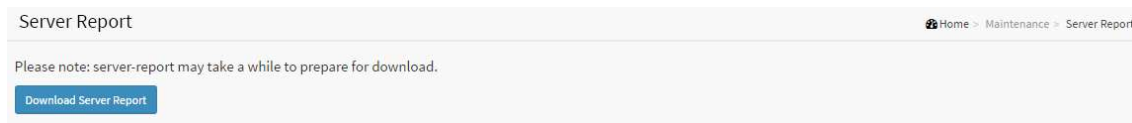
It is possible to download server report file on the switch to the web browser.

Download of server-report may take a little while to complete, as the file must be prepared for download.

### Web Interface

To delete configuration in the web interface:

1. Click Maintenance and Server Report.
2. Click Download Server Report.



**Figure 5-6: Server Report**

### Parameter Description:

#### Buttons

- **Download Server Report :**

Download server report file on the switch to the web browser.

# Glossary of Web-Based Management

## A

**ACE:**ACE is an acronym for Access Control Entry. It describes the access permission associated with a particular ACE ID. There are three ACE frame types (Ethernet Type, ARP, and IPv4) and two ACE actions (Permit and Deny). The ACE also contains different detailed parameter options that are available for individual application.

**ACL:**ACL is an acronym for Access Control List. It is the list of ACEs. It contains access control entries that specify individual users or groups permitted or denied to specific traffic objects, such as a process or a program.

Each accessible traffic object contains an identifier to its ACL. The privileges determine whether there are specific traffic object access rights.

ACL implementations can be quite complex (e.g. when the ACEs are prioritized for the various situation). In networking, the ACL refers to a list of service ports or network services that are available on a host or server. Each has a list of hosts or servers permitted or denied to use the service. ACL can generally be configured to control inbound traffic (they are similar to firewalls).

There are 3 webpages associated with the manual ACL configuration:

**ACL | Access Control List:** The web page shows the ACEs from highest (top) to lowest (bottom). The default the table is empty. An ingress frame will only get a hit on one ACE, even though there are other matching ACEs. The first matching ACE will take action (permit/deny) on that frame and a counter associated with that ACE is incremented. An ACE can be associated with a policy, 1 ingress port, or any ingress port (the whole switch). If an ACE policy is created, then that policy can be associated with a group of ports under the "Ports" webpage. There are a number of parameters that can be configured with an ACE. Read the webpage help text to get further information. The maximum number of ACEs is 64.

**ACL | Ports:** The ACL Ports configuration is used to assign a policy ID to an ingress port. This is useful to group ports to obey the same traffic rules. Traffic policy is created under the "Access Control List" page. You can also set up specific traffic properties (Action, Rate Limiter, Port Copy and so on) for each ingress port. They will only apply if the frame gets past the ACE matching process without getting matched. In that case, a counter associated with that port is incremented. See the webpage help text for each specific port property.

**ACL | Rate Limiters:** Under this page you can configure the rate limiters. There can be 15 different rate limiters, ranging from 1-1024K packets per seconds. Under the "Ports" and "Access Control List" webpages, you can assign a rate limiter ID to the ACE(s) or ingress port(s).

**AES:**AES is an acronym for Advanced Encryption Standard. The encryption key protocol is applied in 802.1i standard to improve WLAN security. It is an encryption standard by the U.S. government, which replaces DES and 3DES. AES has a fixed block size of 128 bits and a key size of 128, 192, or 256 bits.

**APS:**APS is an acronym for Automatic Protection Switching. This protocol is used to make sure that switching is done bidirectional at the two ends of a protection group, as defined in G.8031.

**Aggregation:**Aggregation uses multiple ports in parallel to increase the link speed beyond the limits of a port and to increase the redundancy for higher availability.

(Also, Port Aggregation, Link Aggregation).

**ARP:**ARP is an acronym for Address Resolution Protocol. It is a protocol that used to convert an IP address into a physical address, such as an Ethernet address. ARP allows a host to

communicate with other hosts when only the internet address of its neighbors is known. Before using IP, the host sends a broadcast ARP request that contains the Internet address of the desired destination system.

**ARP Inspection:**ARP Inspection is a secure feature. Several types of attacks can be launched against a host or devices connected to Layer 2 networks by "poisoning" the ARP caches. This feature is used to block such attacks. Only valid ARP requests and responses can go through the switch device.

**Auto-Negotiation:**Auto-negotiation is the process where two different devices establish the mode of operation and speed settings that can be shared by those devices for a link.

## C

**CC:**CC is an acronym for Continuity Check. It is a MEP functionality that is able to detect loss of continuity in a network by transmitting CCM frames to a peer MEP.

**CCM:**CCM is an acronym for Continuity Check Message. It is an OAM frame transmitted from a MEP to its peer MEP and used to implement CC functionality.

**CDP:**CDP is an acronym for Cisco Discovery Protocol.

## D

**DEI:**DEI is an acronym for Drop Eligible Indicator. It is a 1-bit field in the VLAN tag.

**DES:**DES is an acronym for Data Encryption Standard. It provides a complete description of a mathematical algorithm for encrypting (enciphering) and decrypting (deciphering) binary coded information.

Encrypting data converts it to an unintelligible form called cipher. Decrypting cipher converts the data back to its original form called plaintext. The algorithm described in this standard specifies both enciphering and deciphering operations, which are based on a binary number called a key.

**DHCP:**DHCP is an acronym for Dynamic Host Configuration Protocol. It is a protocol used for assigning dynamic IP addresses to devices on a network.

DHCP used by networked computers (clients) to obtain IP addresses and other parameters such as the default gateway, subnet mask, and IP addresses of DNS servers from a DHCP server.

The DHCP server ensures that all IP addresses are unique. For example, no IP address is assigned to a second client while the first client's assignment is valid (its lease has not expired). Therefore, the IP address pool management is done by the server and not by a human network administrator.

Dynamic addressing simplifies network administration because the software keeps track of IP addresses rather than requiring an administrator to manage the task. This means that a new computer can be added to a network without the hassle of manually assigning it a unique IP address.

**DHCP Relay:**DHCP Relay is used to forward and to transfer DHCP messages between the clients and the server when they are not on the same subnet domain.

The DHCP option 82 enables a DHCP relay agent to insert specific information to a DHCP request packet when forwarding client DHCP packets to a DHCP server, and removing specific information from a DHCP reply packets when forwarding server DHCP packets to a DHCP client. The DHCP server can use this information to implement IP address or other assignment policies. The option works by setting two sub-options: Circuit ID (option 1) and Remote ID (option2). The Circuit ID sub-option is supposed to include information specific to which circuit the request came in on. The Remote ID sub-option was designed to carry information relating to the remote host end of the circuit.

The definition of Circuit ID in the switch is 4 bytes in length. The format is "vlan\_id" "module\_id" "port\_no". The parameter of "vlan\_id" is the first two bytes that represent the VLAN ID. The parameter of "module\_id" is the third byte for the module ID (In standalone switch, it always equal 0. In stackable switch, it means switch ID). The parameter of "port\_no" is the fourth byte that represents the port number.



The Remote ID is 6 bytes in length, and the value is equal to the DHCP relay agent's MAC address.

**DHCP Snooping:** DHCP Snooping is used to block intruders on the untrusted ports of the switch device. The intruder gets blocked when it tries to inject a bogus DHCP reply packet to a legitimate conversation between the DHCP client and server.

**DNS:** DNS is an acronym for Domain Name System. It stores and associates many types of information with domain names. Most importantly, DNS translates human-friendly domain names and computer hostnames into computer-friendly IP addresses. For example, the domain name "www.example.com" might translate to 192.168.0.1.

**DoS:** DoS is an acronym for Denial of Service. In a denial-of-service (DoS) attack, an attacker attempts to prevent legitimate users from accessing information or services. By targeting network sites or network connections, the attacker may be able to prevent network users from accessing email, web sites, online accounts (e.g. banking accounts and more), or other services that rely on the affected computer.

**Dotted Decimal Notation:** Dotted Decimal Notation refers to a method of writing IP addresses using decimal numbers and dots as separators between octets. An IPv4 dotted decimal address has the form x.y.z.w. The values x, y, z, and w are decimal numbers between 0 and 255.

**DSCP:** DSCP is an acronym for Differentiated Services Code Point. It is a field in the header of IP packets for packet classification purposes.

## E

**EEE:** EEE is an abbreviation for Energy Efficient Ethernet defined in IEEE 802.3az.

**EPS:** EPS is an abbreviation for Ethernet Protection Switching defined in ITU/T G.8031.

**Ethernet Type:** Ethernet Type, or EtherType, is a field in the Ethernet MAC header, defined by the Ethernet networking standard. It is used to indicate which protocol is being transported in an Ethernet frame.

## F

**FTP:** FTP is an acronym for File Transfer Protocol. It is a transfer protocol that uses the Transmission Control Protocol (TCP). It provides file writing and reading. It also provides directory service and security features.

**Fast Leave:** Multicast Snooping Fast Leave process allows the switch to remove an interface from the forwarding-table entry, without first sending out group-specific queries to the interface. The VLAN interface is pruned from the multicast tree for the multicast group specified in the original leave message. Fast-leave processing ensures optimal bandwidth management for all hosts on a switched network, even when multiple multicast groups are in use simultaneously. This processing applies to IGMP and MLD.

## H

**HTTP:** HTTP is an acronym for Hypertext Transfer Protocol. It is a protocol that is used to transfer or convey information on the World Wide Web (WWW).

HTTP defines how messages are formatted and transmitted, and what actions the web servers and browsers should take in response to various commands. For example, when you enter a URL in your browser, it sends a HTTP command to the web server. It directs the web server to fetch and transmit the requested webpage. The other main standard that controls how the World Wide Web works is HTML, which covers how webpages are formatted and displayed.

Any web server machine contains and serves a HTTP daemon, a program that is designed to wait for HTTP requests and process them when they arrive. The web browser is a HTTP client that sends requests to server machines. A HTTP client initiates a request by establishing a Transmission Control Protocol (TCP) connection to a particular port on a remote host (port 80 by default). A HTTP server listening on that port waits for the client to send a request message.

**HTTPS:**HTTPS is an acronym for Hypertext Transfer Protocol over Secure Socket Layer. It is used to indicate a secure HTTP connection.

HTTPS provide authentication and encrypted communication and is widely used on the World Wide Web for security-sensitive communication, such as payment transactions and corporate logons.

HTTPS is really just the use of Netscape's Secure Socket Layer (SSL) as a sub layer under its regular HTTP application layering (HTTPS uses port 443 instead of HTTP port 80 in its interactions with the lower layer, TCP/IP). SSL uses a 40bit key size for the RC4 stream encryption algorithm, which is considered an adequate degree of encryption for commercial exchange.

## I

**ICMP:**ICMP is an acronym for Internet Control Message Protocol. It is a protocol that generated the error response, diagnostic or routing purposes. ICMP messages generally contain information about routing difficulties or simple exchanges, such as time-stamp or echo transactions. For example, the PING command uses ICMP to test an Internet connection.

**IEEE 802.1X:**IEEE 802.1X is an IEEE standard for port-based Network Access Control. It provides authentication to devices attached to a LAN port to establish a point-to-point connection or to prevent access from that port if authentication fails. With 802.1X, access to all switch ports can be centrally controlled from a server, which means that authorized users can use the same credentials for authentication from any point within the network.

**IGMP:**IGMP is an acronym for Internet Group Management Protocol. It is a communications protocol used to manage the membership of Internet Protocol multicast groups. IGMP is used by IP hosts and adjacent multicast routers to establish multicast group memberships. It is an integral part of the IP multicast specification, like ICMP for unicast connections. IGMP can be used for online video and gaming. It allows for more efficient use of resources when supporting these uses.

**IGMP Querier:**A router sends IGMP Query messages to a particular link. This router is called the Querier.

**IP:**IP is an acronym for Internet Protocol. It is a protocol used for communicating data across an internet network.

IP is a "best effort" system, which means that no packet of information sent over is assured to reach its destination in the same condition it was sent. Each device connected to a Local Area Network (LAN) or Wide Area Network (WAN) is given an Internet Protocol address. This IP address is used to identify the device uniquely among all other devices connected to the extended network.

The current version of the Internet protocol is IPv4. IPv4 has 32-bits Internet Protocol addresses, allowing for an excess of four billion unique addresses. This number is reduced drastically by the practice of webmasters taking addresses in large blocks, the bulk of which remain unused. There is a rather substantial movement to adopt a new version of the Internet Protocol, IPv6, which would have 128-bits Internet Protocol addresses. This number can be represented roughly by a three with thirty-nine zeroes after it. However, IPv4 is still the protocol of choice for most of the Internet.

**IPMC:**IPMC is an acronym for IP Multicast.

**IP Source Guard:**IP Source Guard is a secure feature used to restrict IP traffic on DHCP snooping untrusted ports, by filtering traffic based on the DHCP Snooping Table or manually configured IP Source Bindings. It helps prevent IP spoofing attacks when a host tries to spoof and use the IP address of another host.

## L

**LACP:**LACP is an IEEE 802.3ad standard protocol. The Link Aggregation Control Protocol allows bundling of several physical ports together to form a single logical port.

**LLC:**The IEEE 802.2 Logical Link Control (LLC) protocol provides a link mechanism for upper layer protocols. It is the upper sub-layer of the Data Link Layer. It provides multiplexing mechanisms that make it possible for several network protocols (IP, IPX) to coexist within a multipoint network. LLC header consists of 1-byte DSAP (Destination Service Access Point), 1-byte SSAP (Source Service Access Point), and 1- or 2-bytes Control field followed by LLC information.

**LLDP:**LLDP is an IEEE 802.1ab standard protocol. The Link Layer Discovery Protocol (LLDP) specified in this standard allows stations that are attached to an IEEE 802 LAN to advertise to other stations attached to the same IEEE 802 LAN. The major capabilities provided by the system incorporating that station, the management address or addresses of the entity or entities that provide management of those capabilities, and the identification of the stations point of attachment to the IEEE 802 LAN required by those management entity or entities. The information distributed via this protocol is stored by its recipients in a standard Management Information Base (MIB), making it possible for the information to be accessed by a Network Management System (NMS) using a management protocol. For example, the Simple Network Management Protocol (SNMP).

**LLDP-MED:**LLDP-MED is an extension of IEEE 802.1ab. It is defined by the telecommunication industry association (TIA-1057).

**LOC:**LOC is an acronym for Loss of Connectivity. It is detected by a MEP and indicates a lost connectivity in the network. It can be used as switch criteria by EPS.

## M

**Mac Table:**Switching of frames is based upon the DMAC address contained in the frame. The switch builds a table that maps MAC addresses to switch ports for knowing which ports the frames should go to (based upon the DMAC address in the frame). This table contains both static and dynamic entries. The static entries are configured by the network administrator if the administrator wants to do a fixed mapping between the DMAC address and switch ports.

The frames also contain a MAC address (SMAC address), which shows the MAC address of the equipment sending the frame. The SMAC address is used by the switch to automatically update the MAC table with these dynamic MAC addresses. Dynamic entries are removed from the MAC table, if no frame with the corresponding SMAC address has been seen after a configurable age time.

**MEP:**MEP is an acronym for Maintenance Entity Endpoint. It is an endpoint in a Maintenance Entity Group (ITU-T Y.1731).

**MD5:**MD5 is an acronym for Message-Digest algorithm 5. MD5 is a message digest algorithm, used cryptographic hash function with a 128-bit hash value. It was designed by Ron Rivest in 1991. MD5 is officially defined in RFC 1321 - The MD5 Message-Digest Algorithm.

**Mirroring:**For debugging network problems or monitoring network traffic, the switch system can be configured to mirror frames from multiple ports to a mirror port. In this context, mirroring a frame is the same as copying the frame.

Both incoming (source) and outgoing (destination) frames can be mirrored to the mirror port.

**MLD:**MLD is an acronym for Multicast Listener Discovery for IPv6. MLD is used by IPv6 routers to discover multicast listeners on a directly attached link, such as IGMP is used in IPv4. The protocol is embedded in ICMPv6, instead of using a separate protocol.

**MVR:**Multicast VLAN Registration (MVR) is a protocol for Layer 2 (IP)-networks that enables multicast-traffic from a source VLAN to be shared with subscriberVLANs.

The main reason for using MVR is to save bandwidth by preventing duplicate multicast

streams being sent in the core network. Instead, the stream(s) are received on the MVR-VLAN and forwarded to the VLANs where hosts have requested it/them (Wikipedia).

## N

**NAS:**NAS is an acronym for Network Access Server. The NAS acts as a gateway to the guard access to a protected source. A client connects to the NAS, and the NAS connects to another resource to ask whether the client's supplied credentials are valid. Based on the answer, the NAS then allows or disallows access to the protected resource. An example of a NAS implementation is IEEE 802.1X.

**NetBIOS:**NetBIOS is an acronym for Network Basic Input/Output System. It is a program that allows applications on separate computers to communicate within a Local Area Network (LAN). It is not supported on a Wide Area Network (WAN).

The NetBIOS gives each computer in the network both a NetBIOS name and an IP address corresponding to a different host name. It provides the session and transports services described in the Open Systems Interconnection (OSI) model.

**NFS:**NFS is an acronym for Network File System. It allows hosts to mount partitions on a remote system and use them as though they are local file systems.

NFS allows the system administrator to store resources in a central location on the network to provide authorized users continuous access to them. This means NFS supports sharing of files, printers, and other resources as persistent storage over a computer network.

**NTP:**NTP is an acronym for Network Time Protocol, a network protocol for synchronizing the clocks of computer systems. NTP uses UDP (datagrams) as transport layer.

## O

**OAM:**OAM is an acronym for Operation Administration and Maintenance.

It is a protocol described in ITU-T Y.1731 used to implement carrier Ethernet functionality. MEP functionality like CC and RDI is based on this.

**Optional TLVs:**A LLDP frame contains multiple TLVs. For some TLVs, it is configurable if the switch includes the TLV in the LLDP frame. These TLVs are known as optional TLVs. If an optional TLV is disabled, the corresponding information is not included in the LLDP frame.

**OUI:**OUI is the organizationally unique identifier. An OUI address is a globally unique identifier assigned to a vendor by IEEE. You can determine which vendor a device belongs to according to the OUI address, which forms the first 24 bits of a MAC address.

## P

**PCP:**PCP is an acronym for Priority Code Point. It is a 3-bit field that stores the priority level for the 802.1Q frame. It is also known as "User Priority".

**PD:**PD is an acronym for Powered Device. In a PoE system, the power is delivered from a PSE (power sourcing equipment) to a remote device. The remote device is called a PD.

**PHY:**PHY is an abbreviation for Physical Interface Transceiver. It is the device that implements the Ethernet physical layer (IEEE-802.3).

**PING:**PING is a program that sends a series of packets over a network or the Internet to a specific computer, in order to generate a response from that computer. The other computer responds with an acknowledgment that it received the packets. Ping was created to verify whether a specific computer on a network or the Internet exists and is connected.

PING uses Internet Control Message Protocol (ICMP) packets. The PING Request is the packet from the origin computer, and the PING Reply is the packet response from the target.

**PoE:**PoE is an acronym for Power Over Ethernet.

Power Over Ethernet is used to transmit electrical power to remote devices over standard Ethernet cable. For example, it could be used for powering IP telephones, wireless LAN access points, and other equipment where it would be difficult or expensive to connect the equipment to main power supply.

**Policer:**A policer can limit the bandwidth of received frames. It is located in front of the ingress queue.

**Private VLAN:**In a private VLAN, communication between ports in that private VLAN is not permitted. A VLAN can be configured as a private VLAN.

**PTP:**PTP is an acronym for Precision Time Protocol, a network protocol for synchronizing the clocks of computer systems.

## Q

**QCE:**QCE is an acronym for QoS Control Entry. It describes QoS class associated with a particular QCE ID.

There are six QCE frame types: Ethernet Type, VLAN, UDP/TCP Port, DSCP, TOS, and Tag Priority. Frames can be classified by one of 4 different QoS classes: "Low", "Normal", "Medium", and "High" for individual application.

**QCL:**QCL is an acronym for QoS Control List. It is the list of QCEs that contains QoS control entries classified to a specific QoS class on specific traffic objects.

Each accessible traffic object contains an identifier to its QCL. The privileges determine specific traffic object to specific QoS class.

**QL:**QL in SyncE is the Quality Level of a given clock source. This is received on a port in an SSM to indicate the quality of the clock received in the port.

**Qos:**QoS is an acronym for Quality of Service. It is a method to guarantee a bandwidth relationship between individual applications or protocols.

A communications network transports a multitude of applications and data, including high-quality video and delay-sensitive data such as real-time voice. Networks must provide secure, predictable, measurable, and sometimes guaranteed services.

Achieving the required QoS becomes the secret to a successful end-to-end business solution. Therefore, QoS is the set of techniques to manage network resources.

## R

**RARP:**RARP is an acronym for Reverse Address Resolution Protocol. It is a protocol that is used to obtain an IP address for a given hardware address, such as an Ethernet address. RARP is the complement of ARP.

**RADIUS:**RADIUS is an acronym for Remote Authentication Dial in User Service. It is a networking protocol that provides centralized access, authorization and accounting management for people or computers to connect and use a network service.

**RDI:**RDI is an acronym for Remote Defect Indication. It is an OAM functionality used by a MEP to indicate defect detected to the remote peer MEP.

**RSTP:**In 1998, the IEEE with document 802.1w introduced an evolution of STP: The Rapid Spanning Tree Protocol, which provides faster spanning tree convergence after a topology change. Standard IEEE 802.1D-2004 now incorporates RSTP and obsoletes STP, while at the same time, being backwards-compatible with STP.

## S

**SHA:**SHA is an acronym for Secure Hash Algorithm. It designed by the National Security Agency (NSA) and published by the NIST as a U.S. Federal Information Processing Standard. Hash algorithms compute a fixed-length digital representation (known as a message digest) of an input data sequence (the message) of any length.

**Shaper:**A shaper can limit the bandwidth of transmitted frames. It is located after the ingress queues.

**SMTP:**SMTP is an acronym for Simple Mail Transfer Protocol. It is a text-based protocol that uses the Transmission Control Protocol (TCP) and provides a mail service modeled on the FTP file transfer service. SMTP transfers mail messages between systems and notifications regarding incoming mail.

**SNAP:**The Sub Network Access Protocol (SNAP) is a mechanism for multiplexing on networks using IEEE 802.2 LLC. More protocols can be distinguished by the 8bit 802.2 Service Access Point (SAP) fields. SNAP supports identifying protocols by Ethernet type field values. It also supports vendor-private protocol identifier.

**SNMP:**SNMP is an acronym for Simple Network Management Protocol. It is part of the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol for network management. SNMP allows diverse network objects to participate in network management architecture. It enables network management systems to learn network problems by receiving traps or change notices from network devices implementing SNMP.

**SNTP:**SNTP is an acronym for Simple Network Time Protocol, a network protocol for synchronizing the clocks of computer systems. SNTP uses UDP (datagrams) as transport layer.

**SPROUT:**Stack Protocol uses Routing Technology. An advanced protocol for almost instantaneous discovery of topology changes within a stack, as well as, election of a master switch. SPROUT also calculates parameters for setting up each switch to perform shortest path forwarding within the stack.

**SSID:**Service Set Identifier is a name used to identify the particular 802.11 wireless LANs that a user wants to attach. A client device will receive broadcast messages from all access points within range to advertise their SSIDs. It can choose one to connect to base on pre-configuration, or by displaying a list of SSIDs in range and asking the user to select one (Wikipedia).

**SSH:**SSH is an acronym for Secure Shell. It is a network protocol that allows data to be exchanged, using a secure channel between two networked devices. The encryption used by SSH provides confidentiality and integrity of data over an insecure network. The goal of SSH was to replace the earlier rlogin, TELNET and rsh protocols, which did not provide strong authentication or guarantee confidentiality (Wikipedia).

**SSM:**SSM is an abbreviation for Synchronization Status Message. It contains a QL indication.

**STP:**Spanning Tree Protocol is an OSI layer-2 protocol, which ensures a loop free topology for any bridged LAN. The original STP protocol is now obsolete by RSTP.

**Switch IDs:**Switch IDs (1-16) are used to uniquely identify the switches within a stack. The Switch ID of each switch is shown on the display in front of the switch. It is used widely in the web pages and CLI commands.

**SyncE:** SyncE is an abbreviation for Synchronous Ethernet. This functionality is used to make a network 'clock frequency' synchronized. It should not be confused with real time clock synchronized (IEEE 1588).

## T

**TACACS+:**TACACS+ is an acronym for Terminal Access Controller Access Control System Plus. It is a networking protocol that provides access control for routers, network access servers and other networked computing devices, via one or more centralized servers. TACACS+ provides separate authentication, authorization and accounting services.

**Tag Priority:**Tag Priority is a 3-bit field storing the priority level for the 802.1Q frame.

**TCP:**TCP is an acronym for Transmission Control Protocol. It is a communications protocol that uses the Internet Protocol (IP) to exchange the messages between computers.

TCP protocol guarantees reliable and in-order delivery of data from the sender to the receiver. It distinguishes data for multiple connections by concurrent applications (e.g. Web server and e-mail server) running on the same host.

The applications on network hosts can use TCP to create connections to one another. It is known as a connection-oriented protocol. This means that a connection is established and maintained until the messages have been exchanged by the application programs at each end. TCP is responsible for ensuring that a message is divided into the packets that IP manages. It also reassembles the packets back into the complete message at the other end.

Common network applications that use TCP include the World Wide Web (WWW), e-mail, and File Transfer Protocol (FTP).

**TELNET:**TELNET is an acronym for TELEtype NETwork. It is a terminal emulation protocol that uses the Transmission Control Protocol (TCP). It provides a virtual connection between TELNET server and TELNET client.

TELNET lets the client control the server and communicate with other servers on the network. To start a Telnet session, the client user must log in to a server by entering a valid username and password. Then, the client can enter commands through the Telnet program, just as if they were entering commands directly on the server console.

**TFTP:**TFTP is an acronym for Trivial File Transfer Protocol. It is transfer protocol that uses the User Datagram Protocol (UDP). It provides file writing and reading. It does not provide directory service and security features.

## U

**UDP:**UDP is an acronym for User Datagram Protocol. It is a communications protocol that uses the Internet Protocol (IP) to exchange the messages between computers.

UDP is an alternative to the Transmission Control Protocol (TCP), that uses the Internet Protocol (IP). Unlike TCP, UDP does not provide the service of dividing a message into packet datagrams. UDP doesn't provide reassembling and sequencing of the packets. This means that the application program that uses UDP must make sure that the entire message has arrived and is in the right order. Network applications that want to save processing time because they have very small data units to exchange may prefer UDP to TCP.

UDP provides two services not provided by the IP layer. It provides port numbers to help distinguish different user requests and as an option, a checksum capability to verify that the data arrived intact.

Common network applications that use UDP include the Domain Name System (DNS), streaming media applications (such as IPTV), Voice over IP (VoIP), and Trivial File Transfer Protocol (TFTP).

**User Priority:**User Priority is a 3-bit field that stores the priority level for the 802.1Q frame. It is also known as PCP.

## V

**VLAN:**Virtual LAN is a method to restrict communication between switch ports. VLANs can be used for the following applications:

**VLAN unaware switching:**This is the default configuration. All ports are VLAN unaware with Port VLAN ID 1 and members of VLAN 1. This means that MAC addresses are learned in VLAN 1, and the switch does not remove or insert VLAN tags.

**VLAN aware switching:**This is based on the IEEE 802.1Q standard. All ports are VLAN aware. Ports connected to VLAN aware switches are members of multiple VLANs and

transmit tagged frames. Other ports are members of one VLAN, set up with this Port VLAN ID, and transmit untagged frames.

**Provider switching:** This is also known as Q-in-Q switching. Ports connected to subscribers are VLAN unaware, members of one VLAN, and set up with this unique Port VLAN ID. Ports connected to the service provider are VLAN aware, members of multiple VLANs, and set up to tag all frames. Untagged frames received on a subscriber port are forwarded to the provider port with a single VLAN tag. Tagged frames received on a subscriber port are forwarded to the provider port with a double VLAN tag.

**VLAN ID:** VLAN ID is a 12-bit field that specifies which VLAN the frame belongs to.

**Voice VLAN:** Voice VLAN is VLAN configured specifically for voice traffic. By adding the ports with voice devices attached to voice VLAN, we can perform QoS-related configuration for voice data to ensure the transmission priority of voice traffic and voice quality.